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edited by
Vassiliki Nikiforidou, Mary VanClay
and
Mary Niepokuj, Deborah Feder

Berkeley Linguistics Society
University of California
Berkeley, California
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Mithun
Pederson
Carpenter
Carpenter
Carpenter
Carpenter
Dahlstrom
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Sacapaltec

UTO-AZTECAN
Huichol
Papago

Kinkade

Mithun

Durie
Scancarelli; Svorou

Durie
An Analysis of Lushootseed Diminutive Reduplication
Dawn Bates
University of Washington

0. Introduction. In this paper I will discuss a reduplication process in Northern Lushootseed, also called Puget Sound Salish. Lushootseed employs seven kinds of reduplication in its derivational morphology. One of the most productive of these reduplications is used to form diminutives from almost any lexical category. A preliminary glance at the data appears in (1).^1

(1) Introductory data.

<table>
<thead>
<tr>
<th>form</th>
<th>gloss</th>
<th>reduplicated form</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.čáles</td>
<td>hand</td>
<td>čáčáles</td>
<td>little hand</td>
</tr>
<tr>
<td>b.šúʔwaʔ</td>
<td>younger sibling</td>
<td>súsúʔwaʔ</td>
<td>little younger sibling</td>
</tr>
<tr>
<td>c.číʔaʔ</td>
<td>rock</td>
<td>číčíʔaʔ</td>
<td>little rock</td>
</tr>
<tr>
<td>d.ʔabalxʷ</td>
<td>pass by</td>
<td>bíʔabalxʷ</td>
<td>pass by a little</td>
</tr>
<tr>
<td>e.teláw-il</td>
<td>run</td>
<td>títeláw-il</td>
<td>jog</td>
</tr>
<tr>
<td>f.ʔbuus</td>
<td>four</td>
<td>bíʔbuus</td>
<td>four small items</td>
</tr>
<tr>
<td>g.ʔexʷ-ʔáʔ-ʔał-us</td>
<td>marked face</td>
<td>?exʷ-ʔáʔ-ʔał-us</td>
<td>raccoon (lit. little marked face)</td>
</tr>
</tbody>
</table>

Ellen Broselow, in her (1983) discussion of reduplication in several Salish languages, notes that Lushootseed diminutive reduplication is prefixal and displays the four allomorphs in (2). A copy of the first consonant-vowel sequence of the base, a copy of the first C plus the vowel /i/, or either of these plus a glottal stop.

(2) Allomorphs of the diminutive prefix.

a. CV- (cf. 1.a,b)
b. Ci- (cf. 1.c,e)
c. CVʔ- (cf. 1.g)
d. Ciʔ- (cf. 1.d,f)

In general, each stem may only co-occur with one of these allomorphs; the item in (3) is ill-formed because čales 'hand' in (1.a) takes the CV-, rather than the Ci- allomorph of the prefix.

(3) *číčales 'little hand' (cf. 1.a)

Broselow, following Hess and Hilbert (1976), states that the choice of one of the allomorphs in (2) by a stem is not predictable from phonological or semantic properties of that stem,
and that each stem must be lexically marked for the particular allomorph it takes under diminutive reduplication. I will argue here that the distribution of the diminutive allomorphs is rule-governed. The argument has two parts. First, I will show that the appearance of the glottal stop in the allomorphs of (2.c) and (2.d) is due to a post-lexical rule irrelevant to the reduplication. Second, I will claim that the distribution of the remaining allomorphs in (2.a,b) can be predicted from phonological properties of the stems that select them, and I'll present an analysis which embodies this claim.

1. Evidence for a ?-insertion rule. More data which contain forms which occur with the (surface) glottal stops in (2.c,d) appear in (4), categorized according to which allomorph they select.

(4)

<table>
<thead>
<tr>
<th>form</th>
<th>gloss</th>
<th>reduplicated form</th>
<th>gloss</th>
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<tbody>
<tr>
<td>a. Ciʔ-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>qʷʰlayʔ</td>
<td>log</td>
<td>qʷʰi(?qʷʰlayʔ</td>
<td>stick</td>
</tr>
<tr>
<td>s-qʷʰbáyʔ</td>
<td>dog</td>
<td>s-qʷʰi(?qʷʰbáy</td>
<td>puppy</td>
</tr>
<tr>
<td>kʷʰsyú</td>
<td>porpoise</td>
<td>kʷʰi(kʷʰsyú</td>
<td>young porpoise</td>
</tr>
<tr>
<td>xəc</td>
<td>fear</td>
<td>xí(?xəc</td>
<td>a little afraid</td>
</tr>
<tr>
<td>b. CVʔ-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lil</td>
<td>far</td>
<td>líʔlil</td>
<td>a little ways</td>
</tr>
<tr>
<td>qádaʔ</td>
<td>steal</td>
<td>qáʔqáda</td>
<td>steal unimportant</td>
</tr>
<tr>
<td>tále</td>
<td>money</td>
<td>táʔtále</td>
<td>a little money</td>
</tr>
<tr>
<td>sáʔeliʔ</td>
<td>two</td>
<td>sáʔsáʔeliʔ</td>
<td>two small items</td>
</tr>
</tbody>
</table>

Notice first that many of the forms in (4) have parentheses around the glottal stop. This is how these forms are recorded in Hess (1976). The parentheses indicate optionality of the glottal stop; that is, sometimes the forms appear with the glottal stop, and sometimes it is missing. Immediately this seems to contradict the discussion of (3) above, where the point was that there is no optionality in the choice of allomorph. But (3) points to a true generalization; no optionality is ever found, for example, between the CV- allomorph and the Ci- allomorph. The variability only comes into play between one of the forms in (2.a,b) and that same form with a glottal stop added. If (2) really contained four separate allomorphs, we would not expect this kind of one-sided variability.
I claim that the allomorphs of (2.c,d) are derived from the more basic forms in (2.a,b), respectively, by a glottal stop insertion rule, specifically a post-lexical rule which operates to close an open syllable when that syllable bears the main stress of an utterance. I will return to the stress issue. First, I want to point out that there is never a glottal stop transcribed in the reduplicated syllable of a stem which begins with a glottalized consonant. (Glottalization is indicated here by an apostrophe.) Now if a stem like the one schematized in (5.a) were to select a diminutive prefix ending with a glottal stop, the resulting form would contain a glottal stop followed by a glottalized consonant. This configuration is not found in the diminutive reduplication data, as indicated in (5.b).

(5)

a. C'VC

One might argue that some sort of degemination of the glottal closure feature might account for the distributional gap. However, as Broselow points out, no general rule of degemination applies in reduplicated forms; for example, when the stem /lil/ 'far, remove to a distance' undergoes a CVC- reduplication which indicates the distribution of items, the form ?u-lillil-teb, 'they were separated' results, and no degemination of the /ll/ sequence occurs. So this distributional gap remains unexplained in any analysis which treats (2.a,b) on a par with (2.c,d). A post-lexical glottal stop insertion rule, in contrast, might well be expected to be effected by low-level phonetic constraints against prolonged sequences of glottal closures.

The "distributional" reduplication mentioned above can provide another argument for the non-underlying nature of the glottal stop in these forms. As Broselow shows, Lushootseed allows further reduplication of an already reduplicated form. She argues convincingly that a later reduplication has as its input the output of an earlier reduplication. An example appears in (6).

(6)

a. s-qi?ebay? 'dog'
b. s-qi?i(?qi?ebay? 'puppy'

(6.b) is derived from (6.a) by diminutive reduplication. Now, (6.b) is one of those forms recorded as taking an optional
glottal stop. (6.c) shows the result of prefixing the CVC-
"distributional" template onto (6.b). We expect to find the
glottal stop in the first syllable of (6.c), because the CVC-
reduplication would include it. It is unexpected, however, that a
glottal stop, even an optional one, never appears in the syllable
closest to the root in a form like (6.d); that is, the original
diminutive reduplication syllable cannot contain the glottal stop
that was picked up in the CVC-reduplication. This argues against
an analysis which specifies s-qʷəbəy? 'dog' for the Ci?- prefix in
the lexicon. Notice, however, that the stress falls on the
diminutive reduplication syllable in (6.b), but on the
distributive reduplication syllable in (6.c). The possibility of
the glottal stop in the reduplicated syllable disappears when
stress moves off of that syllable.

It is beyond the scope of this paper to formulate rules of
word stress or sentence stress in Lushootseed, but data from full
Lushootseed sentences can provide more evidence that the presence
of the glottal stop is conditioned by prosodic factors. Consider
the data in (7).

(7)a.

xʷiʔ gʷəsəgʷəʔtxʷ-ʔtiʔil tətyíqaʔ súʔsuʔwaʔ-ʔs.
NEG accompany-INFL DET little younger brother-POSSESSIVE
'Tətyíqaʔ, his little younger brother, was not with him.'

b.ʔəsúuxəb ʔə tsiʔəʔ súʔsuʔwaʔ-ʔs, ʔə tsiʔəʔ káʔkaʔ.
see-PASS PREP DET(fem) little younger sister-POSS PREP DET(fem) crow
'He was seen by his little younger sister, by Crow.'

Informally, Lushootseed sentence stress tends to fall on the
last word. Notice that the reduplicated form for 'younger sibling'
appears with a glottal stop in (7.a), where it carries the main
stress of the sentence. In contrast, the glottal stop is absent
in (7.b), where another constituent carries the main stress of the
sentence. More research needs to be done in this area of sentence
stress in Lushootseed, but these data lend credence to the idea of
a /ʔ/-insertion analysis.

These are some of the reasons I think the glottal stop in
(2.c,d) is inserted, but the most compelling reason is that a
clear generalization about the distribution of the diminutive can
be made if we exclude the glottal stops from consideration. Forms
with the stop pattern exactly like those without it, with respect
to the generalization to be put forward in the next section. I
will return to a discussion of the glottal stop in the conclusion of this paper.

2. Toward a generalization. The generalization that I am alluding to is stated most simply in terms of the particular analysis I will propose here. My analysis encorporates some insights of Broselow's, so I will briefly review Broselow's treatment, and follow with my analysis and the generalization which motivates it.

Broselow adopts the framework of Marantz (1982) in which reduplication involves the affixation of a reduplicative morpheme which is a CV-skeleton, the copying of the phonemic melody of the stem, and the association of the copied melody with the skeletal affix. Familiar universal principles govern the association, which proceeds from left to right in prefixal reduplications. A derivation following Broselow's analysis appears in (8).

(8)

\[
\begin{array}{c}
\text{dim.} \\
\text{stem} \\
CV & CVCCVC \rightarrow \text{(copy and associate)} \rightarrow \\
& | \ | \ | \ | \ | \ | \\
pasted \\
CV & CVCCVC \rightarrow \text{(delete unnassociated material)} \rightarrow \text{papasted} \rightarrow \text{päpasted} \\
& | \ | \ | \ | \ | \\
pasted & pasted
\end{array}
\]

Recall that since she has no glottal stop insertion rule, Broselow must mark each stem for which diminutive affix it selects, CV-, Ci-, CV\text{?}-, or Ci?-. For the Ci- reduplications, the i comes preassociated to the affix, so only the first consonant of the stem may be associated to the affix. The glottal stop also comes preassociated.

Broselow's account allows an insightful treatment of stem with intial consonant clusters like q\text{\textquoteleft\textquoteleft}lay? 'log', as shown in the derivation in (9).

(9) Broselow, p. 323.

\[
\begin{array}{c}
\text{dim} \\
\text{stem} \\
i \\
| \\
CV & C CVCC \\
| \ | \ | \ | \\
q\text{\textquoteleft\textquoteleft}lay? q\text{\textquoteleft\textquoteleft}lay? \rightarrow q\text{\textquoteleft\textquoteleft}iq\text{\textquoteleft\textquoteleft}lay? 'stick'
\end{array}
\]
Only the first C is associated to the affix - any further association would violate universal conditions on multiple association - and the correct form, qwq̃lay?, is generated.

Given Broselow's analysis, however, it is an accident that all stems beginning in consonant clusters select the Ci-allomorph. If the choice of the diminutive allomorph were purely a matter of lexical marking, it would be expected, for example, that some forms with initial consonant clusters would be specified for the CV- affix. A derivation like the one in (10) would obtain.

(10)

\[ \begin{array}{ll}
\text{dim} & \text{stem} \\
\text{CV} & \text{CCVC} \\
\hline
\text{č /ča?/} & \text{čča?} & \rightarrow \text{*ččča?} & \text{stone}
\end{array} \]

The first C of the stem would associate to the affix in the familiar way, but the next consonant would be prohibited from associating to a V- slot. Unassociated elements would delete by general convention, and the illformed *ččča? would be generated as the diminutive of čča? 'rock'. In fact, no cluster initial stem co-occurs with the CV- allomorph under diminutive reduplication; this goes unexplained in Broselow's analysis.

An aside is in order here, on the scope of Broselow's proposals in the article under discussion. It was her intention in that work to discuss the interaction of several different kinds of reduplication, so it was to her advantage to have a simple analysis of each kind; even if that included a lot of lexical marking. Indeed, this paper in no way weakens her central claims in that paper; my goal here is simply to show that much more can be predicted about diminutive reduplication than has ever been discussed in the literature. To this end, the next section will present more data and motivate my analysis.

3. Data and analysis. The data in (11) show that CV- is a clear candidate for the underlying representation of the diminutive morpheme.

(11)

<table>
<thead>
<tr>
<th>form</th>
<th>gloss</th>
<th>reduplicated form</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>kwíd</td>
<td>how many</td>
<td>kwíw~ed</td>
<td>a little bit</td>
</tr>
<tr>
<td>čáxʷ-ed</td>
<td>club it</td>
<td>čáxʷ~ed</td>
<td>club it lightly</td>
</tr>
<tr>
<td>sáxʷab</td>
<td>run, jump</td>
<td>sá?sxʷab</td>
<td>run a few steps</td>
</tr>
</tbody>
</table>
In work in progress (Bates, forthcoming) I have a complete analysis of these Lushootseed facts written within the 'transfer' theory of reduplication presented in Clements (1985). To present the (rather complex) formalism of that theory here would detract from the purpose of this paper, which is to show that the choice of the diminutive allomorph is rule-governed. So, for this presentation, I will give derivations which have the same form as those of Broselow's analysis. One of these abridged derivations appears in (12).

(12)  
<table>
<thead>
<tr>
<th>dim</th>
<th>stem</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV</td>
<td>CVC VC</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>suq'wa?</td>
<td>suq'wa?  + CV CVC VC</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>suq'wa?</td>
</tr>
</tbody>
</table>

The derivation in (12) is exactly comparable to the one in (8) given in Broselow's framework; there is a consonant in the stem to associate to the consonant in the affix, and there is a vowel in the stem which associates to the vowel of the affix. The affix is prefixed onto the stem to produce the correct susuq'wa? for 'little younger sibling'.

Several examples of stems with initial consonant clusters are given in (13) below.

(13)  
<table>
<thead>
<tr>
<th>d'ílix'</th>
<th>creek</th>
</tr>
</thead>
<tbody>
<tr>
<td>čsáy?</td>
<td>spear</td>
</tr>
<tr>
<td>dčú?</td>
<td>one</td>
</tr>
<tr>
<td>bedá?</td>
<td>offspring</td>
</tr>
<tr>
<td>čeg'ás</td>
<td>wife</td>
</tr>
<tr>
<td>d'ídílix'</td>
<td>tiny creek</td>
</tr>
<tr>
<td>čičsáy?</td>
<td>toy spear</td>
</tr>
<tr>
<td>didču?</td>
<td>one small article</td>
</tr>
<tr>
<td>bibedá?</td>
<td>young offspring</td>
</tr>
<tr>
<td>čičeg'ás</td>
<td>dear wife</td>
</tr>
</tbody>
</table>

If we make the minimal hypothesis that CV-, which was motivated by (11) to be an underlying representation for the
diminutive morpheme, is the only underlying representation we need, a derivation like the one in (14) holds for each of the forms in (13).

\[(14)\]

\[
\begin{array}{ll}
\text{dim} & \text{stem} \\
\text{CV} & \text{CCVC} \\
\text{dcią?} & \text{dći?} \rightarrow \text{CVCCVC} \\
\text{dći?} & \text{dći?} \\
\end{array}
\]

The initial consonant of the stem can associate to the affix with no trouble, but the V of the affix remains unassociated to any phonemic melody, since, as in Broselow's analysis, any such association would violate universal principles. For this structure, I propose the epenthesis rule in (15), which will be employed for all forms which take the surface allomorph Ci-.

\[(15)\] i-Epenthesis.

\[\emptyset \rightarrow i / y' \text{ where } V' \text{ is an unassociated V-slot}.\]

Many rules have been proposed in the literature on nonlinear phonology which have the same form as (15). The rule in (15) applies whenever general principles conspire to create a form which satisfies its structural description. The output in (14) satisfies the structural description of (15); the derivation is completed as in (16).

\[(16)\]

\[
\begin{array}{llll}
\text{CVCCVC} & \text{CVCCVC} & \text{CVCCVC} \\
| | | | | | \rightarrow (15) \rightarrow | | | | | \rightarrow \text{universal convention} \rightarrow | | | | | | | | \\
\text{dcci?} & \text{dcci?} & \text{dcci?} \\
\end{array}
\]

First i-Epenthesis applies, and then universal mapping conventions associate the V-slot of the affix with the /i/.

Now that the basic machinery of my analysis has been introduced, it is possible to state, albeit informally, the generalization governing the distribution of the allomorphs of the diminutive morpheme. This informal generalization is given in (17).

\[(17)\] Informal generalization.

a. If the stem begins with a consonant cluster, the prefix is Ci-.
b. If the first vowel of the root is schwa, the prefix is Ci-.
c. If the first vowel of the root is long, the prefix is Ci-.
d. Otherwise, the prefix is CV-.
The situations described in (17.a) and (17.d) were discussed above; it merely remains to discuss (17.b) and (17.d). I will discuss (17.b) first. The relevant data appear in (18).

(18)

<table>
<thead>
<tr>
<th>Kwēl</th>
<th>Spill</th>
<th>Kwēl</th>
<th>Trickle</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-cēk’w</td>
<td>Worm, bug</td>
<td>S-cēk’w</td>
<td>Small worm, bug</td>
</tr>
<tr>
<td>Šēg’wa</td>
<td>Road</td>
<td>Šišēg’wa</td>
<td>Trail</td>
</tr>
<tr>
<td>S-tēk’w-ab</td>
<td>Log</td>
<td>S-tīk’w-ab</td>
<td>Stick</td>
</tr>
<tr>
<td>Iēq’w</td>
<td>Wet</td>
<td>Iiʔq’w</td>
<td>Damp</td>
</tr>
<tr>
<td>Tēz'-i l</td>
<td>Go to bed</td>
<td>Tīzed'-i l</td>
<td>Lie down a while</td>
</tr>
<tr>
<td>Pēq’w</td>
<td>Drift</td>
<td>Pīp’q’w</td>
<td>Small object drifts</td>
</tr>
<tr>
<td>Qwed'-i l</td>
<td>Sit down</td>
<td>Səx’w-qwiʔg’wəd’i l</td>
<td>Little chair</td>
</tr>
<tr>
<td>Xel</td>
<td>Sick</td>
<td>S-xiʔxel</td>
<td>Little illness</td>
</tr>
<tr>
<td>Xel</td>
<td>Bite</td>
<td>Xiel-dup</td>
<td>Snack</td>
</tr>
</tbody>
</table>

To account for the behavior of the forms in (18), it is necessary to introduce a hypothesis from ongoing research (Bates (forthcoming) and elsewhere) that surface schwas in Lushootseed are all predictable from one of the rules in (19).

(19)

a. a → e / ___ (independently motivated)
   -stress

b. Ø → e / [c-cx] (lexical rule)
   stem condition - X contains no V.

c. Ø → e to prevent violations of the sonority hierarchy.

To properly motivate all the rules in (19) would take me too far afield for the purpose of this paper, but let me point out that the rule in (19.b) is the only true innovation in Lushootseed research. Hess and Hilbert (1976) and Broselow (1983) each assume some version of (19.a) and (19.c). The motivation for (19.b) as a principle of Lushootseed grammar will have to wait for another presentation (cf. Bates, forthcoming); the conclusion of this admittedly sketchy presentation is that there are no underlying schwas in Lushootseed. This means that the stems in (18) are underlyingly of the form CC. This proposal is not novel in descriptions of Lushootseed stems; see Hoard (1978). When a CC stem in (18) undergoes diminutive reduplication, a derivation like the one in (20) obtains.
The first vowel of the stem associates to the affix in the usual way, but there is no vowel in the stem to associate to the affixal V-slot. The unassociated vowel slot triggers i-Epenthesis; universal association applies to produce the desired \( \dot{c}i\hat{c}k^w \) for the diminutive of /\( \dot{c}k^w \)/ 'worm, bug'. As can be seen in (20), the analysis I am proposing here requires no additional machinery to generate the correct diminutives for /CC/ stems. The remaining clause of the generalization in (17) is (17.c); I will now discuss the behavior of stems with long vowels under diminutive reduplication. (21) presents the relevant data.\(^7\)

(21)

<table>
<thead>
<tr>
<th>s-paa(\tilde{c})</th>
<th>bear</th>
<th>s-(\pi)aa(\tilde{c})</th>
<th>bear cub</th>
</tr>
</thead>
<tbody>
<tr>
<td>s-duuk(\tilde{c})</td>
<td>knife</td>
<td>s-d(\dot{\imath})duuk(\tilde{c})</td>
<td>small knife</td>
</tr>
<tr>
<td>p(\dot{\imath})ut(\dot{\imath})ed</td>
<td>shirt</td>
<td>p(\dot{\imath})pu(\dot{\imath})ed</td>
<td>thin shirt, favorite shirt</td>
</tr>
<tr>
<td>(\dot{\imath})aa(\tilde{c})</td>
<td>plate, platter</td>
<td>(\dot{\imath})(\dot{\imath})aa(\tilde{c})</td>
<td>small plate</td>
</tr>
<tr>
<td>luu(\tilde{c})</td>
<td>hole</td>
<td>(\dot{\imath})(\dot{\imath})luu(\tilde{c})</td>
<td>little hole in ground</td>
</tr>
<tr>
<td>ha(\hat{c})ac</td>
<td>horse clam</td>
<td>h(\hat{c})a(\hat{c})ac</td>
<td>eastern clam, looks like a small horse clam</td>
</tr>
</tbody>
</table>

In the derivation of diminutives of the forms in (21), a constraint motivated by Clements is in effect. The constraint is repeated in (22).

(22)


Condition: If \(\mathbf{V}\mathbf{V}\) is a syllabic nucleus, its image under association is a syllabic nucleus.

The translation of (22) into the abridged format I'm adopting here would be: 'A branching nucleus must reduplicate as a branching nucleus'. Given the now standard representation of long vowels as branching nuclei, notice that if condition (22) is not recognized as operational for the stems in (21), the incorrect derivation in (23) results.
If (23) were the correct derivation of the diminutive of 
bus 'four', we would expect *bubus as the output, but it is 
illformed.

If we recognize the independently motivated (22) as 
constraining our derivations, however, the correct derivation of 
'four small items' would obtain, as shown in (24).

The first C of the stem associates to the affix in the familiar way, but the association of the stem vowel to the affix 
is blocked by (22), since there is not enough "room" in the skeleton of the affix for a branching nucleus. The V-slot of the affix is left unassociated and triggers i-Epenthesis. The derivation is completed in the familiar way, and bibus, the desired diminutive form for bus, is predicted.

All the subclauses of (17) have now been discussed, and it is possible to state the formal generalization in (25).

Formal generalization. Forms take Ci- if CV- prefixation is prevented by independent principles.

4. Conclusion. I have attempted to show that the distribution of the allomorphs of the diminutive prefix in Lushootseed is rule-governed. I proposed factoring out the appearance of a glottal stop in the forms (2.c,d) from consideration as part of the UR of the prefix. It is now possible to see that forms with the glottal stop behave just like their plain counterparts with respect to the choice of surface allomorph they appear with; notice that all the data in (4.a) that take the Ci- prefix have stems which satisfy (17a,b, or c), while the forms in (4.b) would all be predicted in this analysis to select the CV- prefix.
FOOTNOTES

*I wish to thank Ellen Kaisse, Vi Hilbert, taqwâšâblu, and Thom Hess for the effect they have on my work. The opinions in this paper are not necessarily theirs. This work was sponsored in part by a grant from the National Endowment for the Humanities.

1. Only stems are involved in the reduplication; throughout this paper I will separate affixes from their stems with hyphens. For example, in (1.g), the stem is /xal/, a verb meaning 'to mark'. The prefix is inflectional, and the suffix /-us/ means 'face'. The stem vowel may weaken or delete in a reduplicated structure; I will not discuss this process here.

2. Hess (1976) is the source of most of the data which appear in this paper and Broselow (1983).

3. If one compares the transcriptions of Snyder (1968) to those of Hess (1976), other glottal stops appear where Hess has them, but these glottal stops in diminutive reduplicated syllables are systematically missing.

4. In Clements' framework, association actually proceeds through the CV-tier of the stem; this enables Clements to capture generalizations about how the prosodic properties of the stem effect reduplication. This is essential in my treatment of long vowels later in the paper; but an extensive discussion of the relative merits of Clements' theory versus that of Marantz will have to await future research (cf. Bates, forthcoming).

5. Often, a schwa appears between the first two consonants in the forms of (13), but as Broselow notes, this schwa is clearly epenthetic.

6. As in Broselow's analysis, the second C of the stem is prohibited from associating to the V by universal principles, but there is a technical problem in an analysis based on Clements (1985) with regard to the derivation in (14), specifically that association of the stem vowel /a/ to the affix would not violate universal principles as they are presented in Clements; this would result in *caâka? being predicted as the diminutive of čâa? 'rock', not the desired čîâka?. See Bates (forthcoming) for a solution to this problem.

7. Sometimes haac 'long' is transcribed by Hess haac. This same variation between CVVC and CV?C is found in other forms in (21) also. If this glottal stop transcription is a more realistic statements of the facts, my analysis still holds under the plausible assumption that glottal stops in this position actually
form part of the nucleus of the syllable, instead of being part of
the coda with the closing C. The branching nucleus would trigger
i- Epenthesis the same way that long vowels do.

8. Such a translation into the abridged notation employed
here may be misleading; Clements (1985) argues that the condition
in (22) cannot be stated in a theory of reduplication based on
Marantz (1982).

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Productivity and Pragmatics of Thai classifiers

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Stanford University

Introduction The complex classifier system of Thai has fascinated linguists for decades (cf. Grierson 1903). Surprisingly few, though, have studied the use of classifiers in discourse. Most accounts list each classifier and its accompanying class of nouns, and analyze the semantics of the relationship between the two, with some speculation as to underlying organizing principles or historical tendencies in classifier languages. Such work has led to some important discoveries about the cognitive and cultural bases for classification (cf. Adams & Conklin 1973, Denny 1976) and diachronic tendencies (cf. Greenberg 1977, Delancey 1986). However, with the exception of Haas (1942) and Conklin (1981) there have been no studies of the pragmatics of classifier use in Thai.

In this paper I will present evidence that a lack of attention to the discourse uses of classifiers has led to the misapprehension that semantic distinctions are disappearing from the Thai classifier system. I will show that semantic distinctions are not only alive and well but semantically productive. I will describe some pragmatic constraints on the semantics of classifier use, and discuss some of the discourse-level consequences of loss of semantic specificity, showing that leveling semantic distinctions can bring a different kind of richness to the language.

Thai classifiers Thai is an SVO, five-tone isolating language with largely monomorphemic and monosyllabic words, although there is much compounding and many unanalyzed multisyllabic loan words from Sanskrit and, increasingly, English. Thai is the national language of Thailand, thus officially spoken by almost fifty million people. It shares many areal features with the other languages of Southeast Asia, and is most closely related to the other members of the Tai language family, such as Shan and Laotian. Other members of the Tai language family can be found as far north as China, as far east as the central highlands of Hainan and as far west as Assam in India. The Tai languages are widely regarded as members of the Austro-Thai group, which also includes Indonesian, Balinese, Fijian and Polynesian (Benedict 1975). Notable among the areal features characteristic of the Southeast Asia region as well as the familial features of the Tai languages are numeral classifiers, or unit counters of the type sheet in English two sheets of paper.

The normal word order for a Thai classifier construction is Head noun-Quantifier-Classifier, as in the following example:

มีพี่น้องกี่คน
/mii phi' nawng kii khon/
"How many older/younger siblings do you have?"

Classifiers are used anaphorically when previous mention or context makes the reference clear, as in the answer to the preceding question:

มี Two คน
/mii sawng khon/
"Two."
Classifiers are also used in other individuating contexts, such as with demonstratives:

รู้จักคนนี้ไหม
ruujak khon nii may
know CL-human here INT
"Do you know this person?"

with adjectives:

มีแต่ลูกเล็กๆ
/mii tae luûk leklek/
have but CL-round small-small
"There's only little ones"

and, less frequently, with possessives and with relativizers.

For all of these contexts, the words that appear in the classifier position are drawn from the same set, consisting of about 40 classifiers, conventional measures (e.g., kilo), ad hoc measures (e.g., bag) and an open set of repeaters, or nouns that serve as their own classifier. Repeaters are a semantically specifiable set of nouns, usually geographical terms, body part names and the nouns for certain abstractions like song. Quantifier and modifier uses are widely viewed as a single system, although not all classifier languages use classifiers in all these contexts. Greenberg (1977) has presented evidence that enumerative uses are diachronically original, and that the classifier construction spreads first to demonstratives, then to adjectives, possessives and relative clauses.

Thai has another system of classifiers, known as generics or class terms. They are superordinate compound heads, similar to tree in oaktree, but used far more extensively. The two systems overlap, and generics are often a source for new numeral classifiers (Conklin 1981, Delancey 1986).

<table>
<thead>
<tr>
<th>Table 1 - Generics and numeral classifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compound</strong></td>
</tr>
<tr>
<td>Generic - เครื่อง</td>
</tr>
<tr>
<td>เครื่องบิน</td>
</tr>
<tr>
<td>เครื่องดื่ม</td>
</tr>
<tr>
<td>เครื่องเล่นเพลงเสียง</td>
</tr>
<tr>
<td>เครื่องแกง</td>
</tr>
<tr>
<td>Generic - ลูก</td>
</tr>
<tr>
<td>ลูกไก่</td>
</tr>
<tr>
<td>ลูกมะพร้าว</td>
</tr>
<tr>
<td>ลูกกบ / ราช</td>
</tr>
<tr>
<td>ลูกฟัก</td>
</tr>
</tbody>
</table>
In Table 1, it can be seen that เครื่อง /khreuang/ is the generic compound head for airplane, beverage and record player, among other things, yet only one of these, record player, also takes เครื่อง /khreuang/ as a numeral classifier. Furthermore, other nouns that do not take เครื่อง /khreuang/ as a generic compound head do get classified with it. In the same way, นิ้ว /luuk/ is the generic compound head for offspring of both animals (นิ้ว ไก่ /luuk kay/ "baby chicken"), and of plants (นิ้วมะพร้าว /luuk mapraaw/ "coconut"), as well as of balls (นิ้วดินน้ำ /luuk tennit/ "tennis ball") and keys (นิ้วกุญแจ /luuk kunje/ lit. "son of lock.") It is only the classifier for roundish things like fruits and balls, however, and (rarely) for keys. Animal babies are all classified with ตัว /tua/ the animal classifier. Generic classifiers are often overlooked in studies of Tai linguistics, but they are important to the present discussion because they are frequently the source for new numeral classifiers.

**Two general classifiers.** The Thai classifier system is one of the semantically most elaborate in the world. However, semantically specific classifiers do not get used in every possible context. Like many classifier languages, Thai has a general unmarked classifier อัน /an/, which can be used with the names of most inanimate things when the more specific classifier is not readily retrievable, much like the English word thing in "Put that thing down" or "Is that thing loaded?" This usage with nouns referring to inanimates is unmarked, and is not considered an error, although the more formal a situation is, the more likely speakers are to use the more specific classifier. อัน /an/ may not be used with nouns referring to animals or humans in the quantifying context. Whether or not อัน/an/ may be used in place of a more specific classifier depends on the referent, not on the classifier that อัน /an/ is replacing. อัน /an/ can be substituted for ตัว /tua/ if the head noun is chair, but not if it is dog. There is also a set of nouns that are used only with อัน /an/. They tend to be the names for small, irregularly shaped objects, including coathangers, toothbrushes, paper clips, rulers, bottle brushes and, for many speakers, forks and spoons.

The widespread use of อัน /an/ as a general classifier is often interpreted as indicating that it is expanding its domain at the expense of the other classifiers. However, another classifier, the animal classifier ตัว /tua/, also appears to be gaining ground. ตัว /tua/is not as widely used as อัน/an/, but the following table shows that even accepted conventional uses encompass a semantically quite diverse group of nouns, and documented actual uses form a class that appears quite arbitrary.

<table>
<thead>
<tr>
<th>CONVENTIONAL</th>
<th>COLLOQUIAL (some speakers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>all animals, table, chair, doll</td>
<td>cigarette, guitar, taperecorder, towel,</td>
</tr>
<tr>
<td>ghost, trousers, mannequin,</td>
<td>university course, microphone,</td>
</tr>
<tr>
<td>shirt, skirt, letter, number,</td>
<td>underwear, bathing suit</td>
</tr>
</tbody>
</table>

Although the semantic motivation for the addition of each new member noun to the conventional class is clear when considered on a case-by-case basis, the net effect is a category that is hard to motivate. When the colloquial, frequent but prescriptively incorrect uses are also considered, it appears that ตัว /tua/is behaving more and more like a general classifier. In contrast to อัน /an/, ตัว /tua/ is stylistically marked. The
contrast is similar to the distinction in English between thing and more marked slangy terms like gizmo or thingie. University students comprise the group that uses ตัว /tua/ most extensively, and an examination of the specific documented uses listed shows that many are "youth culture" type items.

<table>
<thead>
<tr>
<th>Classifier</th>
<th>Old nouns</th>
<th>New nouns</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. saay สาย</td>
<td>waterway, belt</td>
<td>airline, busline, catheter, IV tube</td>
</tr>
<tr>
<td>2. sen เส้น</td>
<td>noodle, hair, string</td>
<td>chromosome, spaghetti</td>
</tr>
<tr>
<td>3. met เม็ด</td>
<td>seed, button, gem</td>
<td>coffee bean, pill (e.g., Valium)</td>
</tr>
<tr>
<td>4. dam ตาม</td>
<td>pen, fan</td>
<td>Magic marker*</td>
</tr>
<tr>
<td>5. thaeng แท่ง</td>
<td>pencil, ingot</td>
<td>Magic marker*, popsicle, chalk, chocolate bar, lipstick</td>
</tr>
<tr>
<td>6. lam ลำ</td>
<td>boat, bamboo tube</td>
<td>airplane, helicopter, bus*</td>
</tr>
<tr>
<td>7. bay ใบ</td>
<td>leaf, food container</td>
<td>submarine</td>
</tr>
<tr>
<td>8. duang ดวง</td>
<td>ticket, certificate</td>
<td>petri dish, saucer, teacup, stamp*</td>
</tr>
<tr>
<td>9. phaen แผ่น</td>
<td>star, seal, medal</td>
<td>stamp*, lightbulb, lamp, satellite</td>
</tr>
<tr>
<td>10. phuang วง</td>
<td>tile, plot of land, dried mango paste</td>
<td>record, pizza, bread slice, pancake, Kleenex, stamp*</td>
</tr>
<tr>
<td>11. luuk ลูก</td>
<td>fruit, ball, wave</td>
<td>steering wheel, bunch of keys, apple, strawberry, nuclear bomb, baseball, key*</td>
</tr>
<tr>
<td>12. ton ตัน</td>
<td>mountain</td>
<td>Christmas tree</td>
</tr>
<tr>
<td>13. reuang เรื่อง</td>
<td>story</td>
<td>movie</td>
</tr>
<tr>
<td>14. kawn ก้อน</td>
<td>lump (clay), cloud</td>
<td>bar of soap, French bread, mothball, battery</td>
</tr>
<tr>
<td>15. muan มัวน</td>
<td>rolls of things</td>
<td>toilet paper, tape cassette*</td>
</tr>
<tr>
<td>16. laang หลัง</td>
<td>house, mosquito net</td>
<td>bungalow (at resorts)</td>
</tr>
<tr>
<td>17. lem เล่ม</td>
<td>knife, book, needle</td>
<td>magazine</td>
</tr>
</tbody>
</table>

Note: * indicates use by some speakers but not all

The widespread acceptability of ตัว /an/ and ตัว /tua/ as substitutes for other classifiers in casual speech has led to claims that semantic distinctions are being leveled. If this were the case, one would predict that whatever semantic regularities there might be among class members would not be available for use in extension of the class to novel nouns. In particular, the semantically specific classes would not be productive, and new nouns would be used either with the general classifier or some arbitrary classifier designated as the classifier for new nouns, or they would be used as repeaters. However, Table 3 shows that nouns that have come into Thai as the names for novel objects recently introduced to Thailand are assigned a conventional classifier in keeping with the traditional semantics of the system. This shows quite clearly that
speakers use the system's underlying semantic regularities to extend classes to novel nouns in a principled manner.

The list of novel nouns includes calques (e.g., หลอดทดลอง /lawt thotlong/ tube test "test tube"), neologistic compounds (e.g.,รถไฟ /rot fay/ vehicle fire "train"), and loans (e.g., pizza, apple, stamp). Many of the innovative classifier assignments follow the classifier assignment of a noun that is superordinate to the novel noun. For instance F16 and F14 are ใบ /lam/ because airplane is ใบ /lam/. The names for all fruits are ผล /luuk/, so strawberry and apple are also ผล /luuk/. Compounding is the most productive word-formation device in Thai, and many assignments are based on the generic compound head used to form the new word. For instance, the word coined for "record" is แผ่นเสียง /phaen siang/ (lit. sheet sound), so the classifier is also แผ่น /phaen/. Innovative classifier assignments are a blend of conventional, formal forces as well as perceptual and functional ones. It is necessary to understand what an object is in order to assign a classifier to the noun that refers to it. For instance, I once asked a friend what the classifier for petri dish was, handing him two to examine. He said อิ่ม /an/, the general classifier, looking at them, then asked "What are they anyway?" I told him the Thai name, จำนำลายสั้น /jaan paw cheua/ which means literally "plate culture germ" and he quickly changed his mind, saying "Oh if it's a plate, it has to be ใบ /bai/." Classifier assignment is clearly perceptually based for words like pizza, chromosome and pancake for which there is really nothing similar in traditional Thai culture. When the semantics of a new noun are such that either of two or more classifiers is plausible, then there is variation among speakers between the semantically reasonable choices (see * instances in Table 3).

Table 4 - New Classifiers

<table>
<thead>
<tr>
<th>CLASSIFIER</th>
<th>PRE-CLASSIFIER MEANING</th>
<th>NOUNS IN CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. kreuang เครื่อง</td>
<td>paraphernalia</td>
<td>typewriter, computer, radio</td>
</tr>
<tr>
<td>2. khem เชื้อ</td>
<td>needle</td>
<td>hypodermic injections</td>
</tr>
<tr>
<td>3. chut ชุด</td>
<td>dress, suit</td>
<td>sets of things, dress, bathing suit</td>
</tr>
<tr>
<td>4. rian เรือ</td>
<td>coin</td>
<td>dollar</td>
</tr>
<tr>
<td>5. lawt หลอด</td>
<td>tube</td>
<td>test tube, light bulb,</td>
</tr>
<tr>
<td>6. klawng กล้อง</td>
<td>to pound in a mortar,</td>
<td>drinking straw, camera</td>
</tr>
<tr>
<td></td>
<td>telescoping tube</td>
<td></td>
</tr>
</tbody>
</table>

The entire system is also productive in terms of accommodating new objects by developing new classifiers, a process that continues in Modern Thai. (See Table 4.) Where do these new classifiers come from? New classifiers come from several different sources, but most become classifiers by first acting as partial repeaters in the form of generic compound heads of newly-coined nouns. For instance:

(1) most of the terms for mechanical devices are compounds of เครื่อง /kreuang/ + a Sanskrit word related to the machine's function, as เครื่องโทรศัพท์ /kreuang thoorasap/ (lit. distant voices) "telephone." Although the formal language tends to favor either native or Sanskrit
sources for new words, popular usage tends to pick up English terms. For instance, TV, and tape (recorder), borrowed directly from English, have replaced the native words for these things. In current usage เครื่อง
/kreuang/is rarely used as a generic compound head for machine names, but it remains the productive classifier for mechanical devices.

(2) เข็ม /khem/ means "needle", and เข็มชิตยา /khem chit yaa/ "needle
shoot medicine" was the name coined for hypodermic syringes. As the
vehicle for medicine that is injected, it functions as an ad hoc measure,
and became the conventional classifier for the action of getting shots.
(One cannot say "I had to go get injected 14 times." Only "shots 14
needles" is acceptable.)

(3) ชุด /chut/ was borrowed into Thai from English suit and is the Thai
word referring to dresses and Western style suits, as well as the generic
compound head for pajamas and bathing suits. It is used to classify sets of
things, for instance musical recordings (equiv. to English album), litters of
kittens and snacks of several ingredients sold as a set. Many speakers also
use it as the classifier for bathing suit and dress although other speakers
use ตัว /tua/ for these nouns. ชุด /chut/ has virtually replaced the old
classifier for sets สิ่งของ /samrap/, a Khmer loan word.

(4) เหรียญ /rian/ means "coin" and is now used colloquially for counting
dollars, including American, Singapore, and Australian dollars. (So when
Thais ask how much something would cost in the U.S. they ask how many
เหรียญ /rian/ rather than how many dollars.)

(5) หลอด /lawt/ "tube" is the generic compound head in the nouns coined
for lightbulbs (lit. tube fire sky "electric tube") and test tubes. It is also
used as a repeater with drinking /drinking tube which translated literally just
means "tube".

(6) กลิ่น /klawng/ is the generic compound head in กลิ่นกลิ่น /klawng
thai ruup/ "camera", which is usually shortened to just กลิ่น /klawng/
colloquially. Therefore, กลิ่น /klawng/ functions as a repeater, which in
this case is unusual because cameras are not typical of the class of nouns
that generally function as their own classifier. กลิ่น /klawng/ has
attracted a class of nouns that use it as a classifier when they are used
synonymously with "camera", showing that it is a true classifier and not
just a repeater, as in เหนื่อย /eh! mii nikon kii klawng/ "Oh!
How many Nikons do you have anyway?"

Category reorganization  Speakers sometimes reorganize classes that are
too arbitrary or too disjunctive in order to renew the semantic motivation.
A good example is คน /khan/. Today's prescriptive class includes car,
motorcycle, bicycle, bus and the names for other vehicles (with the
exception of oxcart) and spoon, fork, umbrella, traditional musical
instruments and other utensils with handles (but not knife). Lexically, คน
/khan/ originally referred to something long and thin - "long handle" and
"dike between rice paddies" are both lexical meanings it has had through
this century. It was the classifier for things with long handles, like
ladies, umbrellas, traditional musical instruments, and rickshas (introduced
to Thailand in 1871). Of the other vehicles, the first to be introduced to
Thailand was the bicycle, also an object with salient long handles. Words
for other vehicles that were introduced to Thailand, such as automobiles,
traincars, motorcycles and tanks, also were assigned the classifier คน
/khan/, as a class extension based on the functional concept of vehicle.
This has resulted in what today is a disjunctive category, consisting of
handled things like ladies, spoons, forks and umbrellas, and vehicles like
motorcycles, cars, and tanks. Many speakers seem to be reorganizing this
class around the notion of vehicle, and assigning other classifiers to
non-vehicle members. In an experimental elicitation of classifier uses,
only 10/20 subjects classed fork with คิน /khan/, and 12/20 classed spoon
with คิน /khan/. On the other hand, all 20 subjects classed umbrella and
bicycle with คิน /khan/. It is not clear why umbrella remains such a
strong class member. Perhaps it is less able to fit into other classes.
Most of the alternative classifications of spoon and fork used ผิว /an/, and
perhaps umbrella is not as good a member of that class. Loss of spoon,
fork and guitar (which is colloquially classed with ผิว /tua/) already make
คิน /khan/ a more coherent category, and perhaps a coherent category with
one salient exception is easier for speakers to deal with than a wholly
disjunctive one.

Table 5 - Changes in คิน /khan/ over time

<table>
<thead>
<tr>
<th>I.</th>
<th>II. guitar</th>
<th>III. guitar</th>
</tr>
</thead>
<tbody>
<tr>
<td>ladle umbrella</td>
<td>ladle umbrella</td>
<td>umbrella bicycle bus car</td>
</tr>
<tr>
<td>spoon fork ricksha</td>
<td>spoon fork ricksha</td>
<td>motorcycle tank</td>
</tr>
<tr>
<td>stringed instrument</td>
<td>bicycle str.instr.</td>
<td></td>
</tr>
<tr>
<td>bicycle</td>
<td>bus car motorcycle</td>
<td>fork spoon ladle</td>
</tr>
</tbody>
</table>

Reanalysis has also taken place in the noun class associated with เหลิม
/lam/. In this class today are book and magazine, knife, needle, candle,
scissors and oxcart. This is a disjunctive category, with on the one hand
long things (an oxcart has a very salient long tongue for hitching the oxen
to) and on the other hand printed, bound things. Originally, these two
categories came together in the traditional books of Thailand, which were
long, rectangular pieces of stiff palm leaf, strung together. As the culture
has changed, the class has appeared more and more arbitrary. Today,
speakers are reorganizing the class around the notion of "bound printed
matter" and in the elicitation, knife and scissors were used with เหลิม
/lam/ by only 12/20 and 6/20 subjects, respectively. The real "odd man
out" in this class is oxcart. Although to someone who uses an oxcart, the
wagon tongue is highly salient, few urban Thais have contact with oxcarts.
In the elicitation, only 9/20 adults classed it with เหลิม /lam/. Three
adults moved it into the คิน /khan/ class on the basis of its function as a
vehicle.

Although the คิน /khan/ and เหลิม /lam/ classes have been reorganized
by many speakers, the equally heterogeneous class of ผิว /tua/ has not, and
this may have been a factor in the choice of ผิว /tua/ as the marked
general classifier.

**Pragmatic focus and classifier semantics** Abstract noun class
semantics can be manipulated by speakers to convey pragmatic focus. In
numeral classifier languages, the marked noun refers to the collective
entity, and cannot be pointed to without an intervening word to individuate
specific instances of the collection (Greenberg 1977). Since Thai
classifiers pick individuals out of a collection, Thai speakers can use
classifiers to indicate the group out of which they are individuating.
Choice of classifier is thus relational, based on what group the individual
object is being individuated from. Different pragmatic focuses call for different semantic choices in classifier use. There are three levels of possible contrast: 1) a thing in contrast to everything else; 2) a physical object in contrast to other physical objects; 3) a member of a specific category in contrast to other members of that category. In this system, อัน /an/ the general classifier picks out objects as things contrasted with other things, ตั้ง /tua/ picks objects out as physical things contrasted with other physical things, and specific classifiers pick out category instances (mango, animal, book) and contrast them with other members of the same category. Which classifier to use with a demonstrative, for instance, depends on whether it is being used for simple deixis or to mark an explicit contrast. To speak of a mango as a thing among things, as when only one mango is present, one would use the general thing classifier อัน /an/: 

อาอินน์ เหมน
/aw an nii may/
take CL-thing here INT
"Do you want this?"

อันน์ เรียก ราวกว่ามะม่วง
/an nii riak waa mamuang/
CL-thing here call say mango
"This is called a mango."

However, if an explicit contrast is implied, one is more likely to use the fruit classifier ลูก /luuk/, focusing on the mango as a mango contrasted with other mangoes:

จ่าอาลูกเหมน
/ja aw luuk nay/
will take CL-round where
"Which one do you want?"

จ่าอาลูกนี้
/ja aw luuk nii/
will take CL-round here
"I'll take this one."

ลูกน่ากิน
/luuk nii naa kin/
CL-round here should eat
"This one looks good to eat."

All these utterances are grammatical no matter how many mangoes are present but lack of an explicit contrast favors อิน /an/. อิน /an/ can even be used with demonstratives to refer to human beings:

อินน์ เบื้องหน้า
/an nii pen farang/
CL-thing here is foreigner
"This is a foreigner"
Similarly, using classifiers in connection with a physical attribute increases the use of /tua/ the animal classifier. This is most common with the adjectives big, little, thin, goodlooking and fat, but can also occur with demonstratives.

อันนีตัวเล็กเป็นคนโต
/an nii tua lek pen khon too/
thing-CL here animal-CL small is CL-human grown
"This one, the little one, is the oldest."
(a woman, introducing her son)

รู้จักไหม ในนั้น ตัวอวัย  ผมอย่ารู้
/thuujak may noon tua uan phom yaawyaaw/
know INT there animal-CL fat hair longlong
"Do you know her? There! The fat one. With long hair."
(a secretary, indicating a professor)

I even heard /tua/ used with a demonstrative to refer to a monk:

duuนี้ตายไปแล้ว
/tua nii tay pay leew/
CL-animal here die go already
"This one's already dead"
(a man, explaining the identity of a monk pictured in a pamphlet.)

tuu/tua/ is usually defined as having the lexical meaning "body" and it could therefore be argued that these are references to the bodies of the people, rather than the people themselves, i.e., "This one, with the little body" rather than "This one, the little one." However in the following example, the choice of verb, is rather than has, is evidence that the reference is to the person as an entity, although the focus is on her body.

เป็นตัวเล็กๆ เมื่อคนไทย
/pen tua lekek meuan khon thai/
is CL-animal small same person Thai
"She's a little one, just like a Thai person"
(a teacher, surprised to see a small American)

If the speaker had been referring to the person's body, rather than to the person, the verb has would have been used. 

5 Obligatory minimal distinctions While pragmatic focus helps determine classifier choice in these different syntactic contexts, each syntactic context has certain minimal contrasts that must be maintained, regardless
of focus. In enumeration, for instance, the human-animate-inanimate distinction must be maintained. No matter how casual the situation, one never hears "buffalo two things" or "teachers two animals." In deictic uses, none of these distinctions need be maintained. In certain adjectival uses, the human-animal distinction need not be maintained, and the animate-inanimate distinction is the only mandatory one, although this is not the case for all adjectives.

Table 6 - Obligatory minimal distinctions

<table>
<thead>
<tr>
<th>enumeration</th>
<th>deixis</th>
<th>physical adjectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>human</td>
<td>thing</td>
<td>animate</td>
</tr>
<tr>
<td>animal</td>
<td></td>
<td>inanimate</td>
</tr>
</tbody>
</table>

Although the decision to use อน/an/, ยู/tua/ or a more specific classifier is essentially pragmatic in Thai, it correlates well with a purely syntactic pattern, namely that อน/an/ the general classifier will be used in non-numeral contexts. In certain other Tai languages the distinction is apparently syntactically rather than pragmatically based. In Nung, for instance, อน/an/ is the only classifier that can be used in non-quantifier constructions to refer to inanimates.

The obligatory minimal distinctions are often elaborated upon for pragmatic considerations, including genre, formality and other aspects of the extra-linguistic situation, individual speaker variation, and intention to express an implicit or explicit contrast. While formality favors use of the more specific classifiers, it is not the only important extra-linguistic variable. Contexts where many things are being enumerated favor classifier use over situations where the emphasis is not on enumeration of many different objects in different forms. Commercial transactions particularly favor semantically specific classifier uses.7

**Stylistic reclassification** Reclassification for humorous or insulting purposes is rare, and such uses are more likely to be regarded as erroneous or anomalous than as insulting. In one TV situation comedy, for example, there was a running gag involving a peasant servant-girl from a remote rural area who regularly overused นูย/nooey/ the general classifier from her upcountry dialect as in นูย/nooey/mii khaek ma 2 nooey/ "Two guest-things have arrived." Although this was a predictable gag that never failed to get a laugh, the source of the humor was more her uneducated "country-Bumpkin" style of speech than the misclassification per se. I also heard ยู/tua/ the animal classifier used once for a pair of especially rambunctious children with the implication that they were little monsters. However the speaker, who knew I was studying classifiers, was directing the comment as a joke to me. I never heard it in any other circumstances. I also once heard Buddha images classified as "round objects" by a person who was known to be strongly anti-religious, as a joke as well as a political statement. All these examples are humorous because of their anomaly, but are not really insulting because misclassification is not a conventionalized insult.8 The only really frequent stylistic reclassification I heard was overuse of repeaters. This is the cliche child error, and Thais I asked said they perceived adults who overused repeaters as "cute".

**Conclusions** The goal of this paper has been to show that classifiers should be looked at as a dynamic system, rather than as static word lists.
Thai noun class distinctions are conventional and contain many exceptions, but they also show many semantic regularities that speakers are aware of and that they exploit for social, stylistic and linguistic purposes. Although the general classifiers ้า /an/ and ทู /tua/ are used frequently at the expense of other classifiers, the more specific classes are productive, and speakers exploit semantic rules to enrich their discourse. Furthermore, this situation has probably been stable for a long time. The other languages of the Southwestern and Central branches of the Tai family also use /an/ as their general classifier, and Delancey (1986) has reconstructed /an/ as one of the classifiers in Proto-Tai. In fact, the Standard Thai system has certainly been elaborated relative to the other Tai languages, and the elaboration process appears to be continuing into the present time.

As technological change and contact with other cultures flood the language with new nouns, classes become less transparent. Speakers of a language with semi-opaque classes can deal with them in either of two ways. They can assume the system is essentially arbitrary, and reanalyze class distinctions as formal ones, or they can assume the system is essentially semantically motivated, and juggle classes to make them more coherent. The first strategy is apparently the one taken with the Bantu noun classes, and the second is the one apparently followed by Thai speakers with regard to Thai numeral classifiers.

When considering semantic systems, one must keep in mind that reduction of contrast on one level often brings enrichment on another level. The choice of classifier pertains not only to the classification of a category member, but also to the level of contrast the speaker wishes to draw attention to. In different speech styles, certain levels may be more important than others. For instance the leveling of semantic distinctions with wider use of ทู /tua/ brings a new stylistic dimension to its use, namely the identification of a casual, slangy speech style, and identification of a new "youth culture," a style only appropriate in certain contexts. In other contexts, more specific classifiers must be used. The Thai system, in other words, has been enriched rather than impoverished by the use of general classifiers alongside the specific ones.

NOTES
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2. Data used in this paper come from actual overheard usages noted in a journal during my stay in Thailand, combined with an experimental elicitation performed on university undergraduates, all native speakers of Standard Thai. Diachronic conclusions are based on dictionaries published in 1940 and 1944.
3. Thai examples will be given in their original orthography, followed by a Romanization in slash brackets.
4. In an interesting twist to the problem of determining actual usage from native speakers' intuitions, Thai speakers typically under-report their use of semantically specific, prescriptively correct classifiers. When asked about their attitudes towards substitution of the general classifier for more specific classifiers, native Thai speakers will cheerfully say that they know such use of อัน /an/ is "wrong," but that the more specific classifiers are "too hard." Classifiers are widely perceived as "difficult" and as something that "even Thai people make mistakes on."
5. While ตัว /tua/ is usually glossed as "body" in dictionaries, it is not at all equivalent in usage to the English word "body." Expressions like "strong body," "sexy body," "dead body," "tired body" etc. all use nouns other than ตัว /tua/. The phrases in which ตัว /tua/ comes closest to meaning "body" translate into English as reflexive, as ตนเอง /teng tua/ "get dressed", ตัวเอง /tua eng/ "oneself", and ตัว /tua/ alone, used colloquially as a 2p familiar pronoun, mainly among women.
6. Even in English, with its very simple classifier system, enumeration favors the most specific classifier uses. This seems to relate to identity requirements for counting, i.e., "You can't count apples and oranges."
7. It should be pointed out that marketing is not a particularly formal situation in Thailand, but rather in many ways a social and recreational activity. For instance, kinship terms are widely used among buyers and sellers, and, for words with several, register-sensitive forms, such as "know", "eat", "dog", "husband" and "wife", the informal terms are used.
8. While the animal-human distinction is commonly breached for insulting purposes, this is usually not done with classifiers, but rather with nouns (dog, buffalo, lizard), vulgar kinship terms or verbs for eating.

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Academic Speaking
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One style of language that may be deserving of more attention than it has been given up to now is the kind used by academic people—professors and graduate students—when they are speaking academically. It is a way of speaking that is somewhat different from the style these people use, say, in ordinary conversation: the style they are most apt to use in lecturing to a class or "giving a talk" to an academic audience. It is one of the options available for "presenting a paper" at an academic conference, even though the majority of such papers are read aloud from prepared texts.¹ What I am going to present here is not a full-blown study of academic speaking based on many samples from that genre. I hope to present more broadly based findings in a later, larger work. Here I will discuss four brief samples taken from tape-recordings of four different academic speakers, each of whom was lecturing to a class or other academically oriented audience. These examples are typical of the styles of at least these four speakers.

One thing we will find is that not all academic speaking is the same. There is a range of styles that fit along a continuum from language very much like that of ordinary conversation to language that more closely approximates the style of academic writing. Figure 1 provides a way of visualizing this continuum.

CS <-----------------------------------------------> AW

AS <--------------------------------> AS

Figure 1

"CS" on the upper left stands for "conversational speaking." What I will say about this kind of language is based on samples taken from twenty recorded dinnertable conversations.² At least two caveats are in order. These were the conversations of academic people, who may have imported academic features that would be less common in conversations by other kinds of people. Since, however, these conversations did take place in a relaxed atmosphere among people who knew each other reasonably well, and since the topics of the conversations were quite diverse and by no means restricted to academic matters, the conversational findings I will mention do appear to reflect at least the colloquial style of academic people. It must also be said that not everybody converses in the same way; there is obviously a range of conversational styles (Tannen 1984, 1986). It is quite likely that one's academic speaking style bears a relationship to one's conversational style. That, however, is another study, and to simplify matters here I will pretend that conversational speaking is homogeneous.

"AW" on the upper right of Figure 1 stands for "academic writing," the kind of writing people do for publication in academic books or journals. The data I will refer to come from academic articles chosen by each of twenty subjects as representative of their work in that genre.
The two-way arrow at the top of Figure 1 implies that there is a continuum of styles between the most conversational speaking and the most academic writing. This, too, is an oversimplification, but it will serve our purposes here.

The lower two-way arrow in Figure 1 represents the continuum of styles we are focusing on here. "AS," of course, stands for "academic speaking." The point is that academic speaking styles range from something close to conversational speaking to something that has much in common with academic writing. In no case, apparently, does academic speaking coincide with conversational speaking in all respects, nor does it ever coincide completely with academic writing. Different speakers do, however, produce language at very different points along this continuum.

Since academic speakers are in fact speaking, and not writing, it is useful to think of academic speaking as the borrowing into spoken language of various features whose origins lie in academic writing. In other words, we can take conversational speaking as a baseline for spoken language, and consider how the baseline is distorted when speakers are more heavily under the influence of academic writing. We will see that some academic speakers are very heavily under that influence, while others remain closer to the conversational norm.

What factors might be responsible for such variation within the academic speaking style? Certainly academic speakers must be influenced by a variety of factors: their personalities, their self-images, their goals, as well as the extent and nature of their experience with academic speaking. Certainly the nature of the audience is not irrelevant: whether it is a large lecture class or a small seminar, whether the students are sophomores or advanced graduate students, how well the lecturer knows them, and so on.

If factors like these may be responsible for variation among academic speakers, there are also constraints imposed by the nature of language production itself that keep academic speaking from being, on the one hand, indistinguishable from conversational speaking, and on the other hand from converging fully with academic writing.

An academic speaker is never in a balanced interactive situation, as a conversationalist usually is, but is to a large extent engaged in a monologue. Even though the audience may ask questions and make comments, the speaker has a hold on the floor that considerably exceeds what is normal for a conversation. Furthermore, academic speakers are in a didactic role, where they are imparting knowledge or stimulating thought along channels known better to them than to the audience, channels at least partially thought out in advance. The fact that academic speaking tends to be monologic, didactic, and more highly planned than casual conversation inevitably puts at least some distance between it and ordinary conversational style.

There are other factors that keep academic speaking from being exactly like academic writing. Above all, it is speaking and not writing, and thus it is subject to the same constraints on the production of language that shape any form of spoken language. Producing speech and producing writing are such radically different activities that the resulting language can never be exactly the same. This is true in part because of the cognitive demands of producing language on-line, without
the writer's leisure to deliberate and revise. But in addition academic speakers may feel the need to communicate directly, to interest and excite their audiences, to have a meeting of eyes and minds in a way that is intrinsically impossible for writers. The fact that academic speaking is subject to the limitations and opportunities of on-line language production and direct audience contact keeps it from ever being exactly the same as academic writing.

The following samples of academic speaking from lectures by four different people show conspicuously different styles. In a rough way they fit from left to write along the continuum represented in the bottom line of Figure 1. Example 1 is closest to conversational speech, showing the smallest amount of importation from academic writing, while Example 4 is farthest from conversation and shows maximum influence of academic writing. Experience, situation, and personality may all have played a role in these differences. The speaker of Example 1 was a graduate student whose lecturing experience was more limited than that of the established professor who produced Example 4. Example 1 was spoken to a smaller group in a maximally informal situation where there was a great deal of ongoing discussion with members of the class. Perhaps it is not irrelevant that Example 1 was produced on the West Coast, Example 2 in the East.

Example 2 is different in style from Example 1, but shares with it a preponderance of conversational features. By a rough count, both 1 and 2 show about twice as many distinctly conversational features as features borrowed from academic writing. Example 3, on the other hand, has more in common with Example 4. Although Example 3 may not be influenced by academic writing to the same extreme, both 3 and 4 show an overwhelming preponderance of writtenlike as compared with spokenlike features.

**Example 1**

1(a)(i)  .. But ... you notice some
  (b)  ... it's a very nice kind of ... uh--
  (a)(ii)  ... configurations in the thing,
  (c)  ... tha--t ... that are .. have some ... sort of ... compelling musical value,
  (d)  like .. like this-- uh .. cycling in the end,
  (e)  .. that relates ... um-- for very ... very nicely
to-- ... a figure ... in which there's a-- uh--
two bar phrase that .. that .. repeats three times.

**Example 2**

2(a)  ... but if we wait lo--ng enou--gh,
  (b)  .. then .. the .. the encoding would have taken place
back when the guy was a kid.
  (c)  ... o--r was still young.
  (d)  ... before the first fatal glass of beer.
  (e)  .. and uh-- .. there encoding would have been normal,
  (f)  ... and sure enough,
(g) if we were to test b .. for that kind of stuff,
(h) .. we should find with a normal trace and normal
retrieval we get nice normal data.
(i) .. right?

Example 3

(3)(a) ... Well,
(b) .. one of the factors that people ha--ve .. uh-- ...
talked about as being important .. i--n ... the
development .. o--f ... a high level of performance on
this task,
(c) ... i--s ... uh-- ... the making o--f .. comparisons
between--n .. the referent,
(d) .. the thing you're talking about right no--w,
(e) ... a--nd the other objects .. from which the-- ...
listener has to-- choose.
(f) ... OK?

Example 4

(4)(a) .... Now remember .. that one of the principles of
mythopoetic thought,
(b) ... is .. its tendency ... to collapse time.
(c) ... in--to a kind of time capsule in which time present
and time past and time future.
(d) ... are ... rolled into one,
(e) ... so that ... in a sense ... the model .. on which ...
the past .. is based,
(f) ... is ... sort of the eternal present.

I will discuss these four examples in terms of five different cate-
gories of stylistic features, speculating when possible on the reasons why
particular features should belong to a particular style. First, I will point
out features that appear to be specific to academic speaking itself. Second, I will point out features of conversational speaking that appear
to be retained in academic speaking no matter what its style. Third, I
will point out features of conversational speaking that may be lost in the
styles more influenced by academic writing. Fourth, I will point out
features of academic writing that are present in all styles of academic
speaking. Fifth and finally, I will point out features of academic writing
that influence only some academic speaking styles.

Features Specific to Academic Speaking

There are a few features that appear to be more favored by
academic speakers than by any other users of language, and that are thus
diagnostic of that style. Figure 2 is meant to suggest that these features
are independently appropriate to academic speaking, rather than being
importations from either conversational speaking or academic writing,
and that they suffuse academic speaking of all kinds. In our sample
these features, while they were present with greater or lesser frequency in other styles of language, appeared more often in academic speaking than anywhere else. They are, furthermore, features with an understandable appropriateness to the academic speaking situation.

Both Example 1 and Example 4 begin with invitations to the audience to pay attention to something: "you notice" and "now remember." "You notice" seems not to be an imperative, but rather an impersonal construction more or less equivalent to "one notices." Nevertheless, it invites the audience to join the speaker in focusing attention in a certain way. "Now remember" in Example 4 is more clearly a command. Expressions like these are appropriate to a didactic situation in which one speaker is guiding the thoughts of others along prepared channels.

Academic speakers are also motivated to make sure that the audience is following them. Hence the frequency with which they use expressions like "right?" (2i) or "OK?" (3f).

There are certain hedges, of the kind represented here by the phrase "in a sense" in (4e), that signal academic speakers' reluctance to commit themselves to the absolute truth of what they are saying, while allowing them to say things for which they would not want to be held fully accountable in the long run.

The first person plural pronoun "we," which is so frequent in Example 2, is a didactically useful generic reference that conveys not just "people in general," but "people in our group, people interested in the things we are interested in." It is often used in academic writing as well, but in our data it appeared more often in academic speaking than anywhere else.

Finally, the fact that (2a) is an if-clause is interesting in a way that becomes evident only from a detailed comparative study of several styles. In our data we found that if-clauses are more common in academic speaking than in any of the other styles we examined. Whatever the reason, academic speakers particularly like to say "if."

These, then, are features which seem more at home in academic speaking than anywhere else: invitations to pay attention to something, like "notice" and "remember"; attempts to reassure oneself that attention is being paid, like "right?" and "OK?"; academic hedges like "in a sense"; the first person plural generic pronoun "we"; and if-clauses. All the remaining features to be discussed are either features of conversational speaking that have been retained in academic speaking, or features of academic writing that have been borrowed into academic speaking.
Features of Conversational Speaking
That are Always Present in Academic Speaking

Because, as we have noted, academic speaking remains in some fundamental way speaking and can never literally be writing, it cannot avoid having some characteristics of spoken language, no matter how heavily the speaker may be influenced by academic writing in other respects. Our examples provide us with at least a few instances of basic spoken traits that none of these speakers could avoid. Figure 3 is meant to suggest this importation of certain conversational features into all of academic speaking.

CS ←--------------------------------------------------------→ AW

\`
CS ←------------------------------------------------→ CS
```

Figure 3

One feature of this sort involves the production of speech in the format of relatively brief spurts, or "intonation units" (Chafe in press). These intonation units typically contain five or six words (in English), one intonation peak (or sometimes more), and an initial pause (there may also be internal pauses). All styles of speaking—conversational, academic, or otherwise—adhere closely to this format. For instance, (1d) of Example 1, "like this cycling in the end" with six words (counting only the successful words), and (4b) of Example 4, "is its tendency to collapse time" also with six words, are both typical in this respect. I have speculated elsewhere (Chafe 1980, in press) that intonation units result from the continual flow of small chunks of information into and out of the speaker's focus of consciousness. Since all speakers, conversational or academic, must go through this process of successively activating small pieces of information to be verbalized, it is not surprising that all varieties of spoken language would tend to be limited to intonation units of approximately the same size.

It may be noted that both Example 1 and Example 4 also contain intonation units that are conspicuously longer, such as (1e) and (4c). Units like these will be a matter for discussion below. For the moment we are interested in the fact that none of these four samples differ noticeably with respect to intonation unit length.

A second conversational feature that is common to all these samples is the use of the colloquial hedges "kind of" and "sort of" observable in both Example 1 (in 1b and 1c) and Example 4 (in 4c and 4f). Since speakers are under an obligation to keep speaking, they cannot normally introduce long silences during which they search for the best lexical items to match their thoughts. Spoken language must be produced on the run, and a consequence is that lexical choices are often judged by speakers to be at best approximations to what they have in mind. This approximate quality is often signaled by "kind of" or "sort of," hedges that are entirely absent from academic writing but, as we see here, are present across the full gamut of academic speaking styles.³
A third feature of conversational speaking that may suffuse all styles of academic speaking is the tendency to become "hung up" on a particular word or phrase. This tendency, too, relates to a speaker's need to make lexical choices on the run, so that a particular choice, once made, is likely to remain available in the speaker's mind for subsequent repeated use. In Example 1 we find the phrase "very nice" in (1b) and "very nicely" in (1e). Just preceding Example 1 the speaker said "It's doing a very long kind of retard through the whole piece." He then said "kind of" again in (1b). Several intonation units later he said "and there's this kind of subtlety." The word "time" was obviously a favorite of the Example 4 speaker. Another reference to "mythopoetic thought" directly preceded this segment, and a repetition of "time past, time present, and time future" followed shortly after it. Lexical hangups are endemic to speaking of whatever kind, whereas conscientious writers have been trained to avoid them (Tannen in press).

Finally, conversational language easily falls prey to a certain amount of illogicality, which passes without notice in fast-moving speech but becomes evident in a transcription that remains in place to be examined at leisure. A possible, if subtle example is the "so that" which introduces (4e), a colloquial equivalent for what might appear as "thus" in academic writing. Its resultative function here has to do with the flow of language---"based on what I have just said, this follows"---rather than the flow of content. The logic of language flow is often signaled in speech but seldom in expository writing. Another possible, though equally subtle example of illogicality may appear in Example 2, intonation unit (2h), where "with a normal trace and normal retrieval" evidently belongs with the "test" mentioned in the preceding intonation unit: "if we were to test with a normal trace and normal retrieval."

To summarize, among the features of conversational speaking that may be preserved in academic speaking of all kinds are the organization into short intonation units, the use of the colloquial hedges "kind of" and "sort of," lexical hangups, and instances of illogicality.

Features of Conversational Speaking That may be Lost in Academic Speaking

There are other features of conversational spoken language that are present in the more colloquial styles of academic speaking, but are absent from those styles that come closer to academic writing, as suggested in Figure 4.

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CS <--------------------------------------------> AW
        \`
CS <----------------------- - - - - - - -* AS
```

Figure 4

The most obvious feature of this kind, and the one over which the speaker presumably has the most control, is use of colloquial vocabulary. Let us suppose that a speaker's choices of words and phrases fall roughly into three categories. There are those words and phrases that are
appropriate in casual conversation but not in formal writing, those that are appropriate in formal writing but not in casual conversation, and those that are neutral to this distinction. For the moment we are considering the use in academic speaking of the first type: colloquial words and phrases.

In Example 1 the words "nice" and "nicely" are of this kind, as is the word "like" rather than "such as" in (1d): "like this cycling in the end." The use of "thing" in (1a) also qualifies: "but you notice some configurations in the thing." The largest number of colloquial words and phrases appear in Example 2: "back (when)," "guy," and "kid" in (2b), "sure enough" in (2f), "that kind of stuff" in (2g), and "nice" in (2h).

Examples 3 and 4 contain no colloquial vocabulary. Evidently academic speakers have the power to decide whether they want to sprinkle their language with words and phrases appropriate to conversational language or not. The first two speakers chose to do so, the last two did not.

Another conversational feature that may or may not be present in academic speaking is expressive involvement (cf. the "evaluation" devices of Labov 1972:366ff). I have in mind those features that add interest and color to what one is saying; that make it appear to be worth saying; that make the audience sit up and take notice. The only clear instances are in Example 2, where there are two such devices. In (2a) the speaker introduced expressive, sound–symbolic lengthening into the words "lo--ng enou--gh." In (2d) he introduced a touch of humor with "before the first fatal glass of beer." Humor is anomalous in academic writing, which, if it is anything at all, is serious.

There is another characteristic of conversational speech which academic speakers who are operating toward the more written-like end of the continuum have the power to minimize. It is what might be called disfluency: the false starts, repetitions, and afterthoughts that are a natural consequence of producing spoken language on-line, but that would be edited out if one were transcribing speech for publication.

Example 1 shows a false start in (1b) that interrupts the flow of (1a). The speaker had a momentary change of plan, and then returned to what he originally intended to say:

(1a)(i) ... But ... you notice some
(b) ... it's a very nice kind of ... uh--
(a)(ii) ... configurations in the thing,

In (1c) he repeats the word "that," and has a false start:

(1c) ... tha--t ... that are .. have some ... sort of ... compelling musical value,

In (1e), after a false start, he repeats "very," and again "that":

(1e) ... that relates ... um-- for very ... very nicely to-- ... a figure ... in which there's a-- uh-- two bar phrase that .. that .. repeats three times.
Example 2 shows only one brief false start, the initial voiced bilabial stop of some abandoned word in (2g):

(2)(g) if we were to test b .. for that kind of stuff,

There are, however, several "afterthoughts": premature sentence-final intonations which are then followed by additional material that belongs to the same sentence as the preceding. The falling pitches at the ends of (2b) and (2c) are both premature in this sense:

(2)(b) .. then .. the .. the encoding would have taken place back when the guy was a kid.
(c) ... o—r was still young.
(d) ... before the first fatal glass of beer.

Conversely, the lack of a falling pitch at the end of (2e), where in fact ideational and syntactic closure was reached, is also a kind of disfluency:

(2)(e) .. and uh— .. there encoding would have been normal,
(f) ... and sure enough,

There are no false starts, repetitions, or afterthoughts in Examples 3 and 4, whose speakers in this respect managed to produce something closer to edited written language. I cannot explain how some academic speakers are able to do this. Perhaps the speakers of Examples 3 and 4 had already given these lectures many times before, perhaps they were using more explicit notes, perhaps they had a natural talent for fluent speech. There are certain other hesitational and intonational peculiarities that these speakers did fall victim to, but that is something to be discussed below.

In summary, among the features of conversational speaking that are evident among some but not all academic speakers are the use of colloquial words and phrases; features that contribute color and involvement such as expressive lengthening and humor; and disfluencies such as false starts, repetitions, and afterthoughts.

Features of Academic Writing
That are Easily Borrowed into Academic Speaking

There are certain features characteristic of academic writing that are pervasive in all styles of academic speaking, and thus appear easy to borrow, as suggested in Figure 5.

```
CS <---------------------------------------------------------------------> AW
    //
    AW <--------------------------------> AW
```

Figure 5
Lexical choices provide the clearest example. Just as we saw above that academic speakers can choose whether or not to use colloquial words and phrases, so also they are able to introduce academic words and phrases—the simplest way to make it sound academic.

In Example 1 we find such academic words as "configurations" (1a) and "cycling" (1d), as well as the phrases "compelling musical value" (1c) and "two bar phrase" (1e). In Example 2 there are various standard terms from psychology like "encoding" in (2b) and (2e), and "trace," "retrieval," and "data" in (2h). Example 3 is noteworthy for its academic phrases, such as "one of the factors" (3b), "talked about as being important" (3b), and "high level of performance" (3b). In Example 4 there is "mythopoetic thought" (4a), "time present and time past and time future" (4c), and "the eternal present" (4f).

Another characteristic of all styles of academic writing is the use of a preposition placed directly before a relative pronoun as a way of avoiding a preposition at the end of a relative clause. Example 1 shows "in which" in (1e), Example 3 has "from which" in (3e), and Example 4 has "in which" in (4c) and "on which" in (4e). Not only is this device one of the most tenacious influences of prescriptive grammar in writing (Chafe 1985b), it is apparently also one of the easiest written devices to carry over into academic speaking.

These examples also illustrate the tendency of all academic speakers to introduce occasional intonation units that are longer and more complex than those found in conversational language. Whether written language has anything analogous to the intonation units of speech is a question that deserves more discussion than it can be given here. It can at least be said that the "punctuation units" of writing (stretches of language between punctuation marks) often provide us with a reasonable approximation of spoken intonation units. One finding that holds up for most written language is that its punctuation units show more variability in size than intonation units of spoken language, and that some of them are unusually long, in comparison with the length of spoken units.

We find such long intonation units periodically mimicked in all styles of academic speaking. For example (to be compared with the modal length of 5 words for conversational intonation units):

(1)(e) .. that relates ... um-- for very ... very nicely to-- ... a figure ... in which there's a-- uh-- two bar phrase that .. that .. repeats three times.

(18 successful words)

(2)(h) .. we should find with a normal trace and normal retrieval we get nice normal data.

(15 words)

(3)(b) .. one of the factors that people ha--ve .. uh-- ... talked about as being important .. i--n ... the development .. o--f ... a high level of performance on this task,
(24 words)

(4)(c) ... in—to a kind of time capsule in which time present
and time past and time future.

(16 words)

Academic speakers, like academic writers, achieve this greater
length in various ways. In (1e) the speaker managed to combine three
relative clauses, but not without many pauses and false starts. The
length of (2h) was extended with conjoining and repetition in the phrase
"normal trace and normal retrieval." In (3b), the longest of all these
examples, there was significant hesitating, but there was also the use of
three academic formulas, as discussed above, as well as an exuberant use
of prepositional phrases, as we will note again below. (4c) also made use
of conjoining and repetition. All of these intonation units have more in
common with some of the punctuation units of academic writing than with
the usual intonation units of conversational speech.

It appears, then, that all academic speakers succeed in imitating
academic writing through the importation of academic words and phrases;
the avoidance of final prepositions by placing a preposition before a
relative pronoun; and the occasional use of intonation units which are
considerably longer and more complex than those of conversational
speech.

Features of Academic Writing
That are Less Easily Borrowed into Academic Speaking

Other characteristics of academic writing, however, appear to be
more resistant to borrowing into academic speech, to judge from their
tendency to appear only in academic speaking that is closer to the
academic written style, as suggested in Figure 6.

\[
\text{CS} \leftarrow \ldots \rightarrow \text{AW}
\]

\[
\text{AS} \leftarrow \ldots \rightarrow \text{AW}
\]

Figure 6

There are several features which, while they are by no means absent
from conversational speech, occur with much greater frequency in academic
writing. Among them are (1) the use of several prepositional phrases
within the same intonation (or punctuation) unit, and (2) the use of nom-
inalizations.

While prepositional phrases are certainly present in conversational
language, they tend to occur with no more than one per intonation unit,
and often they constitute an intonation unit in its entirety. In contrast,
the following intonation units in Examples 3 and 4 follow a pattern more
typical of academic writing in containing multiple prepositional phrases.
The prepositions are underlined. The "and" is underlined in (3e) as the
second element in the compound preposition "between ... and":


.. one of the factors that people ha--ve .. uh-- ...
talked about as being important .. i--n ...
the development .. o--f ...

(3)(c) ... i--s ... uh-- ...

(3)(e) ... a--nd the other objects .. from which the-- ...

(4)(a) .... Now remember .. that one of the principles of
mythopoetic thought,

(4)(c) ... in--to a kind of time capsule in which time present
and time past and time future.

(4)(e) ... so that ... in a sense ... the model .. on which ...
the past .. is based,

Another device that is many times more common in academic writing
than in conversational speaking is the use of nominalizations. We can
distinguish between "dead nominalizations" like "configurations" in (1a)
and "encoding" in (2b) and (2e), which have become established lexical
items, and "live nominalizations" which represent the productive reifi-
cation of basically verbal concepts. Instances of live nominalizations are
present only in Examples 3 and 4. In (3b) there are three of them:

(3)(b) .. one of the factors that people ha--ve .. uh-- ...
talked about as being important .. i--n ...
the development .. o--f ...

(Some of the prepositional phrases in this intonation unit are not
unrelated to the occurrence of these nominalizations.)

Intonation unit (3c) contains another such nominalization, as does

(4)(b) ... is .. its tendency ...

to collapse time.

Another characteristic of academic writing that is present in
Examples 3 and 4 but not in 1 and 2 is the use of long, complex noun
phrases with highly abstract referents as the subjects of clauses. Again
(3b) is an extreme example, functioning as the subject of the predicate
which begins in (3c):

(3)(b) .. one of the factors that people ha--ve .. uh-- ...
talked about as being important .. i--n ...
the
development ... o--f ... a high level of performance on this task,
(c) ... i--s ... uh-- ... the making o--f ... comparisons between--n ... the referent,

Example (4) contains three complex, abstract subjects of this kind:

(4)(a) .... Now remember .. that one of the principles of mythopoetic thought,
(b) ... is .. its tendency ... to collapse time.
(c) ... in--to a kind of time capsule in which time present and time past and time future.
(d) ... are ... rolled into one,
(e) ... so that ... in a sense ... the model .. on which ... the past .. is based,
(f) ... is ... sort of the eternal present.

Also of interest here are the two passives in Example 4:

(4)(d) ... are ... rolled into one,
(e) ... so that ... in a sense ... the model .. on which ... the past .. is based,

Passives, which avoid mention of particular people actively doing particular things, are, like nominalizations, a manifestation of the speaker’s detachment from concrete events (Chafe 1982). In that respect they represent the opposite of the involvement conveyed by the expressive lengthening and humor in Example 2.

Finally, it is worth mentioning a nonstandard kind of prosody that is apt to appear when academic speakers mimic academic writing. The simplest cases are those already noted just above, in which a long, abstract subject is spoken as a self-contained intonation unit, separate from the following subject. Spoken language is unable to support an intonation unit long enough and complex enough to embrace both such a subject and its predicate. This comma type closure is evident at the ends of the following:

(3)(b) ... one of the factors that people ha--ve .. uh-- ... talked about as being important .. i--n ... the development .. o--f ... a high level of performance on this task,
(4)(a) .... Now remember .. that one of the principles of mythopoetic thought,
(4)(e) ... so that ... in a sense ... the model .. on which ... the past .. is based,

More curious, however, is the use of a falling pitch intonation at the ends of two of the intonation units in Example 4, neither of which qualifies even provisionally as the end of a sentence:
(4)(b) ... is .. its tendency ... to collapse time.
(4)(c) ... in—to a kind of time capsule in which time present
and time past and time future.

Interestingly enough, this is the kind of intonation people often use when
reading aloud. It is maximally divorced from conversational prosody.
The speaker of Example 4, though he was not in fact reading what he
was saying, went so far in the direction of academic writing that he
actually borrowed some of the prosody an academic person might have
used in reading aloud.

Thus, features of academic writing that are borrowed by some
academic speakers, but not by all, include the use of two or more pre-
positions within a single intonation unit; the use of "live" nominaliza-
tions; the use of long, abstract subjects; the use of passives; and the
use of a prosody that is not standard for conversational speaking, even to
the extent of mimicking the prosody of oral reading.

In conclusion, we have seen that academic speaking is never com-
pletely like conversational speaking, and never completely like academic
writing. We have seen that there is a range of academic speaking styles
characterized by the degree to which the speaker has borrowed features
of academic writing, thus departing from conversational style. We have
also seen a few features that are especially characteristic of academic
speaking itself. Such features, however, are few in number, and it would
appear on the whole that academic speaking is not so much a style in
itself as a variable mixture of features that are fundamentally associated
with either conversational speaking or academic writing.

Footnotes

1 I base this statement on findings from a questionnaire returned to
me by 89 professional linguists in the fall of 1985. One of the questions
was "In giving a paper at an academic conference, do you usually (a) read
from a prepared text, or (b) speak without a text (either with or without
notes)?" 56% of the respondents replied that they usually read, 37% that
they usually spoke. The remaining 7% said that they did both equally;
some remarked that they read a short paper but spoke a long one.

2 These data and all the other data mentioned in this paper are
taken from a study of spoken and written language sponsored in part by
the National Institute of Education, Grant G-80-0125, with additional
assistance from the Sloan Foundation grant in support of cognitive
science studies at the University of California at Berkeley. Some other
findings of this study are available in Chafe 1982, 1985a, and Chafe and
Danielewicz in press. I am grateful for the assistance of Jane Daniele-
wicz, Tanya Renner, and Knud Lambrecht.

3 Both "kind of" and "sort of" are ambiguous between their use as
hedges and their more literal use meaning something like "variety of."
The hedge use is clearer in Example 4 than Example 1; both occurrences
in Example 1 allow the more literal interpretation, and we can only guess
as to the speaker's intent. The significant pause before the "sort of" in (1c) may suggest that this occurrence, at least, was intended as a hedge.

4 I base this statement on preliminary findings from a study of reading aloud that I am presently engaged in.

References


EVIDENCE FOR A STRICTLY SENTENCE-INTERNAL ANTECEDENT-FINDING MECHANISM

Wayne Cowart¹
The Ohio State University

Previous research has demonstrated that there is a process by which the pronoun they can exert an influence on the syntactic analysis of a following ambiguous expression of the form of flying planes. In several experiments subjects have been presented with recordings of sentence fragments such as (1).

(1) (a) As the birds soar gracefully over the field, flying kites...
(b) As they soar gracefully over the field, flying kites...

Immediately at the end of each such fragment, the subject is presented with a visual target word; this is always is in the critical cases. The subject's task is simply to read the verb aloud as rapidly as possible. The results show that the speed of this response is sensitive to the form of the subject of the initial subordinate clause. The response takes anywhere from 20 to 50 milliseconds longer when the clause subject is the pronoun they rather than a lexical NP or you.

Apparently, the presence of they sets up a search for an antecedent. This in turn leads the subject to prefer the plural noun phrase reading of the ambiguous expression because this expression provides a potential antecedent if it is construed in this way. This effect can be called the Pronoun Bias Effect. Note that the effect consists in a slowing of responses to is when they appears in prior context. For expository convenience, we can call the mechanism that implements the coreference relation implicated in this effect the Structural Reference Process.

Interestingly, the Pronoun Bias Effect goes through even when the coreference relation involved is odd. Thus the effect seems to work as well with examples like (2b) as it does with cases where the coreference relation produces a more reasonable interpretation, as in (2a) or (1).

(2) (a) If they use a lot of oil, frying eggs...
(b) If they eat a lot of oil, frying eggs...

These results, which have been replicated, strongly suggest that the Structural Reference Process lacks
access to much semantic and pragmatic information that is ultimately relevant to antecedent selection. It seems likely, for example, that most speakers will readily reject the NP the kitchen smells in example (3) as the antecedent of they.

(3) Once they've eaten their fill, the kitchen smells no longer bother the hungry prisoners.

See Cowart (1983) and Cowart and Cairns (1986) for experimental results and discussion.

An important further observation is that the Pronoun Bias Effect does not arise where there is a syntactic impediment to the coreference relation, as in cases such as (4).

(4) Just because they frequently require that boiling vegetables...

However, the original experimental demonstration of this phenomenon was flawed by the fact that several of the items seemed to show a strong inherent bias against the target verb is. That is, subjects seemed to be strongly biased against the verb form is, relative to are, even in the control condition where you was the subject of the initial subordinate clause. To correct for this a reanalysis was done which excluded the five items with the most extreme bias. With this more balanced set of experimental sentences, there was still no evidence that the Pronoun Bias Effect could operate when the ambiguous expression is embedded within a complement clause. This result may seem intuitively obvious, but as will be evident shortly, not every intuitively obvious property of the Pronoun Bias Effect is real.

At this point there is evidence that the Pronoun Bias Effect can be suppressed when the candidate antecedent for they is placed in a syntactically ineligible position, but that when the coreference relation it involves yields an odd interpretation and there is no syntactic impediment to coreference, the effect appears.

Recent proposals by Fodor (1983) provide a particularly interesting framework within which to view the phenomena reviewed above. Fodor proposes that some subset of human linguistic abilities is realized by a cognitive module that, among other properties, is "informationally encapsulated." The experimental results outlined above seem to provide support for Fodor's views in that the procedures that implement the Pronoun Bias Effect seem to be informationally
encapsulated; they are unable to deploy all of the listener's relevant knowledge.

One view of the results to date leads to the suggestion that the Structural Reference Process is defined over a syntactic representation of the incoming sentence. Such a representation would both provide the information necessary to determine which NPs were and were not structurally eligible and would presumably exclude the semantic and pragmatic information that is apparently not relevant to the pronoun effect. In order to test this suggestion, the work to be reported here will assess the scope of the Pronoun Bias Effect, that is, how much of prior context is relevant to coreference assignments made by the Structural Reference Process. Given the elementary observation that discourse relations seem able to span far larger portions of an utterance than syntactic relations, information on the scope of the Pronoun Bias Effect may reflect on the character of the utterance representation it uses. If the effect is sensitive to the content of a preceding sentence, this will suggest that the Structural Reference Process is either another manifestation of general discourse processing mechanisms or at least a system that interacts closely with them. If it is not sensitive to antecedents in preceding sentences, then this will tend to affiliate the process with syntactic processes, which seem to have the sentence as their maximal domain. To put it another way, a reasonable tentative distinction between discourse processing systems and syntactic or structural processing systems assumes that the discourse systems have access to a representation normally including some multi-sentence span of the incoming utterance while syntactic or structural processing systems operate on representations incorporating material from only a single sentence.

Experiment 1

Two recent experiments have been done with materials similar to those in (5) in the interest of finding out what relation there is between the Pronoun Bias Effect and a preceding sentence. Each item consists of a short context sentence followed by a sentence fragment structured like those used in earlier experiments.

Materials: The materials in (5a,b) should provide a replication of the Pronoun Bias Effect. Item (5c) provides a preceding antecedent for they that should interfere with this effect if the Structural Reference Process has access to context outside the current sentence.
(5)  
(a) Miller might simply be boosting morale. Although these coaches imply that few schools can maintain a long winning streak, losing games...

(b) Miller might simply be boosting morale. Although they imply that few schools can maintain a long winning streak, losing games...

(c) These coaches might simply be boosting morale. Although they imply that few schools can maintain a long winning streak, losing games...

The target item was always is. There were also filler items having different structures.

Design: The experimental design involves one within-subjects repeated measures factor, Context, with three levels (no they and no antecedent, they present without discourse antecedent, they present with discourse antecedent). There is also a between-subjects Groups factor that reflects the three materials conditions that result from using each materials item in each of the three conditions.

Procedure: Experiment 1 was a paper and pencil judgement task administered in classroom settings. Judges were presented with a mimeographed list of sentence fragments such as those in (5). Responses were collected from 100 judges. No judge saw more than one version of a given item and each individual saw ten items in each of the experimental conditions. The items were pseudorandomly ordered and the experimental cases were mingled with 30 filler items. Each item included a sentence and a sentence fragment. The task was to indicate whether IS or ARE seemed to be the better continuation for each item. This response was recorded on a machine-readable answer sheet.

Results: The results were clear-cut and surprising (see Table 1). The first two conditions produced a straightforward replication of the Pronoun Bias Effect. IS and ARE were selected equally often when the fragment included no pronoun, while preference for IS

Table 1: Experiment 1, percent of subjects selecting is as verb following the ambiguous expression

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Pronoun Present (a)</td>
<td>50</td>
</tr>
<tr>
<td>They Present, No Prior Antecedent (b)</td>
<td>43</td>
</tr>
<tr>
<td>They Present, With Prior Antecedent (c)</td>
<td>42</td>
</tr>
</tbody>
</table>
declined to 43% when they was present. In the critical third condition, preference for IS was at 42%. That is to say, the Pronoun Bias Effect was as much in evidence with a candidate antecedent ahead of the sentence fragment as without it. The Context effect was significant (F(2,58)=7.47, p<.005) and there was obviously no significant difference between the second and third conditions. On this evidence it appears that the Structural Reference Process lacks access to discourse context.

Discussion: This outcome was quite unexpected. Because the Pronoun Bias Effect so clearly involves a reference relation, it was expected that this study would demonstrate clear sensitivity to prior context. The fact that this result emerged in a paper and pencil task is doubly surprising because there was ample time for subjects to consider the relevance of prior context and the antecedent it contained (in the critical condition). The fact that the Pronoun Bias Effect persisted suggests that the effect is implemented by some device with access only to the current sentence.

However, with respect to the issues under consideration here, the materials for Experiment 1 had one important limitation. In about half the items it was possible to construe the subject of the first sentence, the instance of they, and the ambiguous expression as all referring to the same entities. This reflected the fact that a somewhat different question had guided the original construction of the materials. Nevertheless, it is obviously only cases where this three-way relation is not available that can bear on the question whether some sentence-internal mechanism produces the Pronoun Bias Effect.

This matter was first addressed by isolating those items from Experiment 1 where the three-way coreference relation was not available (as in (5c)). These 13 cases show essentially the same pattern as the experiment as a whole, though the Pronoun Bias Effect was marginally weaker. Preference for the verb form is declined from 49% to 43% across Conditions A and C, related to (5a) and (5c) above.

Experiment 2

Experiment 2 addressed this matter directly; the materials for Experiment 1 were revised such that they could take either the subject of the first sentence or the ambiguous expression at the end of the fragment as its antecedent, but those two potential antecedents could not be coreferential. Otherwise, the materials, experimental design, and the procedure were those of
Experiment 1. Seventy-six Ohio State University undergraduates participated as judges.

The results are shown in Table 2. It is evident that the Pronoun Bias Effect is a little weaker in

Table 2: Experiment 2, percent of subjects selecting *is* as verb following the ambiguous expression

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Pronoun Present (a)</td>
<td>51</td>
</tr>
<tr>
<td>They Present, No Prior Antecedent (b)</td>
<td>44</td>
</tr>
<tr>
<td>They Present, With Prior Antecedent (c)</td>
<td>45</td>
</tr>
</tbody>
</table>

Condition C here than in Experiment 1, but the pattern essentially holds. This appearance is borne out by the statistical analysis. An analysis of variance shows that the Context effect is significant (F(2,58)=3.34, p<.05). A t-test on the contrast between the first and third conditions shows a significant difference (t(29)=1.95, p<.05, one-tail).

Thus, the Pronoun Bias Effect seems to operate in this task about as reliably when an antecedent for *they* is available in the preceding sentence as when it is not.

The next issue to address obviously is the question whether similar effects arise in a reaction-time task. One possible interpretation of the results of Experiments 1 and 2 suggests that they derive in some way from a strategy peculiar to reading. Though previous results with the Pronoun Bias Effect have been obtained with auditory as well as written presentations of materials, the best way to determine the importance of this suggestion is to replicate the experiment reviewed above with auditory presentations.

A pilot version of this experiment (with no counterbalancing of materials) produced equivocal results. This test used the materials, and design outlined above for Experiment 1 except that there was no counterbalancing of materials across experimental conditions. In statistical terms, materials were nested under experimental treatments. Ten subjects participated.

As in previous experiments, the presence of *they* slowed reaction-time to *is* in Condition B relative to Condition A. This contrast (of 440 vs. 458 msec.) is significant at the .05 level (t-pair(9)=2.65). While there was a trend in this same direction in the third condition as well (440 vs. 448 msec.), this effect was not significant (t-pair(9)=1.80). Since materials were nested under experimental conditions in this pilot, these results will support no strong conclusions
in any direction. A fully counterbalanced version of this experiment is in progress.

One other possible confounding factor bears some consideration. Though subjects in the paper and pencil task of Experiments 1 and 2 were under no particular time pressure, it is possible that they nonetheless drift toward a strategy in which they essentially ignore the context sentence of each item. Obviously, the potential antecedent in the context sentence will have no effect if the sentence isn’t read. This suggestion predicts, of course, that results obtained with items at different serial positions in the materials lists will obtain different results. In this connection, a further analysis made a rough comparison of the results obtained on Experiment 2 with the first six items versus the last six, and with items on the first half of the list versus items on the second half. In both cases it appears that the results are essentially the same for those items occurring early on the list and late on the list.

It seems fair to say that, while the empirical question has hardly been settled definitively, there is important evidence suggesting that the Pronoun Bias Effect arises independently of the content of the sentence preceding the one bearing they.

Discussion

The several results of the experimental program reviewed above endorse or at least suggest some theoretically important conclusions. First, the Pronoun Bias Effect exists; the presence of a pronoun in prior context can influence the syntactic analysis assigned to a following structurally ambiguous constituent. Second, while a coreference relation seems to be implicated in the Pronoun Bias Effect, the Pronoun Bias Effect is not sensitive to selectional or pragmatic influences that are otherwise commonly involved in matters of reference. Rather, the coreference relation seems to be assigned even when the resulting interpretation is strange. Third, the Pronoun Bias Effect seems to be affected by the structure of the sentence bearing they. Apparently, the coreference relation is assigned only when the antecedent is in a structurally eligible position. Fourth, the mechanism that produces the effect seems to have no access to the content of the preceding sentence.

It may be useful to review a model which can accommodate these findings. The model is built on two principal claims: 1) there are two distinct types of
processes, structurally-oriented processes and interpretively-oriented processes, involved in comprehending reference relations, and 2) information flows from structurally-oriented processes to interpretively-oriented processes. This is a logical claim not a temporal one; it says nothing about when each process begins to work on incoming material.

The processes can be differentiated by reference to three criteria: 1) the character of the representation of the incoming utterance to which each process has access, 2) the way that pronouns are differentiated, and 3) the character of the relations the processes establish. Structural reference processes are defined, by hypothesis, over a representation that expresses the kinds of properties and relations captured by some form of phrase marker. That is, precedence and dominance relations, lexical content, grammatical categories, etc. Discourse reference processes, by contrast, are assumed to be defined over interpretations; representations that explicitly capture the semantic, pragmatic and other interpretive properties and relations ascribed to the entities referenced in the utterance. In particular, these representations are assumed to be constructed with reference to whatever non-linguistic knowledge the listener may have about the entities, relations, processes, etc. mentioned in a given discourse.

Structural reference processes, by hypothesis, differentiate pronouns only according to morphological parameters such as case, gender and number, while discourse reference processes treat referring expressions differently according to the semantic environments in which they occur. Relations established by discourse reference processes are integrative; properties ascribed to one member of a pair of coreferential expressions can, for example, be extended to the other. The relations established by structural reference processes are simple ones of linking or pointing.

In this framework, the Structural Reference Process is a syntactic process in the sense that it is defined over a syntactic representation. This model allows a coreference relation assigned by the Structural Reference Process to interact with the processes that select a syntactic analysis for ambiguous expressions used in the experiments reported above; they communicate because they are defined over the same kinds of representation.

Though this model provides a reasonably parsimonious account of the results available to date, it also makes a number of predictions that go well beyond the results
reviewed above. Most simply, it predicts that effects related to the Pronoun Bias Effect can be obtained with other pronouns. Furthermore, the mechanisms and representations suggested should be as relevant to ordinary anaphoric relations as to the cataphoric ("backwards anaphora") cases implicated in the Pronoun Bias Effect. It suggests that other structural properties of sentences may influence the Pronoun Bias Effect, e.g., the contrast between subordinate and coordinate structures may be significant even though, for example, they in the second clause of a two-clause sentence can easily take an antecedent in the first clause whichever sort of relation obtains between the clauses. These and other implications of the model are under investigation.

It has been suggested that there may be a way to avoid the proposal that there are two different kinds of process involved in assigning reference relations. On this account there would be a single reference-assigning mechanism responsible for intrasentential cases related to the Pronoun Bias Effect as well as intersentential cases involving the same pronouns. However, according to this alternative view, some kinds of information take longer to process than others, and this leads to the illusion that those kinds of information are not available at certain stages of processing. Thus, it may be that a single processing sub-system deals with both the syntactic and the semantic/pragmatic factors that bear on the selection of antecedents for they, but the latter factors become effective later because of the additional processing demands they impose. Similarly, establishing a reference relation outside the current sentence might be more time-consuming or demanding than establishing one within the current sentence. Clearly a convincing proposal along these lines will have to provide some principled account of the extra processing demands related to semantic/pragmatic processing or accessing the content of earlier sentences in the discourse.

For the moment it is worth noting that there are two kinds of evidence that count against this suggestion. First, much of the evidence that semantic/pragmatic factors do not affect the Pronoun Bias Effect comes from cases where the source of the oddity is traceable to a selection restriction associated with the verb of the initial subordinate clause bearing they. Thus in (2b) above note that the oddity of the fragment arises from the fact that eat requires an animate subject. It is not clear why it should take longer to compute the consequences of this selection restriction than to determine, say, that a given NP is in a syntactically
ineligible position. Secondly, the interval between the appearance of they and the ambiguous expression in cases like (5) is quite long. There seems to be ample time to determine whether a discourse antecedent is available before the ambiguous expression appears.

In brief, the results of the research program outlined above provide substantial evidence for the suggestion that reference relations are assigned in language processing by two distinct subsystems, one of which is markedly structural in character and deals with relations only within a single sentence. The apparent inability of this system to access some information that is clearly ultimately relevant to the reference relations it assigns suggests that it is an informationally encapsulated cognitive module in the sense of Fodor (1983).

NOTES

1. The author is grateful to Deborah Brennan and Uma Subramanian for their invaluable assistance in preparing and executing the experiments reported here. This work has also benefited greatly from the assistance of Julia Sommerkamp, Karen Steensen, Sung-Ae Kim and John Allen. Comments offered by Keith Johnson and Robie Kantor were also especially helpful. The work was also influenced by discussions with Helen Cairns. Errors and oversights that remain are of course the sole responsibility of the author.

REFERENCES


Weak crossover and obviation
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Smithsonian Institution

Weak crossover refers to a class of antecedent-anaphor pairings which are ungrammatical in many languages, including English. In the Algonquian language Cree, comparable constructions are fully grammatical. The grammaticality of the Cree constructions is due to two factors: the lack of a VP node, and the system of obviation, which often disambiguates third person reference. The first section of the paper describes the obviation system; the second briefly reviews weak crossover in English before presenting the Cree constructions.

1. Obviation

Obviation is a grammatical opposition found in Algonquian languages in which a single third person (= proximate) is distinguished from all other third persons (= obviative). The proximate third person is referred to by unmarked third person forms, while obviative forms receive special marking. The proximate third person is thus conspicuous by being the only unmarked third person. This is illustrated below (taken from Bloomfield 1934, p. 90).

(1) awa pe·yak na·pe·sis
    this one  boy
o·hta·wiya e·-okima·wiyit,
    his father  be chief  obv
misatinwa ite· e·-aya·yit,
    horse  obv  where  be  obv
e·kote· aya·w;
    there  be 3

'A certain boy [prox] whose father [obv] was chief
was there where the horses [obv] were;'

In the above example, the boy is proximate and his father and the horses are obviative. na·pe·sis 'boy' has no suffix, while the nouns referring to his father and the horses bear an obviative suffix -a. The verb aya·w 'be' displays unmarked third person singular inflection, while the verbs with obviative subjects have an obviative suffix -yi- in addition to the third person suffix -t. (Verbs in subordinate clauses take different inflectional endings from those in main clauses.)
Obviation plays a number of roles in Cree grammar. Within a fairly narrow syntactic domain the marking of obviation is obligatory. That is, if there are two or more distinct third persons all but one must be marked as obviative. Outside this syntactic domain obviation is optional, and is employed in narrative texts for a variety of purposes (see Dahlstrom 1986 for discussion). The third person singled out as proximate often corresponds to the discourse topic and is often the focus of the speaker’s empathy, in the sense of Kuno and Kaburaki 1977. In narratives, shifts in point of view are often accomplished by making a new character proximate.

At the clause level, obviation plays a major syntactic role. Cree is a non-configurational language in which verb inflection expresses grammatical relations. Verbs are inflected for person, number, gender (animate or inanimate), and obviation status of subject and object. [1] In the absence of lexical NP arguments, third person verb inflection functions pronominally; if an NP is used, the verb inflection functions as agreement. First and second person verb inflection is always pronominal, and never merely agreement. [2] Independent personal pronouns are reserved for special discourse functions.

When both subject and object are third person, one must be marked as obviative. [3] If lexical NPs are used for subject and object they may occur in any order relative to the verb and to each other. In both of the examples below, the obviative NP, mahke·si·sa ‘fox’, precedes the proximate NP, wi·sahke·ca·hk. In the first sentence Wisahkechahk is the subject, while in the second Fox is the subject. This is indicated by the verb inflection. [4]

(2) nakate·w mahke·si·sa wi·sahke·ca·hk
    leave 3-obv fox obv
    ‘Wisahkechahk [prox] left Fox [obv] behind’

(3) nakatik mahke·si·sa wi·sahke·ca·hk
    leave obv-3 fox obv
    ‘Fox [obv-3] left Wisahkechahk [prox] behind’

The verb stem in both sentences is nakat- ‘leave’. In (2) the inflectional suffix -e·w indicates action by a proximate animate third person singular subject on an obviative animate third person object (animate obviative third persons are not specified for number). That is, in (2), Wisahkechahk, the proximate argument, is subject and Fox, the obviative argument, is object.
(3) is similar to (2) in that Wisahkechahk is proximate and Fox is obviative; the structural position of the NPs relative to the verb and to each other is also the same in both sentences. In (3), however, the verb stem nakat- 'leave' is followed by the inflectional suffix -ik indicating action by an obviative third person subject on a proximate animate third person singular object. In (3), therefore, it is Fox who is subject and Wisahkechahk who is object.

This pair of sentences illustrates the role of obviation and verb inflection in encoding grammatical relations. The marking of obviation distinguishes one third person argument from another in the same clause, and the information carried by the verb inflection imposes a particular interpretation of the syntactic role of the verb's arguments.

The domain in which obviation is obligatory is not limited to arguments of a verb in a single clause, but extends down into possessive constructions, clausal complements, and relative clauses as well. As a consequence, in this domain obviation resembles a switch-reference system operating with respect to the proximate third person: all proximate forms are coreferent, and all obviative forms are disjoint in reference from the proximate third person. For example, the subject of the complement clause in the sentences below must be marked as coreferential or noncoreferential with the subject of the matrix verb.

(4) John kiske·yihtam e·-a·hkosit
    know 3-inan    be sick 3
    'John; [prox] knows that he; [prox] is sick'
(5) John kiske·yihtam e·-a·hkosiyit.
    know 3-inan    be sick obv
    'John; [prox] knows that he; [obv] is sick'

Cree also distinguishes proximate and obviative third person possessors. A singular proximate possessor is indicated by the prefix o- on the possessed noun, plural proximate possessor by o- -iwa·w, and obviative possessor by o- -iyiw. [5] NPs possessed by third persons are obligatorily obviative: the obviative suffix -a attached to animate nouns follows the possessive suffix, if any.
In the above example, the possessor of 'father' is proximate and the possessor of 'car' (which is an animate noun) is obviative. Again, the distinction between proximate and obviative functions like switch-reference with respect to the proximate third person.

For examples of relative clauses see (1), which contains two relative clauses, one with an NP head, the other with a locative head. Both obviative NPs in (1) occur in the relative clauses, while the subject of the matrix verb is proximate. It is not necessary, however, for the proximate third person to occur in the highest clause of the sentence, as seen in the following example from Bloomfield 1934 (p. 96).

(7) e·kwa pe·-na·tima·wa o·hi ka·-ki·-nipaha·t and fetch.pass obv this.obv kill 3-obv 'And the ones [obv] whom he [prox] had killed were fetched, ...'

Here the higher verb is pe·-na·tima·wa 'they [obv] were fetched', a passive verb inflected for an obviative subject. It is followed by a relative clause o·hi ka·-ki·-nipaha·t 'the ones [obv] whom he [prox] had killed'. The proximate third person is subject of the lower verb, and the object of that verb is obviative. The object of the lower verb is also the head of the relative clause, which functions as subject of the higher verb 'be fetched'. Heads of relative clauses must have the same obviation value in both the matrix clause and the relative clause: since the head is here obviative in the relative clause it must also be obviative in the matrix clause.

When there are two distinct third persons, the one that is singled out as proximate is selected not on the basis of its structural position, but rather on the basis of discourse factors (e.g., discourse topic, focus of empathy, source of viewpoint). (7) is taken from the same text as (1), and the proximate third person in (7) is the boy who is introduced as proximate in (1). The entire story is about the boy; the majority of proximate forms in the text refer to him.
2. Weak crossover

Weak crossover effects show up in a subset of antecedent-anaphor pairings: those in which the antecedent acts as a semantic operator, binding the interpretation of the pronoun. This type of anaphora, bound variable anaphora, is subject to certain constraints not found with ordinary anaphoric reference to a definite NP antecedent. The examples given here focus on quantified antecedents: weak crossover effects may also be seen in English when the antecedent is a wh-element in a question or relative clause, or has been topicalized. All these constructions contain NPs behaving as semantic operators. Reinhart 1983 argues that some cases of definite NP antecedents also behave as semantic operators, binding pronouns in their scope. This point is returned to below.

A pronoun whose antecedent is a quantified NP has no independent reference, but instead is interpreted as a variable dependent upon the antecedent. [6] For example, the sentence below may be paraphrased as "for each x, x = a woman, x hoped x would win the lottery".

(8) Each woman; hoped she; would win the lottery.

Bound variable anaphora is subject to certain constraints on the relative position of antecedent and pronoun. While anaphoric reference to a definite antecedent may occur across sentence boundaries, bound variable anaphora cannot.

(9) Bill; loves his; mother.
    He; calls her every weekend.
(10) Everyone; loves his; mother.
    * He; calls her every weekend.

Even within a single sentence bound variable anaphora is more constrained than anaphora involving a definite antecedent. In particular, sentences in which neither the antecedent nor the pronoun c-commands the other are grammatical if the antecedent is definite, but ungrammatical if the antecedent is quantified. These are the weak crossover cases.

(11) His; mother loves John;.
    * His; mother loves every boy;.
    Every boy; loves his; mother.

In English, the presence of the VP node prevents the object from c-commanding the subject: the first branching node dominating the object is VP, which does
not dominate the subject. This well-known structural asymmetry of subjects and objects in English is reflected in bound variable anaphora: if a quantified antecedent is subject, it may bind a pronoun in the object, but an object antecedent cannot bind a pronoun in the subject.

Cree is a non-configurational language with no VP. Subject and object NPs c-command each other, as seen in the following diagram of the structure of (2).

(12)

S

V

NP

nakate•w

mahke•si•sa

wi•sahke•ca•hk

The symmetrical clause structure of Cree is reflected in patterns of bound variable anaphora. A quantified NP object may serve as antecedent for the possessor of the subject, just as a quantified subject may bind the possessor of the object.

(13)

namo•ya awiyak wanikiskisitotawe•w otawa•simisa
no one forget 3-obv his child obv
‘No one [prox] forgets his [prox] children [obv]’

(14) namo•ya awiyak wanikiskisitota•k otawa•simisa
no one forget obv-3 his child obv
‘His [prox] children [obv] forget no one [prox]’
(i.e., No one is forgotten by his children)

In both (13) and (14) the quantified antecedent is namo•ya awiyak ‘no one’, which is proximate. In (13) the antecedent is subject; in (14) it is object. As stated above, possessed NPs are obligatorily obviative, reflected by the nominal suffix -a and by the verb inflection. Again, the use of proximate possessive inflection ensures that the possessor is coreferent with namo•ya awiyak ‘no one’. The possessor cannot have an exophoric reading.

The same pattern holds with universal quantification of the antecedent. There is no singular quantifier in Cree corresponding to each or every; universal quantification is expressed instead by kahkiyaw ‘all’.
(15) kahkiyaw iskwe·wak sa·kihe·wak ota·nisiwa·wa
all woman pl love 3p-obv their dgtr obv
'All women [prox] love their [prox]
daughters [obv]'

(16) kahkiyaw iskwe·wak sa·kihikwak ota·nisiwa·wa
all woman pl love obv-3p their dgtr obv
'Their [prox] daughters [obv] love
all women [prox]
(i.e., all women are loved by their daughters)

The antecedent need not precede the possessed NP:

(17) otawa·simisa wanikiskisitota·k namo·ya awiyak
his child obv forget obv-3 no one
'His [prox] children [obv] forget no one [prox]

(18) sa·kihikwak ota·nisiwa·wa kahkiyaw iskwe·wak
love obv-3p their dgtr obv all woman pl
'Their [prox] daughters [obv] love
all women [prox]

Furthermore, objects of transitive verbs may float quantifiers to preverbal position (Dahlstrom 1986). The quantifier and head noun thus need not even form a constituent:

(19) kahkiyaw sa·kihikwak ota·nisiwa·wa iskwe·wak
all love obv-3p their dgtr obv woman pl
'Their [prox] daughters [obv] love
all women [prox]

There is also no asymmetry if the antecedent is a wh-element. The examples below show a wh-element as subject binding the possessor of the object, and the wh-element as object, binding the possessor of the subject. (Wh-words are always clause-initial, but there is no evidence that this is the result of a movement rule.)

(20) awi·na e·sa·kiha·t oma·ma·wa?
who love 3-obv his mother obv
'Who [prox] loves his [prox] mother [obv]?'
(21) awi·na e·sa·kihikot oma·ma·wa?
who love obv-3 his mother obv

It must be emphasized that the verb forms in (14), (16), (17), (18), (19), and (21) are active verbs, not passives. Syntactic arguments supporting this claim are given in Dahlstrom 1986.
Although bound variable anaphora in Cree does not display subject-object asymmetries, in other respects it behaves like bound variable anaphora in English. Pronouns bound by quantified antecedents do not have a reading of independent reference: the following sentence may be paraphrased as "there is no x such that x hits x’s wife”.

(22) namo·ya awiyak pakamahwe·w wi·wa.
    no one     hit 3-obv his wife obv
    ‘No one [prox] hits his [prox] wife [obv].’

Furthermore, quantified antecedents may bind pronouns only within the sentence. A pronoun in a subsequent sentence cannot be interpreted as referring back to the quantified antecedent.

(23) namo·ya awiyak pakamahwe·w wi·wa.
    no one     hit 3-obv his wife obv
    * ma·ka otawa·simisa a·skaw pakamahwe·w.
    but his child obv sometimes hit 3-obv
    ‘No one [prox] hits his [prox] wife [obv].
    * But sometimes he [prox] hits his [prox]
    children [obv].’

In general, proximate pronominal forms are obligatorily coreferent to c-commanding proximate antecedents whether the antecedent is definite or quantified. This is reminiscent of Reinhart’s (1983) analysis of some definite NPs in English acting as semantic operators binding the pronouns they c-command. According to Reinhart, this may be seen in VP deletion sentences which allow a "sloppy identity" reading. The following example is taken from Reinhart 1983, p. 150.

(24) Felix hates his neighbors and so does Max.

This sentence has two readings: the strict reading is that Max hates Felix’s neighbors, and the sloppy reading is that Max hates Max’s neighbors. Reinhart represents the sloppy reading as follows, in which Felix and Max are operators binding variables:

(25) (\(\lambda x(x \text{ hates } x’s \text{ neighbors})\))(Felix)
    and (\(\lambda x(x \text{ hates } x’s \text{ neighbors})\))(Max)

In the strict reading of (24), on the other hand, his is not a bound variable; rather it has a fixed referent of "Felix".
If proximate pronominal forms are variables bound by proximate antecedents, similar patterns should be found in Cree. However, this is not borne out. The interpretation of deleted material allows only strict readings, and not sloppy readings:

(26) John sa·kihe·w okosisa, wi·sta mi·na George love 3-obv his son obv he.too also 'John [prox] loves his [prox] son [obv], and so does George [prox].'

The reading of the above sentence is unambiguously that George loves John’s son, and not that George loves his own son. In other words, the pronominal possessor has independent reference, just as in the reading of (24) which does not involve bound variable anaphora. This argues against assimilating all cases of intrasentential proximate anaphora to bound variable phenomena. [7]

Cree has a flat, symmetrical clause structure and a corresponding lack of subject-object asymmetries in bound variable anaphora. Though the system of obviation provides a means of tracking third person reference in the constructions discussed here, the obligatory coreference between proximate pronominal forms and definite antecedents appears to be a phenomenon distinct from that of binding by quantified antecedents.

Notes

* Thanks to Madeleine Greyeyes Dennison and John Starblanket, who provided examples quoted here, and to Cathy O’Connor, for discussion of the issues involved. In the examples taken from Bloomfield 1930, 1934, I have omitted word-final h to conform to the current orthography.

1. The system of verb inflection is complex and interesting in its own right; see Wolfart 1973 or Dahlstrom 1986 for details. However, the internal organization of the inflectional system does not bear upon the issues discussed here. Categories marked on the verb will simply be indicated in the interlinear glosses without breaking down the inflection into component morphemes.

2. See Bresnan and Mchombo 1985 for discussion of agreement versus incorporated pronouns.

3. Both subject and object may be marked obviative: Dahlstrom 1986 discusses some textual examples of this. It is impossible, however, for both subject and object
to be proximate.
4. (2) is taken from a text in Bloomfield 1930 (p. 36) in which the trickster Wisahkechahk challenges Fox to a race. (3) has been made up for the purposes of this discussion.
5. The third person possessive prefix is o- before consonant-initial stems. Before vowel-initial independent stems it is ot-; before vowel-initial dependent stems (those requiring a possessor) it is w-, or φ if the stem begins in o(.).
6. I am here ignoring the E-type pronouns of Evans 1980.
7. In (26) George is proximate. If this NP were obviative, the pronoun wi-sta 'he too' could not be used; the reading would then be that John loves both his son and George.

Bibliography
Stress and Vowel Harmony Domains in Turkish
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The paradox, however, is that sciences exist, in countless number...systems abound, unbelievable systems, beautifully constructed, or else sensational in effect.

-Borges. Tlön, Uqbar, Orbis Tertius

Introduction

It appears only natural to assume a unified treatment of word-stress and vowel harmony in Modern Standard Turkish, since both processes appear to be word-based. Word stress falls on the rightmost syllable in unmarked forms, while the domain of vowel harmony is equated definitionally with the domain of the word.

This paper contends that stress and vowel harmony in Modern Standard Turkish are non-unified processes, each of which requires specification of its own domain of application. Such a view will not seem unusual to adherents of autosegmental or tiered approaches to phonology. The larger topic of this paper is a study in the history — or perhaps historiography — of how a shift in theoretical perspective towards a tiered analysis enables us to exclude two earlier analyses of certain anomalous suffixes in Turkish as artifactual. These analyses viewed suffixes which do not take stress or 'permit' stress to shift through them towards the right boundaries of words as enclitics or as marked with a special boundary or a unique phonological property.

I will begin with an examination of the two hypotheses about stress-anomalous suffixes in Turkish and sketch a proposal for dealing with them in a tiered framework. I will then briefly look at vowel harmony domains and show how they are not equatable with stress domains. Finally, I will suggest a reason for why what I believe to be essentially incorrect or artifactual analyses of stress have emerged.

1. Stress-anomalous forms as enclitics

Unmarked stress in Turkish, an exclusively suffixing language, maintains its position on the right margin of forms: 1

1. át     'horse'
    atlár     'horses'
    atlárím     'my horses'
    atlárímzdá     'on our horses'
    atlí     'horsman'

The stress anomalous suffixes never carry main stress and do not allow it to 'pass through' them. Prominent among the 14 such forms (the figure is taken from Lewis 1967) are the Negative (NEG), Interrogative (INT), and Copula (COP) suffixes. I am excluding the non-final stress of vocative and imperative forms here as special cases of morphological conditioning.

2. gelejék     'he'll come'
    gélimiénjejk     'he won't come'
    gelîr     'he's coming'
    gelîrmî     'is he coming?'
    gelîrsin     'you are coming'
    gelîrmsîsin     'are you coming?'
    emíjn     'certain'
    emínîm     'I'm certain'

Lewis makes a distinction between enclitic suffix and enclitic word which is based on Turkish orthography and which I shall for the moment ignore here.
Although there are interesting problems associated with other stress-anomalous forms, I will limit myself in this paper to dealing with the verbal affixes noted above. Lewis claims that the entire set of forms is enclitic, and defines the term as follows: "... [enclitics] themselves are never accented but throw the accent onto the preceding syllable" (p. 23). He notes further:

Part of the controversy about Turkish accentuation is over the question whether these suffixes are properly described as enclitic or atonal, i.e., without accent.

Lewis’s claim that this class is enclitic rests on the stress patterning of compounds followed by a stress-anomalous form. His example follows:

3. bâš bakân ‘prime minister’ : bâšbakánla
   head minister

This form shows typical compound stress, in which the leftmost of two primary word stresses is primary in the compound. When suffixed with -la ‘with’, Lewis claims that ‘the accent before -la [is] at least as noticeable as that on bas’, which suggests that the suffix is correlated with the stress on the syllable before it, or, in Lewis’s terms, ‘throws the accent onto the preceding syllable’.

Though it is not unfeasable to treat clitics dynamically, clitics have been traditionally viewed as unstressed morphemes perceived as bound – but not suffixed – to another form. Our understanding of clitics is far from complete, but several definitions selected from the literature show the consensus.

An atonic form which is treated as if it were part of the preceding word is an enclitic. (Bloomfield 1933, p. 127).

A word in an unstressed form attached to another word which carries the stress. (Hartman and Stork 1972)

[clitics are] neither full words nor, in the strict sense, merely prefixes or parts of a word. Instead they belong to an intermediate class ... unaccented words which must lean for support (the term ‘clitic’ is ultimately from the Greek word for ‘leaning’) on a neighboring full word in their construction. (Matthews, 1974, p. 168).

... bound morphemes attached to (free) words. (Zwicky and Pullam 1983).

These definitions reflect two widely accepted characteristics of clitics: (1) they are alternate or suppletive forms of free morphemes which may be (a) reduced, unstressed alternants of stressed, unreduced forms (as in English is/‘s), (b) unstressed and unreduced alternants of stressed forms (as in Modern Greek (Warburton 1977)), or (c) unstressed suppletive alternants of stressed forms (as in French mot/je, and (2) they are perceived as forming a phonological unit with their hosts, this perception arising out of the fact that they form a single stress-group with the hosts.

Another claim about clitics emerges in the discussions by Matthews 1974 and Kaisse 1981: clitics are positioned by syntactic rule and do not form part of morphological operations. In other words, there is no host-clitic paradigm (see Zwicky and Pullam’s Condition A, below).

By these criteria alone, the majority of suffixes in Lewis’s list are suspect as enclitics. Only -la ‘with’ is a reduced form (of the postposition üle), though the copula forms can be interpreted as resulting from the reduction of a
verb+person suffix as will be noted below. Nor are they unstressed alternants of stressed forms (again with the exception of -la). Nor do they always lean on free forms (again -la does; it is a true clitic). To my ear, its perceived stress equivalency with its host varies with syntactic position and degree of emphasis. One Turkish consultant insists that the main stress is on bağ, as in other compounds, even when -la is affixed. But there are more extended reasons for not considering the stress-anomalous suffixes of Turkish to be true enclitics.

In the recent literature, a number of general principles for defining clitics on the basis of their combinatorial properties and morphophonological patterning have been proposed. Both Kaisse 1981 and Quicoli 1982, for example, refer to the principle known as Wackernagel’s Law — that clitics occur in ‘second constituent position’. Quicoli also proposes that clitics ‘gravitate’ around verbs.

Some of the Turkish stress-anomalous suffixes do form part of the verbal complex, and others do occur in second constituent position. However, there are many examples of true affixes which also occur with verbal forms and/or in second constituent position in Turkish, so these criteria are not enough to classify the stress-anomalous forms one way or the other.

Zwicky and Pullam (1983) (ZP) propose a set of five conditions which distinguish between clitics and affixes. I review these criteria below, comparing ZP’s examples from English with some from Turkish; I also include examples from Serbo-Croatian and Portuguese for purposes of expansion and comparison. (Further proposals in Zwicky 1985 deal with distinguishing clitics from words — I will not deal with these here).

ZP Criterion A: Clitics show low degree of selection with respect to their hosts. (The ‘promiscuity principle’ — clitics occur with various types of lexical or even phrasal categories)

English. ’s ‘is’, ’s ‘has’ and ’ve ‘have’ occur enclitically after prepositions, verbs, adjectives, nouns, and pronouns.

Serbo-Croatian. Pronoun clitics show full and reduced forms. Among them are njega/ga ‘him, it’ Accusative; nju/ju/je ‘her, it’ Accusative. The pronoun clitics occur regular in second constituent position and so follow various hosts; they can also follow each other. Examples: Vidim ga ‘I see him’; *Ga vidim. Znam da ga znate ‘I know that you know him’; *Znam da znate ga.

Portuguese. Among the pronoun clitics, third person masculine o and feminine a direct object pronoun clitics alternate with the full forms ele and ela, respectively. These forms occur in second-constituent position: tenho-o ‘I have it’, não o tenho ‘I don’t have it’, Onde o vendem ‘Where do they sell it?’. In speech, unstressed forms also occur preverbally: o vejo ‘I see him’, but stressed forms occur postverbally: vejo ele/ela.

Turkish. The negative -me follows the derived verb stem and is always followed by aspectual suffixes and tense: démek ‘die’, démek ‘not die’, öldürmek ‘kill’ öldürmek ‘not kill’. The interrogative mi co-occurs with virtually any form. It could be argued that underlying its appearances with diverse hosts is an optional copula, so that the presence of the interrogative really reflects a copula phrase and not a promiscuous clitic. In verbal derivations, the position of the interrogative marker is fixed after the derived stem, (optional) negative marker, and aspect markers. There are no forms like *get-mi-iyor?, where mi is the interrogative.

ZP Criterion B: Arbitrary gaps in the set of combinations are more characteristic of affixed words than of clitic groups.
English. No examples of arbitrary gaps. General combinatory principles prevail.

Serbo-Croat. General combinatory principles prevail here as well, with one exception that may be a gap. The clitic copula forms (which serve as auxiliaries) are the first clitic to appear in subordinate clause forms; *Znam da ste mi ga dali I know that are (aux) him it given 'I know that you gave it to him', but the 3PS copula clitic *je is preceded by other clitics: Znam da ti ga je dao 'I know that he gave it to you'. Is this a gap or just a complex set of placement rules?

Portuguese: Ordering of clitics by general principles.

Turkish. Strict ordering of all suffixes.

ZP Criterion C. Morphophonological idiosyncracies are uncharacteristic of clitics and their hosts.

English. No morphophonological idiosyncracies noted.

Serbo-Croatian. No morphophonological idiosyncracies noted, with the functionally explicable exception of the dissimilation of 3PS F ACC clitic *je to ju when it precedes the 3PS copula aux *je: on ju je video he her is (aux) seen 'He saw her', not *on je je video.

Portuguese. Several anomalies appear to contradict the criterion here. The 3P clitic forms o, a, os, as, when following a verb which terminates in the coronal continuants r, s, or z, appear as lo, la, los, las, and the verb-final coronal is deleted. After nasal-final verb stems (including stems with nasal vowels), the clitics appear as no, na, nos, nas:

damos: damo-los
beber: posso bebe-lo

Turkish. The anomalous stress patterning of these forms in itself constitutes a major morphophonological idiosyncracy.

Also note the morphophonological change in the low-vowel negative -me when followed by a y (though it may well be that this change is nothing more than a low-level or postlexical phonological rule):

git 'go'
gittim 'I went'
gitmedim 'I didn't go'
gitmiyordum 'I wasn't going'

ZP Criterion D: Semantic idiosyncracies are uncharacteristic of clitics.

English, Serbo-Croatian, Portuguese. Clitic forms are unidiosyncratic semantically.

Turkish. The 3P copula form shows a semantic idiosyncracy. In spoken forms, when it is omitted, the form is unmarked (examples from Lewis, p. 98): bahcedeler 'they are in the garden' (bahçe 'garden', -de Locative, -ler Plural). When employed other than to avoid ambiguity, the 3P copula expresses emphasis or supposition: bahcededirler 'they are in the garden' or 'they are surely in the garden' (the latter also bahcedelerdir).2

ZP Criterion E notes that syntactic rules cannot affect clitic groups, which seems to hold across all the languages noted here.

ZP Criterion F claims that clitics can attach to material containing clitics, but affixes cannot. Again, this holds for English, Serbo-Croat, and (?) Portuguese, but in Turkish we can find affixal material following the stress-
anomalous negative morpheme:

\[
\begin{array}{ll}
gitměk & \text{'to go'} \\
gitmemek & \text{'not to go'} \\
gitmemekte & \text{'in not-going'}
\end{array}
\]

In the third form, the -te is an inflectional (locative) suffix. If the negative is an enclitic, ZP Criterion E is violated.

The form \textit{gitmipormusunuz} 'aren't you going?' shows the negative -me (here, morphophonemically \textit{mi}) followed by the aspectual -iyor and the interrogative -mu followed by the 2PPL inflection -sunuz. Again, ZP E appears to be violated, if the negative and interrogative forms are classed as clitics.

If the definitions above reflect a consensus of received wisdom, and the ZP criteria reflect at least tendencies if not absolutes (as some of the conflicting data suggests), Lewis's definition of enclitics is seen to be informal and idiosyncratic. Although theoretically workable, this dynamic view is not necessary to account for the presence of stresses on the preceding syllable.

2. Stress-anomalous forms with special properties

A second tradition of analysis does not directly treat these verbal suffixes as enclitics. Perhaps there was a reluctance to label as enclitic many forms which (a) could themselves be suffixed and (b) are not found as free morphemes in unreduced or stressed form.

The line of development here is from Swift 1962 to Lees 1961 (who attributes the idea for his analysis to communication with Swift) to Foster 1969, all of whom divide Turkish suffixes into two classes, \textit{unstressable} vs \textit{stressed} syllables (Swift), \textit{unstressed} or \textit{weak} versus \textit{stressed} or \textit{strong} suffixes (Lees), or \textit{prestressed} versus (?) \textit{stressed/stressable} suffixes (Foster).

The Swift-Lees-Foster (SLF) approach views these suffixes as containing some inherent property which prevents stress from applying to them, and thus is descriptively different than Lewis's dynamic approach. In Swift's terms:

A syllable belongs to the unstressable class when none of the alternates of the morpheme contains stress on the syllabic (\textit{sic}) in question. (p. 42)

Lees effects stress by an assignment-and-reduction algorithm too lengthy to present in detail here. The overall result effectively assigns primary and secondary stress. The key to assigning these stresses is the presence of various boundary types and diacritics which are crucial to the formulation of the stress rules:

We first specify the stress feature for all [native] vowel phonemes by introducing stress on all harmonic-base vowels; by a second rule we then strengthen to primary the stress of the last vowel of any base morpheme preceded by the harmonic or the composite-verb juncture [which is introduced by the rules which generate composite verbs in the syntactic component] (p. 42).

and

An unstressed, or weak, suffix normally requires an immediately preceding primary stress.

The end result is that some nonfinal stresses are assigned before the special word boundary \( \text{\_} \), and some are assigned before the suffixes marked as weak
Foster employs a feature diacritic, [prestress], which the appropriate suffixes contain in their feature representation. He also assigns the feature to word boundaries in order for them to trigger stress on word-final syllables without recourse to curly-bracket notation.

Each of these analyses in its own way assumes pre stressing to be a property of the suffix in question. They claim, in effect, that the suffix-type (or suffix boundary, which is a diacritic indicating suffix-type since no reference is made to the constituent structure of these forms) blocks the passage of stress. In this sense, though they are descriptively different from Lewis’s dynamic approach, they are not different in principle from his analysis, which also assigns a special property (that of shifting stress back onto the preceding syllable) to these suffixes. The SLF tradition approaches treating these forms as clitics, but stops just short. Clitics appear not so much to block regular stress rules from applying but are rather exempt from stress rules; stress application to their host forms is regular. In other words, clitics act as unaffixed words which are not part of the phonological form undergoing stress assignment—a fact frequently reflected in their orthographies.

In Turkish, these stress-anomalous forms appear to reflect this aspect of clitic identity in that they are exempt from the stress rules, but there are crucial differences: they may be followed by other suffixes, and they are subject to vowel harmony. At the same time, forms containing these affixes all parallel the stress pattern of compounded forms, in which primary stress falls on the leftmost of multiple stresses and the rightmost stress reduces. This pattern is manifest in all compounded forms, whether they are NN, NV, Adj N, or reduplicated Adv:

<table>
<thead>
<tr>
<th></th>
<th>NN</th>
<th>NV</th>
<th>Adj N</th>
<th>Adv Adv</th>
</tr>
</thead>
<tbody>
<tr>
<td>domúc etì</td>
<td>devám etmèk</td>
<td>tahtá kutù</td>
<td>čabúk čabúk</td>
<td></td>
</tr>
<tr>
<td>‘pork’</td>
<td>continue do</td>
<td>‘(to) continue’</td>
<td>quick quick</td>
<td>‘very quickly’</td>
</tr>
<tr>
<td>pig meat-3PPoss</td>
<td>wood box</td>
<td>‘wooden box’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It was this parallelism, among other factors, which led to the independent proposals of Dobrovolsky 1976 and Ozkarağöz 1981 to treat stress anomalous forms as separate phonological words (though not as enclitics), and allow final stress application to proceed regularly. Underhill 1976 refers to the stress-anomalous forms as ‘unaccented’ (p. 34) but also notes (p. 117) that the stress patterning ‘can be accounted for by the compounding rule’.

Since those widely ignored proposals, many changes have been made in the treatment of metrics. Stress assignment in Turkish can currently be handled by any one of three approaches: Selkirk 1980, Prince 1983, and in a lexical phonology framework such as that recently proposed by Hameed 1985 (though H. does not directly address the problems raised here). It is not the object of this paper to compare the validity of these competing approaches, though Turkish might provide an interesting test case. The figure at the end of section 3 shows the derivation of multiple stresses on a verb form in an adaption of the margin-stressing framework proposed by Prince 1983. In this approach, while the word boundary marks the end of the stress domain on the word form, internal ‘word’ domains are also present which allow right-margin stressing to proceed regularly. These domains are sensitive to the constituent makeup of the forms and so are not characterized by special boundaries or diacritics; the boundaries instead are assigned by the constituent structure.
In the case of Turkish, these verb-internal domains (indicated by $\mathfrak{w}$ in the figure) are made up of the negative and those suffixes which attach to it when it is present (for instance, the aspect suffixes) and the interrogative and copula groups. The leftmost of these stresses is reinforced on the next level of stress application (here marked with a C for 'compounding') as in any other phonological compound in Turkish. When these verb forms are placed in larger syntactic construction, right margin stressing again applies at the P or 'phrasal' level to reinforce the rightmost stress. In other words, there is a switching of margin stressing from right to left to right on the successive domains of phonological word, compound, and phrase.

This approach captures all word, compounding, and phrasal stressing, including that of double compounds such as $\text{Ankara vilayeti merkez bankas}i$ 'Ankara province central bank', in which the individual compounds $\text{Ankara vilayeti}$ and $\text{merkez bankas}i$ show leftstress, but the full form is phrasal in character and shows main (right)stress on $\text{merkez}$ (note that in the underlyingly non-final stressed forms $\text{Ankara}$ and $\text{ban}ka$, the stresses remain on the non-final syllables). This phrasal character of doubly compounded forms also surfaces in forms like $\text{kitab okumak}$ '(the) not-reading of books', the negative of the compound $\text{kitab okumak}$, 'book reading'. While the positive form shows expected leftstress, the negative is phonologically doubly compounded due to the presence of the negative stress domain in the verb form, and so the final form shows right-margin mainstressing. The approach I am outlining here also rejects – at least tentatively – the claim made in Klavans 1985 that these stress anomalous suffixes are clitics which first undergo suffixing and are then attached to their host (although I agree with her additional claim that they would be incorrectly viewed as endoclitics). By specifying stress domains on the basis of verb internal morphological structure, we are not obliged to view these forms as clitics.

3. Vowel Harmony Domains

Verbal forms do not always show a match between the domains of stress-groups and the domain of vowel harmony. The domain of vowel harmony is correlated with that of the word; vowel harmony does not spread across word boundaries in Turkish. But there are cases of verbal forms which do not show a match between word-internal vowel harmony and word boundary domains.

As is widely known, Turkish vowel harmony is of two types. Low vowel harmony takes place along a front-back axis, and shows only two alternates $\imath$ and $\partial$, which correlate with the backness feature of the preceding vowel. $\imath$ shall represent these alternations archiphonemically with E. High vowel harmony is sensitive to the rounding of a preceding vowel as well as its backness. It shows the alternates $\ddot{\imath}$, $\dddot{\imath}$, $\dddot{\imath}$, and $\dddot{\imath}$, and is represented archiphonemically as $\dddot{\imath}$.

5. a. gidiyorum 'I am going'
   görüyorum 'I am seeing (it)'
   b. abalabilirim 'I can take'
   görebilirim 'I can see (it)'

The examples in (a) show the progressive aspectual suffix $-\dddot{\imath}y{\dddot{o}}r$, which contains a back rounded vowel, affixed to front unrounded and front rounded vowel verb stems. Suffixes following the aspectual affix conform harmonically to its vowel. The examples in (b) show the 'potential' suffix $-\dddot{\imath}yE{\dddot{b}il}$ ($\dddot{\imath}yE{-}bil$ in some analyses) with its high front unrounded vowel affixed to a back vowel verb.
stem and a front rounded vowel verb stem. Again, the expected word domains of back and front vowel harmony, respectively, are broken up, and suffixes following the harmony-anomalous affixes conform to the ‘new’ vowel. The break in domain is of course internal to the word domain. For a thorough analysis of anomalous vowel harmony in Turkish, see Clements and Sezer 1982.

The parallels with stress assignment are straightforward. Once again, but here perhaps more obviously, it is necessary to allow distinct domains of application word-externally in order to correctly specify the general application of a rule on a free form. The Potential suffix is particularly interesting, since it shows that the anomalous vowel domain may not be a property of the whole morpheme, but begins with a specific morpheme-internal syllable. When preceded by a vowel-final stem, the first vowel of the suffix is preserved by the presence of an underlying y (otherwise deleted after consonant final stems), and it undergoes the expected vowel harmony pattern:

6. a. ana-  
anliyabilir 'understand' (where a + i/___y)  
b. oku-  
okuyabilirim 'I can read'  

The forms cited here also show that the domains of stress and vowel harmony do not match, and that varying domains of application must be specified within the boundaries of a single word form.

7. aliyorum 'I'm taking (it)' (in one dialect)  
aliyorum 'I'm taking (it)' (another dialect)  
alabilirim 'I can see'

The following figure shows this autonomy of specification for stress assignment and vowel harmony. The form displayed is onu bulabilir misin ‘can you find it?’

<table>
<thead>
<tr>
<th>STRESSING</th>
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</thead>
<tbody>
<tr>
<td>P</td>
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<tr>
<td>C</td>
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<tr>
<td>W</td>
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<tr>
<td>σ</td>
</tr>
<tr>
<td>onu bulabilirmisin</td>
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<tr>
<td>σ</td>
</tr>
<tr>
<td>+rd</td>
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<tr>
<td>HW</td>
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<td></td>
</tr>
</tbody>
</table>

VOWEL HARMONY

Structure: ## on + u # bul + a bil + i r + mi + sin ##

it + OBJ find + POTENTIAL + AORIST + INTERROGATIVE + 2P SING COP

4. The word is a clustering of domains

The word as a linguistic primitive is indispensable to the analysis of both stress and vowel harmony in Turkish. Word boundaries determine the placement
of the last stress in a form, and vowel harmony does not cross word boundaries. I have claimed that one analysis of stress has led to a dubious assignment of clitic status to certain suffixes in Turkish, while another line of analysis has proposed unnecessary mechanisms for assigning stress in the form of ad hoc boundaries and diacritics. Why did this come about? I believe the cause lies in our attachment to the idea of the word as a unitary domain. Both traditions attempted the impossible feat of trying to preserve the word as a unitary form and break it up into domains of application at the same time within a linear framework of analysis. As a consequence of this, special properties had to be assigned to affix types or special boundaries inevitably multiplied.

Once it is allowed — for better or for worse — that the unitary free-form word may be made up of a number of autonomous phonological domains, a different view of the relationship of various phonological processes can emerge. In the case of Turkish, this view permits stress assignment on both putative universal (margin stressing) and evident language specific (alternate margin stressing) grounds, and also permits some tentative universal definitions of clitics to be maintained. Although it may well be claimed that the stress-anomalous affixes of Turkish are ‘funny’ clitics, a tiered analysis employing independent domains shows that many of the forms need not be treated as clitics at all.

FOOTNOTES

Thanks are due to Herb Izzo for help with Portuguese, and to Sabahat Tura and Karl Zimmer for valuable comments on this paper. They bear no responsibility for the outcome. I wish Ellen Kaisse had said more.

1. Anomalous stresses on borrowed forms and other types of non-final stress need not be considered here. See Sezer 1981 for a thorough treatment of this phenomenon.

2. It might be felt that this example reflects differences in suffix ordering, but I don’t believe this is the case. The order here more likely reflects the fact that the copula can be inflected for plurality.

3. For another interpretation of boundaries and their relationship to various phonological rules in Turkish, including stress, see Kardestuncer 1982, which I have unfortunately not been able to incorporate here due to space limitations.

4. Though there are some apparent cases of clitic placement affecting accent, as in Classical Greek (Klavans 1985, p. 98). But is this reference to the pitch accent of Classical Greek? And if so, is this accent subject to the same kind of phonological constraints as stress?

5. This is the case in Turkish for the INT, among other forms, which is sometimes written as — and also felt to be — a separate word. It is this fact which leads Lewis (pp. 23–24) to distinguish between clitic suffixes and clitic words.

6. There is a very strong case for treating the copula endings as a part of a separate domain since they optionally appear affixed to the underlying copula verb i– in some instances: hazırdı vs hazırdı ‘he was ready’

7. Thanks are due to Jorge Hankamer for bringing up the issue of kitab okumamak.
8. This is of course a shamefully brief treatment of K's rich and complex set of proposals, excusable only because the aim of this paper is to deal with the motivation behind the Lewis and SLF traditions of analysis.

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Abrupt Transmission Failure in Obsolescing Languages: How Sudden the "Tip" to the Dominant Language in Communities and Families?

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One of the regrettable but interesting things about language death is its long history. It's anything but a new phenomenon, and we have a lot of extinct languages littering the shores of linguistic history to prove it. On the other hand, our own time seems a little curious in one special respect, namely in respect to the number of languages which have persisted with pretty fair strength for what seems like a long period, only to weaken in what seems like a rather short time and suddenly wind up in a downhill toward extinction.

In this country and Canada, for example, some long-established populations with very distinctive customs and languages which have been secure for centuries are suddenly in trouble. The geographical region doesn't seem to matter -- it's the same story regardless of location. Cajun French in Louisiana is in the same trouble as French Canadian in Maine. Pennsylvania Dutch (that is, German) among the secular (non-Anabaptist) Pennsylvania Dutchmen is threatened in the same fashion as Scottish Gaelic in Cape Breton. None of these is a particularly Johnny-come-lately immigrant language -- the oldest of them have been in place for several centuries, and their speaker populations have been relatively loyal and stable, sometimes also reinforced by continuing immigration (this is the case with Canadian reinforcement of the French-speaking population in Maine and Highland Scottish reinforcement of the Gaelic-speaking population in Nova Scotia, whereas the Cajun and Penn Dutch populations seem to have recruited more by absorbing incomers or non-native locals than by major inflows of new immigrants).

In general the twentieth century seems to be notable for the large number of languages which are either obviously dying out or showing marked signs of contraction such as simplifying structure, functional restriction, and loss of speakers at the margins of the community. Whether this century is actually any more characterized by these phenomena, or whether we're only better informed about the number of cases and their wide geographical distribution is unclear.

Some people are inclined to argue that this is a particularly pernicious time for languages which are
isolated, or enclaved, or represented by rather thin populations, or heavily outbalanced by languages of wider currency. People of this persuasion usually point to ease of modern travel, the "global village" phenomenon, the power of the modern nation-state to affect the lives of even its most outlying citizens, the savage thoroughness of the more modern instances of genocide or attempted genocide, the spread of literacy, the penetration of radio and television, and so forth.

I think there is no denying any of these factors. They are all very real and very potent. Anyone who has worked with even a single threatened language can attest to the force of negative policies (or even only negative attitudes) spreading out from a central government and discouraging, or perhaps penalizing, speakers of languages or dialects other than the officially state-promoted language. Similarly the ouster of traditional activities which fostered minority languages -- social gatherings like the ceilidh in Scotland and Ireland, pedagogically-oriented verbal routines such as Aesopian tales, fairy tales, and rhyme genres (all directed toward children) in Albanian-speaking Greek communities (Tsitsipis 1983:27), the most formal styles of public speaking in the Cupeño and Luiseño communities in California (usurped by English; Hill 1973:45) -- by passive or active verbal events which involve only or mainly the state-promoted language has a pronounced, unmistakably deleterious effect on the strength of the minority languages in most cases.

This is the usual outcome, more or less the predictable outcome, and it surprises no one. It's not the inevitable outcome, however, since people seem to be capable of quite remarkable segmentation of their lives, including linguistic segmentation. It's hardly encouraging for a language to be excluded from the schools, ignored in broadcasting, discouraged in public life, and unprovided for in any officially sponsored activities whatever. But in some societies it seems to be possible for people to accept a very restricted role for their native speech form, such that they assume it will be used only in the hearth-and-home sphere: they may even welcome the specialization of their mother tongue as an in-group marker. Where there is a deep gulf between the minority-language group and the dominant-language group, as with certain Native American tribes, the home language may be jealously guarded from members of the majority-language group, treated along with things like religious ceremonials as a privileged form of in-group knowledge, not to be casually exposed to outsiders or
shared with them. There are entire societies in which
the home language has good standing but has been tra-
ditionally restricted in use without any threat to
its ultimate viability (German Switzerland, where
Schwyzertütsch is seldom written and almost never
used in circumstances of any formality is a case in
point), and of course quite a lot of societies exist
in which the language of highest prestige is not the
local language -- most often where religion is involv-
ed, as in many Islamic but non-Arab societies.

Since there are recognized instances of all these
exceptions to any general tendency to succumb to cen-
tralizing dominant-language pressures, the question
may be why there aren't more such exceptions rather
than why there are any. In connection with the rela-
tively long-standing ethnic communities now experienc-
ing survival difficulties in the U.S. and Canada, it
seems to be the temper of the times which works most
against compromises which would allow continuance. De-
spite the "melting pot" myth, special provision for
certain mother-tongue rights of long-established non-
English populations was made in several cases into at
least the early twentieth century: French in Louisiana
(Kloss 1977:112-113), German in Pennsylvania (ibid.: 146-147), Spanish in New Mexico (ibid.: 130-131), for
example. Assimilative pressures have nonetheless been
strong, of course, and the great nineteenth-century
waves of European immigration undoubtedly created ten-
sions for longer-established populations as concerns
were increasingly voiced over the effect of home-
school bilingualism on intelligence and on loyalty
to the national state.

Although functional segregation in language use is
a perfectly feasible way of managing and maintaining
two or more languages, unless the wider community is
one in which this is the norm (as in German Switzer-
land and in Somalia, for example; see Pride 1971 for
the latter case), there seems generally to be little
support for this course and little understanding of
its frequency of occurrence in a good many parts of
the world. In most of western Europe and the areas
colonized by western European nations, the prevailing
attitudes have most definitely not been favorable to
full-fledged linguistic dualism of any sustained kind.

On the basis of my own work with two minority lan-
guages, one in Great Britain and one in the eastern
U.S., and also on the basis of reports from other re-
searchers working in similar settings, I would pro-
pose a rather widespread phenomenon which I have dub-
bed "tip" in describing the British case (Dorian 1981:
51). This phenomenon can be conceived metaphorically
as a gradual accretion of negative feeling toward the subordinate group and its language, often accompanied by legal as well as social pressure, until a critical moment arrives and the subordinate group appears abruptly to abandon its original mother tongue and switch over to exclusive use of the dominant language. Because of the seeming suddenness of the switch-over, it's rather like watching a structure slowly eaten invisibly away at the bottom topple over almost without warning. Yet when the tip has occurred and one begins to examine the period which led up to it, the tip is seldom if ever so sudden as it initially appeared.

The most striking level at which tip occurs is, to my own perception, that of the family. I would like to introduce two cases, one among the Gaelic-speaking fisherfolk of East Sutherland in the extreme northeast of the Highland Scottish mainland and the other among the secular Pennsylvania Dutch of the Hamburg area in Berks County, Pennsylvania. In each of these family cases there were a good many children: 7 in the Gaelic-speaking family, and 12 in the Penn Dutch-speaking family. The parents in each family were skilled bilinguals, but spoke Gaelic and Penn Dutch (respectively) by habit and preference with each other and within the home generally at the outset of their family life. In each of these families the elder children -- the first four of the seven in the Gaelic-speaking family, the first nine of the twelve in the Dutch-speaking family -- were raised as, and became, fully fluent speakers of the parents' original mother tongue. In the Gaelic-speaking family no conscious change in the parents' linguistic behavior toward the three youngest children seems to have taken place, whereas in the Dutch-speaking family there was an acknowledged though unexplained change of that type. In each family the three youngest children emerged as imperfect speakers (or, in the case of the youngest child in the Gaelic-speaking family, as a near-passive bilingual with very little ability to generate utterances in the parental mother tongue).

Several aspects of the two cases are especially interesting. One is that the parents' intentions probably mattered relatively little, since the results were the same in a case where the parents deliberately changed their behavior and in a case where they didn't. The behavior of the peer group outside the family and also the sheer number of older siblings who had attended English-language-only schools and were using a good deal of English among themselves in or around the home most likely had more impact on the language-acquisition patterns of the youngest children.
than the parents' own linguistic behavior or transmission plans, since in both homes the parents continued to use the original mother tongue with each other and with the older children (and with all the children in the Gaelic household). This means that the youngest children received at least a good deal of exposure to that language.

Another interesting facet of the two cases is the clarity of the fully-fluent as opposed to the less-than-fully-fluent demarcation line among the children, and the unimportance of the size of the age-gap where the demarcation line falls. No one in either family is in any doubt about which child is the last of the fully fluent and which is the first of the imperfect speakers. The three youngest children in each family are just as aware of their less-than-fully-fluent status as the older children are, although in the Gaelic-speaking family the three youngest are not particularly sensitive about it whereas in the Penn Dutch family the three youngest mind very much that they are not as competent in Dutch as their older siblings. In the Gaelic family the last of the fully-fluent children is 2 years younger than the next oldest fully-fluent sibling and only one year older than the first of his imperfect-speaker siblings. In the Dutch family the last of the fully-fluent children is three years younger than the next oldest fully-fluent sibling and two years older than the first of the imperfect-speaker siblings.

My data from tests among the Penn Dutch-speaking siblings are not yet fully analyzed. But I can present here two sets of results from testing of the Gaelic-speaking family, offering clear indication of how sharply the fluency line can be drawn between siblings only a year apart in age. In Table 1, Speaker 1 is the mother of the family, Speaker 2 her fourth child, and Speaker 3 her fifth child. Neither child was married; both lived in the mother's household. There is only a year's difference in age between the two siblings. The test was for analogical levelling in four structures, the frequent use of analogically-levelled forms being a notable marker of the imperfect Gaelic of the less-than-fully-fluent. Identical sentences were presented to each of the three speakers, in individual elicitation sessions, for translation from English into Gaelic. (It should be noted that translation is a relatively natural, high-frequency occurrence in a community where kin networks include both bilinguals and monolinguals, since remarks or conversations in one language will often be recounted in translation at a later time to a kinsperson with
Analogically-levelled noun Analogically-levelled verb Analogically-levelled 1st pers. sing. plural (opportunities: 17) stems (opportunities: 16) conditional verb (opportunities: 5)

Speaker 1 1a Ø Ø
Speaker 2 2 Ø Ø
Speaker 3 8 3 5

Analogically-levelled 1st pers. sing. future Total analogically-levelled verb (opportunities: 5) forms: forms # analog. % analog.

Speaker 1 Ø 44 1 2
Speaker 2 Ø 43 2 4.5
Speaker 3 5 43 21 49

Table 1: Analogically-levelled forms supplied by three members of a single Gaelic-speaking household in which Speakers 2 and 3 differ in age by only one year a offered in addition to the irregular, non-analogical form.

whom the language of the original interchange is not the normal language of social interaction). All three of these speakers knew me well, were comfortable with me, and had done this kind of work with me before; I had been around the district over a period of a good many years, and the test sentences were couched in a form of English which was reasonably normal for the local English dialect.

Speakers 2 and 3 may be only a year apart in age, but Speaker 2 is much closer to his mother, 29 years older than he, than to his sister one year younger, in his linguistic usage on this measure.

In Table 2, Speaker 2 is compared with Speaker 3 again and also with Speaker 4, the latter being the next younger sibling, another sister four years younger than Speaker 3 (and so five years younger than Speaker 2). The structures tested (by the same type of elicited translation procedure) were control of three tenses and control of three embedded structures (for discussion of the theoretical difference in the difficulty of the structures concerned, see Dorian 1982).

Although Speakers 3 and 4 show some marked differences in their control of the particular structures tested (Speaker 3 being distinctly better than her sister at using the conjunction 'that' and distinctly worse at forming relative clauses and at construct-
Table 2: Comparison of control of three tenses and three embedded structures by three siblings in a single Gaelic-speaking household

<table>
<thead>
<tr>
<th>Correctly formed</th>
<th>Past</th>
<th>Future</th>
<th>Relative</th>
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<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td>Speaker 2</td>
<td>23 of 23</td>
<td>100</td>
<td>17 of 18</td>
</tr>
<tr>
<td>Speaker 3</td>
<td>24 of 24</td>
<td>100</td>
<td>15 of 18</td>
</tr>
<tr>
<td>Speaker 4</td>
<td>23 of 23</td>
<td>100</td>
<td>16 of 18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correctly formed</th>
<th>'that'</th>
<th>'if'</th>
<th>Conditional</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td>Speaker 2</td>
<td>9 of 9</td>
<td>100</td>
<td>5 of 5</td>
</tr>
<tr>
<td>Speaker 3</td>
<td>8 of 9</td>
<td>89</td>
<td>4 of 5</td>
</tr>
<tr>
<td>Speaker 4</td>
<td>1 of 9</td>
<td>11</td>
<td>4 of 5</td>
</tr>
</tbody>
</table>

|                  | # of errors | opportunities | % incorrect |
| Speaker 2        | 1            | 73            | 1           |
| Speaker 3        | 15           | 75            | 20          |
| Speaker 4        | 15           | 73            | 20.5        |

The number of instances of a given structure sometimes differs across speakers because a particular speaker offered two variants for a particular structure, each of which was recorded, evaluated, and counted in arriving at the tabulation.

The figures here differ very slightly from those recorded for Speaker 3 in Dorian 1982:39, where she appears as WR; results of testing of the future were retabulated and recounted subsequently, with one additional instance recognized for WR.

The really striking difference is between their performances taken together as compared with their brother's. He in fact misproduced only one form in the entire set of sentences, whereas his sisters misproduced 15 each. Overall, then, they performed much like each other, despite the four years between them; the brother, though only a year older than Speaker 3, performed quite differently -- namely like the fully-fluent speaker he is.

For the Berks County Pennsylvania Dutch I can't be certain that intrafamily tip of the dramatic abruptness I found in the 12-sibling group is a frequent occur-
rence, since I worked extensively with two kin networks only. But among the East Sutherland fisherfolk I know of several similar cases where groups of siblings were sharply and abruptly divisible according to full fluency versus imperfect-speaker control of the local Gaelic, even though I undertook close testing of only this one highly available and highly cooperative family. The community at large was well aware of the phenomenon, in fact, and readily identified cases in their own kin networks or others'.

When it comes to tip on the community-wide level, the cessation of home-language transmission can seem equally sudden and surprisingly datable. In the smallest of the East Sutherland fishing villages, for example, I found that people were able to identify the last primary-school class whose members regularly used Gaelic on the playground whenever they were let out to play during the schoolday. The class only one year younger, everyone agreed, might occasionally use Gaelic on the playground, but did so seldom; and they did not typically become, or remain, fully-fluent speakers, whereas their immediate predecessors did. No one could give a particular reason why this change in language behavior should have come exactly when it did, but they agreed on its timing. It was as if a consensus had tacitly been reached among the children -- and that was that. Not merely coincidentally, the brother identified as Speaker 2 in the tables above was a member of the last primary-school class to use Gaelic regularly on the playground, and the sister identified as Speaker 3 was a member of the immediately following class, which did not regularly use Gaelic on the playground. This again suggests that even had the parents in that family made a concerted effort to keep their last three children in the fluent-speaker fold, the climate among the youngsters themselves would have made it an extremely uphill battle. Very strict and very determined parents are certainly known to succeed in producing fluent-bilingual children, and then to succeed in maintaining that bilingual fluency in their children, within communities unfavorable to the phenomenon; but in my own experience most such cases involve either middle-class (often intellectual) parents, or, alternatively, an only child. (One exception which comes to mind did involve a Scottish Gaelic family. They lived in a very isolated district on the west coast of Scotland; the parents were not middle class, nor, so far as I can recall, was there only one child, but the father was considerably older than the norm for a parent in that community and was a formidable and demanding figure in the household life.)
Reports of community-wide tip turn up with some frequency in the growing literature of language shift (see, for example, Gal 1979, Hinojosa 1980, Mertz 1980). Because parents in communities where transmission failure seems sudden often simply decline to raise their children as bilinguals, usually citing concern for the children's success in school or ability to get ahead in the world as reasons (Denison 1971:166-167; Dorian 1981:104; Huffines 1980:52; Pulte 1973:426; Timm 1980:30), some scholars have raised the question of whether the passing of such languages ought rather to be considered "language suicide" than language death (e.g., Denison 1977, Greene 1972). But this is to ignore the long history, usually stretching centuries into the past, of relentless pressure on the non-dominant language.

The Zapotec case presented by Hinojosa (1980) is particularly interesting, because Zapotec in fact showed a relatively unusual degree of resistance to the spread of Spanish among Mexican Indian populations. The Zapotec had been doubly resistant to dominant-language pressure, what is more, since in the pre-Conquest period they successfully fought off the Aztecs and retained their independence and identity to a unique degree (Hinojosa 1980:28). The town of Juchitán, not served by the railroad and the loser in the rivalry for capital-city status in the Isthmus of Tehuantepec, remained strongly monolingual in Zapotec for a surprisingly long time. But in the early 1970s the discovery of oil in a nearby coastal area led to the creation of a new port, Salina Cruz, relatively near to Juchitán. For the first time there was strong economic incentive for Juchitán natives to acquire Spanish, since good jobs became available to those with control of Spanish (ibid.:28, 30). It would seem that the early signs of language shift documented by Hinojosa on the basis of fieldwork done in Juchitán in 1979 might be taken as a rather unambiguous case of a sudden change in language behavior clearly motivated by dramatically new economic factors. The change was sudden, and the economic factors were new and dramatically different.

Yet when one takes into account the long and complex history of language policy in Mexico meticulously traced by Heath in her volume Telling Tongues: Language Policy in Mexico, Colony to Nation (1972), it seems permissible and even necessary to doubt that the change from proud Zapotec language loyalty in Juchitán to sudden willingness to embrace Spanish as the language of economic opportunity could have taken place quite so rapidly without a long and sustained period in which first colonial and then state policy
disvalued the Indian and his language. And if it is true, as Heath reports, that "the Indian had been locked in a caste-like system, which defined his position at the bottom of the nation's socioeconomic hierarchy since Independence" (1972:156), then how much stronger the attraction of a sudden and entirely unexpected opportunity to move out of the lock-in and upward within the socioeconomic hierarchy? Perhaps the abruptness of what looks like an impending tip, leading Hinojosa to speculate on the basis of her findings that "if this tendency continues, the whole community will soon be bilingual and the children will begin to be socialized in Spanish" (1980:38), is abrupt in onset and potential outcome, but not in gestation.

This was certainly what I found to be the case in Gaelic East Sutherland, where the tip clearly took place during the nineteenth century, but the negative attitudes which had prepared the way for that tip could be traced within Scotland for at least six centuries and readily documented for Sutherland itself for a period of over 300 years. Just as the discovery of oil "opened" Juchitán to outside influences and the attendant pressures in favor of Spanish, so the construction of railroads, bridges, and roads in the early nineteenth century and the institution of schools toward the end of the preceding century "opened" East Sutherland to outside influences and to massive pressures disfavoring Gaelic and favoring English. Remote-ness had buffered East Sutherland, as it had Juchitán; but with the loss of that remoteness, the buffering rapidly proved inadequate and centuries of distaste for the indigenous language made themselves felt. In the East Sutherland case, I tried to express this by suggesting that "suddenly, around the beginning of the nineteenth century, Britain came to Sutherland" (Dorian 1981:51).

It is the existence of a long lead-in period which in the end effectively belies the apparent abruptness of transmission failure in communities where a language outside the national linguistic mainstream seemingly turns up its toes so dramatically after persisting with anomalous strength for so long. The failure of linguistic will under these circumstances is a measure of the potency of long-brewing negative pressures and the fragility of isolation as a buffer, since a serious breach of that isolative buffer can produce such rapid decline in a previously resistant population. It's possible that less isolated communities, with longer experience of compromise (for example, such a compromise as the linguistic domain-separation discussed above), have an advantage in survival poten-
tial precisely because they have had a prolonged period in which to learn to cope with pressures for linguistic assimilation. Metaphorically speaking, the more isolated linguistic groups may resemble North American Indian tribes or South Pacific island populations exposed to measles for the first time and carried off in disastrous numbers by the unfamiliar contagion. The measles virus was long in existence, but slow to reach them; when it did, they succumbed with terrible swiftness. In something of the same fashion, the "virus" of hostility to non-mainstream languages may gather strength for a very long time and when it finally breaks through to an isolated community, carry the minority language off in an equally swift and deadly wave of social contagion, producing the phenomenon of linguistic tip.

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NON-FINITE CLAUSES IN CREOLES
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Creole languages have recently become the object of much study, which tries to relate common creole structures to structures universally inherent in the minds of language knowers (see especially Bickerton 1981). This approach, if successful, will yield extremely important and interesting results, and if unsuccessful will still yield interesting results. The creole with which I will be primarily concerned is Tok Pisin, or Melanesian Pidgin English, which is spoken in Papua New Guinea and surrounding areas. The particular history of Tok Pisin and facts about its current behavior allow it to be classified as a currently creolizing stable pidgin (see Sankoff 1985). Therefore, despite its dismissal by Bickerton, Tok Pisin should be considered a legitimate source of evidence for or against his theories concerning creolization. In fact, Tok Pisin may be the best source of evidence for processes native to creolization (if such there be), since we have excellent attestation of the antecedent pidgin phase, something we lack for most creoles. Although the stability of the pidgin phase has resulted in grammatical complications not usually found in classic pidgins, the degree of attestation makes it easier to “factor out” specific pidgin influences on the process of creolization in this case. The debate whether creolization is made up of unique processes or merely normal diachronic changes speeded up by various factors will not be addressed here. In either case, the processes are clearly identifiable and, in the case of Tok Pisin, occurring before our eyes.

Among people who study creoles, it has become a commonplace that all clauses in creole languages are finite clauses (see Bickerton 1980, 1981; Washabaugh 1980; Winford 1985; Woolford 1979, 1980). If this fact is indeed true, it interacts with Bickerton’s theory to yield the interesting result that the finite/non-finite distinction is not basic to universal grammar, but a distinction which must be developed in natural languages. In this paper, I hope to attack this notion by giving evidence that Tok Pisin, as a result of creolization, is developing a clausal finite/non-finite distinction. This fact, in turn, would constitute evidence for the stance that this distinction is basic to the syntax of creoles and hence, if Bickerton is correct, universal grammar. Further evidence from various Caribbean English Creoles will also be discussed and shown to be consistent with this analysis.

The evidence for a clause being non-finite can be threefold: morphological, syntactic, and/or semantic. Morphological evidence for clausal non-finiteness, for languages which inflect for tense, mood, and aspect, is the verb lacking the inflectional tense/mood/aspect morphology or, for languages which lack verbal inflection, the clause lacking whatever tense/mood/aspect markers that it usually has. Syntactic evidence for clausal non-finiteness is the clause’s being subordinate and its inability, with or without its complementizer, to be used as an independent clause. Semantic evidence for clausal non-finiteness is, traditionally, the clause’s lack of tense, modal, or aspectual interpretation independent of that of the clause in which it is embedded. Stowell (1984) showed by examples such as (1) that English non-finite clauses are divided as to this trait:
A better characterization of the distinction is that it is the syntactic realization of the semantic realized/non-realized action distinction, which will be treated here as a privative opposition with "realized" being the marked member of the opposition.

In English, we have all three kinds of evidence. In infinitives, none of the verbs of the auxiliary-main verb chain can be tensed, although the tense and aspect auxiliaries have and be may appear as in to have eaten or to be eating. These clauses are always subordinate and, furthermore, often instantiate the non-realized value of the semantic opposition when in syntactic opposition to a finite complement, as in (2), for example.

(2) a. I remembered/forgot that I locked the door.
   b. I remembered/forgot to lock the door.

When an overt subject appears in a non-finite clause, it is preceded by for and followed by to and is generally assigned "accusative case", as in (3):

(3) It is impossible for [every linguist] / them to eat just one Lay's potato chip.

The evidence that the for-to complement in (3) is indeed a clause and not simple a PP followed by a VP is its ambiguity, although this ambiguity does not rule out for being a preposition taking a clausal complement. In addition, the for-clause is frontable as a unit. In this case, we can say that for is either a complementizer or clause-taking preposition. The only diagnostic that seems to be extant in the creolization literature for an item being a complementizer rather than a preposition with clausal argument is its deletability. Complementizers, but not prepositions, are supposed to be deletable. I can only assume that this means that a complementizer is in free variation with a wherever it occurs. This may be true of English that, but it certainly is not true of English for. However, where for-complements and that-complements are in opposition, it seems counterintuitive to assign them different structures. Thus, I am not sure that deletability is a necessary criterion, although it may well be sufficient. Both analyses assume a functor with clausal argument, so it is difficult to tell what in principle, beside deletability, would distinguish them. I will try to be agnostic in this paper, since it is the finiteness of the clause and not the status of the subordinator that is at issue here. I will assume that a complementizer must minimally be clause-initial. The to in English is a different story. Although once a preposition, there is much less hope of allowing to to be analyzed as either all or part of a complementizer or a preposition, since it is always preverbal and never precedes a full clause which contains an overt subject. Along with Pullum (1982) and anyone else who has ever come up with this analysis, I will take the to to be a modal auxiliary conveying an independent "tense", as Chomsky (1984) has suggested.

A problem arises in the analysis of complements that consist of verb phrases clearly marked as infinitive by the to and which never occur with an overt subject. Some theories, including Generalized Phrase Structure Grammar, treat this complement as simply a verb phrase with the feature [+INF]. Others treat this complement as a clause
with empty subject. If there is a gap in the subject position, it must be controlled somehow, and, what is more, if there is not, the verb phrase still must be controlled from somewhere. I would agree that in cases where a to-complement never has an overt subject and where it does not stand in opposition to a finite clausal complement, it can be treated as merely a VP. However, where either one of those conditions is not met (if it either has an overt subject sometimes or stands in opposition to a finite clausal complement) it seems somewhat safer to say that the complement should be treated as a clause with non-overt, reference-controlled subject. One of the primary mistakes made in the analysis of English-based creoles is the assumption that creole structures that appear to be direct translations of English structures must be structurally parallel. I am not here suggesting this type of treatment at all. I have included this short discussion of English infinitival clauses simply to demonstrate my usage of the terms "clause", "complementizer" and "non-finite" in a context which makes clear how I will use these terms in my analysis of Tok Pisin.

Before very recently, according to Woolford (1980), Tok Pisin did not have much, if any, hypotaxis. Old texts in Hall (1943) confirm this to a large degree. In fact in her dissertation, Woolford (1979) analyzes all examples of clausal complementation as in (4a):

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(4a) a. PP b. COMP c. VP
    P   S     S    MAux    VP
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In her 1980 paper, entitled "The Developing Complementizer System of Tok Pisin", Woolford claims that Tok Pisin has expanded syntactic functions rapidly through reanalysis to now allow complements with structure as in (4b) as well as (4a). Her candidates for complementizer are the preposition long (from English along), the adverb olesem (from English all the same) and the conjunction na. We will ignore na here. Olesem as a complementizer introduces finite clauses unambiguously and has followed a common genesis to its present position by reanalysis from an introducer of reported speech (see Eifert 1985 and references therein). Woolford (1979) conspicuously omits the other preposition of Tok Pisin, bilong (from English belong), although she ends up admitting that long and bilong merit the same syntactic treatment. We will be concerned here with the behavior of long and bilong where they introduce clausal complements.

As seems to be extremely common both in creoles and other languages, bilong, borrowed from an English verb, has become a genitive and dative marker as in (5b):

```
(5) a. dispela yam i bilong en.
    this yam PRED belong/of 3S
    "this yam is his" or "this yam is for him"

    b. dispela yam bilong en
    this yam of 3S
    "this yam of his"
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The structure of (2a) is debatable, since Tok Pisin has no overt equative copula. In any...
case, sure enough, this same bilong is used to introduce purpose clauses, as in the first reading of (6a). The second reading of (6a) indicates the probable original meaning of such constructions, since Mihelic (1971) gives olsem baimbai ("thus, FUTURE") as the only way to express purpose.

(6) a. em i kisim supia bilong kilim muruk.
    3S PRED take spear for kill cassowary
    "he took a spear in order to kill cassowaries" or
    "he took a spear which is used for killing cassowaries"

b. em i kisim supia long kilim muruk.
    3S PRED take spear for kill cassowary
    "he took a spear in order to kill cassowaries"

At any rate, bilong is found almost invariably directly preceding the verb. One exception to this generalization is (7):

(7) yu mas taitim kundu gut bilong ol i ken harim krai bilong em.
    2S must tighten drum well so-that 3P PR may hear sound of 3S
    "you must tighten the drum well so that they may hear its sound"

This example intimates that when bilong takes a full clausal complement, that clause is finite, although, since Tok Pisin has no inflectional morphology (a fact that makes our job all the more interesting) it could be that iken here is the infinitive form of the modal verb itself taking a non-finite VP complement, just as in the case of English be able. Whatever the analysis here, bilong is replaceable by long in purposive constructions. It is not deletable, however, since (6a) with s in place of bilong would mean "he took the spear that killed the cassowary". The ambiguity of (6a) and its substitutability of introducer prompt me to analyze it either as a preposition or complementer (whichever you like, for now) introducing a full, non-finite clause, as in (6b), although Woolford (1979) gives (6a) as its structure.

(6') a. 

If there is any difference between long and bilong, it is shown in (8), where long allows both the matrix subject and the matrix object to control the VP:
(8) a. em i grisim mi bilong kisim mani.
   3S PR flatter 1S for get money
   "he flattered me in order to get money from me"

b. em i grisim mi long kisim mani.
   3S PR flatter 1S for get money
   "he flattered me in order to get money from me" or
   "he flattered me to try and get me to take the money"

At this point, the question may arise as to why I don’t simply analyze these VPs such as kisim mani as nominalizations and keep the rule PP \(\rightarrow\) P NP. The evidence that these are really VPs is several-fold, although Bill Croft (public communication) has warned me that there is in fact a continuum of nominalization from VP to NP and that the evidence that I present does not make my case very clear-cut. First, the constructions in question are modified only by adverbs as opposed to adjectives. Second, the verbal forms co-occur with NP objects rather than PP adjuncts. Finally, when the name of an activity is desired to function as subject, Tok Pisin speakers frequently use the construction pasin bilong X ("the habit of X"). Unlike English purposives, bilong-clauses do not stand in opposition to other clause types. In English, we can say either (9a) or (9b) where the finite alternative must use irrealis to show that the action is unrealized.

(9) a. The king gave Joshua a sword in order for him to smite to Moabites.
   b. The king gave Joshua a sword so that he could smite the Moabites.

The sentence in (7), therefore, can either be paraphrased as "you must tighten the drum so that they may hear its sound" or "you must tighten the drum in order for them to (be able to) hear its sound". I will hope here that the second translation is the better one.

Although for Woolford bilong-clauses must be analyzed as in (4a), she can analyze long-complements as in (4b) just in case long can be replaced in these structures by olsem or \(\&\). Those places where long cannot be replaced or dispensed with are still to be analyzed as in (4a). Her evidence is that: 1. complementizers are deletable and 2. prepositions are non-deletable. It is interesting to note, however, that normal PPs in Tok Pisin are frontalable, whereas long with VP or S complement never is. Since olsem-complements are unambiguously finite, Woolford’s analysis has the effect of saying that all complementation in Tok Pisin is finite. (10) is an example where long is replaceable by olsem or \(\&\):

(10) a. miting long mi kisim pukpuk.
    1S think COMP 1S get crocodile
    "I’m thinking about getting a crocodile"

b. miting olsem mi kisim pukpuk.
    1S think COMP 1S get crocodile
    "I think that I got crocodile meat"

The only problem is, a difference in meaning accompanies the difference in complementizer. In fact, this difference is the realized/non-realized distinction. Notice that the subordinate clause in (10b), a finite clause, contains no tense markers of any sort. This
is an illustration of the well-known fact that finite clauses with non-stative verbs are, in
almost every creole, interpreted as past actions (see Bickerton 1981). This fact will turn
out to be a useful diagnostic in testing for non-finiteness. Next to (10), we have (11):

(11) a. mi tokim em long/*olsem kisim pukpuk.
   1S tell 3S COMP get crocodile
   "I told him to catch a crocodile"

b. mi tokim em long em (i) kisim pukpuk.
   1S tell 3S COMP 3S (PR) get crocodile
   "I told him to catch a crocodile"

c. mi tokim em long/olsem em i save kisim pukpuk.
   1S tell 3S COMP 3S PR ASP get crocodile
   "I told him that he usually catches crocodiles"

d. mi tokim em olsem kisim pukpuk.
   1S tell 3S COMP get crocodile
   "I told him in the same way that I would catch a crocodile"

e. mi tokim em olsem em i kisim pukpuk.
   1S tell 3S COMP 3S PR get crocodile
   "I told him that he caught a crocodile"

(11b) shows that tokim takes a full clausal unrealized complement introduced by long.
(11a) and (11d) show what replacement of long by olsem does in a subject environ-
ment. (11c) shows that long is also allowed to function in free variation with olsem as a
finite complementizer where the aspect marker save occurs in the subordinate clause.
(11e) shows, once again, that an unmarked finite complement is interpreted as a past
action. Looking at (12), we see another instance of long introducing both finite clauses, as
in (12a) and (12c) and non-finite clauses, as in (12b) and (12d):

(12) a. (em) i rong long ol misin i wokim plantesin.
   3S PR wrong COMP 3P mission PR run plantation
   "it is wrong that the missions run plantations"

b. (em) i rong long misin wokim plantesin.
   3S PR wrong COMP mission run plantation
   "it is wrong for missions to run plantations"

c. (em) i rong long misin i save wokim plantesin.
   3S PR wrong COMP mission PR ASP run plantation
   "it is wrong that the missions usually run plantations"

d. (em) i rong long wokim plantesin.
   3S PR wrong COMP run plantation
   "it is wrong to run plantations"

*e. (em) i rong long i wokim plantesin.

*f. (em) i rong long i save wokim plantesin.

Notice that the only difference between (12a) and (12b) is that the subordinate clause in
(12a) contains the plural marker $\text{al}$ and the particle $i$, which has been called a predicate marker (Hall 1943 and most following) or a subject marker (Sankoff 1985) or even a finite clause marker (Eiffort and Peterson 1985). In this case, it seems to be the only indication that the subordinate clause is finite, but, unfortunately, many factors conspire to make its presence or absence normally totally useless as a diagnostic for finiteness, contra Eiffort and Peterson (1985). (12e) and (12f) show that the prediction that the non-pleonastic subject of a finite clause may not be $\text{a}$ is confirmed.

(13) illustrates the finite/non-finite opposition in another way:

(13a) and (13b) show the predictable differences once again. The interesting difference here is exhibited in (13c) and (13d). Once again, long introduces a non-realized action while olsem or a introduces a realized action. Finally, (14) shows the contrast in complementation for the verb save (“to know”, from Portuguese saber).

(14) illustrates the finite/non-finite opposition in another way:

(14) illustrates the finite/non-finite opposition in another way:

(14) a. em i save long wokim haus.
   3S PR know COMP build house
   “he knows how to build houses”
   b. em i save olsem em i wokim dispela haus.
   3S PR know COMP 3S PR build this house
   “he knows that he built this house”
   c. em i save long wokim dispela haus.
   3S PR know COMP build this house
   “he knows how to build this kind of house”
   d. i save long m1 wokim dispela haus.
   1S know COMP 1S build this house
   “I know that I built this house”

Here, the analysis is up for grabs. On one hand, the presence of an overt subject forces the long complement to be finite, hinting that the subjectless long-complement is a VP rather than a clause. On the other hand, save obviously takes full clausal complements and the long-complement (when subjectless) has an unrealized meaning, as the difference in the meaning of dispela haus between (5b) and (5c) strikingly shows.
Another argument for long being a complementizer in sentences such as (14a) is the what-else-could-it-be argument. If long were a preposition, since I have argued that wokim haus is not an NP, we would need a new rule, viz. PP \( \rightarrow \) P VP, a rather unattested structure. We could always hope that long had been reanalyzed as a modal auxiliary, like English to and as pictured in (4c). Woolford (1979), in fact, discusses and rejects this possibility, noting that sometimes long can introduce a full clause and thus cannot be equivalent to English to. Here Woolford has fallen into the trap mentioned earlier of assuming that one form in Tok Pisin should always be equivalent to one and the same form in English. Woolford continues this approach in disallowing long to be the reflex of English for, since it sometimes introduces distinctively finite clauses. There is nothing inconsistent about allowing long to occur in all of these types of structures; that is, to be a preposition when it introduces NPs, a complementizer when it introduces clauses with overt subjects or clauses with empty subjects where these clauses stand in opposition to finite clauses, and possibly a modal auxiliary when it introduces VPs. A little evidence that long is not yet an auxiliary in the pre-VP position is that VP deletion, which leaves the head auxiliary stranded (as in English Jim can't sing, but I can, or Jim wants to go sailing, but I don't want to), cannot leave long stranded in Tok Pisin. Therefore, it is probably best to regard long as either a preposition or complementizer.

The same types of analyses as Woolford's, resulting in the same types of mistakes, have been advanced for Caribbean Creole English by (inter alia) Bickerton (1980, 1981), Washabaugh (1975, 1980) and Winford (1985). All of the controversy in these works surrounds the morpheme fi, also known as fu and fo (but never fai or fum). Example (15) from Guyanese Creole (see Bickerton 1981) shows the opposition of fi with s, with the proper semantic results:

(15) a. i tek i gon fi shuut taiga.
   3S take 3S gun COMP shoot jaguar
   "he took his gun to shoot a jaguar (but did not necessarily do so)"

b. i tek i gon go shuut taiga.
   3S take 3S gun go shoot jaguar
   "he took his gun to shoot a jaguar (and did shoot one)"

Since most of the CEC languages created hundreds of years ago, we have no real data on the pidgin(s) from which they sprouted, and, furthermore, effects of decreolization have taken their toll (see Bickerton 1980, Winford 1985). Where fi comes from is still a matter of debate, but the Twi directional verb fi, with reinforcement from English for, are often cited. In any case, fi, like hilong in Tok Pisin, has a dative function, and, sure enough, is used in purposives, such as (16) from Providence Island Creole (see Washabaugh 1975):

(16) im drap bred skrumz fi day fala di trak.
   3S drop breed crumbs COMP 3P follow the track
   "he dropped bread crumbs so that they could follow the track"

Notice that fi here introduces a clause with overt subject, no auxiliary markers and non-
realized interpretation. The purposive use of *fi* with empty subject is shown in (17):

(17) jan wok fi mek moni.
    "John work COMP make money"
    "John worked in order to make money"

There is, in CEC, an unambiguously finite complementizer, *se*, once again derived from an introducer of reported speech, and shown in (18) interacting with *fi* in the expected way:

(18) yong man se fi mi tel yu se mis missi ded.
    young man say COMP 1S tell 2S COMP Miss Missy dead
    "the young man said for me to tell you that M. M. is dead"

Were the *fi* to be deleted here, or if the first *se* were made complementizer by addition of the verb *tak* and deletion of *fi*, the complement would have taken on a realized past-action interpretation. Washabaugh (1975) finds that in Jamaican Creole, it is common for two *fi*'s to occur just where English *for* and *to* would occur. He concludes from this evidence that all of the other CEC languages have two underlying *fi*'s, *fi*-1 and *fi*-2. Here, Washabaugh has caught what Woolford missed - the fact that *fi* can sometimes be a complementizer and sometimes a preverbal auxiliary with no cause for alarm. Unfortunately, Washabaugh claims that in Providence Island Creole *fi* is *fi*-1 wherever it introduces a clause with overt subject and *fi*-2 where it introduces a VP, and that it is a complementizer in both cases. Beside *fi*’s prepositional and complementizer roles, it acts much like a modal auxiliary in sentences like (19):

(19) im fi kom op ya.
    3S M come up here
    "he ought to come up here"

In a very insightful article, Winford (1985) collapses what seem to be the three uses of *fi* (complementizer, modal auxiliary, and preposition) into just the latter two by giving preverbal uses of *fi*-2 the structure in (4c) where it acts like English *to* (such as in (20a)) and giving it a prepositional structure elsewhere, including (16), which is depicted in (21):

(20) a. \[ S \rightarrow NP \rightarrow \text{mi} \rightarrow V \rightarrow NP \rightarrow \text{tel} \rightarrow \text{im} \rightarrow \text{PRO} \rightarrow \text{fi} \rightarrow \text{step} \]

b. \[ S \rightarrow NP \rightarrow \text{mi} \rightarrow V \rightarrow NP \rightarrow \text{tel} \rightarrow \text{im} \rightarrow \text{COMP} \rightarrow \text{fi} \rightarrow \text{step} \]
Washabaugh takes a different approach, subsuming the modal auxiliary use under an analysis which uses an abstract verb of obligation which never appears on the surface. While this approach may be going too far, English sentences such as (22) make it not entirely implausible to give (19) a structure with empty copula and lower subject, analogous to (20b) (but the very sight of (20b) will make some of the more squeamish among us faint dead away).

(22) He is to come up here.

All of this discussion, however, becomes moot in light of Winford's treatment of purposives, shown in (21). While it is true that subordinate clauses with an overt subject followed by fi-2 and the VP may stand as independent clauses, and it is possible to treat all preverbal instances of fi in these complements as fi-2 and thus a modal auxiliary even where no subject appears, it is nevertheless (even according to Winford) impossible to treat the fi in purposives as fi-2. Thus, even if we call fi-1 a preposition, this fi must introduce a clausal complement. Furthermore, although it is true that these clauses can stand independently, the fact that Winford misses is that they cannot stand independently *sine veritate*. Thus, *dey tala di trak* from example (16), as an independent clause, translates as "They followed the track." Therefore, the lack of aspect markers combined with the non-realized meaning yield the result that purposives at the very least clearly contain non-finite embedded clauses.

What I hope to have shown is that Tok Pisin, in its creolization, has created a rich complementation system which includes both finite and non-finite clauses which instantiate the realized/non-realized action semantic distinction. This analysis is also consistent with the data from CEC. All of these findings constitute evidence that the realized/non-realized distinction is basic to human categorization of actions and that in universal grammar, this distinction finds its prototypical expression in the finite/non-finite syntactic clausal opposition.
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Pragmatically Controlled Zero Anaphora

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1. Introduction

The steps in the process of interpreting a sentence include those of (a) locating all of the governing words of the sentence, and (b) for each such governor, locating its lexical or phrasal dependents. From now on, instead of governor and dependent I will somewhat unhappily use the terms predicate and complement, the latter term taken to include subjects and adjuncts as well as what is more conventionally referred to as complements. Thus, for the predicate CRIED in the sentence THE BABY CRIED we find THE BABY as its one and only complement. For the verb DEMONSTRATED in the sentence SHE DEMONSTRATED THE PROCESS TO THE COMMITTEE we find SHE as one of its complements, THE PROCESS as a second, and TO THE COMMITTEE as the third.¹

Some of a predicate's complements are obligatory; others are optional. In general, that part of the process of interpreting a sentence that I am speaking of is finished when every one of the sentence's subconstituents can be identified as a complement, optional or obligatory, of some predicate (or as a constituent of some grammatical construction containing or contained in a predication), and all of the obligatory complements of the sentence's predicates have been located.

Whenever, in this search, we fail to find appropriate lexical or phrasal material standing for what we might take to be a predicate's obligatory complements, there are several possible explanations. For example, the predicate may be a part of a grammatical construction which independently provides an accounting for one of its complement slots: imperative sentences typically lack a subject, and a subject is missing in a controlled-subject environment. The languages modernly called "pro-drop" languages - such as Spanish and Japanese - allow the subject of essentially any sentence to be missing if its identity can be recovered from the context; and some languages systematically allow direct objects to be missing under some sort of condition of topicality (Huang 1984).

In English, except in certain kinds of highly restricted mini-genres, suggested by such directives as STORE IN A COOL PLACE, SHAKE BEFORE USING, KEEP OUT OF THE REACH OF CHILDREN, conditions for the omission of non-subject complements are limited to particular lexically defined environments. The most commonly discussed of these is the object slot for such verbs as EAT, READ, SING, COOK, SEW, and BAKE, verbs which can occur either with or without a direct object, but which are understood as
having, when used intransitively, an understood object roughly represented as the word STUFF. In perhaps the earliest discussions of such words in the generativist tradition (Katz & Postal 1964), the authors proposed a deletion rule according to which either the word SOMETHING or the word IT was freely deletable. Katz and Postal's discussion was focused on the theory's need to have a NP constituent available at deep structure. Since semantic interpretation was built on deep structure representations, these surface intransitives had to be deep structure transitives in order for them to have objects capable of receiving the verb's selectional features.

It has occasionally been pointed out that a distinction is needed between what I will call indefinite null complements (INC) and definite null complements (DNC). With definite null complements the missing element must be retrieved from something given in the context; with indefinite null complements the referent's identity is unknown or a matter of indifference. One test for the INC/DNC distinction has to do with determining whether it would sound odd for a speaker to admit ignorance of the identity of the referent of the missing phrase. It's not odd to say things like, "He was eating; I wonder what he was eating"; but it is odd to say things like "They found out; I wonder what they found out." The missing object of the surface-intransitive verb EAT is indefinite; the missing object of the surface-intransitive verb FIND OUT is definite. The point is that one does not wonder about what one already knows.

In my own early discussion of the distinction (Fillmore 1969), I proposed that it was necessary to indicate, for each predicate, which of its complements could be represented as zero with an indefinite interpretation, and which could be represented as zero with a definite interpretation. The object of READ, thus, could be an indefinite zero, and the prepositional phrase complement of BLAME as in THEY BLAMED ME, could be a definite zero. Fraser and Ross (1970) accounted for cases of INC by means of a rule called Unspecified NP Deletion; Mittwoch (1971) suggested a rule of Definite Object Deletion as a way of accounting for the DNC interpretation of the intransitive use of FIND OUT.

INC appears to include two distinguishable phenomena, one involving a semantic object of considerable generality, the other requiring the specification of various degrees of semantic specialization. To make this distinction clear, let us consider the verbs EAT and DRINK. In their more general intransitive uses, these verbs designate simply the physical activity of eating stuff or drinking stuff, as suggested by such sentences as

(1) WHEN MY TONGUE WAS PARALYZED I COULDN'T EAT OR DRINK.

Yet in sentences like (2) and (3),

(2) WE'VE ALREADY EATEN.

(3) I'VE TRIED TO STOP DRINKING.
each of these verbs has a more specialized meaning. In particular, EAT is used to mean something like 'eat a meal' - not merely 'eat something' and DRINK is used to mean 'drink alcoholic beverages'. We could list numerous further instances of specialization: McCawley (in lecture) has remarked on the specialization of intransitive BAKE, as in (4),

(4) I SPENT THE AFTERNOON BAKING.

where the missing object is taken to include breads or pastries, but not potatoes or hams.4

The indefinite null complement can be seen to have much in common with a syntactically present indefinite noun phrase: it is markedly indefinite, by which I mean that it is obligatorily disjoint in reference with anything saliently present in the pragmatic context. Adrian Akmajian, in conversation, once illustrated this point by describing a situation in which one person said, WHAT HAPPENED TO MY SANDWICH?, and another said FIDO ATE. That cannot be a well-formed conversation.

The cases of missing complements that are the focus of this paper (namely, DNC) are those with the potential of having a contextually definite interpretation, cases where the speaker’s authority to omit a complement exists only within an ongoing discourse in which the missing information can be immediately retrieved from the context, and on condition that the omission is authorized by a particular lexical item or grammatical construction in the language. I will refer to complement slots capable of being unfilled under the INC or DNC interpretations as indefinite omissible and definite omissible respectively. The phenomenon of definite omissible complements has been referred to as Definite NP Deletion by Mittwoch (1971), as Latent Object by Matthews (1981), as Contextual Deletion or Contextual Suppression by Allerton (1982), and could be referred to in the language of Sag and Hankamer (1984) as pragmatically controlled Model-Interpretive Null Anaphora.

Some verbs have both definite omissible and indefinite omissible complements; one such verb is CONTRIBUTE. The valence description of this verb assigns three complements to it, those of the Giver, the Gift, and the Receiver. The word-specific semantic frame associated with this verb is one in which the Receiver is a fund or agency to which money or goods are given, the usual case being one in which such gifts are to be offered by more than one person. In describing the Gift complement as indefinite omissible, what I mean is that when the gift is not mentioned in a clause containing this verb, the nature or quantity of the gift is left as a matter of indifference: speaker and hearer need have no shared advance understanding of its identity or nature. Thus,

(5) I CONTRIBUTED TO THE MOVEMENT.

is equivalent to
(6) I CONTRIBUTED SOMETHING TO THE MOVEMENT.
However, in saying that the Receiver complement is *definite omissible*, what
I mean is that when mention of the receiving fund or agency is not present
in the sentence, its identity must be recoverable from the context. Thus, a
sentence like

(7) I CONTRIBUTED FIVE DOLLARS.
can only be spoken in the middle of an ongoing interaction, to someone for
whom the identity of the particular agency or fund is "given". The missing
complement can be understood as something like 'to the movement that
we've just been thinking about.' It is possible, of course, for *both* comple-
ments to be omitted, as in a sentence like

(8) I'VE ALREADY CONTRIBUTED.
in which the gift is merely left unspecified, the receiver is understood in the
context.

2. Lexically Specific Nature of Omissibility

It would appear that the determinants of the omissibility phonemena
are lexical, in the sense that individual lexical items will simply have to be
represented as having certain of their complements marked as *indefinite
omissible* or *definite omissible*. There are certain semantic groupings of
predicates that allow the two kinds of complement omission, but a genuine
semantic explanation does not appear to be forthcoming. In the case of
DNC, no purely pragmatic explanation will help us either. No matter how
clear the pragmatic context can be, there are only some words that have
definite omissible complements. Thus, even if it is absolutely clear to every-
one concerned that a particular door is in question, the remark

(9) *DID YOU LOCK?
cannot be used to "refer" to the door in question.

It is possible to find closely synonymous words, some of which permit
definite null complements while others do not. To mention just one exam-
ple, we can see that INSIST allows its complement to be absent under the
relevant conditions, but many of its near-synonyms do not. Thus, a possible
reply to WHY DID YOU MARRY HER? might be (10), but not (11) or (12).

(10) BECAUSE MOTHER INSISTED.
(11) *BECAUSE MOTHER REQUIRED.
(12) *BECAUSE MOTHER DEMANDED.

Other semantically related groups of lexical items for which some allow
DNC and others do not are displayed below, the approved DNC expressions
shown on the left.
She promised.  
*She pledged.  
*She vowed.  
*She guaranteed.
I tried.  
*I attempted.
They accepted.  
*They endorsed.  
*They authorized.  
*They acknowledged.
They approved.
They concurred.
They agreed.
She found out.  
*She discovered.
I looked everywhere.  
*I sought everywhere.
I'm waiting.  
*I'm awaiting.
When did she leave?  
*When did she vacate?  
*When did she abandon?
I protest.  
*I oppose.

3. Lexical Meaning

It would be misleading to say that the DNC phenomenon is restricted to particular lexical items and to stop there. For polysemous items, DNC may be restricted to particular senses. The verb GIVE is a particularly good example. Recalling the omissibility observations we made in (5) through (8) regarding the verb CONTRIBUTE, it might seem at first blush that the verb GIVE has exactly these same properties. Consider the sentences.

(13) I GAVE FIVE DOLLARS.
(14) I GAVE TO THE UNITED FUND.
(15) I GAVE AT THE OFFICE.

Where the direct object is missing, the understanding is indefinite; where the TO-phrase is missing, the understanding is definite. It happens, however, that in these sentences, GIVE is being used in the meaning CONTRIBUTE. It does not have these properties when used to designate gifts of chocolates to lovers or apples to teachers. If you were to overhear me saying something like

(16) I GAVE A COMPLETE SET OF BLs VOLUMES.

(i.e., omitting the TO-phrase), you might conclude that I was talking about my contribution to a departmental book drive, but you would know that I
could not be talking about a Valentine's Day present to my wife.

There are numerous cases of words with different senses, or with different valence possibilities, in which one sense of the verb, or one semantic type of complement, permits DNC and others do not. For example, the direct object of WIN can be the designation of either a Contest or a Prize. Thus, alongside of expressions like

(17) HE WON THE ELECTION / THE RACE / THE GAME.

where the direct object identifies the kind of competition, we also find expressions like

(18) HE WON THE FIRST PRIZE / THE GOLD MEDAL / THE BLUE RIBBON.

However, it is only in one of these senses that the direct object may be omitted: If someone says merely

(19) HE WON.

the understanding necessarily is that there is a contextually given competition in which he was the winner, not a contextually given reward of which he was the receiver.

In the semantically related word LOSE, analogous observations can be made: In this case, too, the complement type represented by a contest contributes to the interpretation of the intransitive case.

(20) HE LOST THE RACE / THE ELECTION / THE CONTEST.

(21) HE LOST HIS WALLET / THE KEY TO THE OFFICE.

But

(22) HE LOST.

(with no explicit object) can only be understood as referring to a type of competition.

A collection of further examples appears as follows:
They accepted my offer. They accepted. They accepted my gift. *They accepted.
They accepted. I applied for the job. They applied the bandage. *They applied.
I applied. This applies to your case. This applies. They approached me. They approached the solution. *They approached.
They approached. We were approaching the town. We were approaching. I approve of the decision. I approved the request.
I approve. *I approved.
She arrived at the summit. She arrived at the answer. *She arrived.
She arrived. She closed the shop early. She closed the drawer. *She closed.
They closed early. I forgot to fix it. I forgot my keys. *I forgot.
I forgot. I forgot that she’d fixed it. I forgot.
I heard that you resigned. I heard the song. *I heard.
I heard.
I insist on doing it. I insisted that it was wrong.
I insist. *I insisted.

I insist that she do it. They know that she resigned.
I insist. *They know.

They know Louise.
They know.

She left home. She left this package.
She left. *She left.

She left.

He noticed that she was blind. He noticed the mouse.
He noticed. *He noticed.

He noticed.

She opened the shop early. She opened the envelope.
She opened early. *She opened.

I remembered to fix it. I remembered my keys.
I remembered. *I remembered.

I remembered.

I remembered that he was there.

I remembered that he was there.

We returned to the camp. We returned to the task.
We returned. *We returned.

We returned.

I see that they're here. I see the rat.
I see. *I see.

I see.

He volunteered to help you. He volunteered his sons.
He volunteered. *He volunteered.

He volunteered.
4. Grammatical Type

In the examples we have already seen, a wide variety of grammatical constructions have been shown to host the DNC phenomenon. To summarize over the examples I have encountered, we see the phenomenon in (i) Lexical NP Direct Objects (as with such words as WIN), (ii) Indicative THAT-clause Direct Objects (as with KNOW, NOTICE, etc.), (iii) Subjunctive THAT-clause Direct Objects (as with INSIST) (iv) Prepositional Phrase Complements of Intransitive Verbs (as with ARRIVE, APPLY, and APPROVE), (v) Prepositional Phrase Complements of Transitive Verbs (as with BLAME and CONTRIBUTE), (vi) Prepositional Phrase Complements of Adjectives (as with SIMILAR, DIFFERENT, RELEVANT, APPLICABLE, etc.), (vii) Marked Infinitive Phrase Complements of Verbs (as with FORCE, BEGIN, and TRY), (viii) Bare Infinitive Phrase Complements of Verbs (as with MAKE and LET), (ix) Marked Infinitive Phrase Complements of Adjectives (as with EAGER and READY), (x) Complex Adjectival Complements (as with TOO-++-Adjective, etc.), (xi) Prepositional Complements of Nouns (as with the OF-Complement of COPY as opposed, say, to that of PHOTOGRAPH).

In addition to the above fairly easily stated contexts, it would seem that certain of the prepositions which have acquired the status of Verb Particles can be taken as capable of having definite null complements, as in sentences like

(23) WE STEPPED IN
(24) I WAS JUST WALKING BY.
(25) THEY WENT BACK OUT.

It is not, in my opinion, the particle in itself which has the omissibility feature, but a verb plus particle collocation in which the particle’s complement has a Source or Goal interpretation. Thus it appears that even the verb BE allows a locative particle to have an omitted Source or Goal complement just in those contexts in which it is associated with the notion of Movement. Thus, we can say

(26) AS SOON AS WE WERE IN, ...

in the meaning ‘as soon as we got in’.

In a context in which one person asks another by what means a particular journey was made, possible answers are:

(27)
(a) I DROVE.
(b) I WALKED.
(c) I DROVE MY BIKE.
(d) I TOOK THE BUS.
(e) I SWAM.

Here the understanding is paraphrasable as ‘I drove there’, ‘I took the bus there,’ and the like. The construction involved is one according to which a
verb-phrase indicating a manner of locomotion is used to express the notion of getting to a particular place by such means. In fact, most of these sentences would be bizarre if uttered in contexts which did not provide such a locative anchor.

5. Semantic Groupings

From the examination of near-synonyms which differ with respect to our feature, we must conclude that DNC phenomena are not explainable by semantic facts. Yet, from our observations of the senses of words which allow and those which do not allow definite null complements, we noticed that there appeared at least to be some commonalities across word meanings within particular semantic domains in the semantic roles of omissible arguments. We must therefore ask the question of whether particular meanings lend themselves more to accepting this feature than others.

In this connection it is particularly striking that the semantic role of Patient (or Theme) appears not to occur among the definite omissibles. That is, we found no cases of DNC with change-of-state verbs like BREAK, BEND, CREATE, DESTROY, MOVE, LIFT, and the like.

Allerton has proposed a semantic account, not of the difference between words (and word-senses) which allow definite omissible complements and those which do not, but of the difference between those which allow INC (his 'indefinite deletion') and those which allow DNC (his 'contextual object deletion'). He has this to say about DNC (Allerton 1975, pp. 214-215):

Contextual object deletion seems to apply particularly in the case of verbs where the meaning of the verb is somehow incomplete without mention of a PARTICULAR OBJECT.

Examples given in illustration of this description are FOLLOW, INTERRUPT, NOTICE, PULL, PUSH, etc. In the case of INC, he states:

Indefinite deletion seems to apply to verbs whose activity may be viewed as self-sufficient without an object.

And the examples he offers here include CLEAN, COOK, HUNT, SEW, etc. In offering a contrasting pair of semantically similar examples Allerton makes it appear that his account is somewhat circular. In comparing the INC verb TELEPHONE with the DNC verb RING UP (the latter as used in British English), he informs us that the former designates the activity of making a telephone connection, while the latter designates the more specifically goal-directed activity of calling a particular individual. Thus, with

(28) HE'S TELEPHONING.

we are to see somebody, out of context, dialing the telephone and waiting for an answer, whereas with
HE'S RINGING UP.

we know that he is calling someone whom the immediate context has caused us to have in mind. It is difficult for me to believe that the difference in goal-directedness of these two verbs comes from independently knowable differences in their meanings. In any case, Allerton does not here give us a semantic account of the difference between words which do and those which do not take definite null complements.

As we look over the examples exhibiting DNC, we notice that they fall into a fairly small number of semantic categories. In one set of examples, the DNC is taken to be the Destination or Point of Origin with respect to some journey. This is true of LEAVE, GO, and TAKE, for which, when the complement is missing, it indicates what we might call the point of origin, and others, such as COME, ARRIVE, BRING, and ENTER, where a missing complement is taken as representing the destination.

In a great many cases, verbs having to do with causing, inducing, or allowing someone to perform an action, allow the desired action to be left unmentioned. Consider

(30) (a) HE DARED ME.
(b) THEY MADE ME.
(c) THEY DIDN'T LET ME.
(d) I ASKED HIM.
(e) I ORDERED THEM.

The semantic generalization we need must involve more than such notions as causation and enablement, since omissibility seems to be limited to cases in which a social act of some sort is markedly involved. Verbs like CAUSE, GET and HAVE, which do not participate in DNC, have more general meanings.

It would appear that most instances of aspectual complementation allow DNC. The event or action complement can go unmentioned in a setting in which it is contextually given. This is true of START, STOP, CONTINUE, FINISH, RESUME, STAY, and BEGIN.

There may be a great many minor regularities in the semantics of lexical items allowing DNC: the semantic connections between WIN and LOSE have already been pointed out; and we might observe similar connections between FORGET and REMEMBER, SAME and DIFFERENT, CLOSE and OPEN, and many others.

6. Conclusions

The relevance of the phenomena observed in this descriptive essay to a larger view of realized and unrealized complements, and to questions of anaphora, are the concern of a larger study. For the moment I draw attention to an issue in lexical semantics concerning the notion of polysemy. Evidence
we have seen here makes it clear that the drive toward monoentity at all costs has a natural stopping place. A common working principle in lexical semantics is that, to whatever extent possible, the varying uses of a word should not be seen as exemplifying its varying meanings: rather, the differences should be explained, wherever possible, by some auxiliary accounts of usage, or pragmatics, or facts about the real world, or the reasoning process, or the like. From the reality that omissibility phenomena of the sort discussed in this paper are tightly connected with specific senses of specific words, it seems unavoidable that (at least in these cases) closely related word senses must be listed separately in lexical entries.

NOTES

1 It will be noticed that complement as used here is distinct from the notion argument. The former but not the latter includes the preposition in this case. 

2 It is usually said that the missing element is the word SOMETHING but for a sentence like I SPENT THREE DAYS COOKING, a paraphrase of the form I SPENT THREE DAYS COOKING STUFF sounds more natural than I SPENT THREE DAYS COOKING SOMETHING.

3 The INC phenomenon discussed here, by the way, appears to be quite distinct from the identity-of-sense anaphora process described for Spanish as Indefinite Object Drop in Campos 1986.

4 Michael Silverstein, in discussion after the presentation of this paper, pointed out that this case (and perhaps other cases) of INC are not well described as clear instances of polysemy, since it is quite possible to say something like AS LONG AS WE'RE BAKING ANYWAY, WE MAY AS WELL DO UP THE HAM NOW TOO.

5 Ordinarily, if I describe something as TOO EXPENSIVE, what I mean is that it is too expensive to buy; NOT COLD ENOUGH might be said of something that's not cold enough to drink. In all such cases, the content of the complement phrase must be something given in the pragmatic context if it is to be omitted.

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1. Introduction.

1.1 Recent work on the organization of narrative discourse has shown that 'grounding' in a text (the foreground-background contrast) is accomplished across languages via similar grammatical oppositions, involving e.g., transitivity, case marking, tense-aspect, and clause type. In particular, it has been observed that foregrounded material tends to be encoded in main clauses, backgrounded material in various types of subordinate clauses. However, the parataxis of many varieties of ORAL narrative, in which stories are played out largely through a syntax of juxtaposed or co-ordinated main clauses, tends to favor grounding devices other than subordination. In this paper I analyze the operation in the Old French Song of Roland of an alternative grounding device, more suited to parataxis, which has been identified in the 'natural' narrative styles of several unrelated languages and which Grimes (1972, 1975) has labelled 'overlay'.

1.2 Roland is a narrative artifact of a feudal warrior culture. As part of the Christian campaign against the infidel, Charlemagne has been battling the Saracens in Spain. Their king Marsilion falsely promises that if Charles will go back to France, he will follow him there and become a Christian. Count Roland nominates his stepfather Ganelon for the dangerous mission of negotiating this arrangement with the Saracens. Ganelon convinces the pagans that the only way to achieve peace is to put an end to the Frankish war-party -- Roland, his companion Oliver, and the 12 Peers. Ganelon has them assigned to the rear guard for the retreat into France, then conspires with Marsilion to have the pagans attack them once Charles and his forces have gone on. As the pagan hordes approach at Roncevaux pass, Oliver entreats Roland to sound his horn to call Charles and the army back for help. Roland refuses, opting to fight on alone. Only when the battle is clearly lost does Roland sound his horn, and in so doing bursts his temples and dies. Hearing the distress signal, Charles returns to Roncevaux, only to find the remains of a massacre. He avenges Roland by annihilating Marsilion's army, then goes on to secure victory for Christianity by defeating the army of the Emir Baligant, Emperor of all Islam. The text closes with Ganelon's trial and execution for treason.

1.3 Among the salient features of the compositional technique of Roland are the 'similar laisses,'1 in which the movement of narrative time is arrested at strategic points by sequences of 2-3 laisses that repeat the same basic information with variations of detail. Most often emphasized in Roland criticism is the lyric dimension of these moments of narrative stasis and their role in the elaboration of a poetic technique that has elevated the Oxford
text (early 12th c.) to a position of pre-eminence within the epic genre. With no intent to minimize this artistic achievement, I propose in this paper to show:

(a) that the 'overlay' structure (defined in 2.2 below) of Roland's similar laisses serves two important discourse functions: MONITORING INFORMATION FLOW (controlling the pace of the discourse and the rate at which 'new' information is introduced) and FOREGROUNDING; and
(b) that certain devices viewed by literary analysts as hallmarks of poetic craftsmanship can and often do occur in non-literary discourse and in widely diverse linguistic traditions. My intent is not to undercut the poetic effect of such devices, but simply to elucidate their linguistic underpinning.

2. Repetition and Narrative Temporality

2.1 Among the components of narrative structure that bear on temporality, Genette (1980) introduced the parameter of FREQUENCY to refer to the number of times an event occurs in the story-world (histoire) relative to the number of times it is narrated in the text (récit). Of the three frequency relations discussed by Genette, the similar-laisse phenomenon of Roland corresponds to his 'repetitive' formula, i.e. telling n times what happened only once. Admittedly, Genette says, a statement such as Yesterday I went to bed early, yesterday I went to bed early, yesterday I went to bed early might seem purely hypothetical and irrelevant to literature — "an illformed offspring of the combative mind" (115). Yet many modern artistic narratives turn precisely on narrative's capacity for repetition: the film of Rashomon comes to mind; or Faulkner's Absalom, Absalom!, in which the main event is narrated 39 times (cited in Rimmon-Kenan 1983:57f.).

2.2 Genette's discussion of repetition focuses on highly literate narrative forms. Yet structures of repetition are even more common in oral poetic traditions, and likewise have their place in the non-poetic, 'natural' narrative styles of certain oral cultures. Relevant to Roland is a particular narrative protocol documented in unrelated languages of Brazil (Borôro) and New Guinea (Chuave, Pidgin, Angaataha), for which Grimes (1972, 1975) has coined the term 'overlay':

The overlay technique involves putting together two or more PLANES, each of which constitutes a narration of the same sequence of events. The first plane consists largely of new information. The second plane, and the others that follow it, begin the sequence over again.... They consist partly of new information that is being given for the first time in that plane, partly of given information such as that which is referred to anaphorically, and partly of information that is repeated piecemeal from an earlier plane. This repeated information has a special status: it is the highlighted information that ties the whole overlay together. Informationally it is the backbone of the whole structure. (Grimes 1975:293)
2.3 The claim we are advancing here is that the similar-laisse phenomenon of Old French *chansons de geste*, which literary critics find most artfully realized in the *Oxford Roland*, bears striking resemblance to the tightly structured rhetorical pattern of overlay found in non-literate --and non-Western--natural narrative traditions. But before proceeding with an analysis of overlay and its functions in *Roland*, a few observations are in order concerning the nature and structure of Old French epic discourse.

3. The Structure of Epic Narrative

3.1 The fabric of Old French epic narrative is woven with periodic 'backstitching' between the laisses. Typically one or more verses of an earlier laisse are picked up anaphorically in a new laisse. Often the linkage occurs at the beginning of the new laisse, where it functions as the starting point or theme, though it may occur elsewhere in the laisse as well. The conspicuous linkages and repetitions of the *chansons de geste* have generally been related to the fact that, according to one widely held theory, this song-poetry was composed and re-composed in performance before a listening audience.\(^4\) For those of us whose 'narrative competence' has developed in a culture of literacy --where chronology is crucial and the building blocks of narratives are sequentially ordered eventlike units—the minimal narrativity of epic discourse, with its frequent violations of chronology, unsignalled repetitions of the same events, and high density of non-eventive material, may prove disconcerting. How does one "follow the plot"? But for the public of the *chansons de geste* the plots of these tales were generally well known. Epic performance offered its listeners not a new adventure in narrative but the pleasure of the familiar in a participatory ritual of communal solidarity. Through each re-citation of this "secular scripture of the community" (Goldin 1978:42), a largely non-literate society engaged itself in the historiographic process.

3.2 The familiarity of the epic material and the requirements imposed by oral-aural transmission were no doubt contributing factors to the low-level narrativity of epic discourse, whose structure has been described as "independent pictures strung together like beads" (Auerbach 1953:114f.). There is little concern for what we consider to be the defining primes of narrative textuality: chronology and causality. As Goldin (1978:42) observes, "each laisse contains not so much a linear narration of a certain act as a meditation upon it.... This can be seen most readily in the laisses parallèles and laisses similaires... but it is the controlling principle nearly everywhere." Another critic goes further: "there is no background, no foreground, no ascending or descending order between scenes. Important moments are stressed quantitatively by repetition in parallel [and similar] laisses, not by climactic sequential development" (Grummann 1976:56). While acknowledging the centrality of repetition to the epic poetic technique, Grummann
apparently fails to perceive the pragmatic role of repetition structures in delineating the narrative foreground.

3.3 This difference between a textuality (usually written) in which grounding is accomplished through subordination and one (typically oral) in which it is accomplished quantitatively through accumulation, is captured in Grimes's contrastive metaphor of 'outlines' vs. 'overlays':

An outline structure puts semantic information into a perspective in two dimensions: coordinating parallel elements and subordinating other things to them, whereas overlay structure adds a third dimension to the other two.... Outline structures communicate relationships by dependency: overlay structures use accretion as well. (Grimes 1972:513)

4. The Similar Laisses

At various points in Roland, the content of an entire laisse will be reiterated with variations, according to a pattern which fits strikingly with the description of overlays given in 2.2. The Oxford text contains 5 sets of similar laisses: 2 sets of 3 laisses each:

40-42: Marsilion and Ganelon discuss the war
83-85: Oliver implores Roland to sound his horn

and three double sets of 3 + 3:

133-135: Roland finally sounds his horn
136-138: Charles returns in vain to aid Roland and the rearguard
171-173: Roland's dying address to his sword Durandal
174-176: Roland's death

205-207: Charles finds Roland's body
208-210: Charles' lament over Roland

Space limitations preclude examination of more than 2 of these passages, nor is it possible to reproduce here, for comparison, the natural narrative texts whose structure the overlay pattern was formulated to capture. The interested reader is referred to Grimes 1972:516-521.

4.1 Marisilion and Ganelon.

4.1.1 The 'narrative' content of laisses 40-42 may be summed up as follows: Ganelon, sent by Charles to negotiate with the Saracens, is interrogated by their king Marsilion as to Charles's inclination to continue the war. This is clearly a moment of narrative stasis: there are no 'events', only speech-events. As presented in (1), the exchange has been broken down into its constituent information blocks, with a letter assigned to each:
a. Said Marsilien: "I tell you, Ganelon
I have a great desire to love you dearly.
I want to hear you speak of Charlemagne.
He is so old, he's used up all his time—
from what I hear, he is past two hundred!
He has pushed his old body through so many lands,
taken so many blows on his buckled shield,
made beggars of so many mighty kings:
when will he lose the heart for making war?"
Ganelon answers: "Charles is not one to lose heart.
No man sees him, no man learns to know him
who does not say: the Emperor is great.
I do not know how to praise him so highly
that his great merit would not surpass my praise.
Who could recount his glory and his valor?
God put the light in him of such lordness,
he would choose death before he failed
his barons."

b. Said the pagan: "I have reason to marvel
at Charlemagne, a man so old and grey—
he's two hundred years old, I hear, and more;
his body has tortured his body through so many lands,
and borne so many blows from lance and spear
made beggars of so many mighty kings:
when will he lose the heart for making war?"
"Never," said Ganelon, "while his nephew lives,
his is a fighter, there's no vassal like him under
the vault of heaven. And he has friends.
There's Oliver, a good man, his companion.
And the 12 Peers, whom Charles holds very dear,
form the vanguard, with 20,000 knights.
Charles is secure, he fears no man on earth."

b. Said the pagan: "Truly, how I must marvel
at Charlemagne, who is so grey and white—
over two hundred years, from what I hear;
gone through so many lands a conqueror,
and borne so many blows from strong,
sharp spears,
killed and conquered so many mighty kings:
when will he lose the heart for making war?"
"Never," said Ganelon, "while one man lives:
Roland!
no man like him from here to the Orient!
There's his companion, Oliver, a brave man.
And the 12 Peers, whom Charles holds very dear,
form the vanguard, with 20,000 Franks.
Charles is secure, he fears no man alive."
4.1.2. In languages that make important use of overlays, Grimes notes (1972:520), the temporal sequence of elements within each plane is unilinear, i.e., a composite projection of all the planes onto a time-line would yield a single sequence of events (but see n.6) as given in (2) for the similar laisses in (1) above:

(2) a. Marsilion: offer of friendship to Ganelon
   b. Charlemagne is so old and grey
   c. He is over 200 years old, they say\(^5\)
   d. His old body has struggled to conquer many lands
   e. He has taken so many blows
   f. He has reduced so many kings
   g. When will he tire of making war?
   h. Ganelon: Never. Charles is secure, he fears no one
   i. He is so noble; his valor and glory surpass description
   j. Never, so long as Roland lives\(^6\)
   k. Roland has no equal
   l. There is also valiant Oliver, his companion
   m. The 12 peers, with 20,000 Frankish knights, form the vanguard
   n. Charles is so noble, he would choose death before abandoning his men

4.2. The "First Horn Scene".
4.2.1. At the crucial moment in the battle of Roncevaux narrated in laisses 83-85, the rearguard of Charlemagne's army, commanded by Roland, is faced with certain defeat at the hands of the pagans. Roland's trusted friend Oliver entreats him to sound his horn so that Charlemagne will hear it and, recognizing it as a sign of distress, come to their assistance with the remainder of the Frankish troops. Once again, the similar laisses occur at a dialogue, whose overall contribution to the plot may be summed up in two 'narrative events': Oliver entreats Roland to sound his horn; Roland refuses:
(3) 83.

a. Said Oliver: "The pagan force is great from what I see, our French here are too few.

b. Roland, my companion, sound your horn then,

c. Charles will hear it, the army will come back."

d. Roland replies: "I'd be a fool to do it.

f. I would lose my good name all through sweet France.

i. I will strike now, I'll strike with Durendal,

k. the blade will be bloody to the gold from striking!

m. These pagan traitors came to these passes doomed!

     I promise you, they are marked men, they'll die."

Dist Oliver: "Paien unt grant esforz;

De noz Fransois m'i semblet avoir molt poi!

Cumpaign Rollant, kar sunez vostre corn,

Si l'orrat Carles, si retournerat l'ost."

Respunt Rollant: "Jo fereie que fois!

En dulce France en perdreie mun los.

Sempres ferrai de Durendal gran colps;

Sanglant en ert li branz entresqu'a l'or.

Felun paien mar i vindrent as porz:

Jo vos plevis, tuz sunt jugez a mort."

84.

b. "Roland, Companion, now sound the olifant,

c. Charles will hear it, he will bring the army back,

     the King will come with all his barons to help us."

     Succurrat nos li reis od sun barnet."

g. Roland replies: "May it never please God

     that my kin should be shamed because of me,

h. or that sweet France should fall into disgrace.

i. Never! Never! I'll strike with Durendal,

     I'll strike with this good sword strapped to my side. Ma bone espee que ai ceint al costet;

k. You'll see this blade running its whole length

     with blood.

m. These pagan traitors have gathered here to die.

     I promise you, they are all bound for death."

"Cumpainz Rollant, l'olifant car sunez,

Si l'orrat Carles, ferat l'ost returner,

the King will come with all his barons to help us."

Respont Rollant: "Ne placet Daamedeau

Que mi parent pur mei seient blasmet

Ne France dulce ja cheet en villet!

Einz i ferrai de Durendal asez,

Tut en verrez le brant ensanglentet.

Felun paien mar i sunt asemblez:

Jo vos plevis, tut sunt a mort livrez."

85.

b. "Roland, Companion, sound your olifant now,

c. Charles will hear it, marching through

     those passes.

     I promise you, the Franks will come at once."

e. Roland replies: "May it never please God

     that any man alive should come to say

that pagans—pagans!—once made me

     sound this horn:

     no kin of mine will ever bear that shame.

i. Once I enter this great battle coming

j. and strike my thousand seven hundred blows,

k. you'll see the bloody steel of Durendal.

l. These French are good—they will strike

     like brave men.

m. Nothing can save the men of Spain from death."

"Cumpainz Rollant, sunez vostre olifant,

Si l'orrat Carles, ki est as

porz passant.

Je vos plevis, ja returnerunt Franc.

—Ne placet Deu, ço li respunt Rollant,

Que co seït dit de nul hume vivant,

Ne pur paien, que ja seie cornant!

Ja n'en avrun reproece mi parent.

Quant jo serai en la bataille grant

E jo ferrai e mil colps e .vii. cenz

De Durendal verrez l'acer sanglent.

Francois sunt bon, si ferrunt

vassalment;

Ja cil d'Espaigne n'avrun de mort guarant."
4.2.2. The information blocks of this scene, in logical order, are given in (4):

(4) a. Oliver: we are badly outnumbered
   b. Roland, sound your horn!
   c. Charles will hear it and return with the army
to help us
d. Roland: I'd be a fool to do so
e. Never let it never be said that pagans made me
   sound my horn
f. My reputation would be tarnished
g. My family would be humiliated
h. France would be dishonored
i. No, I'll do battle with Durendal my sword
j. I will strike 1700 blows
k. The blade [of my sword] will be bathed in blood
l. The French are valiant warriors
m. The pagans are doomed

4.3. The distribution and arrangement of information blocks according to laisses is given in Table 1 below; the discourse status of the information contained in each of these blocks ('given', 'new', or 'highlighted') is given in Table 2:

Table 1. Distribution of content units across similar laisses

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>j</th>
<th>k</th>
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<tr>
<td>40</td>
<td></td>
<td></td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>e</td>
<td>f</td>
<td>g</td>
<td>h</td>
<td>i</td>
<td>k</td>
<td>m</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td></td>
<td></td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>e</td>
<td>f</td>
<td>g</td>
<td>h</td>
<td>j</td>
<td>k</td>
<td>l</td>
<td>m</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td></td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>e</td>
<td>f</td>
<td>g</td>
<td>h</td>
<td>j</td>
<td>k</td>
<td>l</td>
<td>m</td>
</tr>
<tr>
<td>83</td>
<td></td>
<td></td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>f</td>
<td>i</td>
<td>k</td>
<td>m</td>
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<td>84</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Discourse status of information in overlay sequences

<table>
<thead>
<tr>
<th></th>
<th>Given</th>
<th>New</th>
<th>Highlighted₂*</th>
<th>Highlighted₃*</th>
<th>G/N/H</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>a</td>
<td>b c d e f g h i</td>
<td>--</td>
<td>--</td>
<td>1/9/0</td>
</tr>
<tr>
<td>41</td>
<td>--</td>
<td>j k l m</td>
<td>b c d e f g h</td>
<td>--</td>
<td>0/4/7</td>
</tr>
<tr>
<td>42</td>
<td>--</td>
<td>--</td>
<td>j k l m</td>
<td>b c d e f g h</td>
<td>0/0/11</td>
</tr>
<tr>
<td>83</td>
<td>a</td>
<td>b c d f i k m</td>
<td>--</td>
<td>--</td>
<td>1/7/0</td>
</tr>
<tr>
<td>84</td>
<td>--</td>
<td>g h</td>
<td>b c i k m</td>
<td>--</td>
<td>0/2/5</td>
</tr>
<tr>
<td>85</td>
<td>--</td>
<td>e j l</td>
<td>g</td>
<td>b c i k m</td>
<td>0/3/6</td>
</tr>
</tbody>
</table>

5. The Pragmatics of Overlay

5.1 With reference to the definition of overlays given in 2.2, we observe, first, that the texts in (1) and (3) consist of three laisses (= planes) apiece, each of which narrates the same basic sequence of events. Second, as can be seen from Table 2, the first

* Elements highlighted in 2 laisses are separated here from those highlighted in all 3. Triple highlighting is indicated only for the last laisse of each sequence.
laisse of each set consists largely of new information. The second and third laisses begin the sequences over again, in each case omitting a, which was already given information. The second and third laisses contain a mixture of new information and information repeated from the previous laisse(s) in quasi identical formulation. We will examine these two types of information in turn, beginning with new information.

5.2 New Information. As Grimes notes (1972:520f.), another effect of overlay, besides the three-dimensional shaping it gives, is the control it provides over the rate of information introduction. A speaker has control not only over the content and organization of his discourse but also over the rate at which he chooses to introduce new information. The first plane of an overlay "sets the field" and almost all is new information. As shown in Table 2, the ratio of given to new information blocks in laisses 40 and 83 is 1/9 and 1/7 respectively. Once the field has been established and the listener recognizes that he is in an overlay structure, the narrator can use the control provided by the overlay for stylistic or dramatic effect:

5.2.1 In the exchange between Ganelon and Marsilion, the latter's questions are identical in each laisse. Only in Ganelon's replies is there 'movement' (new information), but it is movement that is psychological and dramatic rather than narrative, gradually revealing Ganelon's thoughts and hinting at the eventual betrayal. Thus in laisse 40 he speaks in broad terms of Charlemagne's nobles; in 41 he specifies: Charles will not abandon the war effort as long as his nephew lives; only in 42 does he utter the name of Roland.

5.2.2. An analogous progression occurs in the exchange between Roland and Oliver. In each of the laisses 83-85, Oliver reiterates his request for Roland to sound his horn for help. Each response adds to our understanding of his celebrated pride (over which vials of scholarly ink have been spilled!) by revealing a different dimension of feudal man's identity: in 83 Roland sees the act in terms of the personal shame that would result; in 84 the contagion spreads to the larger body politic— dulce France; in 84 and 85 it touches the kin-group.

The psychological tension and poetic poignance of the similar laisses, the profound lyricism of these moments of narrative stasis, are realized by means of the overlay, a structure in which new information can be dispensed in carefully measured doses, its meaning and effect building up cumulatively through parallelistic repetition.

5.3. Highlighted information. The repeated elements that carry through from plane to plane enjoy a privileged status: they are "made to stand out by being placed in slightly different environments, just as a stereoscopic visual image makes the foreground objects stand out by relating them to slightly different backgrounds" (Grimes 1975:293). Around this highlighted information the other elements constitute "an embroidery of detail". In the texts examined by Grimes, foregrounding seems to be accomplished through subordination as well as through overlay, hence he refers
to overlay as "a third dimension"; accretion operates on top of dependency. But as noted above (1.1), the paratactic metered verse of the chansons de geste does not lend itself well to grounding through subordination. Alternative foregrounding strategies are called for — contrastive, e.g. through tense-aspect oppositions (see Fleischman 1985) and/or quantitative, through overlay.

In Roland foregrounding via overlay operates on two levels: In the narrative 'macrostructure', as we shall see below (§6), it is the laisses similairesthat profile the crucial moments of this drama of feudal conflict. On the level of 'microstructure', within the planes of the overlay, it is through highlighted information that the value structure of the poem is most clearly articulated. But note that what is highlighted in this text through overlay is not at all the sequential event-like structures that investigators typically point to in discussions of foregrounding (cf. Hopper 1979a,b, Wallace 1982), but rather, rhetorically spare lines of dialogue. Individually they function as shorthand surface formulas for complex underlying structures of belief and behavior; collectively they express in nuce the essence of the poem.

5.3.1. This is illustrated clearly in the exchange between Roland and Oliver; the highlighted information is repeated here as (5):

(5) b. Roland, sound your horn!
   c. Charles will hear it and return with the army to help
      i. No, I'll do battle with Durendal my sword
   k. The blade will be bathed in blood
   m. The pagans are doomed

These statements, intoned in three successive laisses, sum up the persona of Roland as exemplar of the feudal warrior class, living in a world governed by conditional necessity and conflicting demands. Each highlighted block encloses layers of meaning: b and c together evoke the hierarchy of vassalage relationships and the obligations they entail: Roland is at once Charles's vassal and lord over his own subordinates; just as Charles is responsible for Roland's well-being (c), Roland is in turn responsible for safeguarding those under him. As a lord his duty is to summon help and prevent the sacrifice of his men (b). But as the proud warrior vassal, Roland believes it his duty to carry on the fight alone. It would be a humiliation to call for help when he is sure he and his men can defeat the Saracens (i, k). As noted above (5.2.2), the new information introduced progressively in d–h reveals three levels on which the act of calling for help would cast a shadow: ego, family, and country. The ultimate level—God and all of Christianity—comes into play in the last element highlighted in this sequence. The Christian triumph over the pagans is for Roland a matter of providential necessity (m). What he does not know is that the miles Christi destined to carry out God's will not be Roland.

5.3.2. The highlighted information in Ganelon's exchange with Marsilion is given in (6). Blocks repeated in all 3 laisses are
marked with an asterisk; the remaining blocks appear only in laisses 41 and 42.

(6) *b. Charlemagne is so old and grey
*c. He is over 200 years old, they say
*d. His old body has struggled to conquer many lands
*e. He has taken so many blows
*f. He has laid low so many kings
*g. When will he tire of making war?
*h. Ganelon: Never. Charles is secure, he fears no one.
   j. Never, so long as Roland lives
   k. Roland has no equal;
   l. There is also valiant Oliver, his companion;
   m. The 12 peers, with 20,000 Frankish knights, form the vanguard

5.3.2.1. Laisses 40-42 are part of the larger episode of "Ganelon's treason", in which the baron conspires with the pagans to wipe out the rearguard of the army, which, through his own maneuvering, will be commanded by his stepson Roland. As can be seen from Table 2. above, most elements in this overlay constitute high-lighted, i.e. foregrounded information. Yet no action takes place. What we are given is a description, focalized through Ganelon, of Charlemagne and his relationship to his vassals, in particular to Roland. Once we understand the conditions of this relationship, and once the treason has been set in motion, the ensuing events are, as in tragedy, ineluctably determined. It is the centrality to the poem of Charles's relationship to Roland that is underscored by its presentation in overlay."

5.3.2.2. The microstructure of these laisses is further revealing of the subtle shades of foregrounding available through overlay. Comparing the relative frequency of highlighted elements in these laisses, we observe first that units repeated 3 times all refer to Charlemagne, while those repeated only twice refer to Roland and his companions. Is this perhaps a subtle validation, on the level of form, of various critics' view that this poem is primarily a story about Charlemagne and only secondarily about Roland? Second, it was noted above that foregrounding in Roland does not correlate with narrative causality, i.e., the foregrounded elements are not necessarily those that advance the plot. The single plot-advancing element in this sequence is j; through his assertion that Charles will continue to make war as long as Roland lives, Ganelon sows the seed of the betrayal. Yet this material so crucial to narrative development is repeated only twice. It thus appears to be of lesser significance than Ganelon's parallel assertion of Charles's fearless determination (h), if frequency is a valid indicator of degree of foregrounding. For it is ultimately Charles who realizes the victory of Christianity over the infidel. But at what price? As the poem closes, Charles is once again called off to war; he "weeps from his eyes, pulls his white beard" (v. 4001). It cannot be gratuitous that the paratactic juxtaposition of these two symbolic gestures is reiterated 5 times
(vv. 772, 2414, 2943, 3712, 4001).

6. Similar Laiisses and Narrative 'Profile'

6.1 Most discourse, narrative or other, is not spoken or written on a uniform level of excitation or intensity. There is mounting and declining tension, generally within a global cumulative development. As Longacre (1981:347ff.) has observed, it is the 'peaks' of discourse intensity that serve to give a 'profile' to a whole text which includes one or more such units. Peaks are frequently marked in the surface syntax of a language by rhetorical underlining — various devices designed to "slow down the camera" by packing or extending the event line so that the peak does not go by too fast. These devices include repetition and paraphrase, or introduction of a mass of detail that would not be appropriate to routine narration (349).

6.2 Longacre distinguishes further between 'narrative' or 'action' peaks and 'thematic' or 'didactic' peaks. Action peaks relate directly to the event structure of the text: they correlate with points of maximum tension (climaxes) or crucial events (dénouements) that make resolutions possible. At thematic peaks "chronological movement ceases and someone talks" (349). This distinction, first suggested in Woods 1980 to describe the narrative structure of Halbi (an IE language of India), is realized in a text in a number of ways, outlined in Table 3:

<table>
<thead>
<tr>
<th>Thematic Peaks</th>
<th>Action Peaks</th>
</tr>
</thead>
<tbody>
<tr>
<td>No chronological progression</td>
<td>Marked chronological progression</td>
</tr>
<tr>
<td>Cyclic structure</td>
<td>Forward movement</td>
</tr>
<tr>
<td>2 participants only, little description</td>
<td>Crowded with participants, much description</td>
</tr>
<tr>
<td>Crowded with props and extensive descriptions</td>
<td>Limited props and limited description</td>
</tr>
<tr>
<td>Dialogue</td>
<td>Events</td>
</tr>
</tbody>
</table>

The above description of thematic peaks is strikingly appropriate to Roland's similar laisses: Narrative time stops; a 2-party dialogue occurs, with no description of participants; and a cyclic structure is realized through the overlay. Though props and description are not abundant, such is not the case for all similar laisses. The double overlay at Roland's death is filled with props described in detail (a dark rock, a pine tree, the olifant, Roland's glove, his sword Durendal with its vividly described relics encased in the bridge).

6.3. The concept of a discourse profile, delineated by peaks, provides a useful analytic framework in which to pose the question of why Roland's similar laisses occur where they do. As in the natural narrative traditions for which this framework was conceived, structures of repetition in Roland are inserted to mark thematic peaks. Longacre suggests that if a text has both action
and thematic peaks, the latter will usually occur after the former (348). But in a minimally linear narrative like Roland, in which the event-line is tenuous and often fragmented, one could argue that there are no action peaks; or, better, that action and thematic peaks coincide. That is to say, pivotal narrative junctures (action peaks)—the plotting of the treason, the two horn scenes, Roland's death, Charlemagne's discovery of Roland's body—are formally marked by the occurrence of similar laisses (thematic peaks). Like a kaleidoscope they "pack" the peaks of narrative tension by multiplying the images in repetitive patterns.7.

Conclusions.

7.1 The similar laisses of Old French epic narrative have been the subject of extensive—and at times very perceptive—literary commentary,8 the thrust of which has been to demonstrate the consummate poetic effect of these lyric interludes in an overall narrative design. This paper has taken a rather different approach to the similar laisses.

Intrigued by their surface resemblance to the overlay patterns found in certain non-literate natural narrative traditions, I sought to determine whether the discourse pragmatic functions of repetitive narration might not be analogous in the two text types. What I discovered is that the quantitative foregrounding made possible through overlays is ideally suited to paratactic discourse—like medieval epic—in which grounding cannot be carried out easily through a main clause–subordinate clause contrast.9 In Roland's overlays functional repetition operates on two levels—that of the laisse as a whole and that of individual information blocks. Through repetition of entire laisses a series of peaks is marked out which collectively define the profile of the discourse. By means of these peaks—zones of "turbulence" on the event-line—the high points of narrative development are foregrounded. Within the laisse unit, overlay operates at once as a device to foreground specific information blocks—a skillful composer can manipulate frequency of repetition to produce a nuanced grounding spectrum—and as a mechanism to control the flow of new information for dramatic and poetic effect. It is at this micro-level that formal structures of repetition are seen to correlate with the most important structures of meaning in the poem.

7.2 It seems clear that the sharp separation many investigators make between literary and conversational, or poetic and non-poetic, texts is not always a useful one. The strategies used in 'natural' and 'artificial' narratives to accomplish certain basic discourse tasks are often the same. I support Polanyi's view (1981:36) that oral storytelling in conversational contexts is the primary site for understanding narrative structure. The foregoing analysis has, I hope, demonstrated the relevance of natural language data, and of certain analytical frameworks linguists use to describe them, to the study of poetic texts.
1. The term 'laisse' refers to the strophic unit of chansons de geste. The number of verses could vary (the average in Roland is 14); what ties the laisse together is a single assonance. A flexible poetic form with only two constraints: meter and assonance, the laisse is well adapted to the conditions of oral performance. On its function in the structure and performance of epic songs, see Rychner 1955: 71–74.

2. As used here, 'foreground' refers to those elements of a narrative text which are marked somehow as salient or central to the meaning of that text. Foreground need not be synonymous with the sequential event-line, as understood by some investigators, nor is it necessarily in binary opposition to 'background'. I have argued elsewhere (Fleischman 1985) against a dichotomous view of grounding in favor of a continuum or spectrum approach (cf. Longacre 1981) involving levels of information relevance.

3. In 'singulative' narration what happens once is told only once; 'iterative' narration involves telling only once what "happened" n times (see Genette 1980: Chap.3).

4. According to "oralists", the chansons de geste are products of formulaic composition-in-performance—a poetic analog of rule-governed creativity; the singer-composer draws on a repertoire of recombinant building blocks (formulas) to put together each performance of a text.

5. This hyperbolic calculation presumably refers to the 200 years of Carolingian rule.

6. The ordering of h-i,n vis-à-vis j-m is unclear. The two sequences represent different components of Ganelon's response. As noted above, strict chronology is not an overriding concern of this poetry. The order given in (2) evidently represents a decision on my part to impose linearity on a temporally "turbulent" point in the text.

7. In the fictional world Charles's relationship to Roland goes beyond that of lord to vassal. A 10th-c. Latin saint's life alludes to an unspecified sin committed by Charles and forgiven by St. Giles. The Old Norse Karlamagnús saga and other vernacular versions of the legend reveal the nature of this sin: Charles had incestuous relations with his sister, whence Roland was born (see Aeischer 1972). Though this is not made explicit in the Oxford text, we can consider it to have been presupposed information in light of an allusion by the poet to a document which St. Giles presumably received from an angel, containing the details of Charlemagne's conduct. Apropos of this document, the poet comments: "He who does not know this, knows nothing" (v. 2098).


9. Grimes notes in passing (1972:516) that in the overlays he examined parataxis tends to predominate over hypotaxis.
REFERENCES

I. TEXTS


II. STUDIES CITED


SEX AND THE QUESTION: TERMINAL CONTOURS
OF RESPONSES BY WOMEN AND MEN

Cheryl Ramsey Garcia
University of California at Davis

1. INTRODUCTION. Robin Lakoff (1975:17) offers the hypothe-
sis that women, and only women, use a 'rising inflection typical
of a yes-no question' when providing a declarative answer to a Wh-
question. She contends that such an intonation pattern conveys
indecision and a need for confirmation stemming from a lack of au-
thority and power. This claim, if true, has far-reaching conse-
quences for both women and men.

It is therefore regrettable that in the decade since their
appearance in print, few of Lakoff’s hypotheses have been given
serious and comprehensive consideration (see Nelder for an excep-
tion). Research on intonation variability between the sexes, for
instance, remains meager: although important contributions to the
area have been made by Brend (1975), Elyam (1977), and Pellowe and
Jones (1978), only Edelsky (1979) and McConnell-Ginet (1983) have
explicitly addressed Lakoff’s hypothesis as stated above. More-
over, the two studies reach different conclusions.

In this paper, I intend to review both studies briefly and
to describe a third study designed to assess by experimental means
whether more women than men use rising terminal contours (RTC)
with declarative responses to Wh-questions.

2. PREVIOUS RESEARCH. Edelsky (ibid) reports a study de-
signed to 'find out if more women than men use rising intonation
when they answer questions to which only they have the answer'
(15). 165 women and 154 men were approached by an experimenter
and asked either where they were born or what their favorite color
was. Each interview was tape-recorded, and responses (which were
combined for both questions) were categorized by raters into one
of four categories: straight rise, straight fall, flat, and com-
plex rise. The latter is also referred to as 'rise-fall-rise', and
is defined as a pattern 'where the lowest pitch level immediately
precedes the final rise, which itself is a short glide upward from
the low point' (22). In other words, the pitch on which the ut-
erance ends is not the highest pitch of the utterance. Chi-
square analyses revealed that 'both sexes used straight rising in-
tonation rarely and equally. Women used a rise-fall-rise pattern
more than men only when they were approached by a female inter-
viewer' (15).

McConnell-Ginet (ibid), on the other hand, claims that fe-
male and male subjects who participated in her studies were dif-
ferentiated in their use of RTC. Specifically, women used more
complex rise and more straight rise than men did. The experimen-
tal design of this study differs slightly from Edelsky’s: experi-
menters in the McConnell-Ginet study asked subjects (in front of a
campus landmark) 'What building is this?' McConnell-Ginet claims
that this is the type of question 'one expects from strangers',


whereas the questions asked in the Edelsky study are 'survey in type'. She thus attributes the different findings to the 'difference in the communicative context' used in each study.

Neither study attempts to ascertain under what conditions women and men are differentiated in their use of RTC. Given this problem and the fact that the findings of the two studies are diametrically opposed, a third study was warranted to resolve the discrepancies. In the next sections, I describe such a study and discuss its findings.

3. METHOD. Two experimenters, one female and one male, conducted rapid and anonymous interviews with 50 subjects each (25 women and 25 men) via a telephone poll. The sample was chosen randomly from a population of 40,000 by means of a telephone directory. Names and addresses had been covered so as to preserve the anonymity of the subjects, and numbers were chosen by calling the first and last number on each page of the phone book. Subjects ranged in age from approximately 14 to 70 years and represented 42 different types of occupation.

Each experimenter was given a script and strict instructions as to the speech style to be used in conducting the interviews. Before the experiment began, each interviewer was recorded while conducting a mock interview; in this way, it was possible to ascertain that the experimenters 1) felt comfortable with the task, 2) were using natural speech, and most importantly, 3) were both using approximately the same pitch variations and intonation contours.

Telephone calls were made on each of the seven days of the week between the hours 10:00 a.m. and 9:00 p.m. Therefore, the subjects polled consisted both of people who are home during the day (most of whom were either students or retired) and of people who work and are thus home only in the evenings and on the weekends. Each call consisted of the interviewers' first identifying themselves as follows:

Hi. My name's (first name), and I'm a student at U.C. Davis. For one of my classes, I've been assigned to conduct an informal telephone poll, and I was wondering if you could help me out by answering a few brief questions.

At this point, the subject had the opportunity to either decline or consent to participate. During a pilot study, we had discovered that many of those we called would immediately ask what class the study was for and/or what the study was about. Accordingly, we devised and used the standard response 'If I tell you now, it will invalidate your responses, but I can tell you after we've finished.' Once consent was obtained, the experimenter explained that it was necessary to ask one preliminary question so that the results would be valid, and then asked 'What's your occupation?' Following the subject's response, the experimenter said, 'Now I have four questions to ask you' and proceeded with the interview. The four questions were:
1. What's your favorite color?
2. What's the capital of California?
3. What's your opinion on the new California State lottery?
4. What's the capital of Nevada?

The introduction and all questions were spoken with falling intonation.

Two telephone extensions were used, and both experimenters listened to and scored each interview for sex of experimenter, sex of speaker, and semantic content and intonation contours of responses. One of the experimenters has no training in linguistics, and the other is a trained linguist. In this way, two interpretations of each interview were obtained, one linguistically naive and one linguistically sophisticated. Only those interviews on which both experimenters concurred as to type of intonational contour were used for analysis. Three types of contour occurred in the data: rising, falling, and flat.

The preliminary question was used to get a rough idea of the social characteristics (sometimes including age) of the subjects and to prevent the results from being heavily skewed towards one particular sector of the population (namely, students: the study was conducted in a college town in which students comprise one half the population). The other four questions were chosen according to their type.

Question 1, "What's your favorite color?", is identical to that asked in the Edelsky study. It is survey in type, and was expected to be a question to which only the subject had the correct answer. Question 2, "What's the capital of California?", was chosen as a factual one that every subject was expected to answer correctly, given that the town in which the study was conducted is located 15 miles from the state capital. In fact, no one answered this question incorrectly. It is also similar to the type of question asked in the McConnell-Ginet study ("What building is this?"), although it is not the type of question one 'expects from strangers' over the telephone. Question 3, "What is your opinion on the new California State Lottery?", is also one to which only the subject has the correct answer; however, it requires the speaker to verbalize a personal opinion, and for many, is asking for a political statement. We expected a somewhat more emotional response to this question, and in most cases, our expectations were met. Finally, we expected that Question 4, "What's the capital of Nevada?", would receive responses of which the subjects were unsure; however, it was intended to be one at which most would at least venture a guess. (In point of fact, the capital of Nevada is Carson City, and not Reno, as most subjects answered.) It was here that we expected to find the most RTC.

4. RESULTS. Results are given in percentages for ease of interpretation and are presented for each factor individually (i.e. Sex of Speaker, Sex of Experiment, and Question Type) as it affects use of RTC. Analyses of variance were conducted using
99% simultaneous confidence intervals to determine the significance of main effects and two-way interactions. A three-way ANOVA was not conducted since there was only one observation per cell.

4.1. SEX OF SPEAKER. No main (that is, overall) effect was found on use of RTC for Sex of Speaker. Women used RTC 29% and men 30% of the time (see Table 1). Judging by main effect of Sex of Speaker alone, then, these data validate neither Lakoff's intuitions nor McConnell-Ginet's results, but rather, support Edelsonsky's finding that women and men are not differentiated in their use of RTC.

| TABLE 1. Categorizations of terminal contours in percentages according to Sex of Speaker |
|-----------------------------------|----------------|----------------|
|        rising        | flat | falling |
| F | 29    | 7    | 64    |
| M | 30    | 7    | 63    |

Neither was the interaction of Sex of Speaker with Sex of Experimenter statistically significant. However, there was a significant interaction of Sex of Speaker with Question Type for use of RTC (p < .02). As can be seen in Table 2, this effect was concentrated in Questions 1 and 4. In responding to the former, female subjects used RTC 16% of the time, whereas male subjects used the pattern 34% of the time. Many of the male subjects did not know their favorite color; indeed, a few of them asked their wives for the answer. The trend is reversed for responses to Question 4, where females used 34% RTC as compared to 26% for males. Note that male speakers gave as many incorrect answers to this question as female speakers did. Thus, women and men who participated in this study used RTC differently, depending on the question type.

| TABLE 2. Categorizations of terminal contours in percentages according to Sex of Speaker and Question Type |
|-------------------------------------------------|-----------|-----------|-----------|-----------|
|                               | Q1 (color) | Q2 (cap. CA) | Q3 (lottery) | Q4 (cap. NV) |
| F Sp   |             |             |             |             |
| rising | 16          | 38          | 26          | 34          |
| flat   | 20          | 2           | 4           | 0           |
| falling| 64          | 60          | 70          | 66          |
| M Sp   |             |             |             |             |
| rising | 34          | 34          | 30          | 26          |
| flat   | 16          | 4           | 4           | 2           |
| falling| 50          | 62          | 66          | 72          |

4.2. SEX OF EXPERIMENTER. The main effect of Sex of Experimenter was significant (p < .01). The female experimenter
elicited 25% RTC, and the male experimenter 33% RTC. Because both experimenters elicited the same percentage of flat contours (5%), the main effect of Sex of Speaker was also significant for a falling contour (p < .05): the female experimenter elicited 70% and the male experimenter 62% falling contour (see Table 3). Thus, subjects used more falling contours and less RTC when interviewed by a female than when interviewed by a male experimenter.

<table>
<thead>
<tr>
<th>TABLE 3. Categorizations of terminal contours in percentages according to Sex of Experimenter</th>
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<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>F</td>
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<tr>
<td>M</td>
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</table>

The interaction of Sex of Experimenter with Question Type was also found to be significant (p < .1). This effect was concentrated in responses to Questions 3 and 4. In response to the former, the female experimenter elicited 22% and the male experimenter 34% RTC. In response to the latter, the female experimenter elicited 24% and the male experimenter 36% RTC (see Table 4). Thus, the female experimenter elicited much less RTC with responses to Questions 3 and 4 than did the male experimenter.

<table>
<thead>
<tr>
<th>TABLE 4. Categorizations of terminal contours in percentages according to Sex of Experimenter and Question Type</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>F Exp</td>
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<tr>
<td>rising</td>
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<tr>
<td>flat</td>
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<td>falling</td>
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<tr>
<td>M Exp</td>
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<tr>
<td>rising</td>
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<tr>
<td>flat</td>
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<tr>
<td>falling</td>
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</table>

4.3. QUESTION TYPE. The final factor, Question Type, had a significant main effect on use of flat contours and RTC. The main effect on use of a flat contour (p < .02) was concentrated in responses to Question 1: 18% flat contour as compared with 4% flat contour with responses to Questions 2, 3, and 4 (see Table 5).

The main effect on use of RTC (p < .03) was distributed fairly evenly among the four Question Types. Responses to Question 1 had the lowest percentage of RTC at 25%. Responses to Question 2 had the highest percentage of RTC at 36%. Each of these two questions elicited RTC levels significantly different
from all other question types. Questions 3 and 4, on the other hand, elicited RTC levels significantly different from Questions 1 and 2, but not from each other, at 28% and 32%, respectively (see Table 5). Question Type, then, proved to be a significant factor in use of RTC, both as a main effect and in interaction with Sex of Speaker and Sex of Experimenter, as discussed above.

TABLE 5. Categorizations of terminal contours in percentages according to Question Type

<table>
<thead>
<tr>
<th></th>
<th>Q1 (color)</th>
<th>Q2 (cap. CA)</th>
<th>Q3 (lottery)</th>
<th>Q4 (cap. NV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>rising</td>
<td>25</td>
<td>36</td>
<td>28</td>
<td>32</td>
</tr>
<tr>
<td>flat</td>
<td>18</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>falling</td>
<td>57</td>
<td>60</td>
<td>68</td>
<td>64</td>
</tr>
</tbody>
</table>

5. DISCUSSION. Table 6 presents the results of the three-way interaction. I present them here because they are enlightening in terms of interpretation of the data, despite the fact that no statistical analyses were performed on them.

TABLE 6. Categorizations of terminal contours in percentages according to Sex of Speaker, Sex of Experimenter, and Question Type

<table>
<thead>
<tr>
<th></th>
<th>S x E (color)</th>
<th>Q2 (cap. CA)</th>
<th>Q3 (lottery)</th>
<th>Q4 (cap. NV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F x F</td>
<td>rising 16</td>
<td>36</td>
<td>20</td>
<td>24</td>
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<tr>
<td></td>
<td>flat 24</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>falling 60</td>
<td>64</td>
<td>76</td>
<td>76</td>
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<tr>
<th></th>
<th>S x E (color)</th>
<th>Q2 (cap. CA)</th>
<th>Q3 (lottery)</th>
<th>Q4 (cap. NV)</th>
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</thead>
<tbody>
<tr>
<td>F x M</td>
<td>rising 16</td>
<td>40</td>
<td>32</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>flat 16</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>falling 68</td>
<td>56</td>
<td>64</td>
<td>56</td>
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<tr>
<th></th>
<th>S x E (color)</th>
<th>Q2 (cap. CA)</th>
<th>Q3 (lottery)</th>
<th>Q4 (cap. NV)</th>
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<tbody>
<tr>
<td>M x F</td>
<td>rising 32</td>
<td>32</td>
<td>24</td>
<td>24</td>
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<tr>
<td></td>
<td>flat 16</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>falling 52</td>
<td>64</td>
<td>72</td>
<td>72</td>
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<tr>
<th></th>
<th>S x E (color)</th>
<th>Q2 (cap. CA)</th>
<th>Q3 (lottery)</th>
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<tr>
<td>M x M</td>
<td>rising 36</td>
<td>36</td>
<td>36</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>flat 16</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>falling 48</td>
<td>60</td>
<td>60</td>
<td>72</td>
</tr>
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</table>
5.1. QUESTION 1. The first column of Table 6, which gives the interaction between Sex of Speaker, Sex of Experimenter, and Question 1, shows that male speakers used significantly more RTC than females did when responding to Question 1, regardless of Sex of Experimenter. Lakoff hypothesizes that interest in color and command of color terminology is a female quality. In other words, we can say that the realm of color is a female domain. Thus, the high rate of RTC used by men in response to this question reflects their unease with the female domain of color in general. This hypothesis finds some support in the semantic content of their responses. First, recall that many men did not have an answer to this question. Second, those male speakers who did provide an answer used only primary color terms. In fact, only two different answers to this question were elicited from men: 'blue' and 'red', whereas women used terms such as 'aqua', 'burgundy', 'mauve', 'peach', and 'dusky rose', in addition to more basic color terms.

5.2. QUESTION 2. Looking at the second column of Table 6, we see that Question 2 elicited significantly more RTC than any other question; this was an unexpected finding since all speakers answered this question correctly. Clearly, the use of RTC in this instance is not a reflection of insecurity. Rather, the contour reflected many speakers' surprise at the simplicity and unexpectedness of the question. I propose that the first question sets up an expectation in the mind of the speaker for subsequent questions to be similar in nature. In this case, speakers would expect the next question to be innocuous, non-factual, and semi-personal. Instead, it is a factual (geographic) question that is surprisingly simple. Many lexicalized their surprise (e.g., 'Are you serious? [Laughs.] Sacramento'), but just as many expressed their reaction intonationally. A modification of the experimental design could easily resolve this problem, namely a reorganization of the questions in such a way as to order similar questions consecutively. Obviously, such a modification could affect the rate of RTC used in responding to Question 2.

5.3. QUESTION 3. Turning now to the data from Question 3, recall that the two-way interaction between Sex of Experimenter and Question Type was significant, and that the effect was concentrated in responses to Questions 3 and 4. Specifically, subjects used more RTC when responding to a male than when responding to a female interlocutor. The data from Table 6 indicate that this effect was not concentrated in the responses from speakers of one sex, but rather is significant for both female and male speakers. Female speakers used 20% RTC with a female and 32% RTC with a male experimenter, and male speakers used 24% RTC with a female and 36% RTC with a male experimenter. In other words, in response to Question 3, both female and male speakers used more RTC with a male experimenter than with a female experimenter.

This result may also be explained in terms of the hypothesis regarding female and male domains. Question 3 is essentially a political question, and politics is stereotypically considered to be a male domain. Thus, both male and female subjects perceived
the male as more threatening than the female interlocutor in terms of this question, since it represents a male domain. Thus, when speakers are asked to voice their political opinions to a male interlocutor, they exhibit a higher degree of insecurity (as reflected by a higher degree of RTC) than when responding in kind to a female interlocutor.

An alternative explanation for the high rate of RTC used with the male experimenter is that male interlocutors are perceived as poorer listeners than females and thus require more interactional cues. Although this may be true in general, I reject such an explanation for the present phenomenon on the grounds that a telephone poll does not represent a standard interaction. In such a question/answer structure, a response, in and of itself, is a strong interactional cue, signaling the interviewer to resume the floor.

5.4. QUESTION 4. Finally, the data from column 4 of Table 6 reveal a particularly interesting discrepancy in use of RTC by female speakers responding to Question 4; when responding to a male experimenter, they used 44% RTC (their highest overall score for RTC) as compared to 24% when responding to a female experimenter. The reverse trend is evident in the percentages for falling contour (56% with a male and 76% with a female experimenter), since none of the female subjects used a flat contour when responding to this question. Thus, in response to Question 4, female speakers used much more RTC when responding to a male than when responding to a female experimenter.

We do not find the same pattern among the male speakers. When responding to Question 4, male speakers used 28% RTC to a male experimenter and 24% RTC to a female experimenter. They used 72% falling contour to both male and female experimenters. Thus, comparing responses of female and male speakers to a male experimenter, we see a major difference: for RTC, females had a score of 44% as compared to 28% for males, and for falling contour, females had a score of 56% compared to 72% for males. Hence, when responding to Question 4 as asked by a male experimenter, female speakers used a great deal more RTC (and conversely, less falling contour) than their male counterparts did in the same situation.

I suggest two possible interpretations of these data. The first is that female speakers were more willing to reveal that they were unsure of the answer to Question 4. However, if this is true, why didn’t they use equal amounts of RTC with both experimenters? Recall that their score for RTC with the male experimenter was 44% for this question, the highest found in the study. Furthermore, the data from Question 3 do not support such an interpretation. Many women were unsure of their answers to this question, as is reflected in the semantic content of their responses (e.g., ‘I’m not sure’, ‘I don’t know’). Nevertheless, they used only 26% RTC, almost half the rate used with responses to Question 4. Hence, this interpretation fails to explain all the facts.
A second possible interpretation is that women felt insecure about answering Question 4. I maintain that this is a better explanation and that it may be articulated in terms of female and male domains. Specifically, I claim that female speakers viewed this factual-type question as a male domain; that is, they saw it as a request for information that they expect men to know. Two types of data lend support to this contention. First, women used far more RTC in responding to a male experimenter than in responding to a female experimenter, indicating that the insecurity reflected by the high rate was provoked by the factor Sex of Experimenter. Second, the semantic content of some of the responses implies such an attitude. For example, many female speakers responded ‘My husband would know’ and several even said ‘Just a minute’ and asked a male speaker for the answer.

In terms of the low rate of RTC used by male speakers in response to this question, recall that just as many men as women gave incorrect answers to Question 4. If the rising terminal contour reflects unease, then its converse should reflect sureness, or at least an appearance thereof. Thus, male speakers adopted a confident contour even when giving incorrect answers to a factual question. Lexical frames validate this interpretation. For example, a male speaker would use falling intonation with the response ‘Uhm ... I don’t know ... Reno’. Male speakers, then, whether consciously or unconsciously, manipulate their intonation contours in such a way as to give the appearance of confidence, even when their lexical frames deny the impression.

The data from Question 4, particularly those regarding female responses, raise some interesting questions. For instance, why do we not find similar patterns in male responses to Questions 1 and 4? Specifically, if Question 1 represents a female domain, why didn’t men use more RTC with a female than with a male experimenter? And if Question 4, like Question 3, represents a male domain, why didn’t male speakers use more RTC with a male than with a female experimenter, as their female counterparts did? Clearly, female and male speakers do not perceive these domains in the same way. I do not propose to address this question in any more detail here. I merely delineate problems for future research.

A final note on Question 4 concerns the high percentage of falling terminal contour used. This was an unexpected finding, given the uncertainty with which many subjects responded. As we have seen, the high rate of falling contour used by male speakers contributed significantly to this effect. Another contributing factor, however, was the fact that subjects always knew that there were only four questions. Thus, many used rising intonation for the first three answers (interpreted by this researcher as an anticipatory contour), but used falling intonation with the final answer, as if to complete or terminate the previously defined structure of four questions and four answers. Clearly, this is a problem with the experimental design; however, the effect could easily be counteracted by simply randomizing the order of the
questions and refraining from informing subjects of the number of questions to be asked.

6. CONCLUSION. This study examined the question of whether more women than men use RTC when providing a declarative answer to a Wh- question. The most important finding overall is that consideration of only the factor Sex of Speaker does not provide a comprehensive answer to this question.

In this study, there was no main effect for Sex of Speaker; female and male speakers used RTC equally. However, main effects were found for the factors Sex of Experimenter and Question Type. Subjects used more RTC with the male than with the female experimenter and used different rates of RTC when answering different questions.

Moreover, the interactions Sex of Speaker x Question Type and Sex of Experimenter x Question Type had a significant effect on use of RTC. Female speakers used different amounts of RTC from male speakers when responding to the questions 'What's your favorite color?' and 'What's the capital of Nevada?'. Specifically, males had the higher RTC score for the former and females the higher score for the latter. The male experimenter elicited higher scores for RTC with responses to the questions 'What's your opinion on the new California State Lottery?' and 'What's the capital of Nevada?' than with responses to the questions 'What's your favorite color?' and 'What's the capital of California?'

I concluded that these findings can be explained in terms of 'domain of activity/knowledge' (Shibamoto, personal communication). That is, use of RTC with declarative responses may reflect a speaker's unease or unfamiliarity with a particular realm of knowledge or activity. I claimed further that such domains may be related to sex roles. A conclusion that cannot be drawn from these data is that women are in general more insecure than men. I also claimed that use of RTC cannot always be interpreted as an indicator of a speaker's insecurity. I suggested that the pattern may also indicate incredulity or anticipation, as well as function as an interactional cue.

Lakoff's intuitions, then, were not validated by the evidence in this study. However, as Edelsky points out, interviews with strangers comprise only a small portion of average verbal interaction, and results from a study of this kind should not be generalized to all spheres of verbal behavior. Clearly, there is a need for further research in the area. For example, the following three questions would provide valuable information. First, do the types of situations in which women use more RTC than men occur more frequently than those in which the reversed pattern is found? If the answer to this is affirmative, it could explain and validate Lakoff's intuitions. Second, are these same patterns of usage found in interactions which take place in more traditional settings, i.e. where the interlocutors know one another, and participant roles are clearly defined? Finally, are these patterns evidenced and perpetuated by cultural stereotypes such as soap opera characters, for instance?
As Lakoff has demonstrated, the issue of the differences between women's and men's speech is not only a linguistic but also a political issue. If 'how we say it' is as important or more important than 'what we say', both male and female speakers should be aware of the attitudes that different intonation patterns produce. Only then can speakers control such patterns and hence convey only those messages they wish to convey, rather than allowing their speech to send out signals that may be inaccurate as well as damaging to their credibility.

This article has greatly benefited from the comments of Janet Shibamoto and Jeri Jaeger, to whom I wish to express my deepest gratitude.

REFERENCES


Clefts, Discourse Representations, and Situation Semantics
Jean Mark Gawron
Stanford University

1. Opening Remarks

In this paper I propose to consider the well-known construction exemplified in (1):

(1) It's Maria John likes.

Let us divide (1) into two pieces, the focus (Maria), and the property, (being an x such that John likes x). It has often been observed that the above construction carries with it a presupposition that the property is instantiated. Thus, (1) is only appropriate in contexts in which it is given that there is someone that John likes. Contextual requirements of this sort have sometimes been called conventional implicatures. Two properties are generally considered criterial of such implicatures: (1) they are not cancellable; and (2) the negation of (1) ("It's not Maria that John likes") has the same presupposition.

What I propose to do in this paper is to account for some of the well-known properties of sentences like (1) in an augmented version of situation semantics. Basically, I want to draw an analogy between the presuppositions associated with definite NP's like the pen on my desk in (2)

(2) The pen on my desk is out of ink.

and the clefted individual. The claim will be, in effect, that clefts involve a very special sort of definite reference, and that the discourse function of (1), and its relation to (2), might be made transparent in a paraphrase like (3):

(3) The one who John likes is Maria.

I will use the term salient to designate that property of entities, whatever it may really be, that makes them specifiable with a definite description in a discourse. In order to draw the analogy between definite descriptions and clefts I will need to make reference to both discourse salient properties and discourse salient individuals. I will present a system in which properties will not be available to be discourse salient unless there is some individual they are true (or false) of. The situation for salient individuals will be exactly symmetric: individuals will not be available to be salient unless there is some property "under which" they are salient -- or perhaps better -- some aspect under which they are relevant.

So in a phrase like "the property of being a unicorn" the property of being a unicorn is not functioning as a discourse salient property. Rather it's a discourse salient individual, one that is salient under the aspect of being the (one and and only) property of unicornhood. (Compare this to Frege's "The concept 'horse' is not a concept.")

At a certain point, it will become clear that the analogy between clefted (or focused) individuals and definite referents will break down, chiefly because of the fact that in (1), there is no presupposition that Maria is commonly identifiable via the
property of being someone John loves; indeed, in any context in which someone would ordinarily SAY (1), Maria is not so identifiable. In (2), on the other hand, the object in question must be commonly identifiable via the property of being a pen and on my desk. Once we have made this difference in status between the two phenomena precise, I will still insist on a similarity. In particular, as has often been noted, the focus must be contextually unique in instantiating the property. It must exhaust the list of contextually relevant property-bearers. In a similar way, the referents of definite NP's must be the contextually unique bearers of their identifying property.

2. Situation Semantics

Situation Semantics (Barwise and Perry 1984) is a framework which proposes to give a general account of information flow, whether in sentences, computers, mathematical proofs, mental states, or causally connected events. One of the central ideas of the framework, drawn from the work of David Kaplan, is that meaning underdetermines content. The simplest examples of such underdetermination are sentences involving deixis:

\[(4) \text{ I like linguistics.}\]

(4) carries different information depending on who utters it. Although a number of different semantic accounts have been offered for sentences like (4), many of them by model theoretic semanticists (see, for example, Bar-Hillel 1954 and Montague 1974), situation semantics (SS) is unique in that it builds the machinery for handling discourse sensitive phenomena into the foundations; it is central to the account of information transfer that meaningful regularities carry information only once they are anchored into a context.

To make this clearer, I outline some features of the theory of linguistic meaning (sketched in Barwise and Perry 1985). In Situation Semantics, meaning is portrayed as a constraint holding between a discourse situation type and a described situation type. Following is a rough representation of the meaning constraint for (4):

\[<a \text{ says "I like linguistics";} 1> = =>_d <\text{like, a, linguistics;} 1>\]

The above constraint can be roughly glossed "a saying 'I like linguistics' involves describing a situation in which a likes linguistics." The double-arrow is what is being read as involves. The d-subscript (for description) is intended to distinguish it from other constraints, involving a very different sort of involvement. These other constraints describe nomological or necessary regularities in the world, for example:

\[<\text{kissing,a,b;} 1> = => <\text{touching,a,b;} 1>\]

One limitation of SS accounts of discourse sensitive phenomena is that until now they have been limited to cases which can be conveniently dealt with as anchorings of a parameter. As far as I can see, the conventional implicature in (1) is not such a case; what I propose to do in this paper is sketch a modified situation semantics in which meanings are given enough structure to deal with conventional implicatures like (1).
Two related points are worth mentioning here. First, one might wonder, why invoke situation semantics at all to handle phenomena involving definiteness and discourse saliency. Although Barwise and Perry 1984 offers a treatment of what they call singular NP's (names, definites and indefinites, as opposed to NP's with quantifiers like every), they make no effort to distinguish among the singular NP's. That is, they propose no way of distinguishing definites from indefinites -- and that is precisely the sort of distinction which (I have claimed) is at issue in dealing with (1). The reason to turn to SS, I think, is not that SS has an appropriate analysis ready to hand, but rather because it gives the appropriate degrees of freedom. It doesn't set out with commitments to possible worlds or full function hierarchies, nor does it methodologically rule out abstract semantic components as uninteresting. Instead the sorts of "funny" commitments one has to make are ontological; whether one is a "realist" about these commitments or not, I think there is a growing sense among linguists that one can't do semantics without appealing to all sorts of funny objects (be they cognitive or uniformities in the world) which can combine in various complicated ways (and not just by function-argument application).

These claims about degrees of theoretical freedom bring me to a somewhat more controversial point. I want to claim that, from a linguist's point of view, SS doesn't even commit one to a particular theory of meaning. Now this claim might at first hearing unsettle Barwise and Perry, but it is, I think, relatively benign. Barwise and Perry's articulation of a theory of meaning was given in the context of a general theory of the flow of information. That account has been focused on certain linguistically pregnant phenomena (like the attitudes), but there is no reason that it should be particularly suitable to the sort of meaning linguists have in mind when they talk about discourse. There is no reason why linguistic types (sentences, NP's, words) shouldn't enter into various sorts of constraints, some the sort that B&P have in mind when they talk about meaning, others that might be more relevant to theorists of discourse. In this sense there might be many different kinds of "meaning" into which linguistic objects enter. Thus an account of meaning as discourse-function can be entirely consistent with an account of meaning as describing function (the B&P sense of meaning). On the one hand, the account I propose will still involve something like a constraint, and all constraints capture "meaningful" relations; on the other, the word "meaning" is appropriate, because what is at issue seems to be meaning in an important sense for linguists.

In what follows I assume a version of Situation Semantics somewhat different from much of the published work. In particular, following some recent suggestions by Barwise, I dispense with the "abstract" situations of B&P 1984 and assume situations are simply primitive objects which are determined by a set of facts. Facts are just a special case of states-of-affairs. To put it another way, the states-of-affairs can be thought of as including all possible facts, including the ones that actually ARE facts, that is, the ones that actually hold in some situation. To express the fact that some state-of-affairs, say one in which John is running, holds in some particular real situation s, I will write:

\[(5) \ s \models <\text{run}, \text{John}; \ 1>\]

The states-of-affairs form a complete lattice. So we can form complex states-of-affairs like the following:
(6) \(<\text{run, John; 1}> \land <\text{sleep, Maria; 0}>\)

(6) is a complex state-of-affairs in which John is running and Maria is not sleeping. In addition, there are states-of-affairs which are vague, in the sense that one or more argument positions of the relation are left unspecified:

(7) \(\exists x <\text{run, x; 1}>\)

This is a state-of-affairs in which someone is running.

3. Discourse Transition Constraints

Following a suggestion of Mats Rooth's, I begin the search for the right treatment of clefts with some unabashed borrowing of the insights in Heim (1982 and 1983). Heim 1983 notes that her system, initially proposed to deal with the problem of definites and indefinites, provides a general framework for dealing with conventional implicatures. Clefts, too, involve conventional implicature and an adequate treatment should be embedded in a framework that is at least a start on an adequate treatment of conventional implicatures in general.

Heim's system takes as a starting point the idea that sentence meaning can be represented as a File (Context) Change Potential (FCP), essentially an operation from files to files which encodes the discourse advancing function of the sentence. The meaning of sequences of sentences in discourse is the composition of their FCP's. Each file in the domain or range of a FCP is in turn a function from worlds to sets of partial variable assignment functions. (Heim 1983) Sentences using definite NP's like the man impose two sorts of constraints on FCP's: (1) the "input" file includes only assignment functions defined over some particular variable (say, \(xI\)); (2) for each world the file includes only assignments which assign a man to \(xI\).

We import a similar idea into SS as follows: sentence meanings will be constraints on something called a discourse transition. A discourse-transition is a state-of-affairs of the form given in (9):

\(<\text{next-discourse-state U1, S1, S2; 1}>\)

U1 in (9) is an utterance state-of-affairs, rather like the utterance situations in Barwise and Perry 1984; it contains information about who says what to whom, and S1 and S2 are discourse-states, in a sense to be explained shortly. A state-of-affairs of the form in (9) is a fact when the utterance situation U1 is real, and it is immediately preceded by S1 and immediately followed by S2. This, then, is like a snapshot of one of Heim's FCP functions. I assume that discourse-states (DS) are states-of-affairs holding at critical points in a discourse; they include information about points of time, or relatively short intervals. Each discourse-state will belong to a unique discourse. (10) gives an example of the sort of information one might expect to find in a DS:

(10) \(<\text{t, just-uttered, 'John liked Mary'; 1}>\)

(10) represents the information a particular sentence was just uttered. A discourse-state might well include information about all the utterances from the "beginning" of the relevant discourse (if the notion of a discourse-beginning can be well defined).
Another sort of information that will certainly be relevant is that some fact is common knowledge in a discourse:

(11) \(<\text{common-knowledge},<l,\text{like},\text{John, Mary};1> ;1>\)

It will be convenient to have an abbreviation that says that a discourse-state $sI$ already includes some fact as common-knowledge. In that case we will write:

(12) \(<\text{includes},s1 , <\text{like},\text{John, Mary};1> ;1>\)

Of course, these examples are offered only as a hint of what characterizing the informational state in a real conversation would involve. I will make no further commitments here about what sorts of information really needs to be included in a fully adequate discourse-state. Rather, I will concentrate on relations that take discourse-states as arguments.

(13) gives the form of a Discourse Transition Constraint (DTC):

(13) \(<\text{next-discourse-state } U1 , S1 , S2> == > \)<... S1...> ∧ <... S1...> ∧ <... S2 ...>\)

A Transition Constraint consists of discourse-transition on the left and a conjunction of states-of-affairs about the input and output states on the right. What a DTC gives, then, is the requirement a sentence makes on its input discourse states, and the changes it requires in the output. On this view, the distinction between assertion and presupposition is recast into the distinction between input requirements and additions to the output common knowledge. As we shall see, there are other changes a sentence can make on the output besides adding to the common knowledge.

4. Definites and Indefinites

Turning now to referential NP's, we will characterize referential salience with a relation \textit{salient} holding among a discourse-state, a property, and an individual. So a certain dog might be characterized as salient in discourse-state $sI$ with the following state-of-affairs:

(14) \(<\text{salient, } s1,a, \text{dog};1>\)

In the case of complex properties like being someone that John likes, I will write:

(15) \(<\text{salient, } s1,a,[x]<\text{likes, john,x};1> ];1>\)

So (15) is a state-of-affairs true when some individual $a$ is salient in discourse state $sI$ under the property of being someone John likes. We will also assume the following constraints:

(I) \(<\text{salient, } s1,a,P;1> == > <\text{includes},s1,<P,a;1> ;1>\)

(II) \(<\text{next-discourse-state, } u1,s1,s2;1> ∧ <\text{salient, s1, a,P;1} == > <\text{salient, s2,a,P;1}>\)
What (I) says is that when a is salient in sI under property P, then the state-of-affairs of a having property P must be common-knowledge in the discourse-state. What (II) says is that once something is salient in a discourse, it continues to be. This is clearly too strong, but it will serve as a first approximation; the chief function of (II) in what follows will be to save some typing. We will see an example below.

The apparatus introduced thus far is sufficient for a very preliminary treatment of the discourse-differences between definite and indefinite NP’s. For definites, we will require that their referents be salient in the input discourse-state:

<s salient,s1,a,P;1>

Constraint II guarantees continued salience in the output. For indefinites, we will require that their referents not be salient in the input state and salient under the relevant property in the output:

<s salient,s1,a,0>
<s salient,s2,a,P;1>

Thus, an indefinite will be unable to have the same referent and property as a preceding definite. To give an example of how this works, we want (16) but not (17) to be a well-formed discourse, on the interpretation where the subject NP’s are coreferential:

(16) A dog entered. The dog left.
(17) The dog entered. A dog left.

Consider the following DTC’s for the discourse in (17) omitting tense:

DTC(17)

<next-discourse-state, <says,a, "The dog entered";1>, s1,s2;1>
  ==>
<s salient,s1,b,dog;1>
<includes,s2, <leave,b;1>;1>

<next-discourse-state, <says,a, "A dog left";1>, s1,s2;1>
  ==>
<s salient,s1,b,0>
<s salient,s2,b,dog;1>
<includes,s2, <leave,b;1>;1>

The first sentence is only appropriate if the referent of the definite NP is salient in the input-discourse-state. By Constraint II, that referent continues to be salient in the output. But the DTC for the second sentence requires that the referent of the indefinite NP not be salient in its input discourse-situation. So discourse (17) does not cohere. Like definites, proper names also trigger output salience, as do indefinites, by overt stipulation rather than via II (the right generalization seems to be that reference triggers salience). So discourses like:
(7a) Fido came in. A dog left.
(7b) A dog came in. A dog left.

will also be predicted to have only the interpretations on which the subjects of the sentences are disjoint in reference.

Their differing input conditions, as Heim notes, will also be responsible for capturing the contrast between definites and indeterminates in licensing backwards anaphora. Consider, for example, the contrast between every man who meets it likes the donkey and every man who meets it likes a donkey. In the latter, coreference between the pronoun and indefinite is impossible, presumably because the pronoun renders its referent salient.

5. Clefts

To extend this sort of account to clefts, we stipulate that clefts require that the clefted individual and property be salient. So the DTC for (1) will be:

\[
\text{DTC}(1)
\]

\[
\text{next-discourse-state, says,a, "It was Maria John loved";} > s1, s2 ; 1 >
\]

\[
\text{salient,s1,b,[x]<love,John,x;} > s1 > ; 1 >
\]

\[
\text{equal,b,c;} > s1 >
\]

\[
\text{includes,s2,<love,John,c;} > s1 > ; 1 >
\]

Looking at the part of the constraint following the arrow, the first state-of-affairs requires that some b be salient in the input s1 under the aspect of being loved by John. This is what captures the cleft presupposition mentioned at the outset. The presupposition of (1) is that there is someone that John loved; since some b is salient in s1 under the aspect of being loved by John, it is common knowledge in s1 (by I) that some b has that property. The second and third states-of-affairs in DTC(1) will require that there be a c in s1 salient under the aspect of being named Maria, and that b equal c. The last state-of-affairs simply represents the content of (1) and inserts it into the output state.

Given our treatment of indefinites, DTC(1) makes an immediate prediction: sentences like (19) ought to be unacceptable:

(19) It was a nurse that John loved.

To see why, we need to look at the Transition Constraint for (19):

\[
\text{DTC(19)}
\]

\[
\text{next-discourse-state, says,a, "It was a nurse John loved";} > s1, s2 ; 1 >
\]

\[
\text{salient,s1,b,[x]<love,John,x;} > s1 > ; 1 >
\]

\[
\text{equal,b,c;} > s1 >
\]

\[
\text{salient,s2,c,nurse;} > s1 >
\]
The cleft construction requires that \( b \) is salient in \( s1 \), and moreover guarantees that \( b \) and \( c \) are equal. But the indefinite NP makes the requirement that its referent not be salient in the input DS, seen in the fact <salient,s1,c;0>. To satisfy this constraint, the same individual must both be salient in \( s1 \) and not salient in \( s1 \). These two clashing requirements can't be met, so (19) should be out. Is it in fact out? My claim is that it is -- on the reading where the entire NP is focused. But there is a closely related sentence which is not unacceptable:

(20) It was a NURSE that John loved.

(20) represents a reading on which what is focused is the property of being a nurse, appropriately uttered, say, in an environment where someone has just claimed that John loved a cab driver. (20) involves a kind of pied-piping. That is, the focused material has brought some of its syntactic environment along with it into the clefted position. An appropriate DTC for (20) would be:

DTC(20)

<next-discourse-state, <says,a, "It was a NURSE John loved";1>, s1,s2;1>  
==>
<salient,s1,P, [PROP]<hold,PROP,b;1> <love,John,b;1>];1>  
<salient,s1,b;0>  
<salient,s2,b,nurse;1>  
<equal, P, nurse;1>  
<includes, s2, <hold,nurse,b;1> <love,John,b;1>;1>

Here \( P \) is the parameter for the property salient in \( s1 \), the property that held of some \( b \) John loved. But note that while \( P \) is salient in \( s1 \), \( b \) is not, under any aspect. \( b \) does not become salient (under the nurse aspect) until \( s2 \).

In proposing this Pied-piping view of some cleft constructions, I am agreeing in spirit with the analysis in Chomsky 1970 and Jackendoff 1972. For a somewhat different view of what is at issue in such constructions, see Rooth 1985.

The idea of property focusing extends quite naturally to clefts involving non-NP's:

(21) It was eating fish that John objected to. (Rooth 1985)
(22) It was under the table that John hid the book.
(23) It was yesterday that John phoned.

The semantics for (21) look very much like (20); a property has been focused, this time with no pied-piping made syntactically necessary. (22) differs a bit. Following Gawron 1985, I treat adjunct PP's as properties of situations:

DTC(22)

<next-discourse-state,  
<says,a, "It was under the table that John hid the book";1>, s1,s2;1>
(23) will look much like (22), with the temporal property of situations replacing the spatial one.

We have seen that both individuals and properties can be focused. Is there anything that can not be? Apparently so. Sentences like *It was every concession John objected to* are quite peculiar, and seem to be salvagable only if some sort of property focusing is resorted to: *It was every CONCESSION John objected to*. On the current approach, these facts seem to be representable fairly straightforwardly as restrictions on the possible "focus" arguments of the *salient* relation.  


There is a serious problem with the treatment offered thus far. The problem stems from the ordinary interpretation of constraints in situation semantics. I repeat the right hand side of the constraint proposed as the meaning for (1):

\[
\Rightarrow
\]

\[
<\text{salient}, s_1, a, [x] <\text{love}, John, x; 1]>; 1>
\]

\[
<\text{salient}, s_1, b, \text{named-Maria}; 1>
\]

\[
<\text{equal}, a, b; 1>
\]

\[
<\text{included}, s_2, <\text{love}, John, b; 1>; 1>
\]

The problem is that the only situations that can satisfy this right hand side will be situations in which some specific individual is salient in s1 under the given property. But then Constraint I will apply, and, by the definition of included, we will have a larger situation in which (24) is a fact:

(24) \(<\text{common-knowledge}, <\text{love}, John, a; 1>; 1>\)

And moreover, a will be anchored to the same individual as b, which is to say, Maria. Then it will be common knowledge OF Maria that she is loved by John. But, of course, this is precisely what ISN'T common knowledge when someone says (1). What we want instead is (25):

(25) \(<\text{common-knowledge}, \exists y <\text{love}, John, y; 1>; 1>\)

In contrast, when we make referential use of the definite article, as in (2), we are exploiting the fact that it is common knowledge -- knowledge of a certain object -- that it is a pen and on my desk. This strongly suggests that the relation we want the property-bearers of clefts to bear to their discourse states is not the saliency relation, but some weaker relation. Let us call it *specifiability*. We can characterize the relation with two new constraints:

(III) \(<\text{specifiable}, s_1, a, P; 1> \Rightarrow <\text{includes}, s_1, \exists x <P, x; 1>; 1>\)
Constraint (III) gets the facts right about common knowledge; having a specifiable property holder only means that we know THAT someone holds the property, not that we know OF someone that they hold it. (IV) captures the relationship between saliency and specifiability. If we now strengthen the semantics of an indefinite so that instead of requiring <salient,a;0> of the input state, it requires <specifiable, a;0>, then a sentence like (19) will still make incompatible requirements on the input discourse-state. This means we will still require that clefted indefinites involve some sort of property focusing.

With this fine point out of the way, we can turn to a more general question: what is the real pay-off of trying to relate facts about definiteness to facts about focus? One benefit, I think, has already been demonstrated: we have an account of why clefts generally involve definites, and why clefted indefinites are special. But there is another property of focused elements that I think offers a better argument. This is the oft-noted fact that focused elements seem to be contextually unique bearers of the cleft property; and this contextual-uniqueness is something that has also been remarked of definite referents. So, just as Maria in (1) needs to be the only contextually relevant person John loves, the pen in (2) needs to be the only contextually relevant pen on my desk.

We can capture both these facts with a single constraint:

(V) <specifiable,s1,a,P>∧<specifiable,s1,b,P> == > <equal, a,b;1>

Since both definites and clefts will involve specifiability (definites will involve specifiability via constraint (IV)), both will require contextual uniqueness.

7. Conclusion

I have proposed a modified version of situation semantics rich enough to model certain facts about definiteness and focus, and proposed an account which allows the two phenomena to be related in a principled way. In particular, the proposed analysis of clefts claims that they involve a weakened variety of salience I have called specifiability.

I have said nothing about how the compositional semantics of the examples in this paper is to be specified. A detailed demonstration will have to be the subject of further work. One point worth mentioning here: that semantics appears to inevitably involve specifying semantic properties of a construction, rather than simply collecting the semantics of independent constituents in some construction-independent fashion. That is not a particularly earthshaking fact: it appears, for example, to be universally conceded for questions; but it may be that on further investigation semanticists find that construction-specific semantics is a far more pervasive phenomenon than they had at first thought. Some recent work (see Fillmore, Kay, and O'Connor 1985 and Lambrecht 1984) suggests that this is the case. If so, discovering the relations of the semantics of particular constructions to semantics found elsewhere in the grammar may become a far more pressing concern, the genus for the particular variety of concern I have addressed in this paper.

Notes
1. At this point, I am only dealing with referential or value-loaded uses of definite NP's. Attributive uses, although they seem to carry an existential presupposition as well, seem to function somewhat differently in discourse. In particular, there seems to be no presupposition that the referent is someone OF whom the description is known (de re) to be true. Nor is it necessarily common knowledge that someone (de dicto) uniquely fits the description (which is what I will claim later in this paper is true of clefts and what I call specifiability). I can say "the man with the martini glass in his hand" to my confederate at a party without assuming that she has ever noticed the existence of such an entity. I discuss common knowledge and identifiability in the last section of this paper.

2. Rob Chametzky points out that this does not explain why or even predict that conventional implicatures are subject to metalinguistic cancellation, but what is asserted is not. To describe THAT difference we might very well have to write out two different constraints with two different sorts of arrows.

3. Chuck Fillmore points out that a more illuminating view here might be to tie focus saliency in with the existence of some sort of list of possible, but mutually exclusive, candidates for bearers of the property. Since quantifier NP's like every concession don't pick out members of such lists, they can not be focused. This contrast-set view of focus might also help explain another property of it-clefts pointed out by another questioner. Unlike wh-clefts, they are peculiar discourse initially.

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References


SOME THEORETICAL CONSEQUENCES
OF DUTCH COMPLEMENTIZER AGREEMENT
Jack Hoeksema, University of Washington

1. Introduction

Several Dutch dialects, though not the standard dialect, show a phenomenon, which is, to my knowledge, typologically rather rare, namely agreement between the subject of a dependent clause and the complementizer of that clause. For example, in (1) below, there is agreement in number between the complementizer of "whether" and the subject:

(1) a. Ik weet niet of ie komt
     I know not whether he comes
     "I do not know whether he is coming"

     b. Ik weet niet ovwe ze komme
     I know not whether they come
     "I don't know whether they are coming"

In 1(b), both the complementizer and the finite verb agree in number with the subject, and in fact both carry the ending -e (schwa). Similar cases of number concord can be found with other complementizers as well, for instance with as "if/when" and dat "that", as the following examples illustrate:

(2) a. As Wim komp
     When Wim comes

     b. Azze Kees en Wim komme
     When Kees and Wim come (examples taken from van Haeringen 1939)

(3) a. Dat ik ziek ben
     that I sick am
     "that I'm sick"

     b. Datte we ziek zijn
     that we sick are
     "that we are sick"

Again, the plural ending -e appears on a lexical complementizer. Some dialects also show some person agreement, such as the one spoken in the province of Groningen:

(4) a. Of ik kom
     whether I come

     b. Ofstu komst
     whether you come

Example 4(b), by the way, shows obligatory
cliticization, since the form ofsttu is derived from ofst du by enclisis of the subject pronoun, followed by assimilation. The second person agreement marker -st appears on both the finite verb and the complementizer. The identical forms of the markers on the verb and the markers that show up on the complementizers has led some of the earliest writers on this phenomenon (e.g. Beckering Vinckers 1872) to suppose that the agreement is nothing but phonetic anticipation of the ending of the verb, in other words, some kind of speech error, rather than a grammatical device. However, even though the agreement in question is not obligatory in all dialects, it is much too common to dismiss it as a speech error, and furthermore, it would seem rather odd that this phonetic anticipation would occur in the dialects, but not in the standard language. Clearly, complementizer agreement is part of the grammar of many Dutch dialects, and not merely a performance phenomenon (cf. also Goeman 1980 for some remarks on this matter).

In this paper, I will not concern myself much with the nitty gritty details of the description of the various agreement patterns in the Dutch dialects. As a matter of fact, there is a remarkable variation in the paradigms of the complementizers in these dialects (cf. Goeman 1980 and the references in that paper). Instead, I will concentrate on some of the theoretical implications of the very existence of these phenomena for theories of agreement.

2. Theoretical Consequences.

The existence of inflection endings on complementizer may have some bearing on the question, in government and binding theory, what the status of the INFL node is in languages such as Dutch and German. It has been suggested by several linguists, e.g. Den Besten, that this node should be equated with COMP in these languages. The existence of inflections on complementizers would seem to be interesting prima facie evidence for such a position. However, I will not be concerned here with this issue, the relevance of which is strictly internal to GB theory, but, rather, with a problem of wider scope, one that seems to arise independently of the particular syntactic framework that one prefers to work in. More precisely, I want to address here the status of number agreement. It has been suggested by a number of people, including myself (cf. Hoeksema 1983), that number agreement between subject and predicate is an essentially semantic
phenomenon. Let me briefly summarize some of the arguments that have been given for this position. Consider for example the different behaviour of conjunctions and disjunctions of singular terms:

(5) a. John and Bill are here.
    b. John or Bill is here.

The difference can easily be described in syntactic terms, but the deeper reason behind the fact that conjunctions agree with plural verbs and disjunctions with singular verbs must be of a semantic nature. If it were just a lexical idiosyncrasy of the English conjunction sign and that it induces plurality, and a lexical idiosyncrasy of the English disjunction sign or that it creates singular noun phrases out of singular terms, then one would expect to find languages where conjunctions are singular, but disjunctions plural. However, such languages do not seem to exist, a fact which is left unexplained by purely syntactic theories, such as for instance the Sag/Gazdar/Wasow/Weisler (1985) theory of coordination in Generalized Phrase Structure Grammar (GPSG). In this theory, the plurality of conjunctions is guaranteed by assigning different features to disjunctions and conjunctions, and a feature cooccurrence restriction saying that a noun phrase with the feature [AND] must always be plural.

The motivation for this feature cooccurrence restriction is clearly a semantic one. We can do away with it altogether, if we allow semantic filtering of syntactic structures. It is easy to see that plural predicates have semantic properties that set them apart from singular predicates. For example, so-called collective readings only occur with plural predicates. Consider for example the sentences in (6):

(6) a. Every professor is writing a book.
    b. The professors are writing a book.

Example (6b) has a collective reading, according to which the professors are writing a book together, but this is not true of (6a).

There are also predicates that may occur only with a plural subject, because of their inherent collectivity:

(7) a. Jack and Jill are together again.
    b. *Jill is together again.

We can account for number agreement in semantic terms by distinguishing two types of entities:
individuals and groups. Groups may consist of individuals, or of other groups, but are not themselves individuals. Plural predicates, then, are predicates of groups. Consequently, they may be predicated of, for instance, the group consisting of Jack and Jill, as in example (7a) above, but not of individuals, such as Jill. This accounts for the anomaly of sentences such as (7b) above. In the same way, it makes sense to let singular predicates denote properties of individuals. This accounts for the acceptability of examples such as (8a), where a singular verb phrase is predicated of an individual and the anomaly of examples such as (8b), where a singular verb phrase is predicated of a group:

(8) a. This book is finished.
   b. *His books is finished.

For a formal elaboration of these ideas in terms of generalized quantifier theory, I refer to Hoeksema (1983) and Dowty and Brodie (1984). My goal here is just to give some support for the contention that number agreement between subjects and their predicates is an essentially semantic matter, which can be described entirely in semantic terms and that a separate syntactic treatment is redundant and lacking in explanatory power.

3. Propositions.

So far we have seen that there is reason to believe that number agreement between subjects and predicates is best analyzed in semantic terms. Now we must determine whether number agreement between subjects and complementizers can also be treated in such terms.

It turns out, that there are major problems for an entirely semantic account. According to conventional wisdom, complementizers combine syntactically with dependent clauses. Semantically, therefore, it makes sense to analyze complementizers as functions over propositions. However, on the level of propositions, it would seem that number distinctions are no longer available. In other words, it does not seem to be correct to make a distinction between plural and singular propositions. For instance, there is not necessarily a difference in interpretation between a sentence with a plural subject, such as (9a) below and one with a singular subject, such as (9b):

(9) a. The boys each have a problem.
   b. Each of the boys has a problem.
In some semantic analyses of propositions, such as Montague's, propositions are analyzed as sets of possible worlds, more precisely, as the set of possible worlds in which the proposition is true. Such an analysis leaves no room, of course, for number distinctions. If there is no semantic distinction between propositions with plural subjects and ones that have singular subjects, then it will not be possible to account for number agreement between complementizers and the embedded clauses they introduce in terms of restrictions on the types of arguments that complementizer denotations take.

However, the Montegovian interpretation of propositions as sets of possible worlds, or sets of world-time coordinates, is by no means the only one around. It has been known for some time that this interpretation is inadequate for contexts of belief and other propositional attitudes. One may believe a proposition and yet not believe one that is logically equivalent to it. The standard possible-world semantics for propositions is not able to distinguish logically equivalent propositions, since they are true in the same worlds. To solve this problem, it has been proposed by some philosophers that propositions should have a richer structure than that of a set of possible worlds. For example, David Lewis, in his paper "General Semantics" (Lewis 1970: 201) proposes to "identify meanings with semantically interpreted phrase markers minus their terminal nodes: finite ordered trees having at each node a category and an appropriate intension". Such an approach to meaning would also make it possible to distinguish propositions with plural subjects from ones with singular subjects. However, useful though this may be for a theory of number agreement that is formulated strictly in semantic terms, I reject it as a general approach to meaning, because it relies too heavily on the syntactic structure of the expressions. It would render the notion "semantically equivalent" almost vacuous, since even such pairs of sentences as the ones in (9) would not be equivalent, because they do not happen to have the same syntactic trees. Similarly, a sentence in a VSO language could never express the same proposition as its translation into an SOV language.

I do not see that a proposition expressed by either sentence in (9) could be an object of belief, or surprise, or any other propositional attitude, without the other one also being an object of belief, or surprise, etc. In other words, propositions should not be equated with the sentences they express. This point is by no means new, of course, and I only stress it here
in order to make it clear that the somewhat vexed status of propositions does not obviously allow us to build in number distinctions in the semantics of subordinate clauses.

So, to sum up, it appears that if complementizers are semantically functions that have the set of propositions as their domain, as suggested by their usual syntactic analysis, a plausible semantic analysis of number agreement is not forthcoming.

4. An alternative.

Suppose now that we impose a slightly different syntactic structure on dependent clauses. Suppose, in particular, that complementizers do not combine with clauses directly, but rather with the subjects of these clauses. For example, the subordinate clause of ie komt could be assigned the structure in (10) below, rather than the more standard one in (11):

\[ S' \quad \text{VP} \]
\[ \text{COMP} \quad \text{NP} \]
\[ \text{of} \quad \text{ie} \quad \text{komt} \]

\[ S' \quad \text{S} \]
\[ \text{COMP} \quad \text{NP} \quad \text{VP} \]
\[ \text{of} \quad \text{ie} \quad \text{komt} \]

I have used the symbol '?' for the complementizer + subject combination, because there does not appear to be a standard name for such combinations. Although structure (10) may look rather unfamiliar, there is actually some evidence for it. This evidence is, that the subject cliticizes onto the complementizer. So, at least phonologically, the two elements must be a constituent, and rather than postulating any readjustment rules, the syntactic structure in (10) would directly account for this fact. Another suggestive piece of information, brought to my attention by Mike Brame, is the fact that in Arabic,
complementizers may case-mark subjects, suggesting a structural relation of the complementizer to the subject not unlike that of a transitive verb or a preposition to its object.

If subjects are directly combined with complementizers, then the latter must be interpreted as functions that take subject interpretations as their arguments, and then, clearly, we could make these functions sensitive to number distinctions, given our contention that these distinctions have a semantic basis. Therefore, a different syntactic analysis could make it possible to stick to a uniform semantic account of number agreement. However, there is a serious problem with the alternative syntactic analysis. While it may well be right for clauses with subject clitics, such as the subordinate clause in (1a), there does not seem to be much evidence for it in sentences without subject clitics. And recall from example (2b) that number agreement is not restricted to complementizers with encliticized subjects. Standard tests for constituency all seem to favour the usual phrase structure. Consider for instance c-command requirements on binding. As in English, subjects can be antecedents for reflexive pronouns in the Dutch dialects under consideration, so if the requirement that reflexives must be c-commanded by their antecedents holds, the alternative structure in (10) is likely to be incorrect, since according to that structure subjects do not in fact c-command direct objects or other positions in the VP.

Another test is provided by sentential anaphora. For this test, we assume that linguistic antecedents for anaphora form semantically coherent units. It is possible to show that subordinate clauses minus the complementizer form such units. Take a look at the following examples:

(12) a. Indien het regent, betreurt ik dat.
    If it rains regret I that
    "If it rains, I regret it"
    b. Toen hij ziek was, sprak iedereen daarover
    When he ill was spoke everyone thereof
    "When he was ill, everyone talked about it"

The pronouns dat and daar do not refer back to the adverbial subordinate clauses introduced by the complementizers indien "if" and toen "when", but rather to the propositions denoted by the bare Ss following them. Under the orthodox syntactic analysis this would not only make perfect sense, it would also be predicted. On the other hand, there do not seem to be pronouns which have complementizer-subject combinations as their
antecedents.

I do not want to suggest here that the tests I mentioned above are watertight. All grammars leak, said Sapir, and so do these tests. However, whatever evidence there is for constituency, seems to point in the direction of the orthodox analysis. Unfortunately, the most popular test for constituency, namely putting a string in front of the sentence, right before the finite verb, which always comes in second position in Dutch, cannot be applied here, since proper parts of subordinate clauses may not be fronted. Either the whole subordinate clause, including the complementizer, appears before the finite verb in the main clause, or nothing.

So it turns out that the semantic theory of complementizer agreement is not going to be saved by an alternative syntactic analysis of subordinate clauses. Before I close the book on this issue, however, let me address briefly a possibility that arises in categorial grammars that have rules of composition as well as cancellation rules. In particular, suppose that we adopt the following rule schemata for syntactic combinations:

(13) Cancellation: \( A/B + B = A \)
Composition: \( A/B + B/C = A/C \)

Following Steedman and other categorial grammarians, we can identify subjects (nominative noun phrases) with members of the category \( S/VP \), and complementizers with members of the category \( S'/S \). Using the cancellation rule schema only, we derive the classical structure:

(14)

```
    S'
   /   \
S'/S  S
   \   /
  S/VP VP
```

The alternative structure is derived by using composition to combine the complementizer with the subject:

(15)

```
    S'
   /   \
S'//VP  UP
   \   /
  S'/S  S/VP
```
If we associate the application and composition rules semantically with function application and composition, respectively, and use a standard Montague-style semantics, the two structures will receive equivalent readings. Furthermore, if we adopt a semantic account of anaphora binding, such as the one proposed by Partee and Bach (1980), which does not rely on syntactic notions such as c-command, it is possible to sidestep the consequences drawn from the two tests for constituency I mentioned before. Using both application and composition rules in a categorial grammar might then seem to allow us to eat our cake and have it. On closer inspection, however, it turns out that there is still no way to make a semantic theory of complementizer feasible. If the lexical category for complementizers is S′/S, then they should be able to combine with any S, and, by composition, with any member of the category S/VP, including singular and plural noun phrases. Semantically, therefore, they must accept any kind of noun phrase denotation, no matter whether it is that of a singular noun phrase or a plural one. This makes semantic filtering of the type proposed for subject predicate number agreement impossible. I conclude, therefore, that an alternative syntactic analysis is not going to save the theory that number agreement is a strictly semantic phenomenon, even within the powerful framework of extended categorial grammar.

5. A syntactic account.

In the foregoing sections of this paper, I have tried to show that a strictly semantic analysis of number agreement between subject and complementizer faces severe problems. While it is not hard to force a semantic account, it does not seem to be attractive to do so, given that we must either make ad hoc assumptions about the nature of propositions, or use an essentially unmotivated syntactic analysis for subordinate clauses. Let us therefore consider the obvious alternative, a syntactic analysis of the agreement facts. It turns out that a particularly elegant treatment follows directly from the theory of agreement incorporated in GPSG (Generalized Phrase Structure Grammar, cf. Gazdar, Klein, Pullum & Sag 1985 for an exposition). In GPSG, agreement is expressed in terms of syntactic features. The distribution of these features is governed by a few general principles, the Head Feature Convention (HFC) and the Control Agreement Principle (CAP), given below in their informal, unofficial formulations:
Head Feature Convention

A head and its mother node carry the same (head) features.

Control Agreement Principle

Controllers carry the same agreement features as their arguments.

These principles operate only when no other rules override them. Note that not all features are head features, but for our purposes it is not relevant to consider any other kind of feature (i.e. foot features). The Control Agreement Principle is an adaptation of Keenan's Functional Principle, which states that function expressions may be formally dependent on their arguments. The control relation is a generalization of the function-argument relation, whose nature will not concern us here (see Klein & Sag 1985 for discussion). Suffice it to say here that VPs control their subjects, and complementizers their sentential arguments. By the CAP, a plural subject induces the plural number feature on the VP. Since the VP is the head of S, the latter will receive this feature value from its daughter by the HFC. Finally, by another instantiation of the CAP, the complementizer gets the plural value for the number feature from its S argument. In a diagram:

The Dutch complementizer agreement facts follow, therefore, on a GPSG account, from the interaction of the CAP and the HFC. One crucial step in the argument is the assumption that the VP is the head of S, an assumption also made by Jackendoff (1977), but rejected by many other X-bar theoreticians. The agreement facts under consideration here might provide some support for the GPSG stand in this matter. I note in passing that
the account sketched here can be used without modification for those dialects that have person agreement in addition to or in lieu of number agreement.

The GPSG account outlined above requires a syntactic reflex of subject-predicate number agreement, since it is the feature value that is assigned to the VP by the subject that is handed over to the S-node which finally induces the same value for the number feature on the COMP-node. It is predicted therefore, that languages without number agreement between subject and predicate will not have number agreement between the complementizer and the subject either. Given that agreement on complementizers seems to be quite rare, it is hard to test this implicational universal, however.

6. Conclusions.

The main conclusion to be drawn from all of this is that number agreement is not a purely syntactic, nor a purely semantic phenomenon. This conclusion may sound familiar, and in fact it has been argued for before by Sadock (1983) and Morgan (1984). Sadock argues at length for the thesis that the semantic and syntactic components of the grammar may overlap, in the sense that both may determine the acceptability or nonacceptability of a given expression. When they make different predictions, sometimes the semantics wins (this is the phenomenon known as "constructio ad sententiam" in traditional grammar), and sometimes the syntax. I am convinced that number agreement is an essentially semantic phenomenon, to be fully understood only if an analysis in terms of meaning is given. However, it has become grammaticalized, just like many other semantic or pragmatic phenomena. Dutch complementizer agreement is a syntactic extension of the agreement system, which is no longer motivated by the original semantic distinctions that gave rise to the agreement system in the first place.

Acknowledgements

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References


On the Acquisition of the Vowel Shift Rule

Jeri J. Jaeger
University of California, Davis

1.0 Introduction. One of the most fundamental assumptions of generative phonology and the more current lexical phonology is that the lexicon is made up of entries which contain not only semantic and syntactic information, but also particular phonological forms. Morphemes which have different pronunciations in different morphological environments are represented by only one lexical entry, and the various surface pronunciations are then derived by phonological rules. In representing the allomorphs of a morpheme as derived by ordered phonological rules from a single lexical representation with a specific phonological shape, this theory sets out a potentially formidable task for the language learner: to abstract from surface forms the correct mental representation of each set of allomorphs, and to abstract the appropriate rules, in the right order, which would assign the conventional pronunciation to each surface form.

No one would claim that very young children, who have a simple vocabulary which probably does not include many alternating allomorphs, will have begun in spite of this to set up abstract phonological representations in their lexical entries. The most straightforward hypothesis about young children's representations is that they are isomorphic with their pronunciations. A generativist scenario for developing lexical entries would proceed as follows: First, the child begins to learn more and more of the relevant vocabulary, and recognizes that words with alternating allomorphs are related, both semantically and phonologically. Second, the child begins to recognize, probably unconsciously, recurrent phonological alternations occurring in different sets of allomorphs. Because it is assumed that the human mind is designed to minimize memorization and maximize the amount of information that can be consigned to rules, the child will now begin to extract these patterns of alternation, formulating them into rules. At this point the child will need to perform a major restructuring of his or her mental lexicon, since the formulation of these rules will allow a number of entries which were previously stored separately to be collapsed into one; this sort of collapsing represents a new and very different hypothesis for the child about how the lexicon can be structured overall. Note that this theory makes two important assumptions: first, that the child can and will automatically perform this restructuring, and second, that the source of the restructuring of the lexicon is as described above: learning new lexical items, noticing recurrent phonological patterns in related allomorphs, and abstracting out the appropriate lexical forms and rules.

The question to be asked in this paper is the following: Is there any psychological evidence that the above scenario for setting up abstract phonological representations is in fact
followed by language learners? Because of the importance of the Vowel Shift Rule (hereafter VSR) in generative and lexical phonology, and the growing body of experimental evidence about its psychological reality, this study concentrates on evidence relating to the acquisition of phonological representations for English vowels, which crucially depend on this and concomitant rules to generate their surface pronunciations. In the first part of the paper I present data from a three-year-old child, looking for evidence as to whether she has begun to set up abstract phonological representations for vowels and to abstract the VSR. In the second part of the paper I review evidence from experiments with older children and adults which show that certain aspects of the VSR do have some psychological reality. In the third part of the paper evidence is presented which bridges the gap between the three-year-old and the older children, and I show that both the time that the VSR begins to develop some psychological status and the source of this status can be pinpointed exactly; I demonstrate, however, that the development of knowledge of VSR does not follow the scenario outlined above, but in fact can be attributed to a very different source. In the final section the theory of abstract lexical representations is briefly evaluated in light of the evidence presented here.

2.0 The Vowel Shift Rule. Before turning to the data, I will summarize the relevant facts about the Vowel Shift Rule. In Sound Pattern of English, Chomsky & Halle (1968; hereafter C&H) proposed a core set of rules for deriving surface vowels in English, of which the VSR was the central member; these rules were claimed to be crucial to the synchronic phonology of English. In this theory, two related words with different surface vowels were derived from the same underlying form; for many pairs, the VSR (along with a diphthongization rule and various backness and rounding adjustments) derived the surface tense vowels, and a Laxing Rule derived the surface lax vowels. The six pairs of vowels derived by this core set of rules are shown in Table 1.

Because Sound Pattern was published 18 years ago, it might seem somewhat out of date to be concerned about specific claims made therein. However, in Halle & Mohanan’s (hereafter H&M) 1985 article ‘Segmental phonology of modern English’, written in the

Table 1
Vowel pairs participating in the Vowel Shift Rule: (C&H 1968).

<table>
<thead>
<tr>
<th>Underlying Vowel</th>
<th>Surface Reflexes</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ɪ/</td>
<td>[aɪ-ɪ]</td>
<td>divine-divinity</td>
</tr>
<tr>
<td>/ə/</td>
<td>[iɛ-ɛ]</td>
<td>serene-serenity</td>
</tr>
<tr>
<td>/æ/</td>
<td>[ɛɪ-æ]</td>
<td>sane-sanity</td>
</tr>
<tr>
<td>/ʊ/</td>
<td>[aw-ʌ]</td>
<td>profound-profundity</td>
</tr>
<tr>
<td>/ʊ/</td>
<td>[ʌw-ʌ/ʊ]</td>
<td>lose-lost</td>
</tr>
<tr>
<td>/ɔ/</td>
<td>[əʊ-ɔ]</td>
<td>verbose-verbosity</td>
</tr>
</tbody>
</table>
framework of Lexical Phonology, the VSR and its concomitant set of rules continues to be a central part of the analysis. In this paper they argue that

...our study confirms the central role of Vowel Shift in the phonology of English. Vowel Shift has been shown to interact with various kinds of lengthening and shortening rules...as well as with Velar Softening...and the ablaut rules of the "strong verbs"...Though this evidence does not constitute proof that Vowel Shift is part of the synchronic phonology of modern English, the facts adduced are of a complexity and variety that would make it extremely difficult to propose an alternative treatment without Vowel Shift.

(Halle & Mohanan 1985:103-4)

In H&M's treatment of English Vowels, there are several changes from Sound Pattern as to which vowel pairs are related by VSR; their set of eight vowel pairs related by VSR are shown in Table 2. Otherwise much of the analysis of English vowels is unchanged from the Sound Pattern version.

3.0 Is the VSR learned by young children? A case study.
3.1 Introduction. Let us now turn to some actual data from a child in the process of learning English. The data to be presented are taken from an intensive longitudinal study which I performed with my daughter Anna from the time she was six months old until she was three and one half. At the time of the current study she was three years two months old (3.2); she was somewhat advanced linguistically, and her pronunciations were almost identical to the adult model she heard most often. She easily produced long, complex sentences, and was particularly aware of language, often volunteering information on her intuitions about word meanings, rhyming, and so on.

The purpose of looking at these data is to help identify the earliest age at which language learners might begin to do the restructuring discussed above: that is, begin to abstract rules such as the VSR and set up unitary phonological representations for alternating allomorphs. In order to see whether Anna could have begun this restructuring, I will ask the following questions

<table>
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<tr>
<td>/i/</td>
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<td>divine-divinity</td>
</tr>
<tr>
<td>/e/</td>
<td>[i-ɛ]</td>
<td>serene-serenity</td>
</tr>
<tr>
<td>/æ/</td>
<td>[e-ɛ]</td>
<td>sane-sanity</td>
</tr>
<tr>
<td>/ɛ/</td>
<td>[aw-ʌ]</td>
<td>profound-profundity</td>
</tr>
<tr>
<td>/ʌ/</td>
<td>[uw-ʌ]</td>
<td>reduce-reduction</td>
</tr>
<tr>
<td>/ʊ/ or /ʌ/</td>
<td>[ʊ-ʌ]</td>
<td>destroy-destruction</td>
</tr>
<tr>
<td>/ə/</td>
<td>[uw-ə/ɔ]</td>
<td>lose-lost</td>
</tr>
<tr>
<td>/ɔ/</td>
<td>[ow-ə/ɔ]</td>
<td>verbose-verbosity</td>
</tr>
</tbody>
</table>

Table 2

Vowel pairs participating in the Vowel Shift Rule: (H&M 1985).
with reference to her data: First, has she begun to notice that there are words which are related, either morphologically or semantically? Second, do these words contain the appropriate alternations, such that she could have begun to abstract out the VSR? It is only if these two conditions are met that she would have the appropriate input to begin the restructuring process.

3.2 Derivational morphology. In the first part of this study I scanned journal entries for a year, from the time Anna was 2.2 to 3.2, looking for evidence that she considered any pairs or sets of words to be related, which for adults are related by derivational morphology, including compounding. Furthermore, I made up a list of over 100 pairs of such words related by the VSR, and checked whether there were any pairs of which she knew both members. Evidence that she considered words to be related consisted of both covert and overt types. An example of covert evidence would be the utterance: "Jump, jump, jump. We are jumping over a moon. What a good jumper!" spoken at age 2.2; this was taken as evidence that she considered 'jump,' 'jumping,' and 'jumper' as related. More overt evidence came from statements such as "Mommy, 'apple' and 'apple juice' begin to rhyme" (said at 3.1, meaning they begin with a rhyme), or the following interesting observation, showing that she thought that 'air conditioner' was related to the names of some family friends, 'Eric 'n' Lorell': "Mommy, turn on the air conditioner; you know, like Eric 'n' Lorell; 'ditioner' means you get cold". Based on evidence such as this I compiled a list of words related by derivational morphology or compounding which Anna considered related; this list is shown in Table 3.

It is clear from this list that Anna definitely had the idea that words can be 'related' in some way. However, in scanning the list it can be seen that she knew no pairs of words in which there is a shift in the vowel from one member to the other. The derivational morphemes which Anna used are all of the type which do not trigger shifting (and of course compounding does not trigger shifting either). Anna's ability to consider two words related seemed to be constrained by how similar they are in both form and meaning; furthermore, English words related by derivation and containing some vowel shifting are for the most part a more advanced vocabulary than one would expect a three-year-old to know. From these data it can be hypothesized that children this young can clearly have the idea that words can be 'related'; however, their limited vocabulary and concrete expectations about the closeness of the semantic and phonological match-up between related words makes it unlikely that any abstract analyses of the mental representation of these words has begun.

3.3 Inflectional morphology. It is perhaps not surprising that a three-year-old does not have the vocabulary which exhibits Vowel Shift alternations in derived pairs of words, since most of these words, as mentioned above, are part of the Latinate, learned vocabulary of English. Kiparsky and Menn (1977) argue that it is through alternations contained in strong verbs, such as 'feed–fed' or 'bite–bitten', that children first begin to develop knowledge
Table 3
Word pairs related by derivation or compounding, treated as related by S from age 2.2 to 3.2.

A. Pronouns: you—your—you’s; my—mine—mine’s.

B. Comparatives
1) good—best (suppletive)
2) big—bigger, little—littler, small—smaller, tall—taller, fast—faster. ([éd] comparative)
3) strong—strongest, best—bestest. ([−ist] superlative)

C. Agentive [−éd]
jump—jumper, help—helper, paint—painter, cut—cutter,
bake—baker, sing—singer, dance—dancer.

D. Instrumental [−éd]
dry—dryer, ham—hammer

E. Diminutive [−i]
1) dog—doggie, no—noie, up—uppie, down—downie, off—offie,
popcorn—popcornie, tape—tapie, etc.
2) blanket—blankie, breakfast—breakfie, chocolate—chocklie
(etc., with deletion of rime of final syllable).

F. Adjectival [−i], [ɪʃ]
1) sun—sunny, scream—screamy, scared—scarey, rain—rainy,
   bubble—bubbly.
2) stripe—stripish.


H. Nominal −ion
   cooperate—cooperation, decorate—decoration

I. Noun-Verb (zero derivation)
dress, drink, paint, cover

J. Compounds
1) wash—washing machine, swim—swimming pool, wrap—wrapping paper,
   stare—starecrow (i.e. ‘scarecrow’), poke—Pinocchio
   ([pʰəwki:jəw]). (V−N)
2) bath—bathtub—bathroom, belt—seat belt, table—tablecloth,
   tea & cup—teacup, apple & juice—apple juice, paint & brush—
   paintbrush, tooth & brush—toothbrush, pillowcase—suitcase,
   grapefruit—grape juice, fire—pacifier. (N−N)

K. Other forms considered to share morphemes
   antelope—cantaloupe, seagull—eagle, serpent—sherbet,
   jungle—juggle, bran muffin—brand new, pretzel—pencil, syrup—
   catsup, chipmunk—monkey, air conditioner—Eric ‘n’ Lorell.
of Vowel Shift alternations. In order to test whether strong verbs were a possible source of incipient knowledge of the VSR for the child in this study, I performed an experiment to see which pairs of strong verbs containing vowel alternations she knew both the present and past tense or past participle of, and she considered related. At the time of the study she was going through a stage in which she produced nearly all verbs with regular past tense endings; however it was clear that she understood many irregular past tense forms, and therefore it could be hypothesized that she had some mental representation for them. In this study I told her a story, in the past tense, and asked her to act it out; as she performed the various requested actions, I asked her questions about what she was doing, which she answered in the present tense. She was scored on both her actions and her verbal responses. The following interaction, for example, was taken as evidence that she knew the forms 'dive-dove', and knew that they were related:

M: Yesterday Anna went to the swimming pool and she dove in.
A: (pretends to dive)
M: What are you doing?
A: I'm diving into the pool!

In this way Anna was tested for her knowledge of a total of 143 pairs of verb forms; the list of verbs was taken from Bloch 1947.

The results of this experiment are shown in Table 4. This table shows the number of vowel pairs in the verb forms that Anna showed evidence of knowing, organized by both specific vowel alternation, and class of vowel alternation: VSR, Lax-Lax, Non-VSR, Tense-Lax, and Tense-Tense. Further, this table contains, under the 'adult' heading, a count of the number of pairs in the original list of 143 which have each of the vowel alternations. It can be seen from this table that Anna knew 71 pairs of verbs with vowel alternations in their present–past or present–past participle forms; of these, only 14, or 20%, contain VS alternations, and only three of the VS alternations contain more than one exemplar. There are in fact 27 different types of vowel alternations in her data, and only five are of the VSR type. It seems clear from this tabulation that Anna's knowledge of related verb forms gives her no basis from which to extract any particular regularities in vowel alternation patterns. More importantly, the same can be said for the adult pattern as a whole. Although VS alternations are the second most frequent pattern type for adults, only two of the VS alternations have substantial numbers of exemplars: [iy–e] and [ay–i]; three alternations have no exemplars. In general the number of different possible alternations involved in strong verb inflections is such that it would be unrealistic to expect that speakers will extract some particular regularities out of the pattern, specifically the VSR or H&M's lowering and backing ablaut rules, and consider others exceptions. Furthermore, Table 5 shows that words with VSR type alternations have the lowest frequency of any of the verbs in this study.
### Table 4

Number of verbs known by S at 3.2 containing specified vowel alternations in present vs. past tense or past participle, and number of irregular verbs with each vowel alternation in English ("Adult"; taken from Bloch 1947). "Vowel Shift" includes the 8 pairs from Halle & Mohanan 1985.

<table>
<thead>
<tr>
<th>Vowel Shift</th>
<th>Child</th>
<th>Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td>[iy-ε]</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>[ey-ə]</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>[ay-ɪ]</td>
<td>3</td>
<td>10*</td>
</tr>
<tr>
<td>[ow-a/c]</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>[uw-ʌ]</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>[aw-ʌ]</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>[uw-a/c]</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>[ɔy-ʌ]</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of total</td>
<td>20%</td>
<td>28%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lax-Lax</th>
<th>Child</th>
<th>Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td>[i-ə]</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>[ɛ-a]</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>[i-ʌ]**</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>[ɐ-ʌ]</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>[ə-ə]</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>[ɐ-ʌ]</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>% of total</td>
<td>38%</td>
<td>33%</td>
</tr>
</tbody>
</table>

### Non-VS

<table>
<thead>
<tr>
<th>Tense-Lax</th>
<th>Child</th>
<th>Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td>[iy-a]</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>[ey-ε]</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>[ey-ʊ]</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>[ey-ɪ]</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>[ay-ʌ]</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>[ay-ʌ]</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>[ow-ε]***</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>[uw-ɪ]</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>% of total</td>
<td>15%</td>
<td>16%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tense-Tense</th>
<th>Child</th>
<th>Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td>[iy-εy]</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>[iy-ow]</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>[ey-ay]</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>[ey-ow]</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>[ey-uw]</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>[ay-æw]</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>[ay-ow]</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>[ow-uw]</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>% of total</td>
<td>27%</td>
<td>23%</td>
</tr>
</tbody>
</table>

* Mainly past participles, e.g. drive-driven.
** Includes hear-heard, i.e. [ɪr-ə].
*** Includes four tokens with vowels [or-ər], e.g. torn-tear.

### Table 5

Frequency Data (from Carroll, Davies & Richman 1970). Average frequencies of past tense forms of strong verbs with indicated vowel alternation types; figures are for number of instance per million words of text.

<table>
<thead>
<tr>
<th>Non-VS</th>
<th>Tense-Lax</th>
<th>Tense-Tense</th>
<th>Lax-Lax</th>
<th>Vowel Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>1878</td>
<td>427</td>
<td>357</td>
<td>333</td>
<td></td>
</tr>
</tbody>
</table>
Again it must be concluded that Anna knew many pairs of present/past tense strong verb forms, and knew that they are related to each other. But the heterogeneity of the vowel alternations present in those words is so great as to argue against the possibility that she could have begun to develop any rules to account for them. Therefore it is most likely that she was storing the alternating forms separately in the lexicon, with some sort of semantic link between them. Combined with the findings of the first part of this study, I conclude that at this point in her development, age 3.2, Anna stored her entire vocabulary in forms identical to her pronunciations.

4.0 Do adults know the Vowel Shift rule? I now turn to data from experiments with older children and adults. A great deal of experimentation has been done to test the psychological status of C&H’s VSR; most of these studies have been summarized in Table 6. Only the most important findings of these studies are discussed here, but for thorough reviews see Jaeger 1984 and Wang 1985.

Experiments testing the productivity of the VSR have found that for the most part it is not productive in spoken English; when asked to derive an existing or a nonsense adjective with a nominal suffix such as -ity, which should trigger Vowel Shift, most subjects produce the derived form with the vowel unchanged. In Wang’s (1985) study he forced his Ss to shift the vowel; under these conditions the alternations [ey-æ], [iy-ɛ], [ay-ɛ] and [ow-ɔ] showed significant strength, but all other VSR alternations showed none (he was testing the eight pairs from H&M). The frequency with which Ss responded with a particular shifted vowel correlated positively with the frequency with which the lax vowel occurs in existing words before the suffix -ity. In a further study, Wang presented Ss with nonsense present tense verbs, and had them give a ‘strong’ past tense, with a shifted vowel. He gave another group of Ss nonsense nouns, and had them form a plural with a shifted vowel. In the verb condition, Ss preferred past tense responses with [æ] or [ow], regardless of the vowel in the present tense form; in the noun condition Ss preferred responses with [iy]. In both cases these are the vowels which occur most frequently in past or plural forms respectively; VSR alternations, or H&M’s backing and lowering ablaut rules showed absolutely no psychological strength. This is not surprising, given the heterogeneity of alternations in these forms discussed above.

When the unsuccessful productivity experiments were reported in the literature, it was argued, notably by Kiparsky (1975), that VSR is most likely a "partially productive" rule, which might figure in learning and memory but not be actively productive. In order to test this, Cena (1978) performed an experiment in which Ss memorized nonsense adjective-noun pairs, some with VSR alternations and some with non-VSR alternations. Four of the VS pairs did show significant strength in facilitating Ss’ memorizations, but the fifth pair tested, [aw-ʌ], showed no psychological
Table 6
Summary of experiments on VSR with adults and older children.

A) Steinberg & Krohn (1975): Productivity exp. with adults, using adjectives and nouns in -ity. Results: VSR is not productive in spoken English; Ss derive new words without shifting vowel.

B) Ohaa (1974): Productivity experiment with adults. Results: VSR is not actively productive in spoken English, though some shifting, both according to VSR and in non-VSR patterns, can be elicited through presenting models.

C) Myerson (1976): Three experiments with children, grades 3 through 12. Results: VSR is not actively productive; Ss show slight preference for VSR-related pairs of words with alternations [iy-ε, ey-æ] over phonetically related [iy-ɪ, ey-ɛ]; Ss learn and remember pairs of nonsense words with these two VSR pairs better than those with the phonetically related pairs.

D) Armbruster (1978): Series of experiments with adults. Results: Some Ss can be induced to shift vowel in productivity exp. when shown written models, but likelihood of doing so is positively correlated with Ss' level of education and verbal S.A.T. scores. In a preference test, Ss' prefer pairs with identical vowels, but when shown written nonsense nouns in -ity will read them with lax vowel. Conclusions: Spelling is crucial.

E) Templeton (1979): Productivity experiment with children 11-16; usually do not shift vowel, but do so most often when presented in written sentence context.

F) Moskowitz (1973): Concept-formation exp. with children 9-12. Results: Ss most easily form and productively use concept of VSR-related (as opposed to non-VSR) alternations (tested only front vowels). Conclusion: source is knowledge of spelling rules.


H) Jaeger (1984): Concept formation exp. with adults. Results: Ss can learn concept 'Pairs of words related by VSR' based on the pairs [ey-æ, iy-ɛ, ay-ɪ, ow-ɔ]; when given opportunity to extend it to new pairs, Ss include [uw-ʌ] in the category, and exclude [aw-ʌ]. Conclusion: This set of 5 vowel alternations has special psychological status only because they are those taught as the 'long and short' versions of the vowel letters A, E, I, O, U.

I) Wang (1985): Series of experiments with adults. Results: When forced to shift vowel in a productivity experiment with nonsense adjective-noun pairs, only some VSR pairs show strength; these are related both to spelling, and the frequency of each vowel pair in existing words. In strong verb present/past pairs, Ss answered with [æ, ow] for past tense regardless of present vowel; in irregular noun plurals, Ss preferred [iy]; these results are totally explained by frequency. Jaeger's CF test replicated with broader range of Ss and vowel pairs, and same results obtained.
strength. Cena concluded that the VSR is psychologically real, but did not try to explain the aberrant behavior of this latter pair of vowels. A similar experiment was performed by Myerson (1976) on children, grades 3–12, but she only tested (and got positive results for) the vowel pairs [iy–æ] and [iy–ɛ].

McCawley (1979) pointed out that a major problem with all of the VSR experimentation being done was that it assumed that the particular set of vowels designated by C&H was the correct group which belonged together in a psychologically real set. Jaeger (1980, 1984) noticed that the vowel pairs which showed psychological strength in Cena’s experiment, as well as all previously reported experiments, were just those pairs which are taught in school as being the ‘long and short’ versions of the vowel letters ‘A, E, I, and 0’. Building on the conclusions reached by Moscowitz (1973), based on a concept formation experiment performed on 9–12 year old children, Jaeger performed a concept formation experiment with adults. She tested the hypothesis that if indeed Ss’ knowledge of spelling was shaping their performance in these VSR experiments, then Ss would consider the alternation [uw–ʌ] to be a member of the set of vowel pairs just mentioned, because it is the pair of vowels taught as the ‘long and short’ pronunciations of the vowel letter U. If, however, it was C&H’s VSR which was guiding Ss’ performance, then Ss’ should consider [aw–ʌ] to be the fifth member of the set. Ss’ categorizations upheld the spelling-rule prediction, in that they clearly considered [uw–ʌ] a member of the set, and they uniformly rejected the pair [aw–ʌ]. Wang (1985) replicated Jaeger’s study with a larger sample of Ss, systematically testing all the alternations said to belong to the VSR-governed group in H&M, and got identical results: the VS pairs which Ss’ grouped together into a set were the five pairs designated by the five vowel letters of English. Both Jaeger and Wang argue that most of the results of the experiments discussed here can be explained with reference to speakers’ knowledge of orthography; Wang further shows that the residue can be explained by frequency, as described above. None of the experiments give any support to the psychological reality of the particular sets of vowels indicated in either C&H or H&M, and therefore they give no support to the psychological existence of the VSR as formulated in either theory.

5.0 Transition into knowledge of VSR. It is one thing to claim that adults’ knowledge of VSR reflects their knowledge of spelling rules; but it is a much stronger claim to argue that spelling rules are the original source of this knowledge. In the studies reviewed here, we have looked at one articulate three-year-old who gives no evidence of knowing the VSR, and we have seen evidence (from the Myerson and the Moscowitz studies) that elementary school-aged children do show knowledge of those VS alternations which are reflected in spelling. These studies clearly flank the critical time period in which children develop this knowledge, and they also flank the time period in which children learn spelling
conventions. An important question remaining to be asked is whether or not children actually begin to develop some knowledge of VSR before they learn to spell. If so, their knowledge of spelling may serve only to reinforce a rule they have already worked out; the fact that it does not coincide with the set of alternations posited to be linked by the VSR may be due to the spelling conventions overriding the psychological status of some previously included alternations, especially [aw-A].

There is strong evidence from children learning to spell that children go into this process with no knowledge of VSR. Ehri (1986) has divided the process of learning to spell into three stages. In the first, 'semiphonetic' (from pre-kindergarten to the middle of the first grade), children use the names of letters to create spellings. For the vowels, children use the vowel letter whose name is the closest phonetically to the vowel sound. Table 7 shows the letter-sound groupings documented by Read (1971) for American English speaking children in this stage; notice that all the vowels spelled by the same letter are phonetically similar to each other.

The second of Ehri's stages is called 'phonetic', since children at this point work on the principle of associating one letter with every sound, according to the segmentation conventions of their language; this stage begins during the second half of first grade. The most important and most difficult task of this stage is learning to associate the 'short' vowel sounds with the appropriate vowel letter. Children show that they are concentrating on this task by completely ignoring the 'long' vowel pronunciations of the letters for the duration (which are, of course, the same as the name of the vowel letter, so were learned during stage 1); this indicates that for them the association of these particular tense and lax vowels, i.e. those designated by VSR for the most part, is very unnatural and can only be accomplished by setting the tense versions aside while the lax versions are committed to memory.

The third stage in Ehri's analysis is the 'morphemic' stage. It is at this stage that children actually begin to learn some of the derivational vocabulary with alternating vowels, and they begin to learn that related words are often spelled the same although pronounced differently. (Note that children do not begin to learn the relevant derivational vocabulary until after they

<table>
<thead>
<tr>
<th>Letter Used</th>
<th>Vowel Sounds Represented</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>[ey, e, æ]</td>
</tr>
<tr>
<td>E</td>
<td>[iy, i, ĭ]</td>
</tr>
<tr>
<td>I</td>
<td>[ay, a, ʌ]</td>
</tr>
<tr>
<td>O</td>
<td>[ow, o]</td>
</tr>
<tr>
<td>OW, U, OO</td>
<td>[u]</td>
</tr>
</tbody>
</table>
have already memorized the spelling-rule pairings for vowels.) However, research cited by Ehri shows that children essentially begin to memorize the correct spellings, rather than extracting some principles about spelling and word relatedness.

In sum, it has been shown that pre-literate children have no knowledge of VSR, and that literate children and adults show knowledge of only those VS alternations that are associated with the vowel letters. This, combined with the evidence that children find learning to associate VS pairs with a particular letter one of the most difficult tasks involved in learning to spell, strongly supports the hypothesis that spelling is indeed the source of English speakers' knowledge of VS alternations.

6.0 Conclusions. The last question to be asked here is: so what? Showing that even as central a rule as the VSR does not have the psychological status previously claimed does not invalidate the entire theory. Perhaps not, but it does raise some serious questions about morpheme-invariant lexical representations.

There is a great deal of evidence from perception and production experiments that speakers do in fact store their entire vocabulary in surface forms. In this paper it has been demonstrated that pre-literate children store only surface forms, and that it takes the extremely strong force of literacy to get them to view certain vowel relationships in a way different from simple phonetic groupings. But the fact that they learn this marginal, unproductive, spelling-related rule does not mean that they have done any restructuring in their lexicon because of it. Again the most straightforward hypothesis is that speakers continue to store most of their lexicon in surface forms (or perhaps Sapirian phonemes; see McCawley 1986), and develop a set of linking rules, such as this Vowel-Spelling rule, indicating various interrelationships among words.

In fact generativists since at least Halle 1973 have acknowledged that all surface forms are also stored in the mind, and are accessed for production and perception. Abstract lexical entries and rules are claimed to have the function of characterizing speakers' knowledge about their language, but they do not function in performance. This claim raises at least three important problems: First, it shows that one of the basic justifications for setting up morpheme-invariant lexical entries, which is that the mind prefers little memorization and much rule-governed variation, has been totally undermined and abandoned. Second, it continues to beg the all-important but perpetually unresolved question about the relationship between speakers' knowledge and performance. Third, it ignores the fact that any number of simpler possibilities for characterizing speakers' knowledge could be and in fact have been suggested, which do not depend on the elaborate abstract formalisms developed in generative theories (see, e.g., Derwing 1973, Vennemann 1974, Hooper 1976, Linell 1979, Wang 1985, McCawley 1986). An obvious theory would be the one indicated above: speakers store words in
surface forms, and have a set of linking or redundancy rules, characterizing phonological and semantic relationships. These sorts of theories deserve more attention than they are currently receiving.

My main point is this: there is very little psycholinguistic evidence supporting the existence of abstract phonological representations and complex rule systems such as the one the VSR is an integral part of. If the purpose of generative and lexical theories is to describe most simply, economically, and thoroughly, all the interrelationships among words which a linguist can ascertain, then the lack of psycholinguistic evidence is acceptable, and the theory can be said to be following in the illustrious but non-psychological footsteps of Leonard Bloomfield and other structuralists. If, however, the purpose is to characterize the knowledge speakers have about their lexicon, in a form which reflects the form in which speakers store this knowledge, then these theories need to be more sensitive to evidence from psycholinguistic and language acquisition studies such as those presented in this paper.

Footnotes

1. This is a condensed and somewhat revised version of a paper entitled ‘On the acquisition of abstract representations for English vowels’, which will appear in Phonology Yearbook, V. 3, 1986, and is being published here with the permission of Cambridge University Press. I wish to thank John Ohala, Bruce Derwing, and Linnea Ehri for useful discussions of this research.

2. Many of the claims made by generativists about the innateness of specific linguistic structures and processes have been developed to support the claim that children can and do perform this task. However, as the existence of these innate capacities has yet to be convincingly demonstrated, the difficulties involved in acquiring abstract phonological representations cannot be explained away by ‘innateness’.

3. There are only nine nouns in English which form plurals by (at least) changing the vowel, and only one contains a VSR alternation; four contain the vowel [iy] in the plural form.

References

Ehri, L.C. 1986. Sources of difficulty in learning to spell and
THE RISE AND FALL OF TONES
THROUGH DIFFUSION(1)

Charles N. Li

University of California, Santa Barbara

0. Introduction

Much is known about the origin of tones in monosyllabic languages of East Asia. Haudricourt (1954) blazed the trail. Matisoff (1973) laid out the general scheme tying the origin of tones with the loss of syllable-final consonants and the neutralization of voiced /vs. voiceless syllable-initial consonants. Hombert (1978) and others substantiated the interaction between consonants and tone with phonetic analysis and experimentations. Placzek (1985) succinctly summarized the study of tonal development and called Matisoff's general scheme the "standard theory" of tonogenesis in South East Asia. But what about the rise and fall of tones through diffusion? It is universally acknowledged that the rise and fall of tonal systems through diffusion is a historical fact. For example, consider the myriad tone languages of South East Asia; regardless of how one views their genetic classification, one cannot escape from inferring that some must have acquired tones through contact and some must have lost tones through contact(2). However, the establishment and acceptance of contact-induced tone-loss and tone-acquisition poses an interesting question: how does a non-tonal language become tonal through diffusion and conversely, how does a tonal language become non-tonal through diffusion? There are probably many diachronic pathways through which contact-induced tone loss or tone acquisition may be accomplished, but none has been established or elucidated. Matisoff (1973) went as far as suggesting that tones may be acquired by diffusion if the acquiring language possesses certain properties such as mono-syllabicity and the merging of consonants that predispose it toward tonogenesis. In this paper, I will attempt to shed light on a diachronic pathway of tonogenesis and a diachronic pathway of tonoexodus (a term coined by Matisoff).

First I will present data from a Mongolian language in western China which appears to be in the process of acquiring tones through diffusion. Then, I will present data from a Chinese language spoken in the same area which has already lost its tones because of contact-induced changes.

I. Contact-induced development of tones

A language which displays evidence of having
reached a certain stage of tone development through contact is Baonan, a member of the Mongolian language family in west-central China. Baonan has two dialects: one spoken by approximately 3,000 Lama Buddhists in Tongren County of Qinghai Province, the other by approximately 3,500 Moslems in Linxia County of Gansu Province. The data in this paper is collected from a Moslem Baonan farmer of Linxia County.

The major contact language for the Baonans is the Chinese dialect of Linxia which, like all Chinese dialects, is tonal. The degree to which Baonan has been influenced by the Chinese dialect of Linxia depends on the age of the speaker. The speech of the village elders shows the least influence of Linxia. The speech of the middle-aged farmers is considerably affected by Linxia. Finally, the speech of the youth has undergone dramatic changes from the elders and the middle-aged groups, incorporating both lexical and grammatical elements from Linxia. My native language consultant, Habib, is in his forties. He is an active trader and entrepreneur during the off seasons of farming. Consequently his speech might contain more borrowings from Linxia than most members of his generation. Nonetheless, he claims that his children speak a version of Baonan that is, in his words, 'far less pure' than his own.

In a lexicon of approximately 2,500 morphemes I collected from Habib, the percentage of loan words from Linxia is 40 percent. These loan words, however, are not restricted to the cultural domains where the Baonan people are most indebted to the Chinese speakers of Linxia, such as the domains of technology, education, politics, etc. In many indigenous cultural areas, Linxia loan words have replaced Baonan words. For instance, out of the 61 kinship terms in Baonan, 29 are loans from Linxia which have replaced the native terms and 10 are mixed compounds of Linxia and Baonan words. Even for numerals, Linxia loans sometimes replace indigenous words, especially in narrative (as opposed to individually elicited sentences). Some examples of Linxia loans and their Baonan counterparts are given in Table 1:

<table>
<thead>
<tr>
<th>Gloss</th>
<th>Recently adopted</th>
<th>Indigenous Baonan</th>
</tr>
</thead>
<tbody>
<tr>
<td>highway</td>
<td>/goŋlû/</td>
<td>/fgo mût/</td>
</tr>
<tr>
<td>doctor</td>
<td>/défu/</td>
<td>/menbû/</td>
</tr>
<tr>
<td>tiger</td>
<td>/loxû/</td>
<td>/basû/</td>
</tr>
<tr>
<td>to play an</td>
<td>/læ-ge/</td>
<td>/tçirge/</td>
</tr>
<tr>
<td>accordian</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The main stress of an indigenous Baonan word falls on the final syllable, i.e. if a morpheme appears in its root form, the stress falls on the final syllable of the root; if a morpheme occurs with suffixes, the stress falls on the last suffix. E.g. Habīb, Habib-ŋe 'Habib-accusative case'. This stress placement rule, however, does not apply to the loan words from Linxia. Before delving into the placement of stress on loan words from Linxia, I should briefly describe the tones in Linxia and the acoustic features of stress in Baonan.

Linxia has three lexical tones: high level (44), high falling (42) and rising (24). E.g. /jy/ (44) 'rain', /vu/ (42) 'fog', /xu/ (24) 'lake'. However, if a syllable is de-stressed, it will have a low level tone (22), e.g. /ja-sua/ (24-22) 'tooth brush', /luo-dzi/ (22-44) 'mule', /bọ-to/ (22-42) 'scarf'.

Stress in Baonan is characterized by high pitch and great acoustic energy.

Table 2 provides some examples illustrating the stress placement on Linxia loan words in Baonan.

<table>
<thead>
<tr>
<th>Gloss</th>
<th>Linxia</th>
<th>Baonan</th>
</tr>
</thead>
<tbody>
<tr>
<td>craftsman</td>
<td>/dząŋron/ (42-22)</td>
<td>/dząŋron/</td>
</tr>
<tr>
<td>wild rabbit</td>
<td>/jetu/ (44-42)</td>
<td>/jétu/</td>
</tr>
<tr>
<td>blacksmith</td>
<td>/tčedzāŋ/ (22-42)</td>
<td>/tčedzāŋ/</td>
</tr>
<tr>
<td>glove</td>
<td>/gątće/ (44-44)</td>
<td>/gįtće/</td>
</tr>
<tr>
<td>doctor</td>
<td>/défu/ (44-22)</td>
<td>/défu/</td>
</tr>
<tr>
<td>landlord</td>
<td>/dźidzu/ (44-22)</td>
<td>/dźidzu/</td>
</tr>
<tr>
<td>factory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>manager</td>
<td>/tšandzāŋ/ (44-42)</td>
<td>/tšandzāŋ/</td>
</tr>
<tr>
<td>school</td>
<td>/cyęço/ (22-42)</td>
<td>/cyęço/</td>
</tr>
<tr>
<td>automobile</td>
<td>/tcítsę/ (44-22)</td>
<td>/tcítsę/</td>
</tr>
<tr>
<td>male donkey</td>
<td>/dzōly/ (44-22)</td>
<td>/dzōly/</td>
</tr>
<tr>
<td>model (person)</td>
<td>/męfąn/ (22-42)</td>
<td>/męfąn/</td>
</tr>
<tr>
<td>commune</td>
<td>/gonęše/ (22-42)</td>
<td>/gonęše/</td>
</tr>
<tr>
<td>expert</td>
<td>/dzuęndza/ (24-22)</td>
<td>/dzuęndza/</td>
</tr>
<tr>
<td>spider</td>
<td>/dzędțę/ (22-24)</td>
<td>/dzędțę/</td>
</tr>
</tbody>
</table>

Table 2: Correspondence between Linxia tones and Baonan stress/high pitch.
The correspondence illustrated by the examples in Table (2) can be stated as follows:

\[
\begin{align*}
\text{Baonan [high pitch]} & \leftrightarrow \text{Linxia [44 tones]} \\
\text{Baonan [low pitch]} & \leftrightarrow \text{Linxia: 22 tones}
\end{align*}
\]

Given the extensive Linxia loan words in Baonan, we find a large number of bisyllabic words with high pitch on both syllables, or on either one of the two syllables:

\[
\begin{align*}
\text{CV(C)CV(C)} & \quad \text{e.g.} \quad /\text{mûmû}/ \quad \text{‘eyebrow’} \\
& \quad /\text{mûnin}/ \quad \text{‘yak’} \\
& \quad /\text{tängçân}/ \quad \text{‘spring season’} \\
& \quad /\text{bódzû}/ \quad \text{‘leopard’} \\
\text{CV(C)CV(C)} & \quad \text{e.g.} \quad /\text{gûngû}/ \quad \text{‘folksong’} \\
& \quad /\text{lûstûe}/ \quad \text{‘camel’} \\
& \quad /\text{miânûa}/ \quad \text{‘cotton’} \\
& \quad /\text{gûnrû}/ \quad \text{‘dried meat’} \\
\text{CV(C)CV(C)} & \quad \text{e.g.} \quad /\text{bûtûa}/ \quad \text{‘white sugar’} \\
& \quad /\text{nûdzû}/ \quad \text{‘brain’} \\
& \quad /\text{jûdzû}/ \quad \text{‘wild pig’} \\
& \quad /\text{cûtû}/ \quad \text{‘gloves’}
\end{align*}
\]

Similarly, for tri-syllabic loan words from Linxia, high pitch may fall on any one or two or all three syllables:

\[
\begin{align*}
\text{CV(C)CV(C)CV(C)} & \quad \text{e.g.} \quad /\text{jînnyêdûa}/ \quad \text{‘musician’} \\
& \quad /\text{vûguoren}/ \quad \text{‘foreigner’} \\
& \quad /\text{jûbebi}/ \quad \text{‘bats’} \\
\text{CV(C)CV(C)CV(C)} & \quad \text{e.g.} \quad /\text{gûdzûdûa}/ \quad \text{‘elbow’} \\
& \quad /\text{sâlûntûe}/ \quad \text{‘petticab’} \\
& \quad /\text{tuibûdûa}/ \quad \text{‘wood shaves’} \\
\text{CV(C)CV(C)CV(C)} & \quad \text{e.g.} \quad /\text{tabûdûa}/ \quad \text{‘a person with a deformed nose’} \\
& \quad /\text{momûtûa}/ \quad \text{‘suds’} \\
& \quad /\text{rûgûdûa}/ \quad \text{‘hot water bottle’} \\
\text{CV(C)CV(C)CV(C)} & \quad \text{e.g.} \quad /\text{gûlûjûn}/ \quad \text{‘wild geese’} \\
& \quad /\text{niûndûa}/ \quad \text{‘eyeball’} \\
& \quad /\text{xûdzûdûa}/ \quad \text{‘alcoholic’} \\
\text{CV(C)CV(C)CV(C)} & \quad \text{e.g.} \quad /\text{pûrûbûn}/ \quad \text{‘prisoner of war’} \\
& \quad /\text{gûûndûa}/ \quad \text{‘smoothly’}
\end{align*}
\]
The most significant result of the massive infusion of Linxia loan words into Baonan is that the one-word-stress rule is no longer valid. Instead of stress, what we have now is a contrast between high and low pitch on the syllables within a word. It is, therefore, not surprising that minimal pairs on the basis of pitch contrast now exist in Baonan. Table 3 below provides some examples:

Table 3: Baonan minimal pairs based on pitch contrast

To demonstrate the significance of the two distinct pitch levels in Baonan, I will cite two passages from two narrative texts. The first passage is the beginning of a narrative describing the year-round agricultural activities in the Baonan village of my native language consultant, Habib. In order to distinguish the Linxia loans from indigenous morphemes, I will underline the morphemes borrowed from Linxia Chinese.

i) ne dzandzáren - ne dzuandgi fánmian
the peasant - genitive agriculture aspect
'The agricultural side of the peasant (life).’

ii) dzuandgi fánmian sun ne fú - tčan lowomú
agriculture aspect from the hot - day plowing
śgę - śv - si keći
do - nominalization from begin
'The agricultural side (of the peasant life) begins from the plowing (of the land) (during) the hot days.’

iii) fú - tčan lowomú śgę - śv - si ne,
hot - day plowing do - nominalization-if pause
particle
'As for plowing (the land) in the hot days,’
dui dzandgarən ne gi liги dguəntun.
to peasant pause be history tradition
it is a historical tradition of the peasant.'

iv) dzandgarən jọ - de - fú , fu - lʃ lʃ
peasant want - obtain - wealth heat - in plow
ty - tʃə
first - round

'If a peasant wants to do well, (he) plows the
first round in the heat.'

v) jọ - de - tʃʊn , gi - jye - lʃ lʃ
want - obtain - poverty ten - month - in plow
ty - tʃə
first - round

'If (he) wants to be poor, in October, (he) plows
the first round.'

vi) ne gi dzandgarən - ne biliŋ
this be peasant - genitive rule
'Such is the rule of the peasant.'

The second passage is the beginning of a narrative
on the matrimonial tradition and practice of the
Baonan people.

i) bu-da - né baonan gatʃə.
we - genitive Baonan language
(exclusive)
'Our Baonan language.'

ii) kegi.
begin
'Let me begin.'

iii) au - də - ver'kal - dʒə - gesi
son - dative wife talk - subordinator concerning
'Concerning talking to (your) son about (getting)
a wife,
jidə gi-wu -liə,
as soon as ten-five-six
as soon as (he) reaches fifteen or sixteen,
də da dəmu ver'kal - dʒə - ok -
father mother wife talk - subordinator give -
dʒə -
imperfective
his father and mother (will) be giving (him) talks
/about taking) a wife.'

iv) ver'kal - dʒə - gesi ,
wife talk - subordinator concerning
'As for talking about a wife,
kegi qan kən - né agə - sən .
begin first who - genitive daughter good
one begins first with (the question): whose daughter is
good?'
v) agv - nė dufoğm ndga - dʒʊ.
girl - accusative match look - imperfective
'(The boy's parents will) be considering the girl
as a match.'

vi) ndga - dʒɪ san jidzigesi ,
look - subordinator good if
'If (the boy's parents) consider (the girl) good,
agv vendän , təintcoín sv - dʒʊ.
girl steady relation settle - imperfective
(that is,) the girl is steady, a relation will be
in the making.'

vii) təintcoín sv - dʒɪ gesi
relation settle - subordinator concerning
'As for making a relation,
keşɪ , no şɪ jìg şguandgán .
beginning this be one pivot
the beginning is pivotal.'

The evidence presented in this section clearly
shows that Baonan has developed two contrastive pitches
(high and low) for the syllables of loan words from
Linxia. In addition, we have the following facts:

(i) Whether a syllable has high pitch or low pitch
is not predictable. In other words, pitch level is
part of the syllable structure in the lexicon.
Furthermore, this fact supercedes the indigenous stress
placement rule when a loan morpheme is combined with
indigenous morphemes. Thus, if a Linxia loan word is
used as a verb and thereby takes on Baonan suffixes,
the high pitch falls on the syllable that has a 44, 42
or 24 tone in Linxia, not on the word-final syllable,
e.g. consider the Linxia loan, /fajyn/ 'faint,' in the
following sentence,
(1) Habib fajyn-ge -dʒɪ
Habib faint-predicative-perfective
Habib fainted.

The high pitch remains on the second syllable as in
/fajyn/ 'faint'.

(ii) For bi-syllable and tri-syllable loan words
high pitch may fall not only on any syllable, but also
on all two or all three syllables of the word.

In view of (i) and (ii), what Baonan is developing
appears to fall on the tonal end of the continuum
between tone languages and pitch accent languages(4).
The question, "Is Baonan a tone language?" still lacks
a definitive answer. But there is no doubt that the
language is in the process of developing a tonal sys-
tem. What is also significant in this development is
that Baonan, a Mongolian language, is not mono-
syllabic. It is not "tone-prone," a term coined by
Matisoff (1973). Yet, it is in transition from a non-tonal language to a tonal language. As a case of contact-induced development of tones, it serves to illustrate not only a diachronic process at work but also the far-reaching effect of languages in contact.

II. Contact-induced loss of tones

As a case study of contact-induced loss of tones, I will cite Wutun. Wutun is a language spoken by approximately 2,500 people living in five villages in Tongren County of Qinghai Province which is historically a part of Amdo Tibet. According to the oral history of the Wutun people, their ancestors were Chinese soldiers sent to Amdo Tibet from the coastal province of Jiangsu and the south central province of Sichuan several centuries ago(5). It was often the policy of the Chinese imperial court during many dynasties that garrisons in the frontier should engage in agriculture and be self-sufficient. Thus, for most soldiers, being sent to a frontier garrison was tantamount to being forced to immigrate without family to a minority region. In the case of the Wutun, the soldiers settled in Tongren County and married the native women most of whom were either Amdo Tibetans, Monguors or Baonans, all speakers of verb-final agglutinative languages. There was no reason to expect the soldiers to speak any of the native languages of the area. Being soldiers of the imperial court, they brought power and prestige with them. The women they married either by force or with the consent of the women's families would have to learn the soldier's Chinese dialects. What the women learned was probably a pidgin Chinese with a Chinese lexicon and a verb-final, agglutinative type of grammar. As the pidgin became established among the females, the soldiers must have adopted their wives' speech. Besides the obvious need of communication with their spouse, the soldiers had another reason for adopting their wives' speech, and that is, the soldiers didn't have a uniform language among themselves. Coming from two different provinces where divergent dialects abound, they spoke dialects that were barely, if at all, intelligible to each other. The absence of a uniform language among the soldiers made it easier for the soldiers to give up their own dialects and adopt their wives' pidgin tongue. After the children were brought up, we had a creole situation and the beginning of the Wutun language. Thus, Wutun is a Chinese-based creole developed by the speakers of Baonan, Monguor and Amdo Tibetan. Its lexicon is basically Chinese, but its grammatical features are taken from verb-final agglutinative languages. I will
highlight a few of the grammatical features of Wutun to show its difference from Chinese and its similarity with verb-final, agglutinative languages.

(a) The language is strictly postpositional and without co-verbs.

\[
\begin{align*}
\text{e.g.} & \quad [\text{th}u\text{o} - \text{gi}] \quad [\text{nanti}n - \text{ra}] \\
\text{head} & \quad \text{on} \quad \text{Nanjing} \quad \text{from} \\
\text{'on the head'} & \quad \text{'}\text{from Nanjing'} \\
\text{[th}i\text{an} - \text{li}] & \quad \text{sky} \quad \text{in} \\
\text{'}\text{in the sky'}
\end{align*}
\]

(b) The language is rigidly verb-final. The following sample sentences illustrate this principle.

1) wut un štxpa vu - ke

Wutun village five - classifier

\[\text{jv} - \text{li}\]

exist - attitudinal

\[\text{particle}\]

'Wutun has five villages'

2) Ṽo kuo ta - li

I him/her hit - attitudinal

\[\text{particle}\]

'I will hit him/her.'

3) čampa na šti\text{an} ji - ta

čampa me money one - dollar

\[\text{kh}a - \text{lio}\]

give - perfective

'čampa gave me one dollar.'

(c) Pronouns are inflected according to nominative-accusative/dative in the singular only. Other grammatical cases are expressed by case suffixes.

<table>
<thead>
<tr>
<th>Singular</th>
</tr>
</thead>
<tbody>
<tr>
<td>nominative</td>
</tr>
<tr>
<td>1st person</td>
</tr>
<tr>
<td>2nd person</td>
</tr>
<tr>
<td>3rd person</td>
</tr>
</tbody>
</table>

(d) The case suffixes of Wutun are the following:

Nominative = \[\emptyset\]  
Genitive = \[-te\]  
Dative/Accusative = \[-ha\]  
Comitative = \[-te\]  
Instrumental = \[-liŋke\]  

There is an interesting interplay between the ordering of the nominals and the presence/absence of the dative/accusative suffix in a sentence. In the unmarked word order, \[-ha\] marks the dative rather than
the accusative. Of all the case suffixes, only the
genitive, the comitative and the instrumental are obli-
gatory in all contexts.

(e) The classifier, [kə], has replaced almost all
other classifiers in Wutun. When [kə] occurs with a
numeral to form a classifier phrase, the phrase follows
the head noun. For example,

[štua vu - kə]
mountain five - classifier
‘five mountains’

[thianmi tshi - kə]
candy seven - classifier
‘seven pieces of candy’

[jitsa san - kə]
soap three - classifier
‘three pieces of soap’

[kə] can also occur as a nominal suffix with the
meaning,

‘one’, e.g.

[xuit[hə - kə]
book - classifier
‘one book’

[pʰinkuo - kə]
apple - classifier
‘one apple’

[ren - kə]
person - classifier
‘one person’

(f) There is no resultative compound in Wutun.
Instead, causative constructions are marked by a causa-
tive suffix, [-kə], on the verb, e.g.

4) i) ʂampa ตนเอง - (ha)
ʂampa Done - (accusative)
tə - lio
hit - perfective
‘ʂampa hit Done .’

ii) ɳo ʂampa - ha ตนเอง
I ʂampa - dative Done

tə - kə - lio
hit - causative - perfective
‘I made ʂampa hit Done .’

Notice in 4) i) the accusative marker is optional,
whereas in 4) ii), the agent [ʂampa] of the verb [tə]
‘hit’, having been demoted to the dative slot because
of the causative, is obligatorily marked with the
dative case marker.

(g) Finally, Wutun is non-tonal, like Monguor,
Amdo-Tibetan and the Baonan spoken by the Lama Bud-
dhists.
The absence of tones in Wutun parallels the presence of tones in another creole, Krio(7). Krio is an English-based creole in Sierra Leon developed by the speakers of tonal languages of the Bantu family. In the genesis of Krio, the target language was non-tonal, but the native languages of the learners were tonal. These tonal languages interfered with the learners' effort to acquire the target language and the consequence was a creole with a tone system. In the genesis of Wutun, the target language was tonal, but the native languages of the learners were non-tonal. These non-tonal languages interfered with the learners' effort to acquire the target language and the consequence was a creole that is non-tonal.

Notes
1. Research and preparation of this paper is supported in part by NSF grant BNS-83-08220.
2. Contact-induced rise and fall of tone system is also found in Africa (Russ Schuh, personal communication). For Example, pre-historic Chadic tones developed through contact with tonal Bantu languages, and Wolof probably lost its tones through contact with non-tonal Afro-Asiatic languages.
3. Baonan is one of the nine Mongolian languages spoken in China (Poppe, 1970). It is genetically distant from Khalkha, the best known Mongolian language. Khalkha is often used synonymously with the term, Mongolian, i.e. the unqualified language name, Mongolian, always refers to Khalkha because it is the national language of the People’s Republic of Mongolia. In China, the standard language of Inner Mongolian is a dialectal version of Khalkha and it is called Inner Mongolian, or simply, Mongolian. In order to illustrate the genetic distance between Baonan and Inner Mongolian, I will provide a few cognate examples of the two languages in the following table:

<table>
<thead>
<tr>
<th>Gloss</th>
<th>Inner Mongolian</th>
<th>Baonan</th>
</tr>
</thead>
<tbody>
<tr>
<td>sun</td>
<td>[nor]</td>
<td>[narŋ]</td>
</tr>
<tr>
<td>star</td>
<td>[ɔt]</td>
<td>[hotŋ]</td>
</tr>
<tr>
<td>wind</td>
<td>[xi:] 'air'</td>
<td>[kʰi]</td>
</tr>
<tr>
<td></td>
<td>[salx] 'wind'</td>
<td></td>
</tr>
<tr>
<td>donkey</td>
<td>[ol dzik]</td>
<td>[tɕigō]</td>
</tr>
<tr>
<td>fish</td>
<td>[tʃ 'ðgas]</td>
<td>[tɕalgasŋ]</td>
</tr>
<tr>
<td>door</td>
<td>[uːt]</td>
<td>[tɔŋ]</td>
</tr>
<tr>
<td>cry</td>
<td>[uflax]</td>
<td>[lagō]</td>
</tr>
<tr>
<td>red</td>
<td>[uilaːn]</td>
<td>[fulŋ]</td>
</tr>
</tbody>
</table>
4. The continuum with true tonal language at one pole and pitch-accent language at the opposite pole is discussed by both McCawley (1978) and Bolinger (1978).

5. A bit of linguistic evidence of some of those soldiers coming from Jiangsu is the presence of some morphemes in Wutun that are unmistakably from Wu dialects. Wu dialects consist of a group of Chinese dialects spoken around the Yangtse river in Jiangsu province and Zhejiang province. An example of a Wu dialect morpheme in Wutun is /mɪndzɔ/ 'tomorrow'.

6. The Wutun data is based on the speech of my native Wutun consultant, Caiji, who is one of the few Wutun people fluent in Chinese.


References
Polyadicity of Three Verbs Associated with Bloodletting Rituals in Western Glyphic Maya

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Polyadicity refers to the number and kinds of arguments a predicate may take. The purpose of this paper is to discuss the polyadicity of three verbs found in the Maya inscriptions of the Classic Period (c. 250-900 A.D.), all having to do with blood-letting. Before discussing the verbs themselves, I would like to begin by presenting a few relevant facts about Mayan languages, and then briefly describing the Maya script.

Whatever languages may have played significant roles in the development of Maya hieroglyphic writing, there is consensus that the language, or languages, recorded in the script on the monuments of the Classic Period is most closely related to Tzeltal, Tzotzil, and various modern Cholan languages, with greater or lesser amounts of influence from Yucatec. All Mayan languages exhibit ergativity, expressed morphologically by person marking on the verb. In addition, modern Yucatec and Cholan have nominative/accusative marking in the incoomplective aspect. The ergative person markers also function as possessive pronouns. Therefore, a third person ergative marker on a verb stem allows for three possibilities:

1. a transitive construction
2. a possessed verbal noun
3. an intransitive construction in incoomplective aspect in a language exhibiting partial ergativity.

The third possibility is relevant to the Classic Period texts only if it is the case that partial ergativity existed in the language(s) recorded at that period and if the texts are in incoomplective aspect (see Macri, in preparation).
As nearly as can be determined, there are no examples of first or second person occurring in the inscriptions. Another relevant fact about Mayan languages is that the third person absolutive is zero, that is, it has no phonological realization. Its presence can, however, be inferred whenever the ergative person marker is present in any verb in purely ergative languages or in verbs in the completive aspect in the type of partial ergative systems found in Yucatecan and modern Cholan languages. Since the verbs are marked for person, independent NPs for subjects and objects are optional. Consequently, a third person ergative marker and a verb stem (with the appropriate morphological marking for tense/aspect, voice, etc.) can qualify as a transitive sentence, and a verb with no person marker can stand alone as an intransitive sentence with the subject being third person singular absolutive (Ø). This has important implications for our understanding of the verbs found in the Classic inscriptions.

In the three or four surviving hieroglyphic codices—bark paper books from the Postclassic Period (c. 900-1500 A.D.)—there are examples of sentences with independent subject and object NPs. In the Classic inscriptions, however, such constructions are virtually non-existent (Lintel 8 from Yaxchilan which records in VOS word order 'captured B, A' being a notable exception).

A typical sentence in the inscriptions begins with a calendrical statement followed by a verb followed by the subject NP which may consist of one or more names and titles, and embedded clauses giving various epithets and parentage statements. The lack of object NPs has prompted epigraphers to remark: "... verbs that can be identified grammatically as transitive constructions are rare in the inscriptions. ... (Schele 1985 10)," and, "(split ergativity) explains major anomalies in which clearly intransitive verbs appear consistently with a third-person ergative pronoun (Schele 1982:10)." The only
criterion Schele gives for labelling verbs as clearly intransitive is that they occur only with one NP, or with one NP and a complement clause.

In discussing possible meanings of the affix T181 read as -\textit{ah} MacLeod states that "In considering any transitive morpheme as a candidate for T181, one must demonstrate a potentially transitive relation between two protagonists (or one actor and one nominal object)(1984: 236)." This ignores the fact that in Mayan languages relevant to glyphic studies independent subject and object NPs are optional, and a transitive sentence may consist minimally of a verb root with an ergative person marker to indicate subject, and the \textit{Ø} absolutive person marker to indicate the direct object. The fact that overt object NPs do not occur is consistent with findings in discourse studies that for Mayan languages the percentage of two full NPs in a single sentence is extremely low. See, for example, Du Bois's data on Sacapultec, an Eastern Mayan language closely related to Quiche (1981).

Maya hieroglyphic writing is a mixed logo-syllabic system. Some of the signs are logographic and represent a word and all of its homophones. Other signs are syllabic, representing CV and VC combinations, and are used orthographically without reference to meaning. Typically the signs occur in glyph blocks. A glyph block may consist of a single sign or a combination of one or two main signs each of which may be accompanied by one or more smaller signs called affixes. Any affix or main sign may be used phonetically, logographically, or as a semantic determinative. Graphic affixes are not necessarily morphemic affixes.

By the turn of the century most of the calendrical glyphs were deciphered, however, the most significant progress in reading the non-calendrical passages has come within the last 25 years. A current estimate given by Peter Mathews of Harvard is that although secure phonetic readings can be given for only a small portion of the hieroglyphic texts, we can understand the meaning of about 80%
of the texts. For example, we may know that a certain glyph is a man's name, and know when he was born, etc., without being able to know how his name was pronounced. In other cases we may know that particular glyph is a verb and that it never is preceded by an ergative person marker, and that it always occurs with the earliest date given a particular ruler. From this we can infer that it is the intransitive verb 'to be born' even though there is no consensus on the phonological form of the word. It is also possible that some glyphs were read differently by speakers of different languages or dialects; 1500 years is certainly enough time to accumulate archaic spellings.

The purpose of the Classic monuments was to glorify and legitimize the local political ruler. The monuments were erected on important calendrical dates or in commemoration of a ruler's accession to power, death, etc. All of these ceremoniously auspicious occasions were commemorated by bloodletting rituals. These were acts of auto-sacrifice which involved tongue, ear lobe, and penis perforation. The three verbs that I will discuss here are all found in association with bloodletting rites. Figure 1 shows lexical entries for these verbs written according to an LFG framework. It gives the argument structure for each of the verbs, and the person, number, and case for each of the the arguments, as indicated by the verb glyph itself.

The first is the scattering glyph, read *ma* 'to scatter' referring to a liquid. It may be spelled purely phonetically with syllabic signs [ma + la], or represented logographically by a hand which sometimes has droplets coming from it. In some cases the hand has the syllabic sign [ma] at the wrist and [la] written beneath it. Of 75 entries in Schele's Verb Catalog 59% are preceded by the ergative third person marker.

The second verb is the jog glyph read by this author as *u ak' u b'a*, 'to offer oneself'. It has been called an "auxiliary verb" (Josserand et al. 1985) because it is frequently followed by *ti*-constructions, that is complement clauses
introduced by the particle *ni*. Of 164 occurrences, it is preceded by the ergative person marker 86% of the time.

The last verb is called the fish-in-hand glyph. Although it is preceded by the ergative marker only 48% of the time (12 out of 25 times), Proskouriakoff (1973: 165) notes that when it follows a date—that is, when it is the main verb in a sentence—it takes the ergative prefix. This fact is also true of the other verbs as well. Generally when they are the main verb in a sentence they take ergative marking. When they occur without the *u-* prefix it is usually in embedded constructions.

Although it is important to remember that overt object NPs are not necessary in transitive sentences, I would like to suggest that for at least two of these three verbs there is evidence for a direct object within the event glyph itself, a kind of graphic object incorporation. In the first verb, *mal*, 'sprinkle', the direct object can be seen as the droplets, supposedly of blood, issuing from the hand. Additionally, the crosshatched element with a circle of dots (T93) that frequently appears affixed to the scattering hand may indicate more information about the direct object. It does occur with a number of other glyphs, but it patterns as if it were being used as a phonetic complement rather than a verbal affix.

In Macri (1984) I have given evidence for reading the second verb as 'to offer oneself'. As illustrated in Figure 2, the glyph segments into four parts: the first element is *u*, the ergative third person marker, the second is the animal's tongue *ak'*, the next element, present only in a few examples, is a smaller *u* positioned over the animal's eye, and a finally, *b'ah*, the established phonetic value for the animal's head which translates as 'gopher' (Proskouriakoff 1968). In Greater Tzeltalan languages *ak'* also means 'to give'. In Tzotzil, when it is paired with the reflexive pronoun *b'a* (which must be inflected with the appropriate ergative person marker) we have the verb *ak' ba*
'present oneself /before authorities/, offer self /sexually/’ (Laughlin 1975:40). It is also part of the formulaic expressions ak' ba ta k'ob riós and ak' ba ta k'ob kahvaltik, both of which mean 'to partake of the sacraments' literally, 'to offer oneself into (by, with, for, because of) the hand of god'. Just as this verb in modern Tzotzil is associated with religious rituals, it appears that its glyphic counterpart had similar associations during the Classic Period. The direct object in this transitive verb is the reflexive pronoun.

At the present time there is no consensus on the reading of the hand/fish event glyph. Again, it clearly occurs in contexts which are associated with blood-letting. Of the three verbs discussed in this paper it is the one least likely to occur as the main verb of a sentence. There are also fewer examples of it, only 25 in Schele (1982), as opposed to 75 and 164 for mal and ak' b'ah respectively. It is not certain whether the hand/fish is meant to include the direct object of the verb phonetically or logographically. As mentioned above, however, a verb with an ergative person marker and the zero affix for the third person absolutive meets the criteria for transitivity.

Next I would like to discuss the C-structure in Figure 2. It contains the sentence from the front of Stela 24 at the site of Naranjo. In the interests of space, the date 9 Lamat 1 Zozt' (9.13.7.3.8, 699 A.D.) has been deleted. This sentence is actually an abbreviated version of sentence four of the main text found on the sides of the monument. Sentence four is the longest and most complex of the sentences which gives several titles for Lady Six Sky, along with the names of her parents. Immediately following the verb glyph (here divided for illustrative purposes into V and object NP) is a PP which might more appropriately be labelled a COMP. The affix read ti functions both as a multi-purpose preposition and complementizer. The monkey face, God C, is a personage associated with bloodletting rites. The phonetic reading is not known, but if it were read 'blood', č'ič', then it would have to occur with a
possessive prefix. In fact, in this case, although the glyph is eroded, there are
two possible candidates for the possessive prefix $u$, one across the top of the
glyph, the other to the left of the face. The sentence might then read "She offers
herself, presents herself, for the purpose of bloodletting (or by her blood, with
her blood), Lady Six Sky of Tikal, Bacab (ruler).

The verb $ak' b'ah$ sometimes occurs only with the subject NP, but
frequently with $ti$-constructions containing a variety of different nouns or
nominalized verbs. Many have to do with bloodletting, but others include the
'ahau (lord)-in-hand glyph' or the verb $ak ta$ 'setting up' associated with the
staff ceremonies observed on the Yaxchilan lintels. Since $ak' b'ah$, which is
always preceded by the ergative person marker never occurs with both full
subject and object NPs, it was cited as support for Bricker's proposal of
nominative/accusative marking in incomplete aspect in the inscriptions (Bricker
1985, Schele 1982: 10). If, however, the interpretation suggested here is
correct, the verb is transitive, and the direct object is the reflexive pronoun
($b'ah$) represented in the glyph by the head of the gopher ($b'ah$).

In this paper I have presented evidence for transitive interpretations of three
verbs known to occur in blood-letting contexts. In the case of the hand-
scattering glyph indications of the presence of a direct object are the droplets
found issuing from the hand itself. Whether or not there is a phonological
realization of this concept is not essential to the polyadicity of the verb, since the
absolutive person marker is present as $\emptyset$. In the case of the gopher glyph, the
direct object is phonologically realized as the reflexive, $bah$. That the hand/fish
glyph is transitive seems to be clear, but whether or not it contains the direct
object is unclear at this time. As part of a rigorous analysis of the syntax of the
glyphs, the polyadicity of each of the verbs needs to be established. In some
cases it will be possible to establish that, even when a phonetic reading or an
exact meaning of the verb has not been discovered.
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When Zero Isn’t There

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Zero forms of morphemes have often been assumed to be simply arbitrary formal alternatives within paradigms. More astute observers have noticed that zero markers do not appear at random points (Benveniste 1966). If one number marker is zero, for example, it is more likely to be the singular than the dual or plural. If one nominal case marker is zero, it is more likely to be the absolutive than the ergative. If one person marker is zero, it is more likely to be the third than the first or second.

Yet there is intriguing evidence that unmarked third persons may not necessarily be even zero. Compare the paradigms below from Mohawk, an Iroquoian language of Quebec, Selayarese, an Austronesian language of Indonesia, and Lakhota, a Siouan language of South Dakota.¹

1) Mohawk Selayarese Lakhota
'I am sick' wakenonhwáktani bambana mahtdže
'you are sick' sanonhwáktani bambáko nikhtđže
'he is sick' rononhwáktani bambani khtđže

When asked how to say 'I am sick', Mohawk, Selayarese, and Lakhota speakers all reply with no hesitation, supplying the forms in the first line above. Asked how to say 'you are sick', the Mohawk and Selayarese speakers cheerfully give the third forms. The Lakhota speakers, however, look puzzled and ask, "Well who do you mean?" Although most Mohawk speakers cannot segment their language morphologically, they know that the pronoun 'he' is in their verb somewhere. Selayarese speakers know that there is a satisfactory equivalent to 'he' in their verb, even though there is no gender or number distinction. Lakhota speakers, on the other hand, know that there is no 'he' in theirs. Similar comments from speakers of a number of other languages indicate that this is by no means an isolated phenomenon.

The nature of pronominal affixes and clitics like those above has usually been clear to grammarians working with languages that have them. Such affixes have sometimes been interpreted by others, however, as simple copies of nominal features, mere 'agreement' markers. (For further discussion of this issue see Jelinek 1984, Mithun 1985, Van Valin 1985.) The reasons for this are understandable.

In languages like English, pronouns are normally in complementary distribution with full noun phrases.

2) a The boy is sick.
   b He is sick.
In languages like Mohawk, Selayarese, and Lakhota, the pronominal affixes appear whether separate noun phrases are present or not. The affixes match the noun phrases in person, and, if distinguished, number, gender, and/or case. Compare the verbs in the Mohawk sentences below.

3) a *Rononhwáktani*  ne  *raksâ:*?a.
   'The boy is sick.'

   b *Rononhwáktani.*
   'He is sick.'

4) a *Iakononhwáktani*  ne  *ieksâ:*?a.
   3.F.SG.PAT-sick-STATIVE  the  3.F.SG-child.DIM
   'The girl is sick.'

   b *Iakononhwáktani.*
   'She is sick.'

5) a *Rotinonhwáktani*  ne  *ratiksâ?okôn:*?a.
   'The boys are sick.'

   b *Rotinonhwáktani.*
   'They are sick.'

Separate pronouns do not appear unless they signal a contrast. Like pronominal affixes, inflectional endings on verbs in many languages reflect the person, number, and/or gender of an argument. They are thus termed 'agreement markers'. Like pronominal affixes, they appear with all verbs, even when separate noun phrases are present in the clause. In the Macedonian sentence below, for example, the third person verb matches its third person subject.

6) a *Bratučedka*  *mi*  *dojde.*
   cousin-FEM  my  came-3.SG
   'My cousin came.'

In some languages with agreement markers, verbs can also constitute grammatical utterances in themselves. In such languages, sometimes called 'pro drop' languages, pronouns are not normally used unless special emphasis is intended. Thus the Macedonian sentences in b) and c) would usually occur without the pronouns in parentheses.

   b *(Taa)*  *dojde.*
   (she)  came-3.SG
   '(S)he came.'

   c *(Jas)*  *dojdojov.*
   (I)  came-1.SG
   'I came.'

The agreement markers do facilitate the interpretation of clauses without nominals: they reflect the person and number of the subject. They differ from pronominal affixes in several ways, however.
Agreement markers, in the narrow sense, normally match just one argument, usually the subject. Pronominal affixes, by contrast, refer to all core arguments of the verb. (Agent and patient pronouns are fused in the Mohawk and Lakhota examples.)

7) 'I know you' Mohawk Selayarese Lakhota
   konienté:ri kuissekkó slolejóye
   'you know me' skienté:ri muisse?ga slolméjóye

Although free pronouns are pragmatically marked in both 'pro drop' languages and those with pronominal affixes, they do not appear under identical conditions in the two. The frequency of free pronouns in 'pro drop' languages varies slightly from language to language, and from speaker to speaker, but they function in such languages in ways not normally found in languages with bound pronouns. As one Spanish speaker related experiences from her childhood, for example, she explained that her grandfather had worked in a penny arcade. When he came home, he would count the coins he earned in tips and put them in little piles on the table. The speaker continued:

8) entonces cuando yo al ver todo ese dinero, then when I to-the see-to all-M this-M money 'so upon seeing all this money,
   me ponía ... mala,
myself put-P-IMP bad-F
I would get into a terrible state,

The free pronoun yo 'I' appears with the shift in topic from the grandfather to the narrator.

The tale then continued uninterrupted by free first person pronouns, as the speaker described how she stole three coins, ran out and bought chocolate, then ate it, but neglected to wash her face. Her grandmother noticed the theft, and went to tell her mother about it, stopping to inform neighbors all along the way. The mother replied that she knew nothing about the coins, but that since the little girl was such a glutton, she might have taken them. The speaker continued:

inmediatamente aparecí yo, immediately appear-P.PF.1S I
'Just then I showed up,

y me vieron
and me see-P.PF.3PL

con toda la boca manchada de chocolate with all-F the-F mouth stain-PRT-F of chocolate
with my whole mouth covered with chocolate.
...yo dije no no,
I say.PPF-LSG no no,
I said no, no,

The free pronouns function here to foreground their referents. The sentence then continued:

yo no he cojido el dinero
I not AUX-LS take-P.PRT the money
I didn't take the money ...

Here, the overt pronoun signals a contrast.

In the Spanish text, as in connected discourse in general, free pronouns are absent more often than they are present. When the pronouns do appear, they provide special emphasis, much like stressed pronouns in English. In this role, they may indicate shifts in topic, simply highlight or foreground their referents, or indicate the focus of a contrast. In languages with pronominal affixes, free pronouns serve only the contrastive function.

Finally, agreement markers appear to differ from pronominal affixes in a subtle but crucial way: they are not referential. They reflect various features of subjects, but they are not subjects themselves. Speakers are well aware of the difference. Whether they have thought about the structure of their language or not, they spontaneously mention 'leaving out' or 'dropping' the pronoun, even when this is the only idiomatic alternative. Macedonian speakers note that jas has been left out of a sentence like 6)c above, just as Spanish speakers volunteer that jo has been omitted from Spanish equivalents. Speakers of Mohawk, Selayarese, and Lakhot, by contrast, would never say that a pronoun has been omitted from wakenonhwáktni, bambahna, or makhúše respectively. The presence of agreement markers may obviate explicit reference to the subject with each verb, so long as the reference is inerrable, but this does not mean that the agreement marker itself is necessarily referential. Note that in languages such as Japanese and Chinese, pronouns are typically not present if the identity of arguments is inerrable from the situation (Matsumoto p.c., Li and Thomson 1979, 1981, Chen 1984, Tao 1986). Yet verbs contain no markers at all specifying person, number, or gender.

It might be easier to dismiss speaker intuitions about the presence of pronouns if they did not correlate with major syntactic differences. For many languages, a basic, syntactically defined constituent order can be determined, such as SVO, SOV, VOS, etc. Often this basic order is obvious: the majority of clauses exhibit the same order, and those that do not are clearly pragmatically marked. Languages of this type can differ in how rigid their basic order is, according to such factors as case marking on noun phrases. English, for example, with no nominal case marking, has relatively rigid SVO order, while Slavic languages, with rich nominal case systems and the same basic SVO order, exhibit considerable sensitivity to pragmatic context in the reordering of constituents. Nonetheless, in all of these languages, deviation from the basic
order signals a more or less pragmatically marked situation.

In a number of languages, however, the determination of a basic order seems at first impossible. All possible orders occur. Usual tests for basic order fail to yield conclusive results. When speakers are provided with potentially ambiguous sentences, usually out of context, scrambling the words does not resolve the ambiguity, (unless the speakers feel that the order closest to the contact language, often English or Spanish, will clarify matters for the grammarian). Comparisons of statistical frequency introduce more complications than they resolve. In languages of this type, although speakers consider it perfectly grammatical to include both a separate subject noun phrase and a separate object noun phrase in the same clause, such full sentences occur relatively rarely in spontaneous discourse, often in as few as 1-2. of clauses. Speakers normally do not introduce several new entities into discourse simultaneously. Yet even within the small set of full clauses, all orders occur. The marginally most frequent order found in a set of highly unusual sentences seems a questionable foundation for a syntactic description.

If sentences in these languages are examined in context, it becomes clear that although all orders occur, their distribution is not random (Mithun 1984, Payne 1984). It is not the syntactic roles of the nominals that determine constituent order: it is the relative importance of all constituents to the discourse at hand: their newsworthiness within a particular context. A word may be newsworthy for several possible reasons: it may establish a new topic, announce a new action, introduce a new object, specify a significant time or place, or indicate the focus of a contrast.

The relationship between the relative importance of constituents and their order has been noticed before. On the basis of the Indo-European languages they observed, Firbas and his Prague School colleagues postulated that information is ordered within clauses according to an increasing degree of 'communicative dynamism', 'the degree to which a sentence element contributes to the development of the communication, to which, as it were, it pushes the communication forward' (1972:78). Speakers begin from an established point of departure, the theme or topic, and move toward newer, increasingly important information, the rHEME or comment.

In languages with purely pragmatic constituent ordering, however, the order is the reverse of that observed by Firbas in Indo-European. The more newsworthy or important a constituent is to the message at hand, the earlier it appears in the clause. Speakers specify the main point of their message, then fill in details, in decreasing order of importance. New topics precede presentative verbs. Significant shifts in time or scene precede subsequent events. (Speakers can assume that if no topic or scene switch is signalled at the outset, these remain the same. There is no need to reset the frame for every clause.) Significant actions are announced before predictable topics, or incidental adverbials.

Because there is no basic, syntactically defined order in these languages, no order is more pragmatically marked than any other. This does not mean that all possible orders necessarily
occur with exactly equal statistical frequency. Languages seldom
distribute important information equally among all types of
constituents. Objects might precede verbs somewhat more often than
they follow them, for example, if free object noun phrases more
often introduce new information than the verbs they appear with.
This would not mean that OV was a pragmatically neutral order.

Languages with purely pragmatically based constituent order
share several characteristics. In such languages, connected
discourse exhibits an especially high proportion of verbs. The
verbs may be morphologically quite complex. They often incorporate
nouns. Particularly interesting is the fact that they also always
have bound pronominal affixes or clitics.²

Mohawk is a language of this type. Constituent order is
pragmatically determined. Words are arranged in descending order of
newsworthiness. Natural discourse consists predominantly of verbs,
which are relatively complex morphologically. Noun incorporation
is highly productive. As was seen above, pronominal prefixes refer to
the agents and/or patients of all verbs.

An example of this can be seen in the passage below from a
Mohawk legend. A man has gone out fishing with friends, become
separated from them, and wandered around by himself all night. Then
the scene shifts to the next morning and the friends.

9) O:nen ki iːken’ wā’iːoːrhɛn’ne’
    now then QUOT PAST-N-dawn-PU NTUAL

    ‘Now then, the next morning,

ronnatēnːroʔs teionkwēːtake wahiatketksko?
M.PL.PAT-friend-DISTR DU-person-number PAST-M.DU.AG-RFL-rise-PU NT
his two friends got up.’

The time shift is most important here, so it appears first. Next
in importance is the shift in characters, so that the subject
precedes the predicate.

The friends notice that the man is missing, and go looking for
him. They find him floating in the river. Then we are told:

10) O:nen wahidtote ke ki ronnatēnːro ...
    now PAST-M.DU.AGT-RFL-point-PCT this M.PL-friend
    His two friends realized ...’

Here the friends represent a continuing topic, so their realizing is
more newsworthy than their identification. (The friends were
reidentified overtly only because our attention had been momentarily
focussed on the floating man.) The predicate thus precedes the
subject. Neither of these orders, SV or VS, is pragmatically
neutral, in the sense that both are pragmatically meaningful. The
same is true of all other possible orders involving other types of
constituents.

The pragmatic rather than syntactic ordering of constituents is
no accident. Compare again the Mohawk and English versions of 9).
9) ...ronnate:ro's teionkw:te take wahiatketsko'
...his friends two people they two got up
...'his two friends got up.'

In the English version, the subject of the verb 'get up' is the noun phrase 'his two friends'. In the Mohawk sentence, the nuclear clause relations are established within the verb itself. The agent of the verb -atketsko- ('get up') is the pronomial prefix -hi-, ('they masculine dual'). The external nominals further identify the agent argument, but they are appositional to the primary argument, the pronominal prefix.

The same is true of sentences with separate noun phrases identifying patients: the nuclear clause relations are specified within the verb.

11) Tsid:ta niionkw:te:te ne: ken nithotiioh:sa
seven people the this young men
ne kwáh rati'sátsste 's tentehshei's'tenhwae'.
the most they are strong you will bring them back.
'Bring back seven of the strongest young men.'

External nominals may further identify the arguments, but these are appositional adjuncts. It is not surprising that these external adjuncts fail to be governed by nuclear syntactic considerations. They are coreferent with the nuclear arguments, but they are not primary arguments themselves.

Lakhota also has obligatory pronominal prefixes on verbs, referring to agents and/or patients, as was seen above. Yet constituent order in Lakhota is clearly syntactically based: it is basically SOV, with modifications reflecting pragmatically marked circumstances. Lakhota speakers, like others, do not normally introduce both a new subject and a new object into the same intonation unit or clause, but when noun phrases representing several major arguments do appear, the pragmatically neutral order is SOV. In the narrative cited below, the speaker had already mentioned that he and his friends had put on a pow wow.

12) Lakbóta ikçeak'a he wačhipiwa ũkáyapi.
Indian ordinary that pow wow we made
'We were just ordinary Indians that put up the pow wow.'

This difference in ordering strategies is not completely unexpected. Recall that only first and second person arguments are represented by overt pronominal prefixes in Lakhota. These are just the arguments that are rarely represented by noun phrases, since first and second person are inherently established by the discourse context. When asked for third person verb forms out of context, speakers prefer to supply a noun phrase establishing the identity of the third person, or at least a demonstrative.
Arguments need not be respecified in every clause when their identity is clear from preceding discourse. A zero prefix is not sufficient in itself, however, to establish reference.

The absence of third person pronominal prefixes in Lakhota signals a crucial difference in the organization of relationships between verbs and their arguments. In Lakhota, the third person agents and patients of verbs are not some zero morphemes invisibly prefixed to verbs. They are external noun phrases or demonstratives. It is not surprising that the relative order of major constituents should mirror this syntactic relationship. Pronominal systems like that in Lakhota, whereby only first and second persons are referenced by verbal affixes or clitics, are common among languages throughout the world. Constituent order in such languages is syntactically based, often SOV, mirroring the syntactic relationships binding verbs and their noun phrase arguments.

The existence of non-zero third person pronominal affixes or clitics is not sufficient, however, to guarantee that constituent ordering in a language will be purely pragmatically based. The Mayan languages, for example, exhibit many of the features characteristic of pragmatically ordered languages. Verbs predominate in spontaneous discourse. Du Bois (1985) has shown for example, that in Sacapultec, a Mayan language of Guatemala, nearly 60% of clauses in connected speech contain only one core noun phrase, and nearly 40% contain no core noun phrase at all. Mayan verbs can exhibit a relatively high degree of polysynthesis, and many show a type of compounding akin to incorporation. They contain pronominal affixes referring to all three persons.

Yet word order in these languages is clearly syntactically based. Most Mayan languages show a syntactically defined, pragmatically unmarked VOS order, a few show VSO, and perhaps one has SVO (Kaufman p.c.). The rigidity of the basic order varies somewhat from one language to another. Nominal constituents may be fronted for focus, or to indicate a new or contrastive topic, but the resulting orders are pragmatically marked, as indicated by certain grammatical markers or intonation breaks separating fronted constituents from the remainder of the verb-initial clause.

A careful look at the forms of the third person markers is revealing. Mayan verbs contain pronominal affixes that operate on an ergative basis: subjects of transitive verbs are referred to by ergative affixes, while objects of transitive verbs and subjects of intransitives are referred to by absolutive affixes, at least in the first and second person. Compare the Sacapultec verbs below. The first prefix refers to the absolutive, the second to the ergative.

14) in-warnaq 'I was asleep'
    at-warnaq 'you were asleep'
\textit{in-a-čixmax} 'you have cared for me'  
\textit{in-ra-čixmax} 'he has cared for me'  
\textit{at-n-čixmax} 'I have cared for you'  
\textit{at-ra-čixmax} 'he has cared for you'

When the absolutive is a third person, there is no overt pronominal affix on the verb. This has traditionally been described with a zero third person absolutive marker.

\textit{Ø-warneq} 'he was asleep'  
\textit{Ø-ni-čimax} 'I have cared for him'  
\textit{Ø-a-čimax} 'you have cared for him'

In light of the above discussion, it might be more appropriate to recognize that the pronoun simply is not there.

As Du Bois has pointed out, absolutes constitute more than an accidental, hybrid category. The objects of transitive verbs and the subjects of intransitives are exactly the arguments normally used to introduce new entities into discourse. New entities, especially third persons, are necessarily introduced by full noun phrases, rather than pronouns. Thus full noun phrases are especially likely to appear as absolutive arguments. In most of the Mayan languages, absolutive noun phrases typically follow the verb, both in transitive sentences (VOS) and intransitive sentences (VS). Their postverbal position appears to be syntactically based, mirroring the syntactic relationship between verbs and their nominal arguments. (As in other languages, overt reference to absolutes is not obligatory in every clause, providing the identity of the referent is clear from context.)

Ergative arguments, the subjects of transitives, rarely represent new entities. They are typically continuing topics, so their only mention is pronominal. It is not surprising that established entities should be systematically backgrounded by morphologization. The ergative noun phrases that do appear often reiterate the identity of the subject in potentially confusing situations, as in 'after-thought' constructions, or they provide the focus of a contrast. Such noun phrases are often separated intonationally from the rest of the clause, the verb-object nucleus. This suggests that in at least some Mayan languages with basic VO order, the primary ergative arguments of verbs may be pronominal affixes, while the absolutive arguments are separate noun phrases (or understood from context).

Although this situation is relatively common among ergative languages, it is not restricted to them. In Daga, a Papuan language of New Guinea, bound pronominal suffixes refer to subjects and objects (Murane 1974). Subject pronouns are fused with tense markers, and show no zero morphemes. The set of direct object suffixes, however, contains one zero member: third person. The language has syntactically determined SOV order.

Yet even a full set of non-zero third person pronominal affixes is not sufficient to guarantee pragmatically based ordering in a
language. In Selayarese, the Austronesian language cited earlier, ergative arguments are referred to by pronominal prefixes on verbs, and absolutes by clitics suffixed to the first word of the verbal phrase. There are no 'zero' morphemes, although third persons are not distinguished for number or gender.

15) a?goloa  'I play soccer'
a?goloko  'you (familiar) play soccer'
a?goloi  'he/she/they play soccer'
ku?uraŋko  'I accompany you'
kku?uraŋi  'I accompany him/her/it/them'
mu?uraŋa  'you accompany me'
mu?uraŋi  'you accompany him/her/it/them'
lauraŋa  'he/she/it/they accompany me'
lauraŋko  'he/she/it/they accompany you'
lauraŋi  'he/she/it/they accompany him/her/it/them'

Such verbs may constitute complete predications in themselves, or they may appear in longer sentences, with noun phrases coreferent to one or both of their arguments. It is clear that the affixes constitute referential pronouns, rather than simple 'agreement' markers. When a speaker was asked whether the -i of the verb allari?i 'he runs', corresponds to the 'he' of the English translation or the '-s', there was not doubt in his mind, even though he had never written nor read his language before. (He is a good English speaker.) He felt strongly that the suffix corresponds to the 'he'.

Although the verbal conjugation contains non-zero pronominal affixes for all persons, Selayarese has a syntactically defined verb-initial constituent order. Any constituent may be fronted for special focus, but this results in a pragmatically marked order.

16)a Lahalli?i  sapoŋjo  iBaso?.
   3.ERG-buy-3.ABS  house-the  Baso?
   'Mr. Baso? bought the house.'

   b iBaso?  lahalli?i  sapoŋjo.
   Baso?  3.ERG-buy-3ABS  house-the
   'Mr. Baso? bought the house.'

Now compare the two sentences below.

17)a Ku-halli?i  sapoŋjo.
   1.ERG-buy-3.ABS  house-the
   'I bought the house.'

   b Mmalli?-a  sapo.
   INTR-buy-1.ABS  house
   'I bought a house.'

When the direct object is indefinite, like sapo 'house' in 18)b, it is not registered on the verb. The absolutive suffix -a refers to the subject 'I', and there is no ergative prefix.
This is a general pattern in Selayarese. Subjects are always marked on the verb by means of referential affixes, but direct objects are referred to in the verb only if definite or in special focus. In light of the foregoing discussion, this is not altogether unexpected. New entities are most likely to be introduced into discourse as indefinite direct object noun phrases. Since they are new, pronominal reference would not be sufficient. Thus the relation between a verb and a first or second person core argument is specified within the verb. The relation between a verb and its third person subject or definite object is also specified within the verb, although an appositional noun phrase may follow to clarify its identity. The relationship between the verb and an indefinite direct object, however, is specified by the order between the verb and the following noun phrase.

This situation, like the others discussed above, is also not restricted to ergative languages. In Amharic, for example, definite specific direct objects are registered on the verb by means of pronominal suffixes, but indefinite ones are not. The language has a relatively rigid verb-final order. (Hetzron 1975, Hudson 1972)

Finally, languages may exhibit still another relationship between pronominal affixes and separate noun phrases. Consider the situation in Abkhaz, a North West Caucasian language described by Hewitt (1979). Bound pronominal affixes refer to three nuclear arguments: absolutes, indirect objects, and ergatives. There are no 'zero' forms in the paradigm: each affix consists of a single consonant followed by an optional vowel. Yet constituent order is syntactically determined: the basic, unmarked order is S-IO-DO-V (Hewitt 1979:103, Hewitt and Khiba 1985).

An examination of the operation of the pronominal system is revealing. Abkhaz has two third person absolutive prefixes, $d(e)-$ for singular humans, $y(e)-$ for all other third persons.

18) $de-ce-\text{yt}'$
\begin{align*}
3.\text{HU.SG-go-FINITE} \\
'(S)\text{he went.}'
\end{align*}

$ye-ce-\text{yt}'$
\begin{align*}
3.\text{N.HU-go-FINITE} \\
'\text{It/they went.'}
\end{align*}

$ye-sete$
\begin{align*}
3.\text{N.HU-to.me-give} \\
'\text{Give it to me.'}
\end{align*}

Hewitt notes that 'if the referent of the affix $y(e)-$ immediately precedes the verb, then this affix $y(e)-$ disappears' (1979:101). Compare the sentences below.

19) $a-xad'aa$  
\begin{align*}
\text{the-man} & \quad de-ce-\text{yt}' \\
3.\text{HU.SG-go-FINITE} & \quad '\text{The man went.'}
\end{align*}

$a-\text{ls}a$  
\begin{align*}
\text{the-dog} & \quad (\emptyset)-ce-\text{yt}' \\
\text{(it-)go-FINITE} & \quad '\text{The dog went.'}
\end{align*}

$a-xad'aa$  
\begin{align*}
\text{the-men} & \quad (\emptyset)-ce-\text{yt}' \\
\text{(they-)go-FINITE} & \quad '\text{The men went.'}
\end{align*}
As noted earlier, third person absolutes are the arguments most often used to introduce new entities into discourse, so they are the arguments most likely to be represented by full noun phrases. As would now be expected, the relative order of verbs and immediately preceding absolute noun phrases is syntactically based. The syntactically based order of the constituents reflects their syntactic relationship. What is interesting here is that the language permits primary arguments to be either free noun phrases or bound pronouns. This situation is also not unusual, nor is it restricted to ergative languages. Comrie (1982) describes a similar situation in the Central dialect of Huichol, for example, whereby third person singular objects are not referred to pronominally in the verb when the object noun phrase immediately precedes.

The occurrence of 'zeroes' in pronominal affix systems is not random. If one person marker is 'zero', this is most likely to be the third person. If only some third person pronominal affixes are 'zero', these are most likely to be absolutes, or, somewhat less often, direct objects. If only some third person absolute or direct object pronominal affixes are 'zero', these are most likely to be indefinite. These are exactly the points at which new entities tend to be introduced into discourse, by full noun phrases. In fact, in some languages, pronominal affixes are 'zero' specifically in the presence of adjacent noun phrases. In all such cases, the presence of these 'zeroes' cooccurs with the existence of a syntactically based order between verbs and their core arguments.

It is not difficult to imagine how a language might move from a syntactically based, theme-rheme order, to a purely pragmatically based, rheme-theme order. (For ideas along these lines, see, among others, Payne 1984 and Givon 1976.) Probably the majority of languages with syntactically based word order allow 'left dislocation', whereby constituents in special focus appear at the beginning of the clause. The markedness of the resulting structure varies, of course, from one language to another. A pronoun may appear in the basic position of the focussed constituent or not, depending on the language. Left dislocation is often accompanied by cues that the focussed item is not an integral part of the nuclear clause, such as an intonation break separating it from the rest of the sentence.

A second familiar construction is right dislocation, resulting in what is often termed an 'afterthought'. In such situations, a speaker utters a complete clause, then fills in details or repairs unclear reference by means of a following explanation. Such additions can be true afterthoughts, as a speaker realizes that the identity of key participants might not be clear due to intervening material. Speakers also often produce such constructions quite intentionally, when inclusion of the information within the nuclear
clause would interfere with the impact of the message. Right dislocated elements, like left dislocated ones, are not part of the nuclear clause, as shown by the intonation breaks often separating them, and a lowering of tone and sometimes volume.

In a language with obligatory overt third person pronouns, fronting significant new information for focus, or reiterating or refining given information following the clause, would not interfere with an understanding of the relations among sentence constituents. The constituents themselves remain firmly in place within the nuclear clause. As speakers use left and right dislocation more often, the pragmatic and intonational markedness of such structures can fade, providing increasingly natural strategies for presenting information according to its pragmatic importance. This does not mean that the dislocated items necessarily assume the role of primary reference. As long as the clause-internal pronouns remain overt, there is no reason for them to abdicate their function. Since the dislocated constituents retain their role as appositives, there is also no reason for syntactically based ordering patterns to extend to them.

A number of language families provide evidence of such development. A particularly rich example is provided by Australian aboriginal languages. As Dixon (1980) has shown, all of these languages are ultimately genetically related. They fall into two major typologically distinct groups, termed Pama-Nyungan and non-Pama-Nyungan.

The Pama-Nyungan languages show interesting variation in their pronominal systems. Some have no bound pronominal forms at all, such as Uradhi (Crowley 1983), Diyari (Dixon 1980), Thargari (Klokeid 1969), Guugu Yimidhirr (Haviland 1979), Dhalandji (Dixon 1980), Pitta Pitta (Blake 1979), Gumbaynggir, (Eades 1979), Yaygir (Crowley 1979), Warrgamay, (Dixon 1981), Mpakwithi (Anguthimri) (Crowley 1981), Nyawaygi, (Dixon 1983), and others. Some of these, such as Uradhi and Diyari, have relatively rigid SOV orders, while others, such as Thargari, and Guugu Yimidhirr, show considerable flexibility, facilitated by the presence of case suffixes on nouns. In all of these languages, however, a basic, syntactically defined constituent order can be perceived.

A number of Pama-Nyungan languages are in the process of developing bound pronominal affix or clitic systems. In accordance with the suffixing character of the Pama-Nyungan languages, the pronominal forms are usually enclitics, suffixed loosely to the verb or to the first word of the sentence. Their recent development is clear. Their resemblance to free pronouns is still transparent, and they show little phonological fusion with the words to which they attach. There are even two dialects of a single language, Margany and Gunya, that differ principally in this feature: 'Gunya has a transparent and obviously recent system of pronominal suffixes to the verb, which Margany lacks' (Breen 1981:275).

Some languages in the early stages of this development, such as Watjarri (Douglas 1981), Yankunytjatjara (a dialect of Western Desert) (Goddard 1983), and Kalkatungu (Blake 1979), still permit a choice between enclitic and free pronouns. Douglas detected a
preference for free pronouns in Watjarri conversation. Goddard remarked that in Yankunytjatjara, 'sentences using free pronouns only are not uncommon in normal speech' (1983:120). Blake reports that Kalkatungu speakers may use bound pronouns alone, free pronouns alone, or combine them, although only one bound form may occur in an independent clause. He found more free forms in elicited sentences, but otherwise noted that the free forms tend to indicate a focus or contrast. In all of these languages, there are no overt third person clitics. Although word order can be relatively flexible, due to case suffixes on nouns, it is basically SOV.

Some languages that offer the alternative between free and bound pronouns have overt non-zero third person enclitics. Dixon notes that in Ngiyambaa, 'a pronoun will normally be reduced to a clitic unless it requires special emphasis' (1980:365). There are no free third person pronouns, but the enclitic third person ergative is -lu/-yu and the absolutive-dative is -na. Third person absolutes can be represented by a noun phrase alone, an enclitic alone, or a combination of both, if the referent is definite. The presence of these non-zero affixes is significant. Dixon states: 'Languages for which it has not proved possible to make statements concerning underlying order include Ngiyambaa' (1980:497).

In still other Pama-Nyungan languages, obligatory bound pronominal systems have developed with no zero members. In Yukulta, for example, 'a clitic complex or cluster of clitics expressing S, A, O, and O₂ (direct or indirect object), transitivity and tense-aspect is suffixed to the first constituent of a clause.' (Keen 1983:191). The clitics are obligatory. An examination of texts in Yukulta reveals that the order of constituents is pragmatically based, with words arranged in decreasing order of newsworthiness, or theme.

Ritharrngu, a Pama-Nyungan language, is closely related to central Australian languages (Heath 1980a), but is spoken in Northeast Arnhem Land, among the typologically distinct non-Pama-Nyungan languages. It is sufffixing, like its closer relatives, but has developed an elaborate system of bound pronominal enclitics, none of which is zero. Constituents are ordered according to their pragmatic function, in decreasing order of newsworthiness, or from theme to theme (1980:102-3).

The non-Pama-Nyungan languages, spoken mainly in Northern Australia, are typologically quite different from their Pama-Nyungan relatives. Languages of this type include, among others, Tiwi (Osborne 1974), Ngandi (Heath 1978), Dhuwal (Heath 1980b), Gunwinggu (Oates 1964), Warndarang (Heath 1980c), Nunggubuyu (Heath 1984), and Rembarrnga (McKay 1975). Connected discourse in these languages typically contains a high proportion of verbs, which can be morphologically quite complex, and can function as complete clauses in themselves. Most of the languages lack case marking on nouns, and where it exists, it is thought to be the result of influences from nearby Pama-Nyungan languages (Heath 1978). Significantly, verbs contain tightly fused pronominal prefixes, all of which have overt, non-zero forms. It is clear from the excellent textual materials in these languages that constituent ordering is
pragmatically determined, with constituents arranged in decreasing order of importance. (Mithun 1984).

The recurring coincidence of full sets of overt pronominal affixes and pragmatically based constituent ordering is too pervasive to be an accident. It may be the case that languages with full sets of bound pronouns can retain a basic, neutral syntactically based constituent order indefinitely, either because speakers never overindulged in dislocation, or because of the well-known sensitivity of word order to external influences. The opposite does not seem to occur, however. It appears that all languages with purely pragmatically determined, rHEME–THEME order, establish core grammatical relations within their verbs, between verb stems and overt bound pronouns. In light of the non-random distribution of 'zero' pronouns within paradigms, and of their ramifications within the syntax, it seems impossible to maintain that such 'zero' morphemes are mere arbitrary paradigmatic alternatives. Sometimes they are not even there.

NOTES

1 I am grateful to the following speakers who generously provided the examples from their languages cited here, as well as discussion: Mrs. Margaret Edwards, of Ahkwesahsne, Quebec for Mohawk, Mr. Hasan Basri, of South Sulawesi, Indonesia, for Selayarese, Mr. Stanley Redbird of Rosebud, South Dakota, for Lakhota, Dr. Olga Tomić, of Skopje, for Macedonian, Miss Alicia Re, of Madrid, and Mrs. Nelly Tellez Schrager, of Barranquilla, departamento del Atlantico, Colombia, for Spanish. Rene Shekerjian transcribed the Spanish texts and conversations discussed here from tape recordings. I also much appreciate helpful discussions with Jack Du Bois, Orin Gensler, Bill Jacobsen, Terry Kaufmann, and Johanna Nichols.

2 Clusterings of many of the properties discussed here, in particular, a preponderance of verbs in connected discourse, complex verbal morphology, variable constituent order, and the presence of pronominal affixes, have also been noticed by Desmond Derbyshire among Amazonian languages (1985), and more generally by Johanna Nichols (to appear) among 'head-marking' languages.

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Phonemes as Mental Categories*
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This paper is a first attempt to explore the nature of a
theory of phonology within the general framework of cognitive
grammar (Langacker in press, Lakoff in press). It will be
found that a number of basic tenets of natural phonology will
fit elegantly into this theory, although some of them will
require some reinterpretation.

Cognitive grammar holds that language is not different in
kind from other human cognitive activities—seeing, hearing,
categorizing, thinking, and that it follows the same organizing
principles that these other cognitive activities display. In
particular, cognitive grammar has adapted the prototype/basic-
level notions of Eleanor Rosch (1973, 1977, 1978) as a basis
for the organization of units in language, as in all other
human activities.

According to Langacker, language is an inventory of
structured units at varying levels and degrees of abstraction.
The units may be either phonological or semantic, but cognitive
grammar rejects any notion of an autonomous level of grammar
that is not directly relatable either to the semantic or the
phonetic substance of language. A great deal has been written
within this framework, exploring the consequences of these
assumptions. Representative studies can be found in Lakoff and

This research suggests that human perception, organization
and encoding of experience is mediated through our interaction
with the world. Direct, perceptual and physiological
experience underlies our understanding of more abstract
domains, and is used to structure our knowledge about subjects
that do not have direct physical existence.

At this point, aside from a few brief comments in Lakoff
(in press) and Langacker (in press and MS), no serious attempt
has been made to investigate the sound systems of language
within this general framework. In order to do so, it will be
necessary to identify some of the crucial concepts that
cognitive grammar takes as central to the nature and
functioning of language and ask how they could be relevant to
phonological theory. Two essential ideas that this paper will
attempt to integrate into phonological theory are those of the
embodiment of mental entities (that is, their expression in
perceptual terms) and the notion of prototype.

Prototype effects were first discovered by Rosch, and have
since been shown to be crucial not only in general cognition,
but also in linguistic categorization (see for example the work
by Ross (1972) and Berlin et al. (1974) and the discussion in
Lakoff (1982 and in press)). The notion of prototype expresses
the sense that objects being categorized are not defined by the
presence or absence of criterial distinctive features, but rather in terms of degree of similarity to what are perceived as prototypical members. To give the prototypical example, a robin is perceived as a prototypical bird, while an ostrich and a kiwi are less good examples of 'birddom', although they are still birds. Similarly, following an example discussed at length in Lakoff (in press), a woman who has produced a child as the product of sexual union with her husband, and whose time is entirely taken up by looking after that child, cleaning her house and preparing meals for her cohabiting but working husband, is a prototypical 'mother'. Any person who deviates from this specification is, both sociologically and linguistically, non-prototypical. Thus we have 'working mothers', 'surrogate mothers', 'single mothers' and so on. Cognitive non-prototypicality can lead to linguistic markedness. Prototype effects are a result of the kind of categorization that Rosch suggests human beings used in dealing with the world. Categories, according to Rosch (1973, 1977, 1978), are groups of objects in the world assembled because of their similarities to one another, organized around a central, prototypical image of the member of the category that is most representative of all the members. Rosch argues that 'categories appear to be coded in the mind neither by means of lists of each individual member of the category nor by means of a list of formal criteria necessary and sufficient for category membership but, rather, in terms of a prototype of a typical category member. The most cognitively economical code for a category is, in fact, a concrete image of an average category member'. (1977: 30)

In addition to the assumption that mental categories are structured around representative examples, it is assumed that language is made entirely of sets of categories of varying levels of complexity and abstraction, but that every unit, at every level is related directly either to semantics, that is, to understanding and meaning, or to phonetics—that is, to the phonetic substance of language. Cognitive grammar explicitly rejects the prevailing notion that it is productive to investigate the structure of grammar independently either of meaning or what means are being used to convey it. Consequently, cognitive grammar is a totally non-autonomous theory in which syntax is purely symbolic of meaning, and in which there are no units that are not either meaning or sound.

Because cognitive grammar is a non-modular, integrative approach to the nature of linguistic systems, all posited elements and principles require non-autonomous explanations. In particular, only the semantic and phonetic poles, and units coordinating those poles, are permitted to have a place in linguistic theory. As a consequence, we will expect the nature of the phonetic substance will determine the kind of structures that we find in language, and this turns out to be exactly the case.
The structure of phonological systems is determined by the substance out of which the systems are constructed—in particular, for spoken language, the nature of the human vocal apparatus and the nature of the constraints imposed by our perceptual apparatus on what sounds and combinations of sounds we can hear. We can predict, consequently, that non-spoken language will be subject to different constraints, because the nature of the producing mechanisms, the perceptual mechanisms and the conducting media are different. On the other hand, the general organizing principles will be the same—categorization in terms of prototypes and basic and higher level organization will be reflected in the organization of whatever units language uses.

What kinds of constraints will be placed on the phonological system by the fact that language is spoken? We will expect a number of general requirements will impose conditions on phonology, and will shape its possible nature: it must be audible, rhythmic, convey information, be efficient, and reflect pre-existing principles of human nature such as emotionality.

The fact that language must be audible guarantees that the primary building blocks of language will be vowels, since vowels are the loudest sounds that the vocal tract can produce. It is only when the vocal tract acts purely as a (tunable) amplifier of the vocal cords that truly loud sounds can be produced—any kind of closure will limit the amount of noise that can be produced. Consequently, language will be primarily made up of vowels—reflected in the fact that most of the actual time in speaking is made up of vowel production, and also in the fact that the prototypical speech sound is probably a vowel, although I do not believe this has yet been demonstrated experimentally.

Rhythmicity is also a general organizing principle of human behavior. In an interesting paper, Kelso, Tuller and Harris (1983) argue that rhythmic organization is a general consequence of energy-producing systems of all kinds by virtue of their self-regulating nature. Furthermore, Lindblom (1983) argues that the rhythmic nature adduced above, coupled with the conflicting requirements imposed by the nature of consonants versus vowels, will result in the syllabic organization of speech sounds that languages universally show. Consequently, the organization of speech sounds into rhythmic units or pulses (perhaps partially coordinating with chest pulses, as Stetson (1951) or jaw movement, as Kelso et al. suggest) is to be expected given the nature of the human motor system.

Speech must also convey information. This means that there must be enough differences to allow information to be communicated. The connection between difference and information has been known for a long time—in one sense since de Saussure, and in the mathematical sense since Shannon and Weaver. However, as we have seen and will see, information-
bearing capacity is not the only requirement that the use of language imposes on the structure of language. Information is just one of the prerequisites to a speech system. It will guarantee, however, that language will be made up of a reasonable number of contrasting units—no language seems to be able to make do with less than about thirteen, while similarly no language seems to need more than around a hundred different sounds. In addition, limits on the human perceptual system will set limits to the minimum distance between contrasting units. For example, no language uses more than three degrees of voice onset time (Nathan, MS), a fact that seems to be determined by mammalian perceptual systems.

Speech must also be efficient, in the physiological sense. This guarantees that, where possible, conflicting physiological instructions will be resolved so as to reduce the magnitude and number of movements that the vocal apparatus is required to undergo. As we will see, this requirement will lead directly to an explanation for why languages have allophones, and why we speak of phonological rules.

Lastly, we can expect language to be organized in accord with the nature of the human expressive system in a wider sense. For example, general emotional arousal leads to exaggerated behavior of all kinds, presumably because of a direct connection between arousal and the motor system. As a consequence, we would expect that languages would have at their disposal the means for expressing emotional arousal which would involve exaggerated motor activity. In general, languages do express intense emotional involvement through increased respiratory activity, (Ladefoged 1982) leading to louder, longer sounds that exhibit greater pitch excursions. Even in languages without contrastive stress in the English sense, like French, we find such devices as the accent d'insistance used to call attention to particular parts of the speech stream. Not all languages make use of stress, as is well known, but I know of no language which does make use of stress, but in which the stressed morphemes are old or unsurprising information.

Stress, as a resource, is available to language, but not every language 'chooses' to use it. On the other hand, having adopted a system of stress, stress is constrained in the way it operates to mark specialness in some manner, either as an emotional signal, an informational one, or, as Troubetzkoy put it, a culminative (boundary) signal.

In sum, then, the nature of the human vocal and perceptual apparatus guarantees that language will be made up of strings of vowels and consonants, organized into syllables that (approximately) alternate open and closed positions in a rhythmic pattern. There will be enough contrasting units for information to be conveyed (although the number required varies by an order of magnitude), but each unit will permit enough variation to allow for efficient transition between motorically different activities. Finally, languages will have available
some device for calling attention to portions of the speech stream for purposes ranging from emotional coloring to signalling the beginning or ending of words.

Let us return at this point to the question of the nature of phonological organization, to see how this conception of phonological substance might interact with the concept of categorization that Rosch and others have been promoting.

The beginnings of this theory can be found in a suggestion by Jaeger (1980), who investigated the psychological reality of various putative phonological relations and entities. She found that, as one might predict, native speakers of English were able to perform various concept-formation tasks which involved associating various allophones of a single phoneme. With greater difficulty they were able to treat as single categories classes of sounds that were grouped by various proposed SPE-style features. Some features, such as voice and continuancy fared better than others such as anteriority. Finally, she investigated the status of the vowel-shift rule, finding that speakers apparently formed categories on the basis of the spelling system, rather than on the underlying forms proposed in SPE and the various revisions thereof. Of course, if one is investigating the psychological reality of phonological systems rather than taking the purely structuralist point of view that all that is being described is patterns, then such things as the influence of spelling are likely to become relevant to a correct description.

At the end of her dissertation, Jaeger suggests that Rosch's categories are the appropriate way to think about the relationship between phonemes and allophones, and it is this conception that I will explore here.

Let us suppose that a phoneme is a category of sounds. Each of the sounds that would be traditionally classified as an allophone will therefore be a member of that category. We can think therefore of a large network of sounds scattered like points on a (multi-dimensional) map. Each language will draw boundaries around some of the points (analogous to, say, state boundaries), enclosing sets of the sounds into categories that will constitute the phonemes. Other regions of the map will simply be unused, for each language. Thus a phoneme is a class of sounds that native speakers consider as being somehow 'the same', in much the same way as English speakers all perceive robins, bluejays and even chickens as 'birds'.

However, Rosch argues, at least for color categorization, that people are not free to group members of a category in any arbitrary manner. She argues that 'there are colors and forms which are more perceptually salient than other stimuli in their domains...Such colors and forms more readily attract attention than other stimuli and are more easily remembered than less salient stimuli' (1973: 114)

Analogously, for sounds, we could argue that some sounds within a category are more representative of the entire
category than others, and in fact that less prototypical members of the category will be heard as the more prototypical member. Furthermore, we could argue that languages are not free to group any arbitrary set of sounds into categories. Instead, I will argue that the sounds that are picked out as the most prototypical are selected because they are perceptually and articulatorily the most distinctive from the point of view of the phonetic substance discussed above. Furthermore, the sounds that are perceived as being members of the same category will be related to the prototypical sounds as natural, contextual extensions of the prototypical sound.

Put in another way, one set of principles will determine that some sounds are somehow more distinctive, while another set of principles will determine possible relationships between the most distinctive sounds and sounds that are similar to those, but are, because of their phonetic context, more appropriate to their surroundings than the prototypical sounds.

This conception of phonological organization is not unique to cognitive grammar, and in fact has been around for a long time. It is a version of the theory of natural phonology as proposed in Stampe 1973, Donegan and Stampe 1979, Donegan 1978 and 1985, Dressler 1985 and elsewhere. Donegan 1978 is a particularly elegant statement of the conception I am proposing here, and much of what I have to say at this point draws heavily from her work.

Donegan argues that there is a class of fortitions, which define the best examples of the class of vowels (and, analogously, consonants). These fortitions are a set of phonological processes which say, for example, that front vowels are likely to be unrounded, especially the lower they are, or that tense vowels are likely to be raised. She presents articulatory and acoustic arguments for the purpose of these processes, arguing that fortitions exist in language in order to make the segments more distinct, and consequently more hearable. Although the total set of fortitions defines maximum hearability for all possible sounds, any single language will select a subset of all possible fortitions, which will consequently define the set of phonemes for that language. Because the human perceptual and articulatory apparatus is the same for all people, we can expect that the total range of possible fortitions is limited, but that languages will differ in which and how many possible sound distinctions they choose.

From our point of view, then, we can say that the fortitions of a language define the center of each phoneme as the maximally contrastive member of the set, in much the same way as natural phonology has argued that the fortitions define the phoneme inventory of a language. Since the fortitions are determined themselves by articulatory and acoustic considerations, the sets of possible phoneme-centers will follow along the lines investigated by researchers such as Jakobson (1968) and Greenberg (1966), who found that there were
universal organizing principles governing the possible inventories of phonemes.

Any particular phoneme, however, will be made up not of a single sound, but of a class of sounds, all of which are classed as 'the same' by native speakers. What is the source of the variation in which sounds are actually produced? This brings us to the second fundamental concept of natural phonology—lenitions. Unless the language explicitly forbids it, the prototypical sounds are automatically replaced by less prototypical sounds if the phonetic surroundings require it. The principles governing these replacements are known as lenitions, and are what are usually represented as 'natural phonological processes' (although, within natural phonology they are only one half of the actual set).

Consider, for example, nasalized vowels. The addition of nasal coupling to vowels reduces the audibility of the resonances that render vowels distinct (i.e. nasality hides formants). Consequently, languages avoid phonemic vowel nasalization. On the other hand, due to the relative sluggishness of the velum as an articulator, it is easier to produce vowels with nasal resonances if a nasal consonant is in the same syllable. Thus we can say that there is a fortition excluding nasal vowels as prototypical vowels, but a lenition permitting nasal vowels as members of non-nasal vowel categories. A child acquiring English need do nothing special with respect to vowel nasalization—it is easier not to try to hear nasalized vowels, but under certain circumstances, it is easier to produce them, even if the target is non-nasalized.

What advantages does this conception of phonological systems give us? For one thing, several constraints on phonological representation that have been proposed by various theorists in various schools 'fall out as theorems' within this system. The constraint proposed by Postal (1968) which has come to be called the Naturalness Condition is automatically required by this theory. Postal argued that phonological representations must be just that—phonological. In this he was arguing against totally abstract representations in which non-phonetic features were posited. This theory goes even further, to argue that underlying and surface representations are all constrained by the requirement that they be sounds. In this case, the theory is even more strongly constrained, in that all representations must be sounds. This effectively excludes a great many possible alternatives, including archiphonemes and other incompletely specified sets of feature matrices, such as those proposed in Arcangeli (1984). In many ways it is similar to the kind of representations that Sapir apparently advocated (McCawley 1979, Sapir 1933). The theory imposes a kind of extreme naturalness constraint that disallows any representation at any level that is not pronounceable, because all representations are simply sounds.

There are, however, some additional complications which
need to be addressed at this point. In recent work Lakoff has suggested that the structure of categories is 'radial', in that less prototypical members may form chains of association with each other, leading further and further away from the central member. Any category may contain a number of chains, arranged like spokes on a wheel, in which members on adjacent spokes may have nothing in common, but are relatable only back through the prototypical member. A good example might be the somewhat overworked case of 'cup'. It is clear that various ceramic containers are all appropriately called cups, but in order to relate the extremely diverse entities of 'two sticks of butter' and 'hands held with palm concave' we cannot go directly from one to the other, but rather must travel through the intermediate of the ceramic entity, recognizing that each of the others is an extension, in different directions, of the prototypical, ceramic, handled, saucered cup.

Phonemes appear to be organized in exactly the same manner, with different extensions of the prototype being, perhaps, unlike each other, but relatable through a reasonable chain of lenitions to the prototype. For example, the /t/ in English may be pronounced as an ejective alveolar stop in certain circumstances (e.g. What?!) but as zero in others (as in a frequent pronunciation [sərdeɪ] for Saturday).

This conception of chains of related phones, successively further from the prototype, is the analog, within this theory, to sequential application of rules. Consider, for example, the system of English alveolar stops. We have at least the following:

1) \[ t^\prime \quad t^h \quad d \quad d \]

The ejective and implosive sounds occur as instances of emphatic coda and onset respectively. The voiceless \([t]\) occurs as an allophone of /t/ after /s/ and as an allophone of /d/ in initial position (see Nathan to appear for discussion). The voiceless flap occurs in syllable-final position in words such as 'hothouse' and even in 'plate'. The flap is voiced intervocally in standard examples like 'city'. /d/ of course may also be realized as both kinds of flap in cases like 'madder' and 'red-hot'. Here we have a complex case of overlapping and interlocking categories. A path along one of these chains constitutes a derivation. As Stampe and others have emphasized, there is extensive evidence that speakers travel these paths in the process of actively constructing speech, because when they produce Spoonerisms, the allophones
that are used are appropriate even if the actual phonemes have been rearranged.

Let us consider a case where the rule interaction becomes somewhat more problematic. In English liquids are devoted following syllable initial voiceless stops. Thus [pliːz] and [krait]. Consequently, we can say that a possible path exists between l and voiceless l, sanctioned by the natural process of aspiration. In addition, English possesses a lenition permitting the deletion of schwa under certain circumstances. In our current terms we would say that zero is one of the alternative realizations of schwa (which may itself be an alternative realization of some other vowels). That is, included within the phoneme zone of schwa is nothing. This permits a potential 'rule-ordering' conflict between the two processes—what is to stop a chain whereby schwa chooses the zero allophone, and 'consequently' the liquid in a word like 'police' chooses the voiceless allophone, becoming virtually homophonous with 'please'. Donegan and Stampe (1979) argue that some processes are marked as non-iterative, while others are not so restricted. What we need here is some notion that a voiceless l can 'be an /l/' in the case where nothing is missing between the stop and the /l/, but cannot 'be an /l/' when there is a zero representing a vowel. The obvious answer here is that not devoicing the /l/ maintains the identity of the missing vowel—the missing vowel is 'recoverable', to use the terminology of the abstractness controversy. In that case, what we have is a restriction on permissible paths that permits two potentially distinct words from becoming merged. This of course is a semantic constraint on 'rule ordering'—a rule may not apply if it will conceal the existence of an otherwise invisible segment.

The conception of 'rule ordering' that is being presented here, is of course, global, in the now discredited sense that generative semantic theory proposed. Within a non-modular theory, however, there can be no a priori rejection of globality in rule application. And in a theory in which the only possible units are either phonological or semantic, any rule connecting the two levels will of necessity be global. Since cognitive grammar permits only phonological and semantic units, or units that are schematic of one or the other, we must expect that phonological units will be influenced either by other phonological units or by semantic ones—there are no other considerations. Given the notion of global constraints on whether a particular phoneme can 'be' another, the idea of any kind of sequential rule ordering can be eliminated. For any particular pair of possible extensions of the prototype sounds, a particular language can 'choose' whether the extension of the extension will deviate too far from the prototypical target. Although [pliːs] seems to me to be too 'sloppy' a pronunciation, I can certainly imagine other people who would not reject it, and as Donegan and Stampe show,
reorderings from counterfeeding to feeding with increasing tempo, or with extremely familiar words are frequent.

Donegan and Stampe argue that counterfeeding constraints of this kind are the only ones needed in phonological theory, and I have argued that they exist entirely for semantic purposes. The nature of language as the cognitive grammarians see it predicts that the only restrictions on possible rule types will be semantic ones, and that is exactly what we find.

One notion that I have not discussed at all is the distinction, proposed by natural phonology, between processes and rules. The distinction in our terms is between categorization (both $t^R$ and D are instances of /t/) and higher level schemas (the morpheme divine, if it is recognized to be morphologically complex in the first place, may be pronounced either with an /ai/ or with an /I/). Processes deal exclusively with what sounds may count as other sounds, and with which sounds are the 'good' sounds for a particular language. Rules (in the technical sense) on the other hand, relate alternative pronunciations of morphemes, not phonemes, and consequently are semantically, rather than phonologically based. A similar conclusion is reached in lexical phonology, where a similar distinction is made between lexical and post-lexical rules (see Rubach 1984 for discussion), where lexical rules require information about morphemic identity, while post-lexical rules are purely rules of pronunciation.

Notes

* This paper has benefitted from the input of a large number of people. These include Margaret Winters, Jo Rubba, Ron Langacker, George Lakoff, Wolfgang Dressler and Lee Hartman. I alone am responsible, however, for the current state of this paper.

1 Study of languages that do not use the vocal tract, such as ASL, indicates the the basic organizing principles differ in just the ways that one would expect from the nature of the 'phonological' resources available. For instance, because visual space can be organized more complexly, ASL allows multiple third person pronouns, distinguished by location, whereas spoken language, with a single channel normally permits only one, or, occasionally, with an aboviative system, two third person referents.

2 Some interesting relationships between the rhythmic nature of speech and that of music can be found in the work of many of the metrical phonologists although they are operating under a different framework.

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In this paper I provide evidence that an adequate analysis of a language's syntax and morphology may require consideration of the discourse-pragmatic status of noun phrase referents. Specifically, I discuss two pragmatically based rules in the grammar of Cherokee, an Iroquoian language spoken by about 10,000 people in Oklahoma and North Carolina. One of the rules is required to account for certain cases of transitive verb agreement and the other is required to account for word order. These rules are shown to interact in constructions which have not been fully described in the Cherokee literature.

Subject and object focus agreement prefixes

Cherokee verbs take pronominal prefixes which index the person, number, and animacy of their subjects and objects. For example, in (1a), the underlined prefix kv:y- indicates that the verb 'hit' has a first person singular subject and a second person singular object, and in (1b), the underlined prefix skw- indicates that the verb has a second person singular subject and a first person singular object.

   'I am hitting you.'
   b. Skwv:niha.
      'You are hitting me.'

With so much information marked on the verb, it is very common not to have many—or any—full noun phrases in Cherokee clauses.

There are two sets of pronominal prefixes which may appear on verbs with third person subjects and third person objects: a set which has been called the "subject focus" set, and a set which has been called the "object focus" set (Cook 1979). There are three distinct, but clearly related, rules which determine whether a verb with a third person subject and a third person object will take a subject focus prefix or an object focus prefix.

The first rule involves an animacy hierarchy, similar to those which have been proposed for other languages by many linguists (for some discussion see Comrie 1981). The relevant part of the Cherokee animacy hierarchy is given in (2).

(2) human > non-human animate > inanimate

When the subject outranks the object on the hierarchy, then the verb takes a subject focus prefix, as in (3a), where the subject is human ('John') and the object is non-human animate ('the dog'). When the object outranks the subject on the hierarchy, then the verb takes an object focus prefix, as in (3b),
where the subject is non-human animate ('the horse') and the object is human ('John'). When the subject and object are both third person inanimate the verb must take subject focus, as in (3c).

John dog 3sg./3sg.SUBJ=kicks
'John is kicking the dog.'
b. So:kwili Ca:n u:hyvthe.
horse John 3sg./3sg.OBJ=kicks
'The horse is kicking John.'
door 3sg./3sg.SUBJ=bump table
'The door hit the table.'

If the choice between subject and object focus is not determined by the animacy hierarchy (that is, if both the subject and object are third person human or if they are both non-human animate), then the choice of focus may be determined by the syntax of the clause. When an object is relativized or questioned, as in (4a), the verb shows subject focus, and when a subject is relativized or questioned, as in (4b), the verb shows object focus.

(4) a. Ka:kw kv:hniha Ca:ni?
who 3sg./3sg.SUBJ=hits John
'Who is John hitting?'
b. Ka:kw u:wa:hniha Ca:ni?
who 3sg./3sg.OBJ=hits John
'Who is hitting John?'

When focus is determined by the animacy hierarchy, the pronominal prefix appearing on the verb of a WH question is in general not determined by the syntactic role of the questioned constituent. Thus, although the object is questioned in (5a), the verb appears with an object focus prefix because the subject is non-human animate and the object is human. Although the subject is questioned in (5b), the verb appears with a subject focus prefix because the subject is human and the object is non-human animate.

who 3sg./3sg.OBJ=chases bear
'Who is the bear chasing?'
b. Ka:kw a:khe:he:ka yo:n?
who 3sg./3sg.SUBJ=chases bear
'Who is chasing the bear?'<4>

If the choice between subject and object focus is not determined by the animacy hierarchy or by the syntax of the clause, then it is determined by discourse pragmatic factors.
Basically, the verb can show object focus when the object is given (following Chafe’s (1976) terminology) so long as the subject and object of the clause are not also the subject and object of the immediately preceding clause. In other cases, the verb will normally show subject focus. So, example (6a), with subject focus, is an appropriate answer to 'Who is Will hitting?' or 'What is Will doing?' Example (6b), with object focus, is an appropriate answer to 'Who is hitting Will?' or 'What's happening to Will?'<5>

(6) a. subject focus (subject may be given)
   Ca:ni kv:hniha.
   John 3sg./3sg.SUBL=hits
   'He’s hitting John.'

b. object focus (object is given)
   Ca:ni u:wa:hniha.
   John 3sg./3sg.OBJ=hits
   'John's hitting him.'

Notice that the full NP in these sentences is preferentially interpreted as the NP which is not given. When neither the subject nor the object is given, then the verb will show subject focus, as in (7), which is the first sentence of a story.

    man young=man 3sg./3sg.SUBL=went=to=steal woman
    'A young man once went to abduct a girl.' (Speck 1926)

To summarize, when neither the animacy hierarchy nor the syntax of the clause determines the focus on a verb with a third person subject and a third person object, then the pragmatic status of the verb’s arguments as given or not given will determine focus. For some additional discussion of the status of subject and object focus prefixes see Cook (1979).

**Word order**

The second pragmatically based rule to be discussed is a rule which determines certain Cherokee word orders.

Some word orders in Cherokee are fixed: Cherokee has postpositions and not prepositions (8a), demonstratives and numbers precede nouns (8b and 8c), the standard of comparison must follow the comparative adjective (8d), and the copula, when it is present, must follow the predicate (8e).

(8) a. postpositions: Calkuwe:thi ti:tl
    North Carolina toward

b. demonstratives: hi?a hlkv:?i
    this tree

c. numbers: ani:thali ani:skaya
    two men
d. standard of comparison and comparative adjective;
   Mary more pretty than Lydia is
   'Mary is prettier than Lydia.'

e. predicate and copula: uwo:tú:hi ke:sv:?i
   pretty was
   'She was pretty.'

On the basis of fixed word orders, and on the basis of
gapping facts, various claims can be—and have been—made about
underlying word order in Cherokee. (Cherokee gaps to the right:
SOV + SO, OVS + SO, and SVO + SO are all possible gapped
constructions: for further discussion see Pulte (1972).) Notice,
for example, that most of the fixed orders presented above are
consistent with operator-operand (i.e., OV) order, although the
comparative facts and the gapping facts suggest an operand-
operator (i.e., VO) order. Many word orders in Cherokee are
variable, as shown below. Some of the possible word orders are
more frequent than others, and frequency has been used as a
criterion for basic order; thus, additional evidence in favor of
one or another underlying or basic word order for Cherokee might
be forthcoming. It is not at all clear, however, that a search
for basic word orders will lead to an insightful description of
Cherokee grammar. (6) A more promising approach involves examining
the principles which govern the many variable word orders of
Cherokee.

Although some word orders in Cherokee are fixed, most are
remarkably free, at least in elicitation. In any given context,
however, word order is considerably less free. Some orders occur
far more frequently than others, and speakers often will not
accept or are hesitant to accept one order in place of another.
The variable orders illustrated in (9) include the order of
adjective and noun (9a), adverb and verb (9b), verb and subject
(9c), and verb and object (9d).

   many different pretty clothes
tu:ni:na.
   they=have=them
   'They have a lot of different kinds of pretty clothes.'

   he=began he=was=meowing now cat big
   'The big cat began to cry.' (Cowen n.d.)

   a=little=while he=walked=around
   'He walked around a little while.'

   small girl she=was=playing outside
   'A small girl was out playing.' (Cowen n.d.)
    but about=ten time they=arrived many people
'About ten o'clock, the people began to come.'
S V Ahlcato:hvski ta:ya:?i.
    preacher he=was=coming
'The preacher was coming.'
    then one whisky container he=went=and=got
'He went and got one of his bottles of whisky.'
V O nokw wiciné:la ku:k
    then I=gave=back bottle
'and when I handed back the bottle,'

Other variable orders, not shown here, include the order of
genitives (and possessive adjectives) and nouns, adjectives and
adverbs, relative clauses and nouns, and verbs and infinitive
complements.

Recent work on so-called free word order languages has
revealed pragmatically based principles which are helpful in
describing Cherokee.

Payne (1984) in examining the placement of verbal arguments
and postpositional phrases in Papago, a Uto-Aztecan language,
developed a three-part rule to account for the order of
constituents relative to the verb. Her rule is quoted here as
(10).

(10) Payne (1984):
    1. Indefinite information precedes the verb when the
       hearer is instructed to open a new active discourse
       file for it, making it available for further deploy-
       ment.
    2. Pragmatically marked information (including all
       information question words) precedes the verb.
    3. Information for which the hearer is not instructed to
       open a new active discourse file follows the verb.
       This includes items for which active cognitive files
       are already available (e.g. definites and uniques),
       and entities for which files are not to be estab-
       lished, including non-referential mentions.

In a language like Papago, the pragmatic principles outlined
above will often result in new information preceding old
information: more specifically, indefinite material precedes the
verb and non-indefinite material follows the verb. Significantly,
it is pragmatic and not syntactic relations which determine word
order in Papago.

Payne considers the order of constituents within the clause,
ot the order of words within constituents. Mithun (to appear)
describes languages (including Cayuga, an Iroquoian language
distantly related to Cherokee) for which a similar pragmatic
principle accounts not only for the order of constituents, but
also for word order within constituents. In languages like Cayuga, according to Mithun, when word order is not fixed, it is determined by a principle involving "newsworthiness": the most newsworthy information comes first, and elements of a clause, or of a lower level constituent, appear in order of decreasing newsworthiness.

Mithun's principle is different from Payne's, for Mithun's relies on newsworthiness rather than indefiniteness and is designed to account for word order on a lower level than Payne's. Nevertheless, in many instances the two rules give the same results: new information will generally precede old information, because it will generally be indefinite (Payne) or because it will generally be more newsworthy than old information (Mithun). Noun phrases representing changes of topic (even if the referents are given or definite), question words and other "pragmatically marked" material will come at the beginning of the sentence, because they are pragmatically marked (Payne) or because, by virtue of their special pragmatic status, they are newsworthy (Mithun).<7>

All of the examples in (9), above, are drawn from texts. Some discussion of the contexts in which the examples are found will show how the newsworthily-first principle operates in Cherokee.

In the first example in (9a), the adjectives 'different' and 'pretty' precede the noun they modify, and in the second example the adjective 'big' follows the noun it modifies. The Adj N example is part of a passage describing the main street of a tourist town, and the speaker is emphasizing the appearance of the street, with its many different shops selling a variety of brightly colored goods. It is not the clothes themselves that are of interest here; rather, it is the festive appearance of the clothes for sale out on the street, which is created by the variety. The N Adj example is taken from a story in which a girl going out to play finds a large cat (a mountain lion) in the tree she wanted to climb. When she first discovers the cat, the cat is referred to with the NP ʼu:thana we:sa, with the adjective before the noun; and there follows a clause describing the big teeth that the big cat has (all referred to by NP's with Adj N order). In the clause given here, the girl is approaching the tree, and the cat begins to cry. The size of the cat is not especially newsworthy at this point in the narrative, having been established just previously.<8>

Both of the examples in (9d) are taken from the same passage, in which a father and his son pass a bottle of whisky back and forth, with the father insisting that the son take a drink, and the son refusing. When the bottle of whisky, which figures so prominently in this story, is first introduced into the text, it appears before the verb (the OV example). Certainly the fact that a bottle of whisky is fetched is newsworthy, but it is not so newsworthy as the fact that what is fetched is a bottle, and particularly a bottle of whisky. Notice the phrasing hwiski u:ltista, with the (more newsworthy) partitive before the noun.
Utilista hwiski is also grammatical, as the story teller noted, but he prefers hwiski utilista. The order utilista hwiski would indicate that the bottle was more newsworthy than the whisky, but what is significant here is that the bottle is full of whisky, since there follows a passage in which the son, who has resisted tasting it because it is intoxicating, is eventually forced to drink. The possibility that the whisky has made him drunk is crucial to the remainder of the story, in which he has a very strange, perhaps alcohol-induced, dream. The VO example in (9d) refers to the passing of the bottle between father and son. What is significant in this example is that the son (the speaker) is handing the bottle back: the action of passing the bottle is newsworthy, but the fact that what is being passed is the bottle, which has been given information for several clauses, is not newsworthy.

Focus and word order in 'actives' and 'passives'

I have yet to consider sentences with two NP arguments: in context, transitive clauses with full NP subjects and objects are rare. In elicited sentences, when the verb prefix disambiguates subject from object, either because of animacy (11a) or because of number (11b), then any order of S, V, and O is permissible, although speakers prefer not to place verbs first in such clauses.

    John dog 3sg./3sg.SUBJ=kicks
    'John is kicking the dog.'

    John boys 3sg./3pl.SUBJ=hits
    'John is hitting the boys.'

There is some controversy as to whether the subject must precede the object when the verb does not disambiguate subject from object. King (1975) and Cook (1979) claim that in such cases the subject must precede the object; examples from Pulte and Feeling (1975) claim otherwise. The two pragmatic principles discussed above, one accounting for subject and object focus prefixes and the other accounting for word order, provide an explanation of this controversy and an account of a related problem: a so-called passive construction in Cherokee.

The examples in (12) illustrate the problems with these transitive clauses. (12a) is an example of an 'active' transitive clause, and (12b) is an example of a 'passive' transitive clause (i.e., an object focus construction with two NP's in which object focus is not required by the animacy hierarchy or by the syntax). There are two translations given for each Cherokee sentence. In each case, the first translations, which are the translations predicted by the discussions of word order presented by King (1975) and Cook (1979), are by far the more commonly elicited—even among Oklahoma speakers, although King and Cook were both describing North Carolina Cherokee.
    woman 3sg./3sg.SUBJ=sees man
    'A woman sees a man.' (King 1975, Cook 1979)
    'A man sees a woman.' (Pulte and Feeling 1975)

    man 3sg./3sg.OBJ=sees woman
    'A man is being seen by a woman.' (King, Cook)
    'A woman is being seen by a man.' (Pulte and Feeling)

Example (12b) shows that a Cherokee verb with an object focus prefix and two NP arguments is translated into English with a passive verb (if the focus is assigned by discourse pragmatic rules rather than by the animacy hierarchy or by syntax: compare (12b) with (3b) and (4b)). Likewise, a verb with a subject focus prefix and two NP arguments is translated into English with an active verb. I suggest that the object focus verbs are translated by English passives because the object focus prefix is used when the object, or patient, is given, and the English passive is often used in just those circumstances.

Sentences with transitive verbs and two full NP arguments are extremely rare in Cherokee (I found only seven among several hundred clauses). The unnaturalness of these clauses, coupled with the fact that Cherokee word order is pragmatically based, makes any judgment of word order and grammaticality taken out of context highly suspect, and it is precisely that sort of judgment which provides the English translations for the examples in (12).

The King and Cook translations, taken out of context, reflect English word order principles rather than Cherokee principles. In English, subjects precede verbs, and the subject of an active verb is the agent and the subject of a passive verb is the patient; but in Cherokee, word order is determined by newsworthiness, and the most newsworthy elements come earliest in the sentence. Given NP's (i.e., the subjects of subject focus verbs and the objects of object focus verbs) are in general unlikely to be newsworthy, and this is reflected in the Pulte and Feeling translations. These NP's can be newsworthy, however, if they are new as topics, for example. In context, if a verbal argument which is given appears as a full NP at all, it is likely to be because that NP is newsworthy; otherwise it would have been omitted.

If this analysis is correct, then any naturally occurring transitive clauses with both subject and object NP's ought to show SVO or SOV order (recall that speakers prefer not to place verbs first in these clauses) if the verbs have subject focus prefixes and the subjects are given, and ought to show OVS or OSV order if the verbs have object focus prefixes. This should hold regardless of whether the prefix on the verb disambiguates subject from object (unless the construction involves topicalization or dislocation: see Cook (1979)). The analysis makes no prediction
about word order in subject focus sentences with no given NP (see (7) for an example of such a sentence).

In fact, sentences with two NP's in which object focus is required by discourse factors rather than by syntax or animacy, are extremely rare in texts—a reflection, no doubt, of the fact that it is rare to have a given object in a sentence which meets the various requirements for object focus; and there are no such examples in the texts I examined for this study. There are, however, examples of subject focus sentences with two NP's, although there are not many. The only word orders exemplified by these sentences are SOV and SVO: this is just what is predicted for clauses with given subjects, but some of the clauses contain subjects which are not given. In every case, whether or not the subject is given, it can be shown that the subject is more newsworthy than the object, since in every example the subject represents a major participant in the text or passage and the object represents a minor participant or else the subject is given but is new as topic. Thus, the lack of sentences in the corpus with OS orders is not problematic, but it remains to be seen whether subject focus clauses without given subjects and with OS order ever occur in texts, and, if they do, under what circumstances they occur.

The newsworthiness principle claims that SVO order appears when the verb represents information which is more newsworthy than the object and that SOV order appears when the object is more newsworthy than the verb; the examples in (13), when considered in context, bear out that claim.

(13) a. SVO: Askaya awe:nu:ca kano:ski:ske:?e ake:hya. man young=man 3sg./3sg.SUBJ=went=to=steal woman

'A young man once went to abduct a girl.'
(Speck 1926)

b. SOV: Nv:khi:yani anino:lito cu:nata:li:?:i four=of=them hunters their=wives tu:nthinv:se?:i. 3pl./3pl.SUBJ=took=along

'(Once) four hunters took their wives (hunting) with them.' (King 1975)

(13a) is the first sentence of a short story or joke in which a young man goes off one night to steal a wife, and ends up instead with an old man who is sleeping in her usual place. The joke is less about the girl than about what happens when the man is off on his expedition. (13b) introduces new participants, the hunters and their wives, into a narrative. The fact that these men are taking people along with them is not so important as the fact that it is the women who are going along, because the misadventures which befall the women (described in the next few clauses) precipitate the main action of the story, in which the men are shown to be main characters. The clause in (13b) is
serving to introduce participants into the story rather than to describe any action that the participants undertake.

I have tried to show how the discourse-pragmatic status of an NP referent, specifically its status as newsworthy or as given, can be relevant to morphological and syntactic rules. In the Cherokee transitive clauses described above, the interaction of these morphological and syntactic rules is best understood in terms of the pragmatic roles of the NP's in the clauses.

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Notes

<1>In my field work I have primarily studied Oklahoma Cherokee, but the facts discussed here hold true for both the Oklahoma and the North Carolina dialects.

<2>Cherokee examples are presented in an orthography similar to the phonemic orthographies of King (1975) and Cook (1979), but I am using <c> in place of their <ts>. The <v> represents a nasalized central vowel. Pitch is not marked in the examples, except that atonic accent (see Cook 1979) is marked with an acute accent.

<3>The abbreviation SUBJ in the glosses indicates a subject focus prefix; the abbreviation OBJ indicates an object focus prefix.

<4>Not all speakers are consistent in applying the animacy hierarchy. For example, some speakers occasionally allow verbs with non-human animate subjects and human objects to take either subject or object focus prefixes. Further, WH questions with non-human animate subjects and human objects in which the object is questioned (e.g., 'Who is the bear chasing?') sometimes show subject focus prefixes, rather than the object focus prefixes which the animacy hierarchy would require.

<5>Example (6a) can also mean 'John's hitting it.' (Subject focus is required when the subject outranks the object.)

<6>Cherokee appears to present some problems for word order universals such as those proposed by Hawkins (1983). Given that Cherokee is postpositional and shows Numeral Noun and Demonstrative Noun orders, it should show Genitive Noun order as well (pp.79-81). Although Noun Genitive order is possible, Genitive Noun order is more common; since Hawkins considers frequency a criterion for basic order, and since he is concerned with relationships among basic orders, there are no problems so far. But by the same token, since Adverb Adjective order is more common than Adjective Adverb order, then Adverb Adjective order is
to be taken as basic. A problem arises, because a postpositional language with Adverb Adjective order should show the standard of comparison before the adjective (p. 88), but Cherokee has the adjective before the standard of comparison.

<7>There are certain elements of a sentence which are not affected by the newsworthy-first principle: Mithun explains that "elements that establish a significant orientation for the first time, whether it be the point of view of the topic, the time, the location, or the reliability of the statement, occur early, just as they do in Czech", a language which otherwise shows word order which is almost the reverse of the newsworthy-first pattern Mithun describes.

<8>It is far more common to find the order Adjective Noun than Noun Adjective, probably because if an adjective is to be used at all it will carry newsworthy information; otherwise, an unmodified noun will do.

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Levels of Grammatical Relations and
Russian Reflexive Controllers*
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1. Introduction

In Russian, a variety of different surface cases can anteced e
reflexives. This is indicated in the examples in (1)-(6)
below.

1 Anna otpravila Borisa k svoim roditeljam
   A-NOM sent B-ACC to SELF's parents
   'Anna, sent Boris, to her/*his, parents'
2 Boris' byl otpravljen k svoim roditeljam
   B-NOM was sent to SELF'S parents
   'Boris, was sent to his, parents'
3 Ėta kniga byla kuplena Borisom dlja Ivana/sebja
   this book-NOM was sent B-INST for I-GEN/SELF-GEN
   'this book was bought by Boris for Ivan/himself'
4 ja emu skazal vse o *sebe (Timberlake 1979)
   I-NOM he-DAT told all about SELF
   '#I told him all about himself'
5 emu bylo skazano o *sebe
   he-DAT was told about SELF
   '#he was told about himself'
6 ej Žal' Borisa/sebja
   she-DAT sorry B-ACC/SELF-ACC
   'she feels sorry for Boris/herself'

A reflexive can be anteceded by the nominative NP of an active or
passive sentence as in (1) and (2) respectively, by the instru-
mental case NP of a passive sentence as in (3), and by the dative
case Experiencer with an experiential predicate as in (6). It
cannot be anteceded by the accusative case NP of an active sen-
tence as in (1) or by the dative case Receiver NP of an active or
passive ditransitive as in (4) and (5) respectively.

2. A Multistratal Account

Perlmutter (1980, 1982, 1984) uses these facts to argue for the
superiority of a multistratal model of grammatical relations
such as Relational Grammar over monostatal models which allow
only a single stratum of grammatical relations corresponding to
surface grammatical relations. Perlmutter gives the condition in
(7) for reflexive control in Russian.

7 Necessary Condition on Reflexive Controllers in Russian
   (Perlmutter 1984:10)
   Only a nominal heading a 1-arc can serve as an antecedent of a reflexive.

In a multistratal account of grammatical relations, the reflexive can be anteceded by the nominative NP in (1) because that
NP is an initial and final subject of the relational network of (1). The nominative can also antecede the reflexive in (2) because that NP is final subject of the relational network of (2). In (3) the instrumental case NP is initial subject of the relational network, and in (6) the dative is also an initial subject, this time of an 'inversion' construction, so both can antecede a reflexive. On the other hand, the accusative NP in (1) is not a subject at any stratum in its relational network, nor are the dative NPs in (4) and (5), and they are thus all ineligible to antecede reflexives.

Further evidence consistent with this analysis comes from a subset of 'inversion' constructions where the Theme appears in nominative case and controls verb agreement, as in (8).

8 Boris nužen svoim detjam  
B-NOM needs SELF'S children  
'Boris is needed by his children'

In this type of construction, the multistratal analysis includes advancement of direct object to subject as well as retreat of initial subject to indirect object. Therefore, in these constructions, the final subject (nominative) should be able to antecede a reflexive, which is correct, as (8) shows. The initial subject should also be expected to antecede a reflexive in this construction, as shown in (9).

9 Borisu nužna svoia masina  
B-DAT need-FSG SELF'S car-FNOM  
'Boris needs his own car'

An additional stipulation is needed to account for the apparent precedence of the final subject as antecedent in sentences like (10), where both initial and final subject are present and both could be potential antecedents.

10 Boris byl otravlen Annoj k svoim roditeljiam  
B-NOM was sent A-INST to SELF'S parents  
'Boris was sent by Annaj to his,/?*her parents'

It is reported that for many speakers, the initial subject cannot control reflexivization if the final subject is also semantically/pragmatically compatible with the reflexive. Final subject precedence is also seen in the absence of a sentence like (11) with a reflexive nominative form and a dative antecedent.

11 Boris nužen samomu sebe  
B-NOM needs EMPH SELF-DAT  
'Boris needs himself'

Final subject precedence is effected by introducing the notion 'working subject' which gives precedence to surface subject where
the multistratal analysis would otherwise identify both initial
and final subjects as reflexive controllers.

Since monostratal models of grammatical relations refer only
to a single stratum of grammatical relations, Perlmutter argues
that there is no straightforward way to state the generalization
about Russian reflexive control in such a model in terms either
of thematic relations or of surface grammatical relations. These
facts, and the apparent elegance with which reflexive controllers
can be identified in a multistratal model of grammatical rela-
tions present a challenge to researchers exploring the capacities
of monostratal models for expressing generalizations about the
syntax of natural languages. This paper will explore an alterna-
tive account of the characterization of reflexive control in Rus-
sian, compatible with a monostratal model.

3. Thematic Relations and Morphosyntactic Manifestation

In exploring a monostratal account of Russian reflexive con-
trol, I will assume that there are conventions for linking a
level of thematic relations associated with a given predicate to
surface morphosyntactic structure, and that these linking devices
for Russian, specify, among other things, case marking. On this
basis, I will introduce the notion 'morphological subject' given
in (12). As stated in (13), the morphological subject controls
verb agreement.

12 Morphological Subject = nominatively inflected argu-
ment of a predicate.
13 Verb Agreement Control: only a morphological subject
can control verb agreement.

I will further assume that there is a statement or statements
which specify the default linking of thematic relations to sur-
face case manifestations. A version of such a statement is given
in (14).

14 Default Morphological Subject Selection Hierarchy

\[ \text{ACTOR} \succ \text{UNDERGOER} \]

'ACTOR' and 'UNDERGOER' are macroroles taken from Foley and Van
Valin (1984); they refer to the most extreme thematic relations
on a continuum like that given in (15).

15 \[ \text{ACTOR/UNDERGOER Hierarchy (Foley and Van Valin 1984:59)} \]
\[ \text{Agent Effector Locative Theme Patient} \]
\[ \text{ACTOR} \leftrightarrow \text{UNDERGOER} \]

'Animate Location' as used in this paper will be assumed to be a
type of Locative, and will include the perceiver of perception
verbs, the experiencer of verbs of emotion and cognition, and some
others to be discussed as well. The statement in (14) will iden-
tify the Agent as morphological subject in a sentence like (1),
since отправил will be assumed to have a thematic structure like that given in (16).

16 ______ Agent/Source, Theme, Receiver/Goal

In a sentence like (17), the Experiencer (as Animate Location) will be selected as morphological subject; the thematic structure for бидяла is given in (18)

17 она бидяла сестра/себя
She-NOM saw sister-ACC/SELF-ACC
'she saw her sister/herself'

18 ______ Experiencer, Patient

In addition, when no higher ranking relation is present, Theme will be selected as morphological subject, as illustrated in (19) and (20) for motion and state predicates respectively.

19 этот пароход идиот в Европу
this train-NOM is going to Europe
'this train is going to Europe'

20 река замерзла
river-NOM has frozen
'the river has frozen'

In addition to this default pairing of thematic relations to morphological subject, a grammar of Russian will contain some other statements for acceptable linking of thematic relations to morphosyntactic structure. One of these will be a statement of the correspondence between active and passive morphosyntax. Following Kiparsky (1985), I will assume that passive morphology has the effect of delinking the highest ranking thematic relation associated with a given predicate, identified here as ACTOR. The default principles of linking thematic relations to morphological subject will consequently select the remaining eligible relation as identified in (14), i.e., the UNDERGOER. If no other eligible thematic relation is present, there will be no morphological subject; that is, the construction will be impersonal. This is the case in (5), where the sentence has no overt Agent or Theme, but where the thematic structure of the verb contains these relations and where the hierarchy in (15) would identify Agent as ACTOR and Theme as UNDERGOER. Thus, the fact that Russian doesn't have dative passives (where the Receiver of a ditransitive verb can be morphological subject) follows from the subject selection hierarchy in (15), since Receiver/Goal (as Locative) ranks below Theme for UNDERGOER status and cannot be selected as UNDERGOER in a thematic structure containing a Theme.

In the case of 'inversion' constructions, two types need to be distinguished: those where the Theme becomes morphological subject, as in (8), and those in which it does not, as in (6). In both types, the Animate Location will be lexically linked to a
dative NP. In the impersonal type like (6), the Theme will also
be lexically linked -- to accusative case --as in the partial lexi-
cal entry in (21). Since both arguments are lexically linked,
neither is a candidate for default morphological subject linking,
and the construction will be impersonal. The type with a morphe-
ological subject as in (6), will have a partial lexical entry like
(22), where only the Animate Location will be lexically linked to
a case, and the default morphological subject linking will sanc-
tion a linking of the Theme to nominative case.

21 Impersonal 'inversion' predicates
   Animate , Theme
   Location
   NP-DAT NP-ACC

22 'Inversion' predicates with morphological subject
   Animate , Theme
   Location
   NP-DAT

4. Reflexive Control

In any analysis of reflexive control, a potential antecedent
of a reflexive must be semantically and pragmatically compatible
with the reflexive. In the analysis given here, it must either
bear the highest thematic relation on the ACTOR hierarchy or be
morphological subject. The ACTOR will not be morphological sub-
ject when it is (i) lexically linked to another case or (ii) de-
linked by passive morphology. When morphological subject and
ACTOR do not coincide, the morphological subject takes precedence
for reflexive control. The precedence statement is given in (23).

23 Reflexive Control Precedence
   Morphological Subject > ACTOR

In sentences like (1), the morphological subject corresponds
to the ACTOR. In (2), ACTOR is unspecified, so no conflict occurs
and the morphological subject antecedes the reflexive. In a sen-
tence like (3), there is potential conflict between the morpholo-
gical subject and ACTOR, but kniga is ineligible/less likely as
antecedent because of its pragmatic incompatibility/less plausible
compatibility with the reflexive, and Boris thus antecedes the
reflexive. In (10), however, both Boris and Anna are plausible
antecedents for the reflexive, and Boris, as morphological subject,
is identified by Reflexive Control Precedence as the antecedent.
In sentences like (4) and (5), the dative NP bears the Receiver/Goal thematic relation which is neither ACTOR nor morphologi-
cal subject. Since neither of the controller conditions is met,
it cannot antecede a reflexive.

In 'inversion' constructions like (6), the dative NP bears
the highest thematic relation on the ACTOR hierarchy, Animate Lo-
cation, but is not morphological subject. It can antecede a re-
flexive in impersonal constructions because, in these, there is no competing morphological subject. On the other hand, in 'inversion' constructions like (8), the Theme is morphological subject via default linking, and thus it is the Theme rather than the Animate Location which can antecede a reflexive.

Some speakers apparently allow an interpretation where either ACTOR or morphological subject can control reflexivization in a sentence like (10), though the preferred interpretation is that the morphological subject is controller. This can presumably be accommodated in either of the analyses examined here by relaxing the final subject or morphological subject precedence from an absolute condition to a preference.

4. Comparison

The account of reflexive controllers in Russian in a monostatal model of grammatical relations is in fact quite similar to the account within a multistatal model. The monostatal account includes a level with a thematic relation hierarchy which is used for the default linking between thematic relations and morphosyntactic structure. Relational Grammar also includes such a level to link thematic relations to the initial stratum of grammatical relations in a relational network. Thus, while both analyses include two levels -- a level of thematic relations and a level of grammatical relations -- Relational Grammar also includes multiple strata within the level of grammatical relations. Both analyses include a two-part condition on the controller of reflexives in Russian. In the analysis consistent with a monostatal model of grammatical relations, the appeal is to a thematic relation hierarchy and to the notion 'morphological subject', while in the analysis presented within a multistatal model of grammatical relations the two parts of the condition refer to two strata of grammatical relations. Thus, the account presented here states the same condition as the multistatal account, without the extra assumption of multiple strata within the level of grammatical relations, but with the assumption that morphological form and thematic structure are simultaneously available for reference in stating such generalizations.

5. Possessive Predicates and Other Obliques

The monostatal account may in fact have an advantage over a multistatal account when some additional data are considered. The data are discussed in detail in Timberlake (1980). There, Timberlake examines the classes of oblique controllers of reflexives in Russian. In addition to the 'inversion' constructions with dative controllers, other non-nominative NPs can control reflexives. For example, the genitive Possessor NP of a possessive predication can control reflexives, as shown in (24) and (25).

24 u Ivanu byli den'gi s soboj (Chvany 1975:99)
   at I-GEN was money-NOM with SELF
   'Ivan had money with/on him'

25 u sem'i Goranskij byl v Zarubinkax svoj dom
   at family G-GEN was in Z SELF's house-NOM
   'the G. family had their house in Z. (Timberlake 1980)
In these structures, the Theme is morphological subject; it appears in nominative case and controls verb agreement.

Timberlake argues that a multistratal analysis of such sentences cannot plausibly include an inversion of initial subject to genitive, because this would violate the Oblique Law, which states that "a nominal that bears an oblique relation in a clause ... bears that relation in the initial stratum" (Perlmutter and Postal 1984:88). It would also be implausible to assume that the genitive NP is final subject with exceptional case marking, because the Theme has the morphological characteristics of a subject: nominative case and verb agreement control. These arguments are based on the strong assumption that case inflection defines final grammatical relations and that different inflections must encode different relations. Timberlake thus assumes that the Possessor prepositional phrase must be an oblique in a Relational Grammar analysis. However, it is not clear that it is a necessary assumption of that framework. Until there is something more explicit in Relational Grammar about the correlation of final grammatical relations and morphological coding, the extent to which these data are problematic remains unclear.

On the other hand, a monostratal account of these possessive constructions within the analysis presented here is straightforward. The Possessor of a possessive predicate is assumed to be an instance of Animate Location. It will be lexically linked, as it is in the dative 'inversion' constructions. In this case, it is linked to the locative prepositional phrase expressing 'location at'. A partial lexical entry for a possessive predicate is given in (26).

26 Lexical entry for possessive predicate

\[
\begin{array}{c}
\text{Animate} \\
\text{Theme} \\
\text{Location} \\
\text{u NP}
\end{array}
\]

Nothing more need be stipulated about the case of the linked Possessor NP, since the preposition u will be specified to govern genitive case. Nothing more need be stipulated about the case of the Theme, either, since the default linking will be to nominative case. In a sentence like (25), the reflexive is a possessive adjective in the morphological subject, so that the only candidate for antecedent is the genitive NP. Since it is ACTOR, it can antecede the reflexive. In (24), the genitive NP is still the only candidate for antecedent, because it is ACTOR and because the morphological subject den'gi is pragmatically ineligible.

Timberlake also gives a set of examples to show that a still wider range of oblique NPs can antecede reflexives, as shown in (27).
In sentences of this type, the Animate Location may be expressed with the preposition у and a genitive NP, with a dative NP, or with the preposition дlia and a genitive NP. Timberlake argues that a multistatal analysis of these as inversions would be forced to add a new inversion rule to correspond to each distinct morphosyntactic manifestation of the Animate Location, under the assumption that each represents a distinct oblique grammatical relation. In addition, some predicates, such as that in (27), would have to permit more than one type of inversion. (Again, the force of this argument depends on the correspondence between morphological form and grammatical relations which is assumed.) In the monostral analysis presented here, the linking would simply specify alternate morphosyntactic realizations of the Animate Location in such a case, as in (28), so that for predicates which allow alternate morphology, the lexical linking will give the alternate forms.

(28) ... Animate Location ...
{NP-DAT, u NP, дlia NP}

5. Concluding Remarks
If one views the surface morphology of reflexive controllers in Russian, the range is very wide. The analysis suggested here, however, specifies a small range of controllers -- ACTOR and morphological subject -- which in fact often coincide. The surface variation is attributed to the linking of thematic relations with the morphosyntax. Where Russian seems to differ from other languages in allowing a surprising variety of controllers, the variability is here attributed to the range of cases which can be linked to ACTOR, and the small range of roles than can be linked to morphological subject. The controllers both have a kind of salience: inherent salience, or natural viewpoint, as represented by the thematic relations hierarchy, and grammatical salience, or grammatical viewpoint, as represented by the morphological subject. It seems reasonable that if one type of viewpoint should take precedence over the other, it should be the grammatical one, since this represents an actual choice made by a speaker in discourse.

It seems, then, that an account along the lines presented here, compatible with a monostral model of grammatical relations, can make a generalization about reflexive control similar in effect to that of a multistatal account but without appeal to strata of grammatical relations, and that the monstral account can accommodate quite readily a fuller range of data concerning reflexive controllers which may be problematic to the multistatal account. While I think that the monstral account
given here does meet the challenge set by proponents of the multistratal account, this is only one of several examples in the Relational Grammar literature that has been claimed to provide evidence for a multistratal model of grammatical relations, so that this account cannot in itself invalidate the Relational Grammar hypothesis that more than one level of grammatical relations is necessary to account for the morphosyntactic patterns of natural language. It is important to emphasize that both models include multiple levels, and it is the fact that a monostratal model of grammatical relations can still assume more than one level -- a thematic level and a grammatical level -- which allows it to capture multilevel generalizations without the further assumption of strata within levels, if it is further assumed that to make such generalizations, information of various types is simultaneously available, specifically, information regarding both natural viewpoint and grammatical viewpoint.

Notes
* I am very grateful to Steven Lapointe and Gerald Sanders for their comments on an earlier presentation of this paper, to Robert Van Valin, Jr. for his comments on thematic relation hierarchies, to Vladimir Attekær for sharing his intuitions on Russian data with me, and to Cindy Mercer for her help with points of grammar and transliteration.

1 Controllers are not required to precede reflexives in Russian, as shown in Perlmutter (1982), so that order is not relevant to identifying controllers.

2 All examples not directly verified by a native speaker of Russian are given with their sources in the literature.

3 I will distinguish 'levels' which contain different types of information/entities (e.g. thematic relations vs. grammatical relations) from strata, which contain the same type of information/entities (initial subject vs. final subject). This terminology has been adopted to conform with the usage of these terms in Ladusaw (1985).

4 Stoney (1985) points out that this characterization is still very restricted, as there is no evidence that more than two strata of grammatical relations are needed to account for all of the facts. This follows in Relational Grammar from the 1-Advancement Exclusiveness Law, which prohibits more than one promotion to subject.

5 I am grateful to Zygmunt Frajzyngier and Johanna Nichols for raising questions leading to this example.

6 This is a necessary but not sufficient condition on verb agreement control, which involves other variables such as linear order and animacy (Corbett (1983)).

7 This precedence is the universal precedence given in Foley and Van Valin (1984) for 'pivot'. Whether morphological subject as used here should be equated with their use of 'pivot' is unclear.
8 This does not mean that Receiver/Goal can never be morphological subject in Russian. It can be, in cases where it is the highest relation for ACTOR selection, as with goal-oriented verbs like receive.

9 For a more complete account of subject selection in Russian, the animacy of ACTOR and UNDERGOER would have to be considered. This is because an animate UNDERGOER takes precedence over an inanimate ACTOR (e.g. Instrument or Force) (Borras and Christian (1959)).

10 Even if it is accepted that the linking between thematic relations and initial grammatical relations is not totally predictable (Rosen (1984)), they are sufficiently so to justify a default principle of the type given in (14) and a hierarchy of the type given in (15).

11 This analysis makes a clear prediction for a sentence like (24) in a case where an animate is Theme. In such a case, the Theme, as morphological subject, should control the reflexive.

I have yet to test a satisfactory example of this type. I am grateful to Jeff Harlig for pointing this implication out to me.

12 Timberlake (1980) also suggests a monostratal analysis of Russian reflexive control and claims that 'prominence' on one of a number of 'axes' identifies controllers. Here, two axes are assumed, thematic and grammatical, and the thematic relations hierarchy incorporates a number of the axes that Timberlake considers.

References


INTRODUCTION. The seed of this paper was planted when I was in fourth grade. My friend Carol was reading aloud her description of a class trip. I recall being both fascinated and slightly amused by Carol's composition. I was fascinated by the familiarity of some of her phrases and constructions, but I kept wanting to giggle because they also sounded oddly stilted. One phrase that stuck in my mind will suggest the type of phrasing I have in mind: She ended her composition with, "A good time was had by all."

This seed began to sprout when I heard Sandy Thompson's excellent paper, "Subordination in Formal and Informal Discourse" at the 1984 Georgetown University Round Table on Languages and Linguistics. Thompson (1984) follows Chafe (1982, 1984) in distinguishing between formal and informal varieties of spoken and written discourse. She analyzes three discourse types: formal written, informal written, and informal spoken.

For informal written discourse, Thompson used "letters to the editor, personal letters, and chatty pieces about people in a radio program guide" (p. 88). The sample of informal written discourse which she presents is from a personal letter written to her by Cousin Margaret. I will reproduce this excerpt here in numbered units as Thompson segments it (p. 90).

1. Your kind invitation to come and enjoy cooler climes is so tempting
2. but I have been waiting to learn the outcome of medical diagnosis
3. and the next 3 months will be spent having the main thumb joints replaced with plastic ones.
4. Thumbs began to be troublesome about 4 months ago
5. and I made an appointment with the best hand surgeon in the Valley
6. to see if my working activities were the problem.
7. Using thumbs is not the problem
8. but heredity is
9. and the end result is no use of thumbs
10. if I don't do something now.
11. I have heard Mother talk about the family
arthritis
12. but one never expects to be included.
13. Writing has almost become impossible
14. so we had the typewriter serviced
15. and I may learn to type decently after all these years.

This writing, it seemed to me, is not exactly informal, although it certainly is not exactly formal either — not in the same way as Thompson’s formal written sample: a memo from the Chancellor’s office at UCLA. What Cousin Margaret had written, I felt, was neither formal nor informal but an informal idea of formal writing — a kind of folk formality. (When I introduced this term at a meeting of the American Anthropological Association, I was asked what I intended the term "folk" to constrast with. The answer is, with professional writers and contexts. In other words, it is "everyday" or "private" formality.)

In order to demonstrate that Cousin Margaret’s letter is relatively formal, I rewrote it in a less formal register, in lines corresponding to those of the original.

1. It’s kind of you to invite me to visit you and enjoy cooler weather and I’m tempted to accept
2. but I’ve been waiting to learn the results of some medical tests I’ve taken
3. and I have to spend the next 3 months having my main thumb joints replaced with plastic ones.
4. I started having trouble with my thumbs about 4 months ago
5. and I made an appointment with the best hand surgeon in the Valley
6. to see if the problem was anything I was doing.
7. It turned out that there’s no problem with the way I use my thumbs.
8. It’s just heredity
9. and the upshot is that I won’t be able to use my thumbs at all
10. if I don’t do something now.
11. I’ve heard Mother talk about the family arthritis
12. but I never thought it would happen to me.
13. It’s almost impossible for me to write
14. so we had the typewriter fixed
15. and I may learn to type decently after all these years.

Even this, however, is relatively formal as
language goes: It is monologic; it is written in complete sentences; and the diction, though not elevated, is not slang either. To illustrate written discourse that is still less formal, I will present an example that I have discussed elsewhere (Tannen in press): notes written by a teenage girl to her friend.

(1) a. High! What's up? I'm kool! I'm cranking in science with Norm N. & Nate Noster. Party train up the butt!

b. You would look so good /w the one and only Tom Baxter! So go for it! He loves you yeah yeah yeah!

c. [about a friend who got into trouble with a teacher] Karen is dead. Shams! DIES! Dead meat all over the street!

I am suggesting, then, that, as Thompson shows for subordination, formality is not a monolithic dimension. Folk formality is somewhere on a continuum between very formal and very informal.

OVERVIEW. This paper identifies some of the linguistic forms that characterize folk formality. I begin by examining Cousin Margaret's letter and then cite some markers of folk formality found in other samples of discourse I have examined: a family association newsletter, letters to the editor and My Turn columns in Newsweek, personal letters written by older correspondents, Christmas letters, and fundraising letters. I then illustrate a related phenomenon, folk eloquence. Finally, I place my analysis in the framework of Becker's (1984) notion of linguistic competence as knowledge of prior text. Before proceeding, however, I will comment briefly on how the term "formality" and related concepts have been used by others, and how I am using them.

NORMATIVE PRESSURE. Kazazis (1968) describes the way an Athenian high-school graduate whom he calls Socrates spoke to him:

For about five minutes, Socrates' intonation was all wrong. His tempo was slower than usual. His choice of words betrayed a strong preoccupation with sounding educated and with impressing me: he would select katharevusa words, or at least words generally used in elevated styles of dhimotiki .... In other words, Socrates was speaking his Sunday Greek.
Kazazis notes that Socrates’ Sunday Greek was characterized by lexical, syntactic, morphological, and phonological affectations. In the case of Greek, such forms can be seen to derive from an identifiable High register, katharevusa ("puristic"), as described by Ferguson (1959) in his classic paper, "Diglossia."

Kazazis suggests that Socrates put on his Sunday Greek because he felt under "normative pressure" in conversation with an interlocutor he perceived as superior in status. (Perhaps the fact that he was speaking to a language expert was significant as well.) Although English is not characterized by as clearly distinguishable High and Low registers as Greek, nonetheless there are situations in which English speakers feel under normative pressure; that is, they feel they should speak "good English," just as one puts on one’s "good clothes" for certain situations. And "good English" seems often to be perceived as formal English.

The language thus produced may be entirely appropriate. Cousin Margaret’s letter, for example, would not make anyone squirm; it is clearly a well-written letter. Indeed, Kazazis’ description of Socrates’ Sunday Greek, quoted above, is not critical, except for the observation, "For about five minutes, Socrates’ intonation was all wrong." But one who is not in complete control of the more formal register, like my fourth grade friend Carol, may produce discourse that sounds a little odd. And, of course, individuals differ in expectations about how much and what type of formality is appropriate in any given context.

Labov (1982) also observes the influence of normative pressure in his characterization of the language of a "formal" sociolinguistic interview: "Generally speaking, an interview which has as its professed object the language of the speaker, will rate higher on the scale of formality than most conversation" (p. 61). Awareness of attention to language makes the language produced in the interview more formal.

Irvine (1984) is concerned with "Formality and Informality in Communicative Events." Surveying how sociolinguists, ethnographers of communication, and others have used the term, she distinguishes four aspects of formality: (1) increased code structuring, (2) code consistency, (3) invoking positional identities, and (4) emergence of a central situational focus. She observes that the first aspect, code structuring, is independent of the other
three. It is this aspect of formality that is my concern (although I would prefer, following Becker [1985], to resist the metaphor of language as a code). In other words, I am considering formality to be a conventionalized set of linguistic choices reflecting and constituting register.

FORMALITY AS REGISTER. Ferguson (1985) defines register as "variation conditioned by use." He notes at least three sources of simplification: 1) space-time economy (as in newspaper headlines); 2) addressee incompetence (as in baby talk and foreigner talk); and 3) social distancing, as in the "mother-in-law talk" found in some Australian languages, in which reduced forms are used to show respect.

The relatively formal register I have described is the flip side of this process; in a sense, it is complexification, to use a term coined by Heath (1981). In contexts in which it seems appropriate to sound more formal, complexification is one way to accomplish formality.

CHARACTERISTICS OF FOLK FORMALITY. Which of Cousin Margaret’s linguistic choices made her letter sound more formal than the alternative I composed? Markers of formality in her letter include lexical choice, nominalization, article deletion or definite article substitution, use of the impersonal pronoun "one," and formulaic expressions associated with letters of this type. Examples follow.

LEXICAL CHOICE. Cousin Margaret chose words and phrases that sound formal or literary and would not typically be used in conversation:

(2) a. line 1: cooler climes
   b. line 2: outcome (instead of "results")
   c. line 9: the end result (instead of a colloquial expression like "the upshot" or the more current "the bottom line")
   d. line 14: serviced (instead of "fixed")

NOMINALIZATION. Closely related to lexical choice is the nominalization of items that would be expressed by verbs or verb phrases in informal register:

(3) a. line 7: Using thumbs is not the problem (instead of "the way I use my thumbs")
   b. line 9: and the end result is no use of thumbs (instead of "I won’t be able to use my thumbs")
Another example of nominalization was written by my aunt who referred, in a letter, to someone’s "dedicated commitment toward societal betterment." (The adjectival "societal" is also marked, but that is a different matter.)

ARTICLE DELETION. The behavior of articles is also closely related to both lexical choice and nominalization. Examples from the letter include:

(4) a. line 2: the outcome of medical diagnosis (instead of "a medical diagnosis" or "the results of medical tests")
b. line 4: Thumbs began to be troublesome (instead of "my thumbs")
c. line 7: Using thumbs is not the problem (instead of "my use of thumbs" or "using my thumbs")
d. line 9: and the end result is no use of thumbs (instead of "use of my thumbs" or "my use of thumbs")

DEFINITE ARTICLE SUBSTITUTION. Not only are some articles deleted, but a definite article appears where a less formal register would have a possessive pronoun:

(5) line 3: the main thumb joints (instead of "my main thumb joints")

ONE-CONSTRUCTION. The third person impersonal pronoun is used where the sense refers to Cousin Margaret herself:

(6) line 12: but one never expects to be included (instead of "I never expected to be included"; or the colloquial general, "you never think it will happen to you; or the more personal, less formal formulaic "I never thought it would happen to me")

FORMULAIC EXPRESSIONS. "Your kind invitation," the letter’s opener, is a standard way to refer to an invitation; the inclusion of "kind" is therefore formulaic. ("A good time was had by all" is a formulaic closer.)

DEPERSONALIZATION. Most of the elements discussed above have the effect of making the discourse less personal. (This is reminiscent of Chafe’s [1982]
finding that writing is characterized by "detachment." Clearly, more formal styles of writing are more detached.)

(7) a. line 3: and the next 3 months will be spent having the main thumb joints replaced with plastic ones (instead of "I will spend the next 3 months having my thumb joints replaced")

b. line 4: Thumbs began to be troublesome about 4 months ago (instead of "I began to have trouble with my thumbs about 4 months ago")

Cousin Margaret’s syntax casts months and thumbs in subject position, rather than Cousin Margaret ("I"). As Leanne Hinton observed in discussion following this presentation, the medical topic of this letter may have occasioned the depersonalized stance. Nonetheless, the effect of the strategy of depersonalization is to make the discourse sound more formal. It seems that the formal and the personal are perceived to be incongruent by many Americans.

FORMAL FORMULAS. Some common forms of folk formality are not found in Cousin Margaret’s letter. For example, phrases which appear in samples of Newsweek’s Letters to the Editor and My Turn columns (typically written by nonprofessional writers) include: "I for one," "How, pray tell, " "I certainly hope," "I can only hope," and "I take exception." The formulaicity of the latter phrase is indicated by the following two letters which appear in the same issue of Newsweek:

(8) a. I read the article on Bill Cosby with much delight. He has always been one of my favorite comedians.... However, I take exception to the psychiatrist’s advice to him about some scenes in this season’s opening show.

b. Thank you for the article on my favorite comedian, Bill Cosby. I take exception, though, to the people who criticize the program because the Huxtables’ life-style isn’t typical of black families.

Not only the phrase "I take exception" but the opening reference to Cosby as the writer’s favorite comedian is similar in the two letters, suggesting a conventionalized discourse pattern. The repetition of these phrases in adjacent letters signals their formulaicity. Often the
repetition of a word or construction within a single discourse heightens its markedness. For example, note the following statement written by a photographer to accompany an exhibit of his photographs:

(9) To clearly express an idea, be it with words, watercolors, or film, I have found it best to immerse myself in the subject's natural setting, become as inconspicuous as possible, find out what there is to say, eliminate the distractions, then say it -- simple and to the point.

With the camera I see and express things most clearly -- be it an object, a person, a moment, a mood.

The construction "be it" is a folk-formal form, and its repetition reinforces the impression that it is formulaic.

Sometimes grammatical incorrectness is a clue that folk formality is afoot. For example, the second instance of "be it" in (9) violates number agreement: "With the camera I see and express things most clearly -- be it an object, a person, a moment, a mood." If "it" (singular) refers cataphorically to "an object, a person, a moment, a mood," then it cannot agree with the anaphoric referent, "things" (plural). Strictly, the author should have written, "be they objects, people, moments, moods." The lack of grammatical agreement attests that the construction "be it" is formulaic -- found ready made and slipped in rather than spontaneously generated.

Similarly, in (8), the writer of (a) who took exception to the psychiatrist's advice was grammatically correct, but the writer of (b) who took exception "to the people who criticize" was not. Exception is taken to utterances ("I take exception to your point"), not speakers ("I take exception to you").

Another folk-formal formula is found in (10), the fourth and fifth paragraphs of a fundraising letter, telling how the soliciting organization helped a deaf and blind man.

(10) Several months ago Gus' Tellatouch machine broke beyond repair. He applied to a government program for a new one but there was no funding for that purpose. Other agencies told him that they would try to help but none did. Gus remained very much alone. The Jewish Braille Institute learned of his plight and responded promptly through the
generosity of caring friends. Gus now has a Tellatouch machine and has literally "reentered the world." We also found that his braille writer and braille watch, which were old when he was given them several years ago, were broken beyond repair. Through the same caring friends the JBI replaced both of these essential aids with new ones in good working order.

The repeated expression "broke(n) beyond repair" is formal in its nominalization (in contrast with "it couldn’t be fixed") and the register associated with the word "beyond."

QUOTATION MARKS. Another feature of folk formality seen in this letter is the use of quotation marks to set off an expression ("reentered the world") that is metaphoric but conventionalized (as contrasted with the standard use of quotation marks to set off cited forms or terms from which writers wish to distance themselves). This feature is particularly frequent in my sample family association newsletters, as seen in (11).

(11) a. Our "Founding Members" laid the valid basis on which this family organization is based.
b. Once again I ask you to send me items of news we are all interested & "concerned".
c. In these troubled times of international threats & alienation we turn to old ties & old traditions of the family for a deeper sense of security and "togetherness".
d. I have about twenty-five copies which I will distribute to our members. A real "treat" for you.

Quotation marks are here used not for citation or otherwise disclaiming responsibility but for emphasis and to mark words that seem stylized. (See Lakoff 1982 for discussion of diachronic and synchronic variation in use of quotation marks in speaking and writing.)

CAPITALIZATION. In the first of the preceding examples, "Founding Members" is not only enclosed in quotes but also capitalized. Capitalization is another feature of folk formality. In the following letter from San Francisco Mayor Dianne Feinstein to the San Francisco Ballet Company (as reproduced in a Kennedy Center program), one may argue that "Company" is short for the company’s name, but there is no
grammatical justification for capitalizing City and Congratulations (except that they start with C!?) -- but then why not "our nation's Capital"?)

(12) Dear Ballet Members:

I am very pleased to learn that the Company has accepted an invitation to perform in our nation's capital at the Kennedy Center -- where you open for performances on May 14.

All San Franciscans join me in expressing our City's heartfelt Congratulations on this exciting achievement. It demonstrates, once again, how highly regarded the Company is and it presents a marvelous opportunity to share the grace, the skills and magic of ballet with audiences that recognize great talent when they see it.

(13) shows the first and fourth paragraphs of an ad letter inviting the recipient to join a singles organization. 24% of the words in this letter are capitalized, excluding sentence beginnings.

(13) "The Personal Connection" Invites you to join with A Special Group of Singles who have discovered the satisfaction of meeting new and interesting people through the medium of Personal Advertising. Personal Ads are the new and effective alternative for discerning individuals to meet the best among us.

To insure that our early Advertisers receive the Quality Response they Deserve our initial mailing will reach approximately 8,000 Carefully Selected Eligible Men and Women.

The accretion of capital letters at the end, crescendo-like, suggests that capitalization is being used to intensify impact.

(14), the opening paragraphs of a fundraising letter from People for the American Way, contains numerous examples of folk formality.

(14) Dear Friend,

It's an old lesson we learned -- about how every American is entitled to their Day in court. Whether the issue is a traffic ticket or freedom of speech, we were taught to trust that whoever sits behind the bench is fair, impartial, and listens to all the facts before making a decision.

After all, in America judges don't pre-judge and they certainly don't pre-swear their loyalty to
any one ideology or individual -- or do they? You might be surprised at the answer. Because a few very powerful people appear to be on the verge of achieving just that -- a purified, loyal, "right-thinking" judiciary.

Quotation marks surrounding "day in court" and "one"; the word "certainly"; and the use of "just that" in the absence of an anaphoric referent for "that," all suggest folk formality. (In contrast, the quotation marks around "right-thinking" aptly identify a pun: Those purporting to be "right-thinking" really aren’t, except insofar as they are thinking on the political right.)

FOLK FORMALITY IN CREATIVE WRITING. A subtype of folk formality is associated with creative writing -- fiction and poetry -- that would be judged ineffective by professional writers. A complete taxonomy of forms characterizing ineffective creative writing would constitute another paper, but a few may be mentioned.

FOLK ELOQUENCE. When asked to write a story she had told in conversation, a woman began and ended with a story-like frame. In conversation she had simply launched the story, its coherence supplied by the preceding topic of talk. In writing, however, she felt it appropriate to set a frame in which the story would fit. (Writing typically requires such frame-setting, as discussed in Tannen 1984). Some of the constructions she used in introducing her written narrative seemed to represent a nonprofessional writer’s idea of eloquent writing:

(15) I tell the story to share a truth I am no longer able to deny -- death can and does touch every one of us.

"To share" is a construction that might as easily have been spoken, but "To share a truth" seems more lofty in tone. In addition, "no longer," "able," "can and does," and "everyone of us" all establish a literary-like register.

Another marker of folk eloquence is standardly poetic forms:

(16) Time brings its burden of joy and of sorrow Yet Time comes with healing and hope for the morrow.

As the sun blinks down
This lovely morn
Spirits run free.

Using "morrow" for "tomorrow" and "morn" for "morning" gives these verses an automatic stamp, "poetic" (just as the capitalization of "Time" lends it importance).

The following poem is folk eloquent in a number of ways.

(16) Winter colors
    clear in the frozen
    landscape.

    Northcountry scenes
    strangely settled in
    on this peaceful citadel
    surrounded by a city of hurry
    and erstwhile depression.

In addition to the poetic-sounding words "citadel" and "erstwhile", this poem is marked by vague rather than particular images: "landscape," "scenes," "depression".

In a review of May Sarton's *The Magnificent Spinster* in *The New York Times Book Review*, Josephine Humphreys criticizes Sarton's use of standardly poetic and vague words instead of novel or ordinary words and precise details:

But Jane isn't shown with the sort of detail that enlivens. Cam thought that in writing a novel she would be free from the struggle with detail. But a novel should be one long struggle with detail, not of dates and facts but of difficult scenes, of character caught off guard. Words like "passionate" and "glamorous" are the opposite of detail. They become in a novel almost useless, the vocabulary of eulogy.

LINGUISTIC COMPETENCE AS MEMORY OF PRIOR TEXT. What are the sources and effects of using registers such as those described here? After noting some of the functions of simplified registers, Ferguson (1985) observes that "features of register ... may become conventionalized to the extent that they serve only as register markers without other communicative function." As he puts it, simplification may simply be "register-making." I will conclude by building on this notion of register for register's sake.

Speakers use a register they perceive as
appropriate to the context in order to sound right. Simultaneously, their choice of register is part of what creates the context. This view contributes to an aesthetics of discourse such as Becker (1984) described in this forum two years ago. The coherence of style (or, in the terms of Ervin-Tripp 1972, co-occurrence constraints) that characterizes a given register and links it to a given context simultaneously provides cultural coherence. Becker further proposes, "The actual a priori of any language event -- the real deep structure -- is an accumulation of remembered prior texts, acquired from particular sources. ... And our real language competence is access, via memory, to this accumulation of prior text" (p. 435). Thus, someone writing a letter to the editor wants the letter to sound like a letter to the editor. Consequently, when composing such a letter, s/he refers to letters to the editor s/he has read in print. The editors who decide whether to print this letter refer to their notions of what one should sound and look like. And if it is printed, this letter then serves as a model for those who will write future ones.

SUMMARY AND CONCLUSION. Folk formality is a discourse style which sits at the intersection of public and private discourse. An informal notion of formality, it is found in such discourse types as business letters written by private individuals who do not often write business letters, personal letters written by some (typically older) correspondents, letters to editors, newsletters and minutes of meetings produced by nonprofessional writers, Christmas letters, and many other contexts in which their non-work lives lead people to write in a genre they perceive as formal.

Preliminary findings indicate that folk notions of formality focus mainly on the lexical and intra-clause level. As Thompson (1984) found in letters to the editor and letters from a cousin, syntactic complexity in inter-clause relationships is not typically found. Markers of formality discussed above include lexical choice, nominalization, article deletion, definite article substitution, the impersonal "one" as pronoun, other forms of depersonalization, formal formulas, and quotation marks and capitalization. A related phenomenon I discussed briefly is folk eloquence: a register associated with less than effective creative writing.

Like Kazazis' Sunday Greek, folk formality is a
discourse style decked out in its Sunday best. For many writers, like Thompson’s Cousin Margaret, the results are duly impressive. Others may end up appearing like the unfortunate Dr. Aziz in E. M. Forster’s A Passage to India, with a starched collar sticking awkwardly out (very likely for equally admirable reasons).

The notions of folk formality and folk eloquence suggest that formality is relative, not monolithic. Considering these dimensions in light of the theoretical perspectives of Ferguson and Becker suggests that understanding such registers can contribute to new insight into linguistic competence.

ACKNOWLEDGMENTS

I am grateful to Deborah and Michelle Lange for Example (1) and to Debbie Glover for (15). Bambi Schieffelin and Kit Woolard offered helpful comments following my talk on folk formality at the 1985 annual meeting of the American Anthropological Association, Washington DC.

REFERENCES


The Development of the Indirect Passive in English

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This paper concerns the historical development in English of so-called "indirect passive" sentences such as 'He was given the book' wherein the indirect object (IO) of a corresponding active sentence also containing a direct object (DO) (e.g. 'Someone gave the book to him') becomes the grammatical subject of the related passive sentence. The traditional explanation for the appearance of such passives is: reanalysis under formal identity. That is, various non-accusative objects in Old English merged into the grammatical category of DO and therefore within the domain of the passive operation.

Of theoretical import are the claims of Lightfoot (1981), Lieber (1979) and Cole et al. (1980). Lightfoot's analysis is based on a theory of grammar in which (1) Nominative and Objective cases are assigned at surface structure, (2) Oblique case is base-assigned, and (3) the "movement of a N to another N position will take place only from a non-case-marked position (p.103). In conjunction with this theory he argues that the transformationally derived passive (Move N) has been present for all stages of English grammar and that base-assigned Oblique case was lost during the period of Middle English, making the indirect passive a 15th century innovation. Lieber argues that neither the IO nor DO is assigned Oblique in the base. Rather, the DO is assigned accusative at the surface level and the IO (in contrast to other Old English non-accusative objects) is not a lexically governed dative IO but a regular dative IO and receives its (dative) case assignment at surface structure as does the DO. Thus both the IO and DO of verbs like 'give' are converted to nominative subjects in corresponding personal passives. Lieber's analysis, then, predicts that direct and indirect passives existed in Old English. Both Lieber and Lightfoot assume, moreover, an isomorphic relationship between morphological and base-assigned cases and conceive of grammatical relations as discrete morpho-syntactic entities.

Others, however, have conceived of grammatical relations as sets of properties and have investigated diachronic change in terms of the redistribution of these properties across NPs.¹ The major work in this area is that of Cole et al., in which three stages are proposed for the acquisition of subject properties by a non-subject: (A) a period when a NP has none, (B) a subsequent period when the NP acquires subject behavior properties followed by (C) the period of acquiring subject coding properties. It is argued in Cole that stage C never precedes stage B. The data from early English do not fully support the Cole et al. hypothesis.

The view in this paper is that grammatical relations are not discrete morpho-syntactic entities but rather are constituted by the interaction and integration of semantic and discourse-pragmatic factors defined in terms of continua rather than roles.²
Constructions of the type in (1) are well-attested in Old English.

(1) \(SU + V_t + IO + DO\), where IO = NPdat; DO = NP or S

Sentence (2), taken from Visser (p.622) is but one illustration

(2) he gedaelde seofon hlafas feower busendum
    DO  IO
    'He distributed seven loaves to four thousand.'

where we see the IO is a NP with the dative -um suffixed to the noun. When active sentences such as (2) appeared in the passive, their DOs converted to the passive subject (SU) and the verbs underwent the attendant changes. The normal word order for regular passives is seen in (3) (from Gaaf (1929:59)):

(3) bis scheld is igiuen us agean all temptaciouns.
    SU(DO)  aux  PP  IO
    'This shield is given to us against all temptations.'

where 'this shield' is the grammatical subject of the passive sentence and corresponds to the DO in an active counterpart. It is singular and clearly controls verb agreement with the auxiliary. The plural IO us follows the passive verb. However, in many OE regular passive sentences an alternate word order prevailed. The IO appeared in sentence- or clause-initial position and the passive SU appeared after the verb or between the aux and past participle (PP). From Visser (p.2142-3) we see the SU between aux and PP:

(4) Us ys cild acenned, and us ys sunu forgifen.
    IO  aux  SU  PP  IO  aux  SU  PP
    'A child is born to us and to us a son is given.'

Even though the IO is fronted in the above example and appears before the aux, it is not the SU of the passive sentence. As (4) clearly shows, the singular NPs cild and sunu, the SU in each clause, agrees with the singular form of the aux in each. Gaaf (p.60) provides several examples of passives with fronted IOs and post-verbal SUs as below:

(5) us is alefed edhwyrf to paem ecean life.
    IO  aux  PP  SU
    'To us is granted a change to the everlasting life.'

Examples (4) and (5) in OE and many others like them in Middle English (ME) illustrate an alternate word order to the normal passive construction. Such 'variants' have the advantage of topological an inherently highly animate and definite NP, the IO, and thus correspond to the 'preferred direction of information' in a clause. 3

This tendency to adhere to a flow of information from high to low animacy and definiteness can be seen in other ME data -- in relative clauses in which the passive SU is the relative pronoun (R-SU) as
in (6): 4

(6) c.1200 ic wende wel bat be saege sod weoren bat me wes to niht
    R-SU IO aux
    \underline{itald.}
    PP
'I believed fully that the sayings were true that to
me was recounted tonight.'

So far, the data presented do not illustrate the indirect passive. Rather they have been adduced to show that for active ditransitive sentences there existed in OE and early ME regular passives that conformed not only to the morpho-syntactic requirements of canonical passive (i.e. the active DO is the passive nominative SU), but to the pragmatic prototype of information flow. Placing the IO in clause-initial position meets the pragmatic requirement while leaving undisturbed the grammatical properties of the passive clause. To further support the hypothesis that the position of the IO in passive clauses reflects a preference for fronting the highly animate/definite NP, an example from another construction type, relative clauses, was presented to show that pre-verbal position for IOs persisted at a time when SVO order was becoming the norm.

We now come to the point for presenting evidence that fronted IOs in regular passives became reanalyzed as the grammatical SUs of these passives such that the animate, definite NP intersects with the property of given information and grammatical SU properties. It will be argued that the motivation for reanalysis is not formal identity and that there is no evidence that the process began with full NPs and generalized to pronouns. Rather, it will be claimed the motivation for the development in English of the indirect passive is a universal tendency for clauses to adhere to the pragmatic prototype of information flow.

The examples below are the kind usually adduced to demonstrate that when the fronted IO in a passive sentence is a full NP, it is ambiguous for case and thus susceptible for reanalysis as SU. From Gaaf (p.61) we see:

(7) Thus was the tre bodun wronge For the braunchc that of hym
    aux IO/SU PP SU/DO
    spronge.
'Thus was the tree proclaimed wrong because of the branch
that jumped out at him.'

(8) The marchand was peyd xxxti pownde fyne.
    IO/SU aux PP SU/DO
'The merchant was paid a thirty pound fine.'

(9) no creature in erth is grauntyd more mercy i-wys.
    IO/SU aux PP SU/DO
'No creature on earth is granted more mercy certainly.'

(10) Mynstrals were gyffen gyftis fre.
    IO/SU aux PP DO/SU
'Minstrels were given gifts free.'
In (7) the NP 'the tree' appears between the aux and the PP. If we translate the sentence according to the pattern that places the IO before the SU it reads 'Thus to the tree was proclaimed a wrong because of the branch that sprang out at him.' Since the aux is singular and the NPs 'tree' and 'wrong' are also, we cannot rely on verb agreement to discriminate the above reading from 'Thus the tree was proclaimed wrong....' Example (8) is ambiguous in the same way having the two possible interpretations: 'A 30 pound fine was paid to the merchant' and 'The merchant was paid a 30 pound fine.' Sentence (9) may be read as 'No creature on earth is granted more mercy certainly' or 'More mercy is granted to no creature....' In (10) we have either 'Gifts were given to minstrels free' or 'Minstrels were given gifts free.' In each sentence verb agreement does not serve to specify the SU since both NPs have the same number. Therefore, other evidence must be found to indicate which NP is SU. Such evidence exists in the sentences below.

(11) c.1300 The Duke Mylon was gever hys lyff. And fleygh out of land with hys wyff. 'The Duke Mylon was given his life and flew out of the land with his wife.'

(12) 1303 Swyche a man bat bus ys shr Yue, May be assoyled, and penance gyue. 'Such a man that thus is confessed may be absolved and given penance.'

(13) a.1349 I fand Thesus bowndene, scourgede, gyffene gall to drynke, Nayled to be Crosse. hyngand in be Crosse and dyead in be Crosse. 'I found Jesus bound, scourged, given gall to drink, nailed to the cross, hanged on the cross and dying on the cross.'

(14) c.1380 Adam made was of be clay And gyuen gost & lif also. 'Adam was made of clay and given breath & life also.'

The first clause in (11) may be ambiguously read as 'To the Duke Mylon was given his life' with 'life' as SU and 'Mylon' as IO or as 'The Duke Mylon was given his life' with 'life' as DO of 'give' and 'Mylon' as SU. Since both NPs are singular, as is the aux. the criterion of verb agreement fails to determine the SU of the clause. However, the clause is conjoined to the non-passive finite verb 'flew,' the SU of which is 'Mylon' indicating that 'Mylon' in the first clause is SU. We can say then that the IO of 'give' has acquired in (11) the SU syntactic property of Conjunction Reduction (CR) which triggers the deletion of a co-referential SU in a conjoined clause. Therefore, (11) represents a clear case of an indirect passive at the beginning of the 14th century.
Similar analyses for (12)-(14) indicate that the IO of 'give' is the grammatical SU of each sentence. In (12) the passive SU 'man' of 'is shrunen' triggers deletion of the SUs in the conjoined verb phrases 'be absolved' and 'is penance given' indicating that 'man' is SU and not IO of the verb phrase with 'give.' The DO 'Jesus' of the matrix verb in (14) is the derived SU of all participial phrases following it, 'bound,' 'scourged,' 'given gall,' etc., again indicating that the derived SU of 'give' is the IO 'Jesus' and not 'gall.' CR in (14) shows that the SU of 'give' is 'Adam' rather than 'breath and life.' Thus all of these 14th century sentences are unambiguous examples of the indirect passive.

In (11)-(14) it has been demonstrated that an ambiguously marked IO of a di-transitive verb was reanalyzed as a passive SU on the basis of its having acquired the syntactic SU property of CR. This observation suggests that reanalysis begins with the acquisition of SU syntactic properties by a non-pronominal NP for which the verb-agreement test fails to apply. Indeed this is the hypothesis of Cole et al. It is an intuitively attractive account: full NPs in ambiguous morphological environments are conjoined with another structure that forces assignment of a subject property of the ambiguous NP. Presumably, once speakers get used to the idea of a non-SU behaving like one in certain environments, it is a short step until coding properties are also assigned, eventually in all environments, thereby eliminating all prior traces of the non-SU function of the NP; thus the non-SU NP becomes fully reanalyzed as SU and has all SU properties in all environments.

The Cole hypothesis is based strictly on morpho-syntactic properties of SUs and excludes initial position on the basis that it is a topic, rather than SU, property. Leaving word order facts aside, then, we should look for historical evidence that confirms or rejects the hypothesis that non-SU NPs acquire syntactic properties prior to coding properties. In other words, if the hypothesis is correct, we should expect to find in the language evidence like (11)-(14) above historically prior to sentences like 'He was given a book' and 'They were shown the treasure,' where prior IOs give evidence of possessing only SU coding properties but not SU syntactic properties. If the hypothesis is incorrect, i.e. if coding properties are acquired before syntactic properties, we should expect to find sentences like 'He was given a book' and 'They were shown the treasure' prior to sentences like (11)-(14) or sentences like 'They were given the soap and washed themselves before eating the meal,' in which the prior IO, now nominative, triggers CR and Reflexivation, both syntactic properties formerly restricted to SUs.

It has already been shown in (11)-(14) that stage B (when a NP acquires syntactic SU properties) is attested in English for the period of c.1300 to 1400. Given all the evidence available, we must determine whether indirect passives with nominative pronouns (which control verb agreement of course) existed prior to that time, i.e., if sentences like 'He was given a book' are attested prior to sentences like 'The king was given a book and read it.' A careful examination of the examples adduced in Visser
(pp. 2144-5) supports the Cole hypothesis: in indirect object constructions, SU syntactic properties are acquired by ambiguously marked NPs at the beginning of the 14th century but nominative pronominal SUs do not appear in these constructions till the end of the 14th century. If, however, we include in the class of indirect passives represented by 'The king was given a book' DOs which are that-clauses or infinitives, OE examples can be adduced. e.g. from Visser (p. 2144):

(15) he ne waes forlaeten peodum godcunde laere to bodienne.
   SU  aux  PP              inf
   'He was not permitted to preach sacred teachings to the people.'

(16) he cuæd daet he haten waes.
   that SU  PP  aux
   'He spoke that which he was commanded.'

(17) Ic eom forgifen from þam aelmihtigan gode ... eow to ge-
   SU  aux  PP              inf
   gingienne.
   'I am allowed by Almighty God to intercede for you.'

(18) Ic waes bede from þæm biscope baet ic him rice alyf.
   SU  aux  PP              that
   'I was ordered by the bishop that I hand over my kingdom to him.'

in which the pronominal IO of verbs such as 'permit,' 'command,' 'allow,' and 'order' appear as nominative SUs in passive sentences. We are led to ask why IOs in constructions of the type in (1) having clausal/infinitival DOs are passivized hundreds of years earlier than IOs appearing with nominal DOs. It is argued here that the IO with a clausal or infinitival DO is semantically more like a prototypical DO than is the that-clause or infinitive it appears with. That is, in OE active sentences corresponding to (15)-(18), the IO is the affected entity in the transitive construction and thus eligible to be related to passive nominative subjects despite its dative morphology. On the other hand, in a Type 1 construction having a (pro)nominial DO, it is the affected entity and the IO retains its recipient relation to the verb. If the DO is non-clausal or non-infinitival in a Type 1 sentence, it, rather than the IO, is eligible for Passive in early English. Only after a period during which IOs are fronted to clause-initial position, as motivated by the pragmatic prototype of information flow, is the IO susceptible to reanalysis as SU. Evidence will now be examined that disconfirms the Cole hypothesis, i.e. instances that show that coding properties were acquired by some prior non-SUs at approximately the same time that syntactic properties were being acquired.7

Recall that the earliest examples of SU syntactic properties having been acquired by full NPs were dated from the beginning to the end of the 14th century. Gaaf (p. 62) presents evidence that in the early part of the 14th century pronouns were appearing in indirect passives containing nominal DOs. In various texts of the Cursor Mundi we see:
(19) 1300 Giu sal forgiuin be giur sak. (E text)
      IO PP aux SU
'To you shall forgiven be your sin.'

(20) 1300-50 You sal for-given be yur sak. (C text)
      IO PP aux SU

(21) 1300-50 ye sal forgiven be yur sake. (G text)
      SU PP aux DO

(22) 1340-99 ye shulle for-vey gn by your sake. (F text)
      SU PP aux DO

(23) 1400 ye shul forguyen be youre sake. (T text)
      SU PP aux DO

In the earliest text (E) the IO is fronted but retains the dative form. The same holds for the C text. In the G, F, and T texts, however, the dative pronoun has been replaced by the nominative pronoun ye. Gaaf notes that a similar shift is evident among the texts for line 8396F of the Cursor Mundi where C text has:

(24) For-giuen es be bar-of bi plight. (C text)
      PP aux IO SU
'Forgiven is to you thereof thy guilt.'

A direct passive interpretation is 'Your guilt is forgiven to you'; an impersonal reading with 'guilt' as DO is 'It is forgiven to you thereof your guilt.' In either, the IO is non-SU. The G and T texts agree with (19) except that the plural dative you has been substituted for the singular dative be:

(25) For-giuen es you bar-of bi plight. (G & T texts)
      PP aux IO SU

However in the F text the line appears as:

(26) ye are for-given of pat unrigt. (F text)
      SU aux PP

In the F text the nominative plural ye appears unambiguously as SU of the passive verb. By observing in these texts the variation of IO and SU pronouns in passive constructions, one is observing syntactic change in process in the mid-14th century.

As Gaaf says, "Alterations of a syntactical character, introduced into a text by a scribe, always deserve notice, as they frequently reflect a change of idiom." A few other examples of reanalyzed IO pronouns appear in the 14th century which are not accounted for in Visser. Gaaf (ibid.) provides the following:

(27) a.1330 To wrong bou art ylerd.
      SU aux PP
'Thou art taught to wrong.'

(28) c.1350 bu sett him to fostering, Till he be lerid himself
      SU aux PP
to lede. 'You set him to fostering till he is learned
      himself to lead.'
In (27) the IO of 'learn'/‘teach' appears as passive SU in the form of the second person nominative 'thou.' In this instance the DO is an infinitive. The indirect passive SU in (28) appears anomalously to control reflexivization. However, the translation of he be lerid himself to lede is 'he was taught (by someone) such that he lead.' Although this does not constitute a case of reflexivization per se, the SU of the DO infinitive appears in reflexive form on the basis of coreferentiality with the passive SU. In (29) the personal object of 'ask' appears as passive SU in nominative form; the DO is clausal. In (30) the IO of 'give' appears as nominative he in 'he was [forgiven his debts].' In (31) the SU and aux are orthographically conjoined in ycham, 'I am told here thou shalt thy will abide'; the DO in this case is also clausal. In (21)-(23) and (26)-(31) adduced in Gaaf, the prior IO has been reanalyzed as SU. In (21)-(23) the DOs are nouns; in (27)-(31) the DOs are clausal or infinitival. Though the evidence is slight, it is clear that indirect passives of the type 'He was given a book' originate before 1450 (when Lightfoot dates them) and make their first appearance in texts as early as the beginning of the 14th century (and later than when Lieber claims they exist). On the basis of all the evidence available to date, we can summarize the development of the indirect passive with respect to the sub-types of Type 1 constructions as in Table 1. After 1400 the indirect passive with nominal DOs increases in frequency. The following 15th century example (one of many) from Visser (p.2145) illustrates what has become a common idiom:

As shown in Table 1 and in this paper, there is no evidence that an indirect passive with nominal DO existed in OE. The earliest attested example is at the beginning of the 14th century. Thus the data do not support the claims of Lieber or Lightfoot. Whether or not the hypothesis in Cole et al. can be supported is moot. Their argument that stage B (wherein only syntactic properties are acquired) must precede stage C (when coding properties
Table 1
The Development of the Indirect Passive in OE/ME

Type 1 Construction(s): SU + V_t + IO + DO

1. DO = (a) that-clause/infinitive
   (b) Noun

2. IO = (a) Pro (nom case)
   (b) NP (citation form)

<table>
<thead>
<tr>
<th>Indirect Passive Type</th>
<th>First Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO(2a) DO(1a)</td>
<td></td>
</tr>
<tr>
<td>'He was permitted to preach'</td>
<td>OE: 900-1150</td>
</tr>
<tr>
<td>IO(2b) DO(1b)</td>
<td></td>
</tr>
<tr>
<td>'The Duke was given his life and fled out of the land...'</td>
<td>MME: 1300-1399</td>
</tr>
<tr>
<td>IO(2a) DO(1b)</td>
<td></td>
</tr>
<tr>
<td>'You shall be forgiven your sin'</td>
<td>MME: 1300-1399</td>
</tr>
</tbody>
</table>

are acquired) is supported by the evidence in Visser which indicates that, indeed, SU syntactic properties were acquired in passives by prior IOs approximately 100 years before the acquisition of coding properties. The evidence in Gaaf, however, indicates that coding properties in these constructions were being acquired in English at the same time as syntactic properties, i.e. that stage B is not a prerequisite to stage C. As more early English evidence comes to light, it may be the case that sentences like (11)-(14) representing stage B vastly outnumber sentences like (21)-(23) and (26)-(31) representing stage C. In this eventuality we would conclude that reanalysis of grammatical relations very likely proceeds by means of an intermediate stage during which full NPs, being ambiguous for case and verb agreement, are dually analyzed as SU or IO. In the eventuality that the Cole et al. hypothesis is not supported by further evidence, we must conclude that stage B is not a prerequisite to stage C, i.e. that reanalysis does not necessarily begin with the ambiguity of full NPs and generalize to pronouns but rather that fronted pronouns in passive constructions may undergo reanalysis independently on the basis that they are clause-initial, that they possess the pragmatic properties of SU and that the constructions in which they appear correspond to the prototype of information flow.
Notes

1. The properties referred to are those of Keenan (1976).
2. An elaboration of this view of grammatical relations can be found in Thornburg (1984).
3. For a fuller discussion of this concept see Thornburg (1984).
4. One of several examples from Gaffi (pp.60-l); the date for the shs. cited in Gaffi is from Brandl & Zippel (1949).
5. These ambiguous sentences appear in texts from the middle ME period, the 14th and beginning of the 15th centuries.
6. See Thornburg (1984:194-6) for the analysis of these data.
7. Although these data disconfirm the Cole hypothesis, it is noted that they constitute weak counter-evidence. Stronger counter-evidence would be data that show coding properties were acquired before behavioral properties rather than approximately simultaneously with them.
8. Gaffi (fn.1) states for this example, "In Old English the personal object accompanying ascian was in the accusative. In Middle English aske(n) is sometimes followed by to, so that the personal object was no longer felt to be an accusative.

References

CV- versus X-Notation: A Formal Comparison

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Two competing skeletal theories, CV-Notation and X-Notation, are a source of controversy in recent work in phonological theory. X-Notation has generally been viewed as the more restricted theory, because it claims to use only one skeletal element label, while CV-Notation posits two. Though there have been arguments advanced for each framework, two questions have yet to be directly addressed: a) Is the power used by CV-Notation actually different from that used by X-Notation? b) Are CV- and X-Notation formally distinct theories, or notational variants? In this paper, I compare the two frameworks and argue that CV-Notation and X-Notation use the same number of primitives, and equivalent power. However, the two theories are not notational variants, and a characterization of the distinction between them is provided.

0. Background

Since it is now widely accepted that the feature [syllabic] is eliminated from the melodic level (following Guerssel (1986), among others), it is necessary to represent syllable peakhood on some other level of structure. In CV-Notation (McCarthy (1979), (1981), Clements and Keyser (1983), and others), syllable peakhood is encoded on the skeleton via the two skeletal categories. C and V. A V-element represents one timing unit which functions as a syllable peak, and a C-element represents one timing unit which functions as a non-peak. Underlying representations consist of two unlinked levels, the skeletal level and the melodic level, which become linked either by convention or by language-specific rule. A sample underlying representation in this framework is given in (1):

(1) \text{C V C} \\
\text{[F] [F] [F]}

In X-Notation (Levin (1983), (1984), Archangeli (1985), Guerssel (1986), and others), the skeleton consists of unlabelled timing slots, symbolized by Xs. Syllable peakhood is represented on a separate level, as N, unlabelled, or R, according to Levin, Archangeli, and Guerssel, respectively. (All three treatments are representations of a nucleus, or syllable head.) If underlying representation in this framework consisted of the unmarked skeleton and the melody, as shown in (2), then X-Notation would need only one underlying skeletal category as compared to CV-Notation's
two. X-Notation, then, would be the less powerful, and, therefore, stronger, theory. [2]

(2) \[ X \ X \ X \]

[F] [F] [F]

However, we argue below, if the elements of the skeleton are to remain featureless, the type of underlying representation exemplified in (2) will not be adequate for all structures in all languages. Underlying representations in this framework must be able to stipulate three levels of structure: the melody, the skeleton, and the rhyme (or nucleus). A sample underlying representation in X-Notation, then, is given in (3):

(3) \[
R
X \ X \ X
\]

[F] [F] [F]

The argument that CV- and X-Notation are equivalent in power is made in two steps: 1) In order to account for data in which ambiguous melodies like i/y are phonemically distinct, X-Notation must include the abovementioned three levels of structure in underlying representation; 2) CV-Notation need not stipulate the rhyme level of structure in underlying representations. The syllabic structure that must be included in underlying representation in X-Notation is derived via a function on the skeleton in CV-Notation.

1. Phonemically Distinct Limbo Melodies [3]

When the distinctive feature [syllabic] was eliminated, the difference between some elements on the melodic level was also eliminated. For example, the difference between high vowels and the corresponding glides, between syllabic nasals and non-syllabic nasals, between syllabic liquids and non-syllabic liquids, etc., is no longer represented on the melodic level. The melodic representations for [i] and [y], which used to differ in their specification for the feature [syllabic], are now ambiguous between the two melodies. The distinction between [i] and [y] is a structural one: [i] is linked to a syllable peak and [y] is linked to a non-peak. In CV-Notation, this distinction is represented by the linking to a V-element (syllable peak), or to a C-element (non-peak), as shown in (4), where the i/y melody is arbitrarily represented as [i] on the melodic level:
In Levin's (1984) X-Notation analysis of Klamath, most instances of the high vowel/glide melodies, (i.e., i/y and u/w, which are in the Limbo set for Klamath), were realized as non-peaks via syllabification rules incorporating onsets and codas. For those Limbo melodies that were not onsets or codas, a Default Nucleus-Placement rule was written: (Levin's (13))

(5) Default N-Placement: [+hi, +son]

\[ \text{X} \rightarrow \text{X} \rightarrow \text{N} \]

(where X' represents an unsyllabified X)

In this way, the ambiguous i/y and u/w melodies were realized as high vowels when they occurred after unsyllabified elements, and as glides elsewhere.

X-Notation would use fewer underlying skeletal category labels than CV-Notation, then, if each phonological structure in each language belonged to one of two sets: (A) the set of structures in which all skeletal elements are linked to non-Limbo melodies, or (B) the set of structures for which phonological rules can account for skeletal elements which are linked to Limbo melodies. There are, however, languages with phonological structures which are members of neither set A nor set B. In Turkish, there are structures with skeletal elements linked to Limbo melodies for which an N-placement rule cannot be written. The Limbo set in Turkish contains only one member, the feature matrix ambiguously representing [i] or [y]. Thus, the i/y melody can be syllabified either as a syllable peak or as a non-peak in Turkish, exemplified respectively in (6.a) and (6.b):

\[ \text{(6.a)} \]

\[ \begin{array}{ll}
\text{'pride'} & \text{kibir} \\
\text{'building'} & \text{bina:} \\
\text{‘tongue, language'} & \text{dil} \\
\text{‘loofah'} & \text{lif} \\
\text{‘beard'} & \text{ris}
\end{array} \]

\[ \text{(b)} \]

\[ \begin{array}{ll}
\text{‘pitchfork'} & \text{yaba} \\
\text{‘oil'} & \text{ya} \\
\text{‘mane'} & \text{yale} \\
\text{‘village'} & \text{kby} \\
\text{‘wine'} & \text{mey}
\end{array} \]

However, the structural position of the melody does not necessarily determine whether it surfaces as a peak or a non-peak,
as seen in (7.a) and (b):

(7.a) 'restoration' iade (b) 'bright' yal
'donation' iane 'toward' yana
'loan' iare 'wound' yara (also yare)
'a feeding' iase 'wet' yas
'good, well' iyi 'food' yi yi

Moreover, i/y melodies do not always behave predictably with respect to suffix allomorphs. A rule of suffix allomorphy in Turkish deletes a suffix-initial consonant after a stem-final con-
sonant, exemplified in (8) for the 3sg.poss. suffix, /-sI/. [5] (I is used to symbolize a high vowel that undergoes vowel har-
mony).

(8.a)

<table>
<thead>
<tr>
<th>stem</th>
<th>3sg.poss.</th>
</tr>
</thead>
<tbody>
<tr>
<td>hand</td>
<td>el</td>
</tr>
<tr>
<td>garbage</td>
<td>$d$p</td>
</tr>
<tr>
<td>louse</td>
<td>bit</td>
</tr>
<tr>
<td>sea</td>
<td>deniz</td>
</tr>
</tbody>
</table>

(b) hat $apka $apka-sI
chin $ene $ene-sI
gazelle $ahu $ahu-sI
shrub $dalı $dalı-sI

In (9.a) the i/y melody behaves as a consonant, triggering suffix-initial consonant deletion, while in (9.b) the same melodic element in an analogous environment behaves as a vowel:

(9)

<table>
<thead>
<tr>
<th>stem</th>
<th>3s.poss.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) prohibition' nehy</td>
<td>nehy-I</td>
</tr>
<tr>
<td>(b) 'ending' mutenahi</td>
<td>mutenahi-sI</td>
</tr>
</tbody>
</table>

In CV-Notation, this phonemic i/y distinction in Turkish is represented as the difference between a C-element and a V-element being linked to the Limbo melody. The underlying forms for 'prohibition' and 'ending' in CV-Notation are given in (10.a) and (b), respectively:

(10.a) C V C C (b) C V C V C C V

nehi mutenahi
In X-Notation, since an N-placement rule cannot be written in the case of phonemic Limbo melodies, there must be another means of representing the peak status of one subset and the non-peak status of the other subset. In his analysis of glides and high vowels in Berber, Guerssel (1986) represents a phonemic distinction between glides and their corresponding high vowels by stipulating some X-elements as lexically attached to syllable heads. According to this type of analysis, the underlying forms for 'prohibition' and 'ending' in Turkish would be those shown in (11):

\[(11.a) \quad \begin{array}{c|c|c|c|c|c} R & & & R & & R \\ \hline X & X & X & X & X & X \\ n & e & h & i & m & u & t & e & n & a & h & i \end{array} \quad \begin{array}{c|c|c|c|c|c} \end{array}\]

Whether or not the [e], [u], and [a] melodies are dominated by Rs in underlying structure, or via redundancy rule, the theory must have the power to distinguish the stem-final element in (11.a) from the stem-final element in (11.b). Thus, in order to account for phonemically distinct Limbo melodies, one of two routes must be taken: either two skeletal element categories of plus and minus peakhood valences must be distinguished, or a third level of underlying structure must be allowed. (We note that a representation using only X labels, in which some X-slots are underlined, or marked with a tic, is still a representation with two skeletal element category labels: X-with-a-tic and X-without-a-tic.) Since the major tenet of X-Notation is that it does not use two separate skeletal element labels, the third level of underlying structure is necessary.

If CV-Notation also needs to posit syllabic structure in underlying forms, then X-Notation's claim to less power is well-founded, because X-Notation would need to posit only one underlying category of elements on the skeletal level, while CV-Notation uses two. Note, however, that the two underlying categories in CV-Notation are symbols for timing units of different peakhood valences. If CV-Notation does not need to posit underlying forms with rhyme-level information, then the number of skeletal element categories in CV-Notation will be equal to the number of skeletal element categories in X-Notation. In both frameworks there is a category of timing units that are underlingly linked to syllable peaks, and a category of timing units that are not underlingly linked to syllable peaks. The separation of syllable peakhood from the skeleton is significant, but it should not obscure the presence of separate underlying specification for different peakhood valences. In the next section, we argue that CV-Notation need not posit syllabic structure in underlying representation.
2. Syllabification as a Function on the CV-Skeleton

Clements and Keyser (1983) propose a core syllabification algorithm for CV-Notation in which "V-elements are prelinked to əs." Archangeli (1985) recognizes this prelinking as being equivalent to underlying syllabic structure, analogous to the underlying syllabic structure used in X-Notation. However, syllabification by prelinking is not a necessary component of CV theory. Steriade (1982) posits a universal syllabification rule for CV structures which uses no prelinking and no underlying syllabic structure: (Steriade's (64))

\[(12) \quad \text{(C) V} \rightarrow \text{(C) V} \quad \underbrace{\text{O R}}_{\text{6}}\]

Using Steriade's syllabification rule, syllable heads and onsets are syllabified, using underlying forms consisting of CV-skeleta only. The syllabification algorithm is a function that takes a single level, the skeleton, as input, and provides a three-level output, consisting of the syllable, the skeleton, and an intermediary sub-syllabic level. Syllabification according to this rule for the Turkish forms in (10) is shown below:

\[
\text{(13.a)} \quad \text{(b)}
\]

After the universal syllabification rule has applied, language-specific onset and/or coda rules may apply. These will be rules syllabifying C-elements in positions other than the one immediately preceding a V-element. With respect to these rules, then, specification of a rhyme level in underlying form is irrelevant.

Though the above examples do not prove that tri-level underlying forms are never needed in CV-Notation, they do show syllabification in CV-Notation without prelinked or underlying syllabic structure. Furthermore, they show that for instances of phonemic Limbo elements, where X-Notation must lexically mark rhyme heads in underlying form, CV-Notation derives syllabic structure via a function on the skeleton alone. We will assume, then, that all
syllabic structure can be similarly derived in CV-Notation, until it is proven otherwise. [6]

Thus, CV-Notation does not need to stipulate a third level of structure in underlying forms, and X-Notation's use of lexically-marked syllable heads is unmasked as the equivalent of two skeletal category labels: X-underlyingly-linked-to-syllable-peak and X-not-underlyingly-linked-to-syllable-peak. In both theories, two separate underlying peakhood valences are encoded by two separate symbols. In CV-Notation, the peakhood valences are encoded in the symbols for the timing elements on the skeleton, while in X-Notation, the peakhood valences are represented as a combination of the skeletal and rhyme levels. The issue of relevance with respect to the number of skeletal element categories is the power of the theories using them. The power of a theory is not measured by its choice of symbolism, but rather by the primitives, underlying structure, and mechanisms it must use. Both CV-Notation and X-Notation represent skeletal timing as a primitive. Both CV-Notation and X-Notation use two valences of a syllable peakhood primitive. The fact that CV-Notation symbolizes the two peakhood valences on the same level of structure as the timing, and X-Notation symbolizes the two peakhood valences on a level other than the level representing timing, is irrelevant to the comparison of the theories' power. We have shown that both theories need the power to represent timing and two valences of syllable peakhood in underlying representation. Thus, with respect to timing and peakhood primitives, the two theories are equivalent in power.[7]

3. The Distinction between CV- and X-Notation

Even though we have argued that CV- and X-Notation use the same number of primitives, there are two independent features in which the theories differ: a) the range of the skeletal element category over syllable peakhood valences, and b) the structural level on which syllable peakhood information of underlying forms is encoded. In this section, we will examine the differences between the frameworks, and provide evidence that they are formally distinct.

3.1 The Range of the Marked and Unmarked Categories

In CV-Notation, the two skeletal element categories C and V encode opposite valences of syllable peakhood. It would be equivalent, then, to represent the two skeletal element categories as +P and -P, where +P denotes a timing unit that functions as a syllable peak and -P denotes a timing unit that functions as a non-peak. Furthermore, it would be equivalent to mark only the plus values on the skeleton, leaving the unmarked skeletal category to be interpreted as minus. Thus, we see that the marked
skeletal category in CV-Notation ranges over the set of syllable peaks and the unmarked category ranges over the set of non-peaks.

In X-Notation, those skeletal elements underlyingly linked to R-nodes can be symbolized as +P and those skeletal elements which are not underlyingly linked to R-nodes can be symbolized as P. Note that +P is used to represent the marked category in both frameworks, and P is used to represent the unmarked category in both frameworks. In X-Notation, the marked skeletal category again ranges over syllable peaks, but in this theory, it ranges over only a subset of the set of syllable peaks: those that are lexically designated. The unmarked category in X-Notation ranges over both non-peaks and those peaks that are not lexically designated.

It is possible, then, to distinguish the two theories by naming an element that is a member of the set +P in CV-Notation, but not a member of the set +P in X-Notation. For example, in Turkish, the word for "garbage", çöp, contains no Limbo elements. The underlying representation in CV-Notation, along with its translation in terms of P and +P, is given in (14):

(14.a) \[ C V C \quad (b) \quad P \; +P \; P \]

The underlying representation of the same word in X-Notation, along with its translation in terms of P and +P, is given in (15):

(15.a) \[ X \; X \; X \quad (b) \quad P \; P \; P \]

CV- and X-Notation are thus shown to be non-equivalent with respect to the range of the categories used to mark syllable peakhood.

3.2 The Representation of Syllabic Peakhood

We have shown that in CV-Notation, syllable peakhood is encoded directly on the skeleton, whereas in X-Notation, syllable peakhood is represented on the rhyme level. In this section, we provide an example of a type of rule that can be stated using CV-Notation, but cannot be stated using X-Notation, further distinguishing the two theories.

As mentioned in Section 1, there are rules of allomorphic variation in Turkish which serve to delete suffix-initial consonants after stem-final consonants and suffix-initial vowels
after stem-final vowels. The forms in (16) illustrate the allo-

(16.a) stem 3sg.poss. 2pl.poss.
        /-sI/  /-Iniz/
hand  el  eli  eliniz
stalk  sap  sapı  sapınız
garbage  dıp  dıpû  dıpûntız
louse  bit  biti  bitiniz

(b)
chin  dene  denesi  deneniz
gazelle  ahu  ahusu  ahunuz
shrub  dalı  dalısi  dalıniz
island  ada  adasi  adaniz

In an X-Notation analysis of the Turkish data, Archangeli
(1985) posits the following two rules: (Archangeli’s (9) and (10))

(17)  with the affix /-Iniz/
X  -->  ø / X]  where X is a syllabified slot
    [F]

(18)  with the affix /-sI/
X  -->  ø / X’]  where X’ is an unsyllabified slot
    [F]

In the X-Notation analysis, then, it is relegated to coin-
cidence that the deletion rules each match the peakhood valence of
the target to the peakhood valence of the trigger. Furthermore,
it is relegated to coincidence that all suffixes that must be
listed with the first rule are vowel-initial, while all suffixes
listed with the second rule are consonant-initial.

In CV-Notation, the two rules could be collapsed, as shown in
(19), where +P represents a V-element, -P represents a C-element,
and α is a variable ranging over + and - valences:

(19)  α P  -->  ø /α P]  
      [F]
Note that it is consistent with CV theory to have a rule referring to the indexed disjunction of the two skeletal element categories. (What would be inconsistent with CV theory would be to posit an underlying form without a peakhood-specific skeletal element category.) If we adopt the rule in (19), we capture in a single rule the peakhood valence matching generalizations that were merely coincidental in the X-Notation analysis. Not only is it impossible to collapse Archangeli's two rules into a unified deletion rule, but it is impossible to write rules in X-Notation that could be collapsed in this way, due to the fact that both syllable-initial vowels and syllable-initial consonants are syllabified by the universal syllabification rule. Thus, the X-Notation analysis is unnecessarily complicated, and CV-Notation is seen to be the superior theory with respect to the representation of syllabic peakhood.

4. Conclusion

In this paper, we have argued that CV- and X-Notation use the same number of primitives, and equal power, but are not notational variants. The theories are distinguished in two ways: 1) the range of the skeletal element categories over syllabic peakhood valences, 2) the structural level on which syllable peakhood information of base forms is encoded. An example of a rule of Turkish allomorphy was provided to suggest that the CV-Notation system of encoding syllabic peakhood directly on the skeleton is superior to the X-Notation system of encoding syllabic peakhood on a third level of underlying structure.

FOOTNOTES

[1] Clements and Keyser (1983:136) refer to C and V as primitives, but we will interpret their intent as to define peakhood as a primitive. In their view, and ours, syllabic peakhood is not a distinctive feature, and not able to be defined by articulatory or auditory properties. C and V, then, represent the concatenation of two primitives: timing and peakhood.

[2] The issue of whether or not the skeleton and melody are linked in underlying structure is not addressed in Levin (1983, 1984) or Guerssel (1986), but we have adopted Archangeli's (1985) version of the minimally specified theory.

[3] Following Waksler ((1985), (1986b)), we refer to those melodies which may be linked to peak or non-peak elements as "Limbo" melodies. The set of Limbo elements is defined as a function of the sonority scale for each language that chooses the Limbo resolution parameter. For further discussion, see Waksler ((1986b) and (forthcoming)).
[4] Cf. Guerssel (1986) for analogous examples from Berber. Guerssel's argument is for the elimination of the feature [syllabic], but his result of lexically-marked rhyme heads is the same as ours.

[5] This is an oversimplified characterization of the rule. For expanded discussion and formalization of Turkish suffix allomorphy, see Waksler (forthcoming).

[6] Syllabification of long vowels has not been treated here, but it does not necessitate the stipulation of rhyme structure in underlying representation in CV-Notation. For discussion of the syllabification of long vowels in CV- and X-Notation, as well as a mechanism that parses syllables rather than building them, see Waksler (forthcoming).

[7] A formalized version of this proof is given in Waksler (forthcoming).

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Metrical Structure in Wakashan Phonology
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0. Introduction

In spite of the current popularity of metrical theory as a model for describing the prosodic features of various languages, little has been said concerning the interaction of metrical structures with the rules of segmental phonology. If the often complex notations proposed by a tree-based metrical theory (binary feet, word trees, extrametrical elements) are accurate depictions of a speaker's internalized knowledge of suprasegmental patterns, we should expect them to play a role in defining the domains of a variety of processes, not just some pre-selected subset of productive rules.

Only a few such examples have appeared in the literature to date. Hayes (1981) has analyzed two rules in Yidin', a vowel lengthening and a deletion rule, as being sensitive to metrical structure as part of their environment. Kiparsky (1979) and Selkirk (1980) have made similar suggestions for rules in English. Still, the number of clear examples cited and the generality of these cases have been quite restricted.

This paper will present data from the Wakashan family of languages spoken in British Columbia which demonstrate a greater degree of interaction between metrical and segmental rules than has previously been detailed. Specifically, changes in metrical structure in certain of the Wakashan languages have led to a number of re-analyses of older segmental processes, playing a role in general diachronic change.

1. Wakashan Background

Wakashan can be divided into two main branches, the Northern or Kwakiutlan group, and the Southern or Nootkan group. The distribution of languages within the sub-groups is as follows:

```
Proto-Wakashan
  /       \
 /         \
|           |
\           \
|           |
Kwakiutlan  Nootkan
 /         /\
/         /\
|        |  |
Kwakwala Haïsla Heiltsuk Nootka Makah Nitinat
```

The relationships within each of the main subgroupings are relatively close, while Nootkan and Kwakiutlan are quite distant cousins. A large amount of areal contact and borrowing has hampered reconstructive work. The general outlines of the family tree as developed by Sapir, Boaz, Jacobsen and others, however, are quite clear.

In this paper, most of the data cited will be drawn from the best attested languages, Kwakwala from the Kwakiutlan branch and Nootka proper (Tsishath dialect) from the Nootkan branch. Other languages will be consulted as necessary.

All of the Wakashan languages are polysynthetic and
exclusively suffixing. All make use of several types of reduplication, as well as morphologically conditioned lenition, two types of glottalization, and vowel lengthening and shortening processes. As examples of word formation are given these forms as analyzed by Swadesh (1939):

\[ \text{wik\textasciitilde}ay\textasciitilde aq\textasciitilde as\textasciitilde ay\textasciitilde at} \ 'see someone act foolishly' \\
\text{root: wik-} 'no, not' \\
suffixes: \text{-at} 'aware of...', \text{-aq\textasciitilde} 'inside' (a leniting suffix, here turning \text{i} to \text{y} for historical reasons), \text{-s\textasciitilde at} 'act, do...', \text{-yo\textasciitilde at} 'see...' \\
\text{?o\textasciitilde otah\textasciitilde sim\textasciitilde cy\textasciitilde ak} 'device for ritual training for success in hunting or whaling' \\
\text{root: ?o-} 'it, such-and-such' \\
suffixes: \text{-ata\textasciitilde h} 'hunting, catching...' (causes reduplication of the stem), \text{-sim\textasciitilde} 'ritual training for success in...' (causes lengthening of the first vowel), \text{-y\textasciitilde ak} 'instrument, device for...' \\
\text{processes: ?o\textasciitilde atah\textasciitilde sim\textasciitilde cy\textasciitilde ak} > ?o\textasciitilde otah\textasciitilde sim\textasciitilde cy\textasciitilde y\textasciitilde ak (by reduplication) > ?o\textasciitilde otah\textasciitilde sim\textasciitilde cy\textasciitilde y\textasciitilde ak (by vowel contraction, see below) > ?o\textasciitilde otah\textasciitilde sim\textasciitilde cy\textasciitilde y\textasciitilde ak (by vowel lengthening) \\
\text{?a\textasciitilde x\textasciitilde a\textasciitilde qim\textasciitilde \textasciitilde a} 'handling two round objects at a time' \\
\text{root: ?a\textasciitilde x-} 'two' \\
suffixes: \text{-qim\textasciitilde} '...many round objects', \text{-a} durative aspect \\
\text{processes: stem lengthened and initial CVC- reduplication to express repetitive aspect} \\

Similar word formation processes are found in all of the Wakasian languages. The languages of the Nootkan group, however, have innovated a number of morphological and phonological processes, and have changed a number of inherited Wakasian rules in comparison with the more archaic Kwakiutlian group. The innovations germane to this discussion share an unusual feature: they all make reference to a phonological distinction between the first two syllables of a word and the following syllables. In every case, the vowels of the first two syllables appear "stronger" than following vowels. No such distinction occurs in any of the languages of the Kwakiutlian group. The origin of this distinction is the main focus of this paper.

2. **Nootkan Variable Vowels**

All of the major Nootkan languages (Nootka, Nitinanat and Makah) share a set of underlying vowels whose surface length is dependent on their position within a word. Such vowels, dubbed variable vowels by Sapir, are long when they appear in the first or second syllable of a word, and short otherwise. Such lengthening occurs after reduplication, but before vowel contraction. Variable vowels occur in both stems and suffixes; in stems, they are only identifiable as variable when reduplication changes their
syllabic position. Variable length is indicated as V(:). Some examples, again from Nootka:

-na(ː)k 'having, possessing...'  
?onaːk 'possessing it', but Қapacnək 'possessing a canoe' 
-ve(ː) 'troubled by, with...'  
t'ohy'ə: 'troubled at the head, headache', but Қapacy'a 'having trouble with a canoe' 
caqi(ː)č 'twenty'  
durative aspect caqiːč, but distributive cacaqic

These alternations between short and long surface forms have no parallel in Kwakiutlan. Historically and underlyingly, the variable vowels are short; the details of their development have been a mystery since Sapir's early work. Their significance here is the special form in the first two syllables, indicating some synchronic lengthening at work.

3. Rule Innovations in Nootkan

Besides the variable vowels, the following vocalic rules all make reference to the first two syllables of a word as a strong phonological position.

a) Vowel Contraction

In all the Wakashan languages, V+V sequences normally contract, though this may be blocked by morphological conditions not relevant here. In the Kwakiutlan languages, such contraction always produces a long vowel regardless of the quantity of the vowels involved:

Kwakwala: ?o:m'g-a 'that chieftainess' > ?o:m'ə: 
 la-osdes 'go up from the beach' > la:šdes 
 la-la:la:la 'to go about' > la:la:la

In the Nootkan languages, however, vowel contraction produces a vowel with the length of the longest component; that is, the resulting vowel is long if either of the original vowels were long, and is short otherwise:

Nootka: no-ʔato-ap 'the singing is stopped' > noʔatop 
 ?o-k'i-a(ː)s 'it is on the surface' > ?ok'iːs > 
 ?ok'iːs 
yə:-al 'yonder' > yaːl

However, if the first and second syllables contract in Nootkan, the result is always long, even if both vowels involved are short:

Nootka: ?o-aqsti: 'within it' > ?o:qsti: 
 cf. ?o-ʔo-aqsti: 'within it here and there' > ?oʔoqsti:
b) Vowel Contraction across Glottal Stops

Vowels in Wakashan can normally contract across an inter-
vening glottal stop. In the Kwakiutl languages, this uniformly
produces a long vowel, and is indistinguishable from regular vowel
contraction above. In the Nootkan languages, the first and second
syllables of a word may not be contracted across a glottal stop.
The second and third syllables may so contract, and will produce
a long vowel (now, of course, in the second syllable). Any other
syllables that contract in this way will produce a short vowel.

Nootka: maʔas 'tribe', no contraction possible, but the
reduplicated distributive maʔ-t-maʔas > matmaʔas
shows contraction

c) Vowel Deletion

In Nitinat, Makah, and the Kyuquot dialect of Nootka, short
vowels may optionally delete if the phonotactics would otherwise
allow the resulting consonant cluster. Such deletion may only
take place in a third or later syllable.

Nitinat: qalaʔtk 'younger brother', Nootka qalaʔtik
Kyuquot: hayuci(ː) 'it went on for ten days' > hayucī
(with variable vowels underlyingly short)

d) Iterative Lengthening

One of the formal markings of the iterative aspect in Nootka
is shown by lengthening the first two vowels in a word and shor-
tening all the others except the last. This last syllable gener-
ally consists of the morpheme -siːt, part of the iterative marker.

Nootka: ?aːkɑːk' aːmiksiːt 'become a getter of eight
(animals) at intervals' < ?aːkɑːk' aː 'eight' + -mik:
'getter of...' + -siːt iterative marker

In general, lengthening and shortening processes in Nootkan
effect only the first two syllables of a word, regardless of the
position of the morpheme causing the change in quantity.

These four rules, then, indicate the special status of the
first two syllables in Nootkan. Another pattern that may be re-
lated to these is a vowel ablaut used in familiar forms of direct
address. Jacobsen (mss.) has listed examples from all of the
Nootkan languages showing the various vowel changes and word trun-
cations common in such forms. In most cases, words are shortened
to mono- or bisyllabic forms, with accompanying change in vowel
quality.

Makah: ?abeʔ:iqsu 'mother' > ?eːb
hitax:iːtuba 'daughter' > heːtax
Nootka: ?umʔ:iːqsu 'mother' > ?oːm'i

Of special interest here is Jacobsen's conclusion that such
ablaut was historically the result of original vowels added to multisyllabic words, and the resulting vowel quality change moving forward to the first or second syllable. These final vowels are still present in vocative forms in Nootka and the Kwakiutlan cognates. Such a shift may have been caused by the higher phonological prominence of the first two syllables, paralleling the sensitivity of the preceding rules. However, the possibility of baby talk influence on these forms limits their value as evidence in this regard.

Why, then, should the Nootkan languages modify two existing rules (a. & b. above) and innovate two additional rules (c. & d.) to take this syllabic boundary into consideration? Also, what has influenced the evolution of the variable vowels to make them sensitive to the same environment of the apparently unrelated rules we have examined? One clue to all this lies in the nature of the stress systems of the two branches of Wakashan, an area of the phonology unfortunately largely ignored.

4. Stress Rules in the Kwakiutlan Languages

An important feature of the Kwakiutlan languages is the presence of reduced vowels, schwa or certain phonetic variants of schwa. These are lacking in the Nootkan group.

All of the Wakashan languages distinguish between light and heavy syllables, that is, between non-branching and branching rimes. In Kwakiutlan, a light syllable contains a reduced vowel. A heavy syllable contains a full vowel (which may appear on the surface as either long or short), or a reduced vowel followed by a tautosyllabic sonorant that fills the second V-slot in the branching rime.

The basic stress rule of Kwakwala places primary stress on the first heavy syllable in a word. Secondary stresses fall on alternating syllables after the primary stress. Epenthetic schwas, which are inserted after stress assignment, are therefore not counted in placing secondary stresses.


$gəx'ído$ but $gəx'íməw$ (with epenthetic schwa resulting from the fracture of $ə$ before $e$)

Secondary stresses that would fall on reduced vowels are never marked in the data. It is unclear if reduced vowels are phonetically incapable of bearing stress, or if this is an idiosyncrasy of the transcription.

Heiltsuq, a smaller Kwakiutlan language, has developed phonemic tone (Kortland 1975). Primary stress falls on the first high-tone syllable in a word, and the status of secondary stress is unclear. However, the Heiltsuq tones are generally predictable historically from syllable weight. Heavy syllables came to bear high tone, while light syllables bore low tone. Thus, the underlying stress assignment rule remains, though tonal shifts have rendered it unpredictable synchronically.
Likewise, Haisla, another Kwakiutlan language, appears to have developed a pitch accent (Lincoln & Rath 1980). The accent generally appears to fall where the general stress rules would predict main stress, but the mapping is far from perfect. However, nothing in the Haisla data would argue against taking the Kwakwala rule as basic.

At this point, it is important to emphasize two features of the Kwakwala stress system. First, primary stress may fall on any syllable of a word, as long as all of the preceding syllables are light: səlt'ede, Gəʔaːlaxs, m'ək̓ələ, etc. Second, stress iterates across the Kwakwala word. Both of these features will contrast with the Nootkan situation.

In metrical terms, Kwakwala builds iterative metrical feet from left to right, each foot labelled left is strong. A special condition holds for the first foot, that its strong node must branch. In other words, no metrical structure can be built until a heavy syllable is encountered. The feet are gathered into a left branching word tree.

The secondary stresses marked here are from Boas (1947), and are often spottily recorded. There is evidence that they may be dropping out of Kwakwala, or at least the speech of younger speakers. Still, the analysis presented here is consistent with the historical data as far as is known.

5. Stress rules in Nootkan

As mentioned above, the languages of the Nootkan group have no reduced vowels. Historically, schwa appears to have become i in most environments in Nootkan, u when adjacent to a rounded consonant.

Because of this change, Nootkan has a different definition syllable weight than Kwakiutlan. A light syllable contains a short vowel, while a heavy syllable contains either a long vowel or a short vowel plus resonant (which in Nootkan would have to be a nasal). Notice that in an autosegmental analysis, where a short vowel would be mapped to a single vowel slot and a long vowel to a VV sequence, the two definitions of quantity are identical.

In Nootka, stress falls on the first syllable, unless it is light and the second syllable is heavy, in which case the second syllable receives the stress. There are no secondary stresses marked in the data, and stress never falls anywhere but on the first two syllables.

Examples showing the four possible patterns of light and heavy syllables:
The stress rule of Nootka cannot be "stress the first heavy syllable in a word", which would be the parallel version of the Kwakwala rule. When both of the first two syllables are light, stress falls on the first even when there are other heavy syllables later in the word. Examples (from Sapir 1924):

\[ t'\acute{o}t'ohcaqc'o:?i \] 'having a head at each end'

\[ g\acute{\text{a}}'ec'i:k \] 'wolf'

\[ ?\text{\acute{\text{a}}}acsi:b \] 'Nitnat proper name quoted in Nootka text'

A metrical analysis of the stress facts in Nootka would build a single (non-iterating) foot at the beginning of a word, labelled left strong iff it branches. Like Kwakwala, the strong position in the foot must dominate a branching rime. In the case that both of the syllables eligible for strong position are light (non-branching rimes), no foot can be constructed. The left branching word tree would then apply stress to the first syllable by default. Examples of these structures:

\[ \begin{array}{c}
\text{tiq 'il?}a \\
\text{t'asi:}ak'i \\
?\text{ink'i} \\
?o:si\text{mc}a
\end{array} \]

Variable vowels, as mentioned earlier, are underlyingly short, and the stress patterns treat them accordingly:

\[ \text{si}m(a:)cyin \] 'sticking up at the bow'

\[ k\acute{\text{a}}yo(:)min \] 'panther'

In Makah, stress falls on the first syllable if it is heavy, and on the second syllable if the first is light. This rule differs from Nootka only in the case where both syllables are light. Nootka would stress the first syllable, while Makah stresses the second. Makah has thus lost the condition that the strong node of the first metrical foot must branch. The foot is always built, and stress is never applied by the word tree.

No data on stress is available for Nitinat or any of the smaller dialects of Nootka, though given Nitinat's treatment of the first two syllables, we should expect to find quite similar rules of stress placement.

Since Kwakiutl is the more conservative branch of Wakashan both phonologically and lexically, we can assume that the Kwakwala stress rule represents the older form of the Wakashan stress pattern.
6. Historical Changes in Wakashan Prosody

Given the data discussed above, I would suggest the following course of events to account for the changes both in the rules in sections two and three, and the metrical patterns seen in sections four and five.

First, the Nootkan languages neutralized the full vowel vs. reduced vowel distinction, schwa being replaced by i or u. This would have had an immediate effect on the placement of stress in Nootkan. The first metrical foot would always be built over the first pair of syllables in a word, since only reduced syllables could be skipped (assuming the older definition of light and heavy syllables had not yet changed).

Second, the Nootkan languages lost secondary stress. In metrical terms, the stress rule became non-iterating. Though perhaps strengthened by the frozen position of stress in Nootkan, this loss of alternating feet can be seen as an independent change.

Finally, the rules of syllable weight caught up with the new vowel quantities, producing the stress rules now apparent in Nootka and Makah. The important distinction was now between long and short vowels, rather than full and reduced.

The changes and innovations in rules of vowel contraction, lengthening, etc., can now be seen as a reaction of the segmental phonological system to a change in metrical structure. All of these processes became sensitive to the metrical status of a vowel, that is, whether the vowel was within the metrical foot or outside it. Such a distinction could not be made in Kwakiutlan, nor in the older stages of Wakashan, since feet were built over the entire word. Thus, no parallel treatment of specific syllables is found in any of the Kwakiutlan languages.

It could be argued that other, non-metrical, divisions of the word might account for the pattern seen in Nootka, but such a boundary has not been apparent. The division is certainly not one of stem vs. affix. Mary Haas (1972), in her study of Nootka-Nitinat stem structure, has concluded that the canonical shape of Nootkan (and, most probably, Wakashan) stems was CV-(X)-, where X represents an optional "extending" consonant which gave a more focused meaning to a general semantic class of stems. Thus, while a stem vs. affix distinction could set apart the initial syllable for special consideration, there is no good reason why the second syllable should show any increase in prominence compared to the rest of the word.

It is interesting that the Nootka rules, as well as the variable vowels, do not take the specific location of stress in any given word into account. Rather, it is the foot itself that is the strongest candidate for inclusion in their structural descriptions. Even though the weak node of a given metrical foot is identical (in theory) to the weak nodes assigned by the word tree, the generalized strength of the foot itself takes precedence.
Wakashan presents a case of metrical structure playing an integral role in the course of a number of specific changes in the phonology of a language group. The development in Nootkan of a non-iterating stress foot was both a response to segmental change (the loss of reduced vowels) and a cause of it (the creation of variable vowel length, etc.). Metrical change as a form of historical change deserves to be considered in the formulation of a complete model of diachronic phonology, both segmental and prosodic.

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The positioning of nominal constituents around the verb has been a major source of controversy in Mandarin syntax and discourse studies. We will deal with three claims in particular: 1) preverbal (XV) vs. post-verbal (VX) position correlates with definiteness:

1a. Sǐ rén le vs. b. Rén sǐ le
   die person asp. person die asp.
   'a person has died' 'the person is dead'

In (1a) an indefinite interpretation is strongly implicit in the postverbal nominal rén, while in (1b) a definite interpretation is strongly implied by its preverbal position. Next, 2) XV vs. VX correlates with contrastiveness or emphasis:

2a. Pài yī ge nánrén dào Běijīng, pài yī ge nǚrén dào Shànghǎi
   send 1 CL man to B send 1 CL woman to S
   '(they) sent a man to Beijing, and a woman to Shanghai'

2b. bā zhàngfù pài dào Běijīng, bā qīzi pài dào Shànghǎi
   OM husband send to B OM wife send to S
   '(they) sent the husband to Beijing, and the wife to Shanghai'

In (2a) no special contrast is implied between the man and woman, and VX is normal. In (2b) there is a pragmatically implicit strong contrast between the husband and wife, and XV order is strongly preferred. Finally, 3) position correlates with topicality:

3a. mén yī kāi, yī ge láotóu zǒu le jǐnlái, bǎ mén guān shàng
   door once open 1 CL old-man walk AM in OM door close up
   zǒu dào zhūō biān zuò xià. 'The door opened, an old man walked in, closed the door, walked up to the table and sat down'

3b. mén yī kāi, zǒu jǐnlái yī ge láotóu, bǎ mén guān shàng
   door once open walk in 1 CL old-man OM door close up
   'the door opened, in walked an old man, closed the door...

In (3a) the preverbal NP easily controls zero-anaphora in subsequent clauses, while it is harder for the postverbal noun in (3b) to do so. Zero-anaphora is closely related to topic continuity (Givon, 1983) suggesting that XV is a topic-marking device in Mandarin.

1.1 In their recent paper in Language on the pragmatic function of word order in Mandarin, Sun and Givon (1985) criticize Li and Thompson's (1975) hypothesis that 'word order has taken on the
function of denoting the definite/indefinite property of nominals (p. 165)" i.e. that pre- and postverbal position have a strong correlation with definite and indefinite NPs, respectively. S&G present quantitative discourse data to show that this correlation is spurious. They go on to claim that VO is the standard, unmarked position for objects, and that OV is a marked, "emphatic/contrastive discourse device," i.e. that speakers place an object preverbally in order to mark it as emphatic or contrastive. They tie this contrastive function to the general lesser, vs. greater, accessibility/continuity of an entity in discourse (Givon, 1983) and observe (p. 332) that L&T's definiteness hypothesis is in conflict with their contrast hypothesis through the tie with accessibility.

We will attempt to resolve the conflict between the definiteness and the contrast hypotheses by showing that they are each limited aspects of a more general phenomenon: the ways in which text mediates between speaker's and listener's knowledge structures. To do this we will present a concept of TOPIC based on speaker and listener knowledge structures, rather than on sentence/text constituents. The function of TOPIC, in our view, is PROACTIVE (forward-looking): it "sets a spatial, temporal, or individual framework (Chafe, 1976)" within which the following events of the discourse are interpreted. This function of TOPIC will be shown to have RETROACTIVE (backward-looking) consequences reflected in "topic continuity" and definiteness.

We will then attempt to show that our TOPIC concept is generally more compatible with S&G's data than their own contrast/emphasis hypothesis. In particular, we will a) predict the exact distribution of their definiteness data, which they fail to do; b) predict the results of their "referential distance" measure, equally predict their contrast effects, and finally, provide a better account of their emphasis effects, the focus of their argument. We thus hope to provide an explanatory framework to account for pre- vs. postverbal position in Mandarin which brings diverse empirical data together into a unified account. This framework will presuppose an "open-text" theory of discourse structure which focuses on text as a negotiation between a speaker (writer) and listener (reader) by placing "structure" in the speaker's mental constructs leading to the production of text, and the listener's mental constructs resulting from text comprehension. Such a framework contrasts sharply with a closed-text theory which places structure in the text itself.

2.0 Major problems with the concept of "topic" as previously used in linguistics have been a) insistence that a topic be a constituent of the text, and b) confusion between the proactive function of topics and the retroactive consequences of this function. In our definition of topic we attempt to rectify these problems:

2.1 TOPIC FUNCTION: A "topic" is an entity, place, time interval, etc. which the speaker uses as a frame of reference (or domain) within which the subsequent stretch of discourse is interpreted. Thus the communicative function of "topic" is proactive rather than
retroactive: its purposeful relation is to text which follows it, and not to the preceding discourse. Although topics may often be "old" or "given information," it is not their function to be so.

Consequence A: topicality is a characteristic of speakers' (and consequently listeners') knowledge structures, and not a constituent of sentences or texts. However, the speaker may invoke (mention) a topic for the listener in the text.

Consequence B: since topics are domain specifiers, they will tend to remain in force over a stretch of text greater than one clause. (Without these multiple event domains, a discourse would unravel into a list. In particular, we propose that a place, time, or entity domain, once established by the speaker, will remain in force (i.e. remain "topical") until it is cancelled.

Consequence C: it follows from B that a "topic" is a relatively prominent part of the speaker's knowledge structure corresponding to a stretch of discourse. This, in combination with Clark and Clark's (1977) Cooperative Principle, suggests that speakers will tend to select as topic domains those places, time intervals, and entities which already form a prominent part of the listener's knowledge structure.

Consequence D: It also follows from B and from the Grice's Maxim of Quantity that the speaker will invoke a topic when there is communicative reason to do so: when a domain is cancelled and another is substituted for it ("topic shift"), when a potential competitor arises in the discourse ("referential interference"), when the speaker wishes to emphasize the event (cf. 3.43), etc. On the other hand, it follows from B and D that the speaker will not continue to invoke a topic once its domain has been established and remains in force.

2.2 Topic Identification (how the listener figures out what the topic domains are for each successive clause in a text): It follows from (A - D) that the listener can safely assume that for any specific clause, already-established topic domains are still in force, unless there are indications in the text to the contrary. Thus in many languages a major source of information for the listener about the topic domains for a particular event will be the lack of any topic identification in the text, i.e. §. Secondly, the listener will look for (language-specific) low-information "reminders" which reinvoke a topic domain: pronouns or agreement markers for entity adverbial particles, tense markers, etc. for time and place. Finally, the listener will take any more substantial invoking of a topic domain (e.g. by full NP) to signal either an identification problem (potential competitor, topic shift) or simple emphasis.

2.3. Topic Marking: Topics are mental entities (consequence A) which on specific occasions the speaker will need to invoke in the text (Consequence C) so that the speaker will use it as a frame of reference for the following text (Topic Identification). For this purpose the speaker needs specific grammatical means for marking a text constituent as topical. These means are language specific;
in Mandarin, if a speaker wishes to mark a place/time/entity as topical in the sense of (2.1) s/he places the constituent which invokes it in front of the verb.8

3.0 Objective Correlates. A major problem with definitions of "topic" has been their vagueness and lack of predictive ability, a state of affairs which Givon (1983) laments with good cause. We hope to show that our TOPIC hypothesis outlined in section 2 is capable of making quantitative predictions about overall frequency of topic marking, definiteness, textual continuity and contrastiveness, and a qualitative prediction about emphasis.

3.1 Frequency of topic marking. It follows from Consequences B and D (2.1) that topics will be unspecified in the text (zero-anaphora) much more often than they will be invoked; i.e. topical objects in the text (OV) will be infrequent in comparison to non-topical objects (VO). Table 1 shows that VO outweighs OV in frequency by a ratio of 16/1 in written text, and by a ratio of 12/1 in spoken text. This data of course equally support S&G's hypothesis that the function of OV is to mark contrast.

3.2 Definiteness. It follows from Consequence C of Topic Function (2.1) that if an NP is marked as topical (XV), then it will almost always be definite. (Infrequent exceptions are predicted, however, since the speaker is not absolutely constrained by the proactive function of TOPIC to always choose an entity which is "definite" for the listener.) This yields the inferential implicature (4a) and its logically valid contrapositive (4b):

4a. topic (preverbal) ==> definite
4b. not definite (indefinite) ==> non-topic (postverbal)

The non-inferrable converses of (a) and (b), however, are predicted not to hold:

4c. definite #==> preverbal
4d. postverbal #==> indefinite

Our TOPIC construct thus views definiteness as an inference from topicality, and predicts an asymmetric relation between the two concepts, given by (a) and (b), but not (c) and (d). L&T do not differentiate these four discrete implicational relations, and S&G assume, in rejecting their definiteness hypothesis, that they claim all four. Table 1 below shows that in S&G's own quantitative discourse data, (a) and (b) are strongly supported, while (c) and (d) are not.

Following implication (a), if an NP is topical (OV), then 76 out of 79 tokens (96%) are definite in written discourse. In spoken discourse 31 out of 32 topic tokens (97%) are definite. In sum, topicality implicates definiteness. But the inverse (implication c) is clearly disconfirmed: only 76 out of 991 (8%) definite tokens in
written discourse and 31 out of 320 (10%) in spoken discourse are marked as topical (OV), i.e. definiteness does not implicate topicality.

Following implication (b), if an NP is indefinite, then 276 out of 279 tokens (99%) are non-topical (VO) in written discourse, as are 109 out of 110 tokens (99%) in spoken discourse; i.e., indefiniteness implicates non-topicality. But again the inverse (implication d) is clearly disconfirmed: out of 1191 non-topical tokens (VO), only 276 (23%) are indefinite in written discourse, and only 109 out of 398 (27%) in spoken discourse, i.e. non-topicality (VO) does not implicate indefiniteness.

Table 1: summary of Sun & Givon's (1985) tables 1 and 2, showing the relation between definiteness and word order Actual number of occurrences in S&G's quantitative discourse samples is given.

<table>
<thead>
<tr>
<th></th>
<th>written discourse</th>
<th>spoken discourse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VO</td>
<td>OV</td>
</tr>
<tr>
<td>referential</td>
<td>276</td>
<td>3</td>
</tr>
<tr>
<td>indefinite NP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>definite NP</td>
<td>915</td>
<td>76</td>
</tr>
</tbody>
</table>

Our reanalysis of S&G's data thus show that L&T are partially right: there is some relation between definiteness and topicality, but that S&G are also partially right: this relation is not one of simple covariance. Finally, the fact that the data strongly support implications (a) and (b), but not (c) and (d), and the fact that most, but not all tokens comply with (a) and (b), were fully predicted from our hypothesis that XV has topic-marking function.

3.3 Continuity:10 It follows from consequence B of topic function (2.1) that topics will have greater continuity with previous discourse than non-topics. In other words, when an entity is invoked as a topic (XV) at a particular point in the text, it is much more likely to already have been "in use" (by mention or by zero) in the previous, or at least a recent clause, than an entity which is invoked as a non-topic (VX), as depicted in (5):

5. (clause) (clause) (clause) (clause) (clause) (clause) (clause) (?\underbrace{XV}^{\text{XV}})\\(\uparrow\)

\underbrace{VX}_{\text{VX}}

Givon's (1983) measure of referential distance (RD), used by S&G, a measure of this distance (in clauses) from an NP backwards in the text to the previous mention of the entity, or its evocation through zero-anaphora. Their data, summarized in Table 2, show that in both written and spoken discourse, topical NPs (OV) have a much shorter RD than non-topical NPs (VO); on the average, the RD for VO is mo
than four times as great as for OV, i.e. topical nouns have much greater referential continuity in discourse, as we predict. This contradicts S&G's expectation that OV will be more "discontinuous" than VO, leading them to reformulate their hypothesis in terms of "contrast/emphasis."

Table 2: summary of Sun & Givon's (1985) tables 5 and 6 giving the median11 referential distance for definite objects12 in preverbal and postverbal position.

<table>
<thead>
<tr>
<th></th>
<th>written discourse</th>
<th>spoken discourse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VO</td>
<td>OV</td>
</tr>
<tr>
<td>unmodified</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>definite nouns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>names</td>
<td>9</td>
<td>4</td>
</tr>
</tbody>
</table>

3.4 Contrast/emphasis: It follows from consequence D of Topic Function (2.1) and from Topic Identification (2.2) that most of the time, topics in the speaker's knowledge structure do not make it into the text (zero-anaphora). Only when a special reason arises—when one topic is being substituted for another, when a potential competitor arises, when the speaker wishes to emphasize the entity or the event in which it participates—will the topic actually be invoked in the text. This leads to the expectation that most topics invoked in the text, i.e. most nouns in preverbal position, will have some sort of contrastive or emphatic effect associated with them. Postverbal, non-topical nouns may also be contrastive or emphasized, but there is no bias expecting them to be so.

3.4.1 Givon's (1983) measure of Potential Referential Interference (PRI), also used by S&G, is a measure of weak contrastiveness. It inquires whether, for a given NP in the text, there is another reference in the preceeding three clauses which is "semantically compatible with the predicate of the referent under consideration (S&G, p. 331)," i.e. which could cause confusion for the listener if the referent were not clearly disambiguated. S&G's results are

Table 3: summary of Sun and Givon's (1985) tables 8 and 9 showing the extent to which pre- and postverbal objects have Potential Referential Interference (PRI).

<table>
<thead>
<tr>
<th></th>
<th>written discourse</th>
<th>spoken discourse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VO</td>
<td>OV</td>
</tr>
<tr>
<td>PRI</td>
<td>81</td>
<td>32</td>
</tr>
<tr>
<td>no PRI</td>
<td>789</td>
<td>41</td>
</tr>
<tr>
<td>percent PRI</td>
<td>9%</td>
<td>43%</td>
</tr>
</tbody>
</table>
summarized in Table 3. These data show that preverbal objects in written discourse are often contrastive, and in spoken discourse are contrastive most of the time, while contrast for postverbal objects is infrequent. They thus strongly support our claim that topics, when invoked in the text, should be somehow either difficult for the listener to uniquely retrieve, or emphatic. They equally support S&G's claim that XV is a marking device for contrast/emphasis.

3.42 S&G argue that the text distribution of OV in Mandarin, for example the short RD and the high PRI, closely resembles contrastive structures in other languages, for example OV in Biblical Hebrew, which they go on to compare to Y-movement in English. We have two things to say about this. First, by the data they cite from Fox (1983) in their Table 12, OV in Biblical Hebrew is always contrastive (as measured by PRI), whereas in spoken Mandarin OV is not always contrastive in this sense (80%), and in written Mandarin only about half the time. In other words, Mandarin OV is only sometimes literally contrastive, whereas OV in Biblical Hebrew, and Y-movement in English are always contrast devices.

Secondly, Y-movement in English in not just a contrast device, but is also has TOPIC function in our sense (Z.l). Y-movement in text is often followed by repeated "use" of the fronted entity, e.g.

6. "I didn't see Mary there; JOHN I saw right away. He was dancing with George and wearing a really weird outfit."

In other words, whatever similarity there is between OV in Mandarin and Y-movement in English strengthens our claim that Mandarin OV is a form of topic-marking.

3.43 S&G view their contrast/emphasis category as an aspect of discourse accessibility. Now contrast, to the extent it is measured by PRI, does reflect accessibility in the sense that if a referent has competition in the immediately preceding discourse, it is less uniquely accessible to the listener. But this is not true of emphasis. An entity may be emphasized, and at the same time be uniquely accessible and thus fully clear to the listener. Many of S&G's own examples from spoken discourse bear this out. The following excerpt is from their (22c-e):

7. ...nǐ guǎng luójì shàng dōng le hái bù-xíng; nǐ bìxū yǒu only logic on know AM still not-good you must bā nèi dōngxi chītòu, cái zhēnzhèng bā dōngxi xué dào shǒu le OM that stuff eat-well then really OM stuff learn to hand AM

"if you only understood logically, it's still no good; you must understand the stuff thoroughly, only then will you have really learned the stuff"
The "stuff" in question has already been established as topic, and there is no competitor in sight. If the underlined NPs are omitted, no uncertainty whatever arises about what is being referred to. What is lost, however, is emphasis.\(^{13}\) and the emphasis is on the events of 'understanding' and 'learning', not on the 'stuff' invoked in preverbal position. This and similar examples in S\&G of emphasis associated with OV do not in fact support their implicit claim that OV marks discontinuity in the sense of contrast,\(^{14}\) since there is no referential ambiguity, but only emphasis. On the other hand, these examples are fully consonant with our TOPIC construct: if the speaker invokes a topic in the text when there is no uncertainty for the listener about its identity, then the listener will infer emphasis on that entity, or somewhere else in the event.\(^{15}\)

3.44 Another discourse example from S\&G (their no. 22) shows particularly clearly how OV can link weak contrastiveness with topicality.

8. (context) Zhè yú-piàn zhòu, shī yòng yī-jīn-bān zhī liǎng-jīn de xiān-yú zuò de. 'This sliced-fish stew* is made by using 75 to 100 grams of fresh fish.' (*zhōu = soupy cooked rice)

a. Xiān qù-diào lín hé nèi-zàng, 'first remove the scales and internal organs first go-away scale and internal-organ and internal organs'

b. jiāng bù dàì cì de bùfèn qiě chéng bāo-piàn, 'cut the bonels part OM boneless SB part cut become thin-slice into thin slices'

c. bān hǎo zuǒ-liào, '(and) mix (it) well (with the) mix good help-material flavoring (=spices, etc.)'

d. Dài shā-gū lǐ de zhōu áo hǎo hòu, 'after the rice in the wait earth-pot in SM rice cook good after pot is well cooked'

e. Jiāng yú-piàn fàng rù zhōu lǐ jiăobān, 'put the fish slices OM fish-slice put into rice in stir into the rice and stir'

f. Zài zhǔ yǐ-hū̀ jìu kě qǐ gūō. 'cook (it) a while longer, again cook l-while, then may out pot then you may remove the pot'

S\&G point to two instances of OV (8b & e) to support their contrast hypothesis, which they point out themselves are only weakly contrastive, presumably in the sense of PRI. But they fail to mention two instances of VO (8a & c) which are equally contrastive in this sense. If Mandarin OV were a direct contrast-marking device, then these objects should also have been fronted.

If on the other hand we rank the five entities in order of prominence, both in terms of frequency of mention in this passage, and of their centrality to the sliced-fish stew receipe, we find that the stew itself and the main ingredient have been accorded OV status, while the lesser ingredients and the waste have been relegated to VO:
OV

\{stew
\{boneless parts, fish slices
\}

VO

\{flavorings
\{scales and internal organs
\}

The occurrence of OV in this passage thus shows only a partial correlation with weak contrast, but an intimate correlation with prominence, and with TOPIC in our technical sense: preverbally invoked entities continue to be active in the discourse, while the postverbally invoked ones do not.

4.0 Our TOPIC hypothesis for the positioning of constituents with respect to the verb in Mandarin has three advantages over the definiteness hypothesis of L&T and the contrast hypothesis of S&G. First, it is able to more fully account for the quantitative pattern of discourse data observed by S&G than the other hypotheses. Secondly, it is able to account for emphasis and prominence effects which are not accompanied by contrast in the literal sense of competition with other possible participants. Finally, it provides a unified theoretical account for diverse kinds of message effects—definiteness, referential continuity, contrastiveness, emphasis, prominence—by showing these all to be inferences from one underlying construct. "Definiteness" is not the meaning of OV, but rather an indirect consequence which the listener infers from an entity marked as topic. Similarly, "contrastiveness" and "emphasis" are not the meaning of OV, but rather are inferences from the fact that topics are normally not invoked in the text at all.

Footnotes

1. L&T claim that "Tendency A: nouns preceding the verb tend to be definite, while those following the verb tend to be indefinite (p. 170)," with certain exceptions based on morphological marking and "inherent" or "non-anaphoric" definiteness. S&G claim that their data "seems to demonstrate rather conclusively that L&T's hypotheses, at least with regard to their Tendency A, are not borne out by the facts of the language as actually used (p. 336-7), and again that their data "suggest that it cannot be the case that the VO order in Mandarin codes indefinite objects, while the OV order codes definites (p. 344)." They do hedge this claim, however, with the observation that "the great majority of OV constructions occur with definite objects (p. 344)." This hedge will be crucial in our own analysis.

2. A clear example of closed-text theory is to be found in Halliday and Hasan (1976), who view text cohesion as a relationship among elements of the text. Givon (1983), in discussing the history of research on topicality, points out that "the various strands of this tradition tended to divide sentences (clauses) into two distinct components, one of them the "focus"..., the other the "topic"...we tended to incorporate uncritically our predecessors..."
view of "topic" as an atomic, discrete entity, a single constituent of the clause (p. 5, emphasis ours)."

We feel that S&G’s contrast hypothesis implicates a closed-text theory, since it limits itself methodologically to constituents in the text, rather than taking evoked participants in the reader’s constructed text-world (i.e. "zero-anaphora") equally into account. In other respects, Givon’s work in general (e.g. 1983, 1984) is a clear example of open-text theory.

3. Chafe (1976) clearly distinguishes the pro- and retroactive aspects of "topic," but does not elaborate. Li and Thompson (1981) elaborate on this (pp. 100-103): retroactively, "one of the functions of topic..is simply to relate the material in the sentence of which it is a part to some preceding sentence." Proactively, "when a speaker wants to contrast two items, s/he places them as the topics of contrasting sentences," and "the topic has priority...in determining the reference of a missing noun phrase in the sentence that follows." Our analysis generalizes on the proactive functions pointed out by L&T, and reanalyses the retroactive "function" as a communicative consequence of proactive function.

4. "Prominent," for example, as measured by the number of links to other parts of the knowledge structure. The relative "prominence" of a chunk of information in a knowledge structure has, surprisingly, been explored much more extensively in the Artificial Intelligence literature than in the psychological or linguistic literature (see, for example, Grosz (1981) and Bullwinkle (1977). This is a promising buttress for linguistic research, and we plan to link our work on TOPIC in Mandarin to the work on knowledge structures and their relation to "Deictic Centers" in narrative discourse (Bruder et al., 1986) in the Cognitive Science research group at SUNY Buffalo.

As an anticipation of such research, three ways in which a "topical" information chunk might be prominent in a speaker’s knowledge structure come to mind. First, a chunk might be permanently prominent, independent of any particular context. Such chunks might be the names of familiar people; familiar time intervals such as morning, afternoon, week, year; and familiar places such as home, work, school, Buffalo, or Berkeley. Secondly, a chunk might be activated when a frame of which it is part is activated. Invoking a restaurant frame, for example, immediately makes the waiter, the food, the check, the bathroom prominent.

Finally, a chunk might be activated when it is imbedded in the (perhaps temporary) knowledge structure from which the speaker constructs a particular discourse. In particular, the chunk would be prominent in proportion to the number of events to which it is linked in the structure. For example, in the structure from which the narrative in (8) was created, "stew" is linked to all the events, and therefore immanently available as a topic domain when constructing the text; "fish slices" is linked to several events,
and also makes a good domain, but the "scales and entrails" are linked only to the event of being removed, and thus do not make a good topic domain.

5. This works for languages such as Mandarin whose structure is extensively responsive to the topical organization of knowledge structures (hence "topic prominent"). English is less obviously organized in this fashion, and needs pronouns to maintain topic continuity.

6. J. Myhill reminded us that these "low information reminders" are often grammatically obligatory. But the speaker can still choose to use them. For example in English the speaker can *choose* to use *Ø* and conjunction reduction as a package, or choose to use a pronoun with no reduction. The grammatical cooccurrence simply pushes the speech-production decision up to a higher constituent level.

7. These remarks are intended to place topic marking in the same domain as the marking of other grammatical information, such as case, aspect, or definiteness. No argument is needed to affirm that a language may have several devices for marking these notions, while another may have none at all, but rather use indirect means for getting the listener to infer them; and furthermore, that languages vary fundamentally in the grammatical means for expressing these notions.

   In addition to preverbal position, Mandarin has a set of discourse particles which seem to have topic-marking function (Li & Thompson, 1981, p. 86). Furthermore, topicality may be inferred from a variety of circumstances, the primary one of which is zero-anaphora (a zero in the text may be non-topical, but this is rare if an entity is introduced in a presentative construction, the listener may infer that it is a domain specifier for the following discourse (i.e. will control zero-anaphora), even though it never occurred in postverbal position.

8. In Mandarin discourse only one constituent generally occurs before the verb, if any. Instances in which more than one constituent occurs there include time/place adverbial + NP, instances of SOV and OSV, and the so-called "topic and subject" (Li & Thompson 1981) and "double subject" (Chao, 1968) constructions. We contend that these are all instances of two topic domains being specified in the same clause. An issue of considerable psychological and linguistic interest is the relation of the two topics so specified. We believe that the domain of the initial topic for the following discourse is greater than that of the second topic (i.e. the scope of the second is contained in the first). Facts supporting this hypothesis include: a) temporal/spatial adverbials almost always occur before entity NPs; b) of two entity NPs, the first will control following zero-anaphora more extensively than the second.
9. "Non-referential indefinite" NPs have been left out since these may be either "definite" or "indefinite" in different senses.

10. We hope we are not causing confusion by using "continuity" somewhat differently than Givon (1983) does. He uses it as a cover term for a variety of measures of how uniquely "available" a particular entity is at a given point in the text. We are restricting it to those measures, such as his RD, which focus on how recently and/or how often an entity has been evoked in the previous discourse (c.f. Zubin, 1979, for such continuity measures applied to subjects in German), but not on potential competitors or on thematic support.

11. S&G report both median and mean distances, but consider the median to be more reliable for technical reasons.

12. We do not report S&G's data for pronouns, or definite nouns modified by a demonstrative or a restrictive phrase/clause. These categories showed little or no RD difference, a finding which they link to the extreme positions of these categories on Givon's (1983) scale of topic accessibility.

13. Actually, emphasis is still in the message, carried by the emphatic markers -tōu, cái and zhēnzhèng, by the repetition of nǐ, and by the general structure of the expressed thoughts. The emphatic effect of invoking a topic when the referent is already clear redundantly supports these other sources of emphasis.

14. S&G's argument on this point is hard to follow. They start by giving contrast, measured by PRI, as an aspect of discourse continuity/accessibility. Then they shift to "contrast/emphasis" alone in their summary statements and conclusions.

15. This accords fully with Hinds' (1977) observation that full NPs tend to occur in the clause which is the "pragmatic peak" of a paragraph, while pronouns and zero-anaphora occur in other clauses. Giving more information than necessary seems to be a widespread if not universal strategy of evoking emphasis. Deictic particles like "this" and "that" are used in many languages not only when there is possible ambiguity about reference, but when the speaker wishes to emphasize the event (cf. Kirsner, 1979, for a probing study of this phenomenon in Dutch). The strategy follows directly from Beaugrande's (1980, p. 107) principle of upgrading informativity.

16. One might conclude from our remarks in this paper that we reject S&G's position. The opposite is true. We fully agree with their methodological approach, and with their observations of contrast and emphasis effects. In fact, it is the insight of their approach and the precision of their methodology that enabled us to clarify and support our view of TOPIC, which we regard as an
extension of S&G's and L&T's positions. We hope that our TOPIC hypothesis in turn forces further refinements. The only good hypothesis is one which invites itself to be eaten by the next.

References


The general case: basic form versus default form
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1. The issue. In formal linguistics there are (at least) two
different ways to conceptualize the relationship between the
general case and a special or exceptional case, which I shall
refer to as the General as Basic view (BASI, /bési/, for short)
and the General as Default view (DEF0, /dɛf0/, for short).1

1.1. The BASI conceptualization. Here one case is taken to
be basic, deep, or underlying; its rule applies 'first', and
another rule alters the basic forms for another case. The BASI
view has dominated all aspects of generative grammar — syntax,
morphology, and phonology.

In syntax, for instance, it lies behind many familiar
treatments of word order, government and agreement, the expression
of grammatical relations, and of course gap-filler constructions.
Basic constituent orders are established and then altered to
permit constructions with other orders; basic case assignments are
made and then adjusted in certain contexts; basic constellations
of grammatical relations are subject to 'relation-changing' rules;
and basic phrase structure configurations are disturbed by
'unbounded movement' rules.

In morphology, the BASI view has provided the paradigm for
describing allomorphy that is (at least arguably) not reducible to
a series of phonological mappings. Such allomorphy is in some
cases determined word-externally, as in a Hungarian rule (cited by
Dressler 1985:61f) /s/ —> /l/ affecting the 2nd singular present
affix /s/ after stems ending in fricative sibilants, or in a Dutch
word formation rule -eur —> -rice posited by Booij (1981) in the
derivation of words like ambassad-rice 'female ambassador' (cf.
ambassad-eur 'ambassador' and ambassade 'embassy'). It can also be
determined by factors external to the word, as in a Sanskrit rule
-as —> -a affecting a particular inflectional affix before words
beginning with a voiced consonant, or in a German rule mentioned
by Radford (1977) which shifts als 'than' to denn before an
instance of als 'as' (and in other rules that avoid sequences of
phonologically similar items by replacing one of them by a totally
different item, the Spanish 'spurious se' rule discussed by
Perlmutter (1971:20-5) being a familiar example).

In phonology, as in syntax, the generative approach posits a
set of underlying or basic representations that are altered by the
application of rules. Orthodox generative phonology does not
systematically distinguish variation in phonological form that is
morphophonemically from variation that is allophonic (as structuralist
frameworks do) or nonautomatic variation from automatic (as the
framework of Natural Phonology does), but in adopting a BASI view
of such variation it continues an older tradition, in which 'basic
allomorphs' and/or 'basic allophones' play a central role. On
this view, the fact that the English verb leave has /liiv/ as its
general allomorph is described by taking /liiv/ to be its
underlying phonological representation, so that this is the form
that remains when no rule changes it, in particular when neither
the (morphologically triggered) laxing of its vowel nor the
(phonologically triggered but lexically restricted) devoicing of
its final consonant is applicable, as they both are in the past
tense form left. And the fact that the phoneme /t/ has an unaspirated voiceless alveolar stop as its general allophone is described by taking [t] to be the basic representative of the phoneme, so that this is the allophone that remains when no rule (not aspiration, or flapping, or glottalization, or any other) changes it, as in stop.

1.2. The DEFO conceptualization. Here one case is viewed as the otherwise, or elsewhere, contingency; its rule applies "second", and it is overridden by the rule for another case. Overrides will follow from the most general sort of (meta)principle, (1), but they might also be predicted by more specialized assumptions, such as (2), or they might be stipulated for particular pairs of rules, as in the following comments by Anderson (1983:15) on his analysis of Georgian: "...the /-t/ and /-s/ rules constitute "competing" suffixation processes and thus belong to the same disjunctive block. When both are motivated by the structure of the form...only /-t/ appears - indicating that the /-t/ rule precedes the /-s/ rule within their common block, just as the /g-/ prefix rule takes precedence over the /v-/ rule within theirs."

(1) Panini's Principle: The more specific rule overrides the more general.
(2) Lexical Blocking: Properties specified in the lexicon override those provided by morphological rules.

The DEFO viewpoint has often been expressed in linguistic descriptions, but for the most part this expression has been informal, largely a matter of references, within ordinary-language accounts of linguistic phenomena, to what happens 'elsewhere' or 'otherwise' or to what is the 'usual', 'typical', or 'normal' situation. Examples abound in the literature on syntax, morphology, and phonology.

A number of streams have now converged, however, to make the systematic exploration of the DEFO viewpoint attractive. From outside of linguistics, there is the treatment of conditionals in most programming languages, involving ordered statements of the form (C₁ A₁), (C₂ A₂), ..., which express a series of levels of defaults: if condition C₁ holds, then do action A₁; otherwise, if condition C₂ holds, then do action A₂; and so on. And (perhaps not unconnected with the first fact) there is the exploration of default logics in artificial intelligence, especially in connection with the frame concept (see, for example, Hayes 1980).

Within linguistics itself, the active investigation of principles (1) and (2) - versions of the first in such theoretical proposals as Proper Inclusion Precedence (Koutsoudas et al. 1974) and the Elsewhere Condition (Kiparsky 1973), versions of the second in such approaches to the lexicon as those of Halle (1973) and Jackendoff (1975) - has introduced override/default thinking as a central part of theory construction. What is important here about (1) and (2) is that both treat one statement not merely as preceding another (that might simply be the extension of ordering, as a mechanism for specifying interactions, into new territory), but also as precluding it.

Explicit default statements are provided in phonology by Chomsky and Halle (1968:405-7), in the guise of markedness conventions - the default value for the feature NASAL is MINUS,
and so on - and in syntax throughout the literature on generalized phrase structure grammar (see Gazdar et al. 1985:29-31) - the default value for the feature INVERTED on an S is MINUS, the default situation for a V is not to have the value PASSIVE for the feature VFORM, and so on. In fact, it is the enormous success of GPSG in its program of replacing the BASI approach characteristic of generative syntax with a thoroughgoing DEFO approach to this component of grammar that served as the proximate inspiration for my reflections in this paper.

1.3. Choosing between BASI and DEFO. Suppose X is the general case, with special alternant Y occurring in context C. Then it might seem that there is no substantive difference between saying that X is basic, but is altered to Y by a rule applying in C, and saying that a rule stipulates that Y occurs in C, with X occurring elsewhere. And in fact, if we are considering only one such pair of alternations, there is not much difference. But when we expand our field of vision to take in several such alternations in potential interaction with one another, the two conceptualizations become distinguishable. What is crucial is that a BASI analysis is derivational, while a DEFO analysis is monostatal: rules of the former type map representations into representations and so induce a series of representations, each of which is available as the locus for the statement of other generalizations (that is, as a stratum at which conditions can be stated or to which rules can apply), while the rules of the latter specify a set of conditions, some of them overridden by others, but all holding for a single stratum of representations.

There are circumstances in which BASI seems clearly to be the right view. In particular, crucial feeding interactions between rules belonging to the same component of grammar will argue for a BASI view of that component. And such interactions are well attested within at least two sets of rules: the set of automatic phonological rules (the processes of Natural Phonology), including both allophonic rules and automatic morphophonemic rules; and the set of morphological rules (to use the terminology of Dressler 1985), within which I mean to include at least those rules that are phonologically triggered but apply within morphological or syntactic domains (rather than within prosodic domains, as is the case for automatic phonological rules).

Two brief, and familiar, illustrations. First, from the autphonological (automatic phonological) rules of English, consider A_1, which expresses the variation between (a) voiced obstruents as the general case and (b) corresponding voiceless obstruents as the special case in syllable-final position after a voiceless obstruent; and A_2, which expresses the (optional) variation between (a) voiceless stops as the general case and (b) the glottal stop as the special case in syllable-final position. In a BASI analysis, A_1 will feed A_2, so that the word *slopped* is predicted to have [slap] as a pronunciation. But a DEFO analysis predicts counterfeeding here; feeding could be described only at the cost of embedding the conditions for A_2 within the statement of A_1 and consequently duplicating the statement of A_2.

A parallel case can be made for morphological rules. Consider the rules governing the declension of nouns in Latin, among them M_1, which expresses the alternation between (a) stems ending in /t/ as the general case and (b) stems lacking this /t/ before /s/; and M_2, which expresses the alternation between (a)
short stem vowels as the general case and (b) long stem vowels as
the special case before /n+s/.

In a BASI analysis, M₁ will feed
M₂, so that the nominative singular (with affix -s) for the
'tooth' stem (genitive singular dent-ís) is predicted to be
dent-ís. But a DEFO analysis predicts counterfeeding again; feeding
could be described only at the cost of embedding the conditions on
M₁ within the statement of M₂ and consequently duplicating the
statement of M₁.

So far I have argued that there are two components of grammar
in which BASI seems to be the right view. Are there, then,
arguments that for other components DEFO is correct instead?

My positive answer to this question turns mainly on the fact
that BASI can be extended easily to give analyses for phenomena
covered by DEFO, by stipulating that some rules apply only to
basic representations; the result is a certain number of
counterfeeding interactions. However, no simple tinkering will
extend DEFO to cover characteristically BASI phenomena, in
particular feeding interactions. It follows that DEFO is the more
constrained view of rule interaction within a component of grammar
and so has a prior claim on our attention. That is, DEFO ought
itself to be the default view of how rules work in a component of
grammar, with the more powerful BASI view adopted only on the
basis of evidence that DEFO is inadequate for that component. I
will in fact take the position that BASI is the right view only
for morphonology and authroponology, and that all other rule
components are to be seen in DEFO terms.

There are also situations in which a DEFO analysis is natural
and a BASI analysis is at least strained. Here I have in mind
cases where an ultimate default X is overridden by Y in a special
context and where this Y is overridden by X again in a still more
specific context - for instance, the fact that instances of +N
categories (nouns, adjectives, and determiners) in German are
generally declined, but that instances of the subclass of
adjectives are usually indeclinable, but that instances of
prenominal adjectives are declinable; some Welsh examples are
provided in section 3 below. BASI requires that X be mapped into
Y and then back into X, a derivation that in many cases seems to
be an artifact of the BASI view rather than a genuine claim about
particular languages.

2. On the overall organization of grammar. It will be
obvious from my remarks so far that I am assuming a rather highly
articulated theory of grammar. This is not the place to tell the
whole tale, and certainly not to justify the way in which its
episodes unfold, but a certain amount of detail is necessary if I
am to show what roles DEFO and BASI play in the action.

To begin with, I assume that a grammar is organized into at
least the six components listed in (3). Of these, the components
named in parentheses will not be under consideration here, nor
will the semantic component, which in any case does not appear in
(3). I will have more to say shortly about the shape component,
which is the place where the lexicon interacts with (3). But first
I note the derivational character of (3); though I am proposing
that the DEFO view is the correct one within all the components in
(3) except morphonology and authroponology (where BASI holds sway),
I assume that the components as wholes are ordered with respect to
one another as in (4) - an assumption that predicts rule
interactions of all sorts (feeding, bleeding, counterfeeding,
counterbleeding, and others that have no standard names) between rules in different components.

(3) SYNTAX - (LIAISON) - SHAPE - MORPHONOLOGY - (READJUSTMENT) - AUTFONOLOGY

(4) Component Ordering: The application of a rule in one component C in (3) precedes the application of any rule in a component following C in (3).

Next, I observe that an individual component can be subject to interactional principles of its own; Donegan and Stampe (1979), for instance, maintain that interactions within the autphonological component obey the special requirement that all applications of 'fortition' rules precede all applications of 'lenition' rules. Indeed, nothing I have said would exclude the possibility of a component's having a complex organization of its own, involving several subcomponents. This is just what I claim about the shape component.

The gross structure of this component is sketched in (5). Again, I cannot justify, or even explain, the main points of these proposals. A few remarks will have to suffice.

(5) IMPLICATION / REALIZATION / FORMATION
LEXICON
SHAPE CONDITIONS

In this picture the lexicon, in the middle, is a complete (and therefore highly redundant) enumeration of the properties of individual lexical items. Among these properties for each item is its i-list, which pairs morphosyntactic features with the phonological features of the corresponding i-form (inflectional form) of the item (for the English verb rob, pairing [TNS:PRES, PERS:1, NUM:SG] with the i-form /rab/, [TNS:PRES, PERS:2, NUM:SG] with /rab/, [TNS:PRES, PERS:3, NUM:SG] with /rabz/, etc.).

Three groups of 'morphological rules' express generalizations about the properties of lexical items: (a) an implication rule* (IR) predicts properties of an item from other properties of that item (predicting, for instance, that nouns of a certain gender will belong to a particular declension class); (b) a realization rule* (RR) predicts some of the contents of i-lists; it predicts the phonological features of i-forms from their morphosyntactic features plus the phonological features of the base for the item (predicting, for instance, that the plural of a noun will be formed by suffixing certain phonological material to its base); and (c) a formation rule* (FR) predicts the existence of some items (derivatives) from the existence of others (one or more sources), and also predicts properties of derivatives from properties of sources (predicting, for instance, that corresponding to adjectives of quality the lexicon will contain abstract nouns formed by suffixing certain phonological material to the base of such an adjective).*

Within each of these three subcomponents the unmarked DEFO view can apparently be maintained. In the case of RRs, for example, overrides that follow from Panini's Principle, (1) above, are quite common; see the illustrations from German inflection in Zwichy (1985a).
All three subcomponents are also subject to the principle of Lexical Blocking in (2), according to which properties given for individual lexical items override those specified by IRs, RRs, or FRs. For instance, listing irregular inflectional forms (like the past tense forms *brought, did, and went*) in the lexicon blocks the forms predicted by RRs.

As I note in (6), RRs are overridden as well by the remaining type of rule in (5), namely shape conditions (SCs). An SC specifies aspects of the phonological shape of i-forms, but 'postlexically' - by reference to triggers at least some of which lie outside the syntactic word. Many rules traditionally classified as external sandhi rules are SCs: the Sanskrit rule requiring *-a* in place of the default *-as* (sec. 1.1 above), and the English rule for *an* in place of the default indefinite article *a*, for instance. So are most of the conditions that have been treated under the heading of 'surface structure constraints' or 'surface filters': the Spanish condition (again from Perlmutter 1971) requiring that clitics fit the template *se II I III*, for instance. So are rules substituting one i-form for another in a partly syntactic context: for example, the Spanish spurious *se* rule already mentioned (substituting the reflexive clitic for the first of two third-person clitics), not to mention a Spanish rule replacing a feminine singular definite article by the masculine and a similar French rule replacing a possessive pronoun in the feminine singular by one in the masculine (see Zwicky 1985b). 10

(6) Shape Blocking: Features specified by SCs override features provided by other statements in the shape component (in particular by RRs).

The scheme in (4) is undoubtedly complex. It is also quite different in character from the scheme in (3), where the components of grammar are related to one another in much the same way that rules are related to one another on the BASI view. In (4) the subcomponents come in three groups, related to one another in much the same way that rules are related to one another on the DEFO view, with SCs overriding stipulations in the lexicon, and those in turn overriding features provided by morphological rules, including RRs.

The two component schemes, the BASI-style (3) and the DEFO-style (4), intersect in the shape component. Together they make a number of predictions about rule interactions; they predict, for instance, that the phonological operations associated with RRs and FRs come at the beginning of an ordered chain of 'phonological' rule-types, as in (7), and that since SCs precede morphological rules, as in (8), they can feed them.

(7) 'Phonological' Rule Ordering: All phonological operations in RRs and FRs precede all morphological rules, which in turn precede all autophonological rules.
(8) Shape Ordering: All SCs precede all morphological rules.

3. Defaults in Welsh mutations. I now explore the SC subcomponent, illustrating the utility of the DEFO view within this subcomponent and exploiting the ordering assumptions in (3) and (4) - which have syntax preceding SCs - and (8) - which has SCs preceding morphological rules. My vehicle for this
exploration will be a small portion of the system of Welsh consonant mutations.

These mutations involve, to begin with, some type of 'phonological' rules; the facts to be described are alternations in the phonological shape of i-forms (cath 'a' cat' in some circumstances, gath in others, nghath in a third set, and chath in yet another, with a parallel series involving cathod 'cats', gathod, and so on). The alternations are transparently not automatic, nor is their primary and productive function as concomitants of RRs or FRs, so that in the framework I have been developing they are either SCs or morphonological rules. I shall in fact be claiming that in a sense they are both.

When we ask about the principles that pick out the words subject to mutation, it is quite clear that in general they refer to syntactic phrases belonging to various categories, not to individual words, much less i-forms. It is bare NP adverbials that manifest the 'soft' mutation, not just bare N adverbials: 'every day' is pob dydd when it functions as subject or object, but bob dydd, with a mutated initial quantifier, when it functions as an adverbial. In similar fashion, a vocative NP shows the soft mutation, as does a direct object NP in certain circumstances, a subject NP in other circumstances, an NP object of most common prepositions, a feminine singular AP, and a feminine singular Nom in construction with the definite article.

Finally, it is also clear (even from this brief listing of contexts for mutated forms) that many instances of mutation are 'untriggered', which is to say that their triggers are syntactic rather than lexical; no morpheme, word, or i-form is available to trigger the soft mutation for bare NP adverbials, for example.

I cannot see any satisfactory way to analyze these facts without dividing the burden of description between a set of principles (highly sensitive to syntactic structure) distributing abstract features for mutation and a set accounting for the phonological effects of these features on individual words. Principles in the first set are SCs; those in the second are morphonological rules. At least some of the SCs are sensitive to case features distributed by syntactic rules, in particular to the difference between the NOM[inative] case of subjects, the GEN[itive] case of prenominal modifiers like the 2 sg dy 'your' in dy gath 'your cat' and postnominal modifiers like cath in pen cath 'a cat's head', and the ACC[usative] case of (among other things) direct objects of finite verbs, as in Gwelodd y dyn gath 'The man saw a cat'. I will then be using the assumptions of the previous section which order syntax before SCs and these before morphonological rules.12

The syntactic side of these matters itself involves defaults. I will assume that government rules mark certain NPs as NOM and certain ones as GEN (among the latter being the direct objects of infinitive verbs, or 'verbal nouns'); the ACC marking is the default. The result is that not only do direct objects of finite verbs receive the feature ACC, but so do the objects of (most) prepositions, bare NP adverbials, and vocative NPs.

On the SC side of these matters we are concerned with the distribution of the feature values -MUT[ation] and +MUT; for +MUT phrases, the distribution of the features SOFT, SPIRANT, and NASAL (only the first of these under illustration here); and for SOFT phrases, the distribution of the rule features MRI (voicing of
initial consonant), MR2 (spirantization of initial consonant), MR3 (shift of initial consonant to /v/), and MR4 (deletion of initial consonant).

I now summarize the main lines of the SC part of the analysis, without justifying or illustrating these formulations of the rules:

(A1) The ultimate default setting of MUT for individual words is -MUT.
(A2) But the setting of MUT in certain circumstances, in particular for initial words of N-type constituents (NP, Nom, N), is +MUT, overriding (A1).
(A3) But the setting of MUT in still more specific circumstances, in particular for initial words of an NP with the case feature NOM when that NP follows a V, and for initial words of any NP with the case feature GEN, is -MUT, overriding (A2).
(B1) For +MUT words, the default mutation feature is SOFT.
(B2) But in certain circumstances (following particular prepositions and possessive pronouns) the mutation feature is SPIRANT or NASAL.
(C1) For words with the feature SOFT, the default rule features are MR1 affecting voiceless consonants, MR2 affecting /d/, MR3 affecting labials (/b m/), and MR4 affecting /g/.
(C2) But in certain circumstances other rule features are stipulated; in particular, the definite article yr and the predicative particle yn block the application of MR1 to liquids, and various negative particles require that voiceless stops be affected by MR2 rather than MR1.

A few comments on the principles in (A3). Making subjects (more exactly, NPs with the case feature NOM) immune to mutation only when they follow a (trigger) V predicts that subjects in other positions are mutated, which is correct; see the discussion of 'separated subjects' in Zwicky (1984). Making all GEN NPs immune to mutation predicts, correctly, that the (GEN) objects of infinitive verbs are unaffected, and also that the possessive pronoun dy is never mutated, even though it begins with a mutable consonant - its SOFT version would be ddy - and can occur in contexts where NP-initial mutation would be expected by (A2), for instance in the object of the preposition i 'to': i gath 'to a cat', but i dy gath 'to your cat' and not *ddy gath.

The system of Welsh mutations is undoubtedly complex, but if we look at these phenomena in a highly modular framework and take the DEF0 view of the way rules apply within (at least) the subcomponent of shape conditions, then it is possible to discern that (despite considerable lexical idiosyncrasy) it is in fact a system, governed by general principles.

Notes

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teaching at the Beijing Language Institute, where most of the theoretical ideas in this paper were developed.

1. This short paper touches on a huge range of issues in theoretical syntax, morphology, and phonology, and it is impossible for me to cite the relevant literature in full, or even to give credit to everyone whose work has directly influenced mine. My apologies in advance to those whose ideas have been oversimplified by compression or (apparently) ignored entirely. The things that do get cited are the ones at the top of my intellectual stack at the moment.

2. Here I follow Ladusaw (1985) in making a distinction between levels of representation — the components in section 2 below — and strata within a level.

3. Neither alternation is automatic; /ts/ occurs in the language, as do short vowels before /ns/.

4. Just this proposal is made by Donegan and Stampe (1979) to permit counterfeeding interactions in autophonology.

5. This is not to deny that on occasion (as Pullum 1976 observes) there might be motivation for such a ‘Duke of York’ derivation.

6. A close correspondent to the ‘lexical redundancy rule’ in some other frameworks.

7. That is, a rule of inflectional morphology.

8. A close correspondent to the ‘word formation rule’ in some other frameworks. FRs are rules of derivational morphology and compounding.

9. There is considerably more to be said about RRs and FRs. I assume that the phonological aspect of these rules is to be described by reference to a set of allomorphy rules (AMRs). A single morphological rule might involve several AMRs — with, say, suffixation of /iti/ to the base, shift of stress to the final syllable of the base, and vowel changes in that syllable all associated with one rule (divinity, porosity). And the same AMR might play a role in several rules, of both types — with a certain vowel change, say, associated with a past tense RR (slept), a noun-forming FR (serenity), and an adjective-forming FR (Hellenic).

In addition, some RRs do not describe the realization of morphosyntactic features directly, but instead refer this description to the realization for some other set of features. See the discussion of rules of referral, as opposed to rules of exponence, in Zwicky (1985a,b).

Finally, though FRs usually ‘build on’ source bases (that is, their AMRs usually operate on bases), they can build instead on a specified i-form of the source, as when English derives adjectives directly from past participles (un)cooked, bent, written).

10. Such rules are the SC correspondents to the rules of referral mentioned in the previous footnote.

11. These are the AMRs of footnote 9.

12. The sketch for an analysis that follows here is based on the observations of Zwicky (1984). The proposal that +MUT be taken as the default setting at some level is advanced there, and in a more restricted fashion by Willis (1982).
References


Interacting Semantic Systems: Mixtec Expressions of Location
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0. Introduction: This paper concerns the interaction of two semantically related classes of lexical items in the Chalcatongo dialect of Mixtec, an Otomanguean language spoken in the state of Oaxaca, Mexico. The two systems that we will discuss are the verbs of location and the set of body part terms (hereafter, BPTs) which express locative relationships. We will describe their interaction with reference to the following considerations: first, what kinds of semantic information are coded in each of the two systems and how the semantics coded by one system differs from that of the other; and second, how these different lexicalization patterns combine to produce a highly-elaborated expression of the locative relationship. Because each system uses semantic parameters different from those encoded in English verbs and prepositions, we will briefly contrast the two languages with respect to the issues mentioned above.

1. Mixtec

1.1. Verbs of Location: Our claim that the Mixtec verbs of location encode different semantic parameters than those encoded by the BPTs might be taken as implying that the semantic parameters employed are uniform across each system. This is not the case, however. In fact, the set of verbs of location includes forms ranging from a generic "be located," to many forms which entail being in a particular location, but whose primary denotation is much more highly elaborated (for example, the stative "be locked in").<1> We have limited ourselves in the present study to formally intransitive verbs, including forms which code posture of Figure or a particular spatial relation between Figure and Ground.<2> One factor which does constrain the set we are concerned with is that they all either require or strongly tend to collocate with locative expressions containing BPTs.

The term "Figure" will be used to refer to that entity of which location is being predicated; in our Mixtec examples this will always be expressed linguistically by the subject which is clausemate of the locative expression containing a BPT. The term "Ground" will always refer to the entity relative to which the Figure is located, expressed by a noun-noun sequence which includes a BPT.<3> Actually, the Ground is sometimes referred to by a simple noun without a BPT, but we exclude such cases from consideration here after a preliminary conclusion that this possibility is restricted by independent principles, i.e. constraints both on the nature of the spatial relationship and on the type of entity identified as Ground. We will also not be considering abstractions in such expressions as in place of...
The verbs of location that we will be considering are given in (1), with provisional glosses (some of which will be modified later).<4>

1. Generic
   (a) hízaa(R-Sg) / kúžaa(P-Sg)/
       káísikú(R-P1) / kúísikú(P-P1) - 'be located (generic)'
   Posture
   (b) híndíi(R) / kúndíi(P) - 'be standing'
   (c) ndúkoo(R) / ndúkôô(P) - 'be sitting'
   (d) hítuu(R) / kutuu(P) - 'be lying'
   Position
   (e) híndee(R) / kundee(P) - 'be in'
   (f) hísndee(R) / kusndee(P) - 'be on (top of)'
   (g) kándee(R) / kundee(P) - 'be in, hidden from view'

As (1) shows, the verbs encode a diverse range of details relevant to spatial relationships, for example, posture of the Figure (1b-d), position of the Figure relative to the Ground (1e-g), and whether the Figure is visible (1g). The members of this set cannot be described paradigmatically or taxonomically, since there is no lexicalized opposition between, e.g., "be located, hidden from view," and "be located, visible," or "be on (top of)" and "be underneath." This lack of paradigmatic opposition, however, is not unexpected in such a broad category (see Talmy 1985b).

1.2. Body Part Terms: BPTs in Mixtec often appear as the first element in a noun-noun sequence with the second noun indicating the entity of which the BPT denotes the Subregion, as in (2):

2a. šini ndá?á - Finger  b. siki kiti - Horse's back
    head hand               animal+back horse

Regular analogical principles allow the BPTs to be used to identify subparts of inanimate objects. In identifying such subparts, the noun-noun sequences can serve either as nuclear terms of their clauses (as in (3)), or in locative expressions (as in (4) and (5)):

3. nda?á yánu tá?nu
   arm tree break
   The tree's branch is breaking
4. hižaa-re šini yuku
   be+located-3SgM head mountain
   He is at the top of the mountain
5. hikà wàa hižaa nuú mesa
   basket the be+located face table
   The basket is on the table
In example (4) the configuration of the human body is imposed on the mountain such that its top area is referred to as its "head". In (5), the top of the table is referred to by nu\u0161a 'face.' This term has the widest, or most general use of all the BPTs. Among other uses which we will describe below, nu\u0161a can be used to refer either to the front or to the top surface of a box-like object, such as a table.

When BPTs are used in locative expressions, there is no other explicit marking to indicate that the sequence is being used to refer to the location of a state or event, nor to constrain the possible nature of the spatial relationship, nor to mark complement or adjunct status of the locative. We have argued elsewhere (Brugman 1983) that BPTs are neither semantically nor syntactically interpretable as prepositions.

Only a subset of the whole list of BPTs can appear in locative expressions. The rest can be used only as nuclear terms, describing a Subregion of either an animate or inanimate Ground. The terms which we know to be used in locative expressions appear in (6).

6. (a) šini - 'head'                      (e) nda\u0161a - 'hand/arm'
    (b) ha\u0119a - 'foot/leg'               (f) žata - 'back [human]'
    (c) š\u0101kš - 'back [animal]'         (g) či\u0119 - 'belly'
    (d) ini - 'stomach'                    (h) nu\u0161a - 'face'

BPTs are also used to refer to areas near to but outside of the boundaries of the named subpart of the object. Examples (7) and (8) illustrate this use:

7. ni-ndečé źź sa\u0161a šini ž\u0101nu  
   Cp-fly one bird head tree 
   A bird flew over the tree

8. ni-ndečé źź sa\u0161a žata ž\u0101nu  
   Cp-fly one bird back tree 
   A bird flew behind the tree

In (7) the area over the tree is coded with the word for "head", while in (8) the area behind the tree is coded as žata 'back'. We will call this the Adjacent Space use of a BPT, and define it as requiring that there be no contact between the Figure and Ground.

When the BPTs are used in locative expressions, there may be ambiguity between the Subpart and the Adjacent Space readings. We will show that part of the work of disambiguation is done by the verbs with which the BPTs collocate. However, there are also lexical conventions according to which some BPTs have only one of the two possible readings. Two exceptional cases we have noted are nda\u0161a 'hand', for which an Adjacent Space reading is not available, and žata 'back', for which a Subpart reading is not available. Thus, while šini in (7) can be used to refer to a space in the air adjacent to the tree's "head," thus rendering the English translation 'over,' nda\u0161a can never be used in this way, to
refer to an adjacent space in the air over a branch of the tree. A sentence corresponding to (7), in which nda?a replaced šini, could only mean 'the bird flew to the branch of the tree,' not 'the bird flew around, through, over, or under the branches of the tree.' Conversely, žata cannot be used to refer to the upright back surface of an object in a locative expression. It may only have the Adjacent Space interpretation. A sentence like (8), then, can only mean "A bird flew behind the tree," never "*A bird flew to the back (branches) of the tree."

It was mentioned earlier that nuù 'face' deviates somewhat from the other BPTs in that it is used to denote locations on a Ground which are not precisely analogical to a corresponding subregion on a human or animal body. The use mentioned earlier was that of nuù referring either to the front or top surface of a box-like object. There is also another unexpected facet of the use of nuù, as exemplified in (9) – (12), below:

9. saà ndéčé sìkì itú
   bird fly animal+back cornfield
   The bird is flying over the cornfield
10. saà ndéčé nuù itú
    bird fly face cornfield
    The bird is flying among the corn in the cornfield
11. ni-käžzáa ini ndùčá
    Cp-drown stomach water
    Someone drowned in the water
12. sučá-ró nuù ndùčá
    swim(P)-2SG face water
    You will swim in the water

At first glance, it is unclear whether nuù in (10) and (12) is being used with a Subregion or an Adjacent Space reading. While the action is not being performed in a three-dimensional area away from the Ground (hence, requiring an Adjacent Space reading), the Ground is also not, strictly speaking, two-dimensional (requiring a Subregion reading). Rather, the action is being performed through some medium in each case; the corn in the cornfield in (10), and the water in (12). We claim that this is, in fact, a Subregion use, by virtue of the fact that there is a salient two-dimensional surface in these examples. This surface is allowed to have a small amount of "depth" only because that depth is a small fraction of the total depth dimension. Also note that there is contact between the Figure and Ground in these cases, which is definitional to the Subregion use of BPTs. Accordingly, we will call this the "Shallow Subregion" use of nuù.

1.3. The Interaction of the Two Systems: The two classes of lexical items under discussion code interacting aspects of the more general domain "location." In a sentence containing both, verb choice may restrict the reference of the BPT (i.e. selecting for either Subregion or Adjacent Space use, within the constraints
on possible reading noted above for particular BPTs), while choice of a particular BPT may construct and define the space which licenses verb choice. We will first give some relatively simple examples with posture verbs, and then proceed to the more complicated cases.

1.3.1. Posture Verbs

Examples (13) - (17) illustrate typical sentences containing both a verb of location and a BPT. (13) - (15) are examples of Subregion uses, while (16) and (17) are Adjacent Space uses.

13. hîžaa nuû ndâ?a-ri
   be+located face hand-1Sg
   It is in my hand (chalk on open hand, lying or balanced upright)

14. hîtuu nuû ndâ?a-ri
    be+lying face hand-1Sg
    It is lying on my hand (chalk lying on open hand)

15. hîtuu ini ndâ?a-ri
    be+lying stomach hand-1Sg
    It is lying in my hand (chalk in closed fist)

16. rû?ù hindii-ri nûû Maríá
    I stand-1Sg face Maria
    I am standing in front of María

17. ndukoo ha?a žûnû
    sit foot tree
    He is sitting at the foot of the tree

Such cases give one a feel for the ways in which members of each lexical class are used, but pose no real surprises for the analysis. We will now proceed with more interesting cases, in which the BPTs interact with the verbs describing relative position of Figure and Ground.

1.3.2. Position verbs

Hîndeé: The following examples illustrate hîndeé 'to be in', in collocation with various BPTs:

18. kafée wâa hîndeé ini kaha
    coffee that be+in stomach box
    The coffee is in the box

19. halûlî-ro hindee ści mesa žâ?a
    child-2Sg be+in belly table that
    Your child is under that table

20. kiti-ré kundee nuû corral-ri ści
    animal-3SgM be+in(P) face corral-1Sg tomorrow
    His animals will be in my corral tomorrow
In (18), híndeë and ini 'stomach' collocate predictably. It is not surprising that the inside of a box would be referred to with the term for "stomach," and that something in this space would be located with the verb meaning "to be located in".

However, this is not the only possible BPT in a sentence with híndeë. Consider example (19). The Subpart reading of kíží 'belly', in kíží mesa, would describe the underside of the table top. But the Adjacent Space reading, which is the relevant one here, refers to the three-dimensional space beneath that underside, bounded on four sides by the edges of the table top. It is this bounded space that the child is in in example (19).

(20) is somewhat more complicated. As mentioned before, nù, 'face', is unusual among the BPTs in that it can code several Subregions. Apparently nù has become so abstract that it can now refer to any two-dimensional surface, whether it is vertically or horizontally oriented.<5> We see this in (21), in which nù codes the inside bottom surface of the "molcajeté" (the mortar of a mortar and pestle):

21. sá?a-rí ndučá?á nù molcajeté make(P)-1Sg salsa face molcajeté
I'm going to make salsa in the molcajeté

This latter use of nù, coding an inside bottom surface, is the same reading as that in example (20). Given this fact, however, we are forced to reconsider our understanding of the meaning of híndeë. If it means "to be in", in the intuitive, three-dimensional sense, then its collocation with the planar surface reading of nù is contradictory. Example (20) is evidence that this is not the most accurate translation for híndeë. A more precise gloss would be "to be within the boundaries of," a definition which is neutral with respect to dimensionality of the ground. We hypothesize that híndeë only requires that the Figure be within some bounded space, and that the BPT it collocates with fill in information about the shape of the Ground.

Thus, the appearance of ini in examples such as (18) is not redundant. Rather, it codes one possible shape of the Ground for which the Figure is in a híndeë relationship. Because ini refers to the three-dimensional interior of the Ground (that is, the box in (18)), the requirement of boundedness is explicitly met.

Note also that (20) is acceptable with ini in place of nù:

22. kítī-ré kundee ini corral-rí sīá
animal-35G M be+in(P) stomach corral-1Sg tomorrow
His animals will be in my corral tomorrow

The two sentences describe the same situation. Given the physical shape of a corral, which is a broad horizontal surface bounded by a low fence, the Ground is construable either as a three-dimensional container (expressed with ini), or as a saliently planar area (coded with nù). kundee (the Potential of híndeë)
just expresses containment, rather than giving any information about the shape of the Ground. Thus, it can collocate with either BPT, as long as the shape of the Ground is compatible with each construal. In this case the distinction expressed by the difference between ini and nuò could be described as "pragmatic" rather than "semantic," in the strict sense that the distinction codes the speaker's perspective on the situation rather than on the actual state of the world.

Kândee: Like híndee, kândee 'be in, hidden from view' collocates most frequently in our corpus with ini 'stomach'. This reflects the normal real-world situation, in which the Figure is hidden from view because the Ground is an enclosed three-dimensional container. Hiddenness, being more specific a feature than mere containment, entails "being within the boundaries" of the Ground. We claim that the dimensionality of the Ground is left unspecified with kándose just as it is with híndee. Consider the following examples:

23. kándee ŋé ŋazĩũ ini be?e wąa
   be+hidden one person stomach house that
   There is a stranger in the house
24. ndihá-rí kándee čii tškaĩ
   shoe-15g be+hidden belly blanket
   My shoes are under this blanket
25. kándee bina ŋó?ni nuò ndu?a wąa
   be+hidden now now face plain that
   He is on the plains right now

(23) illustrates the expected case of kández's collocation with ini, in which the object is hidden within a three-dimensional Ground: the house. (24), in which kández collocates with čii, describes shoes hidden under a saliently two-dimensional object, a blanket. This sentence contains a Subregion use of the BPT, as evidenced by the fact that the blanket and the shoe are in contact. In (25), there are two possible explanations for the use of kández. Either the subject is hidden by virtue of the fact that he is far away and out of sight, or he is hidden by the grass (or corn or whatever) growing on the plain. (The latter would be an example of what we have referred to as the "Shallow Subregion" use of nuò). In either case, however, nuò codes a two-dimensional surface, illustrating our point that kández is unspecified for dimensionality. Thus we claim that three-dimensional containment represents only the pragmatically most usual case for the use of kández, rather than reflecting a lexical requirement of this verb.

Hístdee: Having established that the nuò of (20) denotes a two-dimensional surface, one might speculate that a sentence like (26) would be acceptable either with hížaa 'be located (generic)' or hístdee 'be on (top of),' or that the verb künde (in (20))
could be replaced by kusndeē (the Potential of hisndeē), as in (27):

26a. bílu wāā hižaa nuū ūuu
    b. *bílu wāā hisndeē nuū ūuu
        cat that be+located face mat
        The cat is on the mat

27. *kštś-rē kusndeē nuū corrál-rī śštś
    animal-3SgM be+on(P) face corrál-1Sg tomorrow
    His animals will be in my corral tomorrow

However, (26b) and (27) are unacceptable. Hisndeē requires more than just the spatial relation of English on; it requires that the Figure be located on a Ground with a raised surface. The gloss of hisndeē, then, must be modified to read "be on a raised two-dimensional surface."

Śktś 'animal back' has a Subregion reading which exactly fills the semantic requirements of hisndeē. That is, it represents a horizontal surface which is raised. Therefore, it is not surprising that hisndeē collocates almost exclusively with śktś. (28) is a typical example:

28. hisndeē sktś mesā wāā
    be+on animal+back table that
    It is on that table

What is curious is that hisndeē does not normally cooccur with nuū, despite the fact that nuū, as noted above, can refer to the kind of two-dimensional raised surface that hisndeē requires (for example, the table top, as in example (5). In fact, one consultant explicitly stated that hisndeē may never cooccur with nuū. Our data show, however, that there is no lexical constraint against this cooccurrence per se, as evidenced by the following example, produced by the same consultant:

29. sū?unu-ro hisndeē nuū śūnu wāā
    clothes-2Sg be+on face tree that
    Your clothes are on that tree

This sentence describes a situation in which clothes are spread over the branches of a tree, for drying. The example suggests the following: we know that nuū is a much less semantically elaborate term than sktś, since the former is unspecified for elevation, while the latter marks elevation positively. We suggest that in the unmarked use of hisndeē, nuū is blocked by sktś, even when nuū would otherwise be truth-conditionally equivalent. This is the principle behind the putative prohibition stated by the consultant. However, (29) is grammatical because the top surface approximated by the tree's branches does not fit the requirements for sktś, which requires fairly precise horizontalness and planarity, and appears, based on
independent evidence, to require that the longest dimension of the three-dimensional object be the horizontal plane. It does, however, fit the requirements of nuû, defining a roughly two-dimensional and semi-horizontal surface, and location on that surface fits the requirements of hisndee. (29) describes a rare real-world case, then, in which a raised nuû is not also a sîktî, and so blocking does not apply.

We can find further evidence for the semantic description of hisndee hypothesized here by looking at the following contrasting examples:<6>

30. *çusndée kaçini-ró šini poste
   put hat-2SG head post
   Put your hat on the post
31. sú?unu-ro hisndée šini žunu wââ
   clothes-2SG be+ON head tree that
   Your clothes are on that tree

The consultant explained the ungrammaticality of (30) as being due to the fact that hisndee cannot collocate with šini, much as he claimed that it cannot collocate with nuû, either. However, the consultant later gave example (31) as grammatical. Notice that (31) differs from (29) only in the BPT, and describes the same real-world situation. From this we conclude that what is unacceptable about (30) is that the šini, or 'head', of the post is not saliently two-dimensional; that is, that its top surface is too small with respect to its height to fulfill the requirements of hisndee.<7> Recall that sîktî is appropriate of a subregion just in case at least one of its horizontal dimensions is salient relative to its height. Based on these examples, we can conclude that hisndee requires the Ground to possess a saliently two-dimensional and raised surface. This will typically be a sîktî, but when such a surface exists which cannot be described by sîktî, hisndee can be used with other BPTs nonetheless.

2. A Brief Comparison of Mixtec with English

Several differences between English and Mixtec emerge from our consideration of the Mixtec data. One which is immediately obvious is that the nature of the relationship between Figure and Ground, when lexicalized at all, appears in verbs in Mixtec and in prepositions in English. This is evident from the English glosses of the Mixtec position verbs, e.g. hisndee 'be on (top of).' English has a fairly large set of spatial prepositions which usually encode the feature of contact between Figure and Ground, and sometimes also code the orientation or shape of the relevant subpart of the Ground. What they do not consistently do is code the overall shape of the Ground, which, as we have seen, Mixtec does in some detail with both the position verbs and the BPTs. For instance, English on codes contact with an external planar
surface, but is neutral with respect to whether that surface is elevated or whether it is horizontally or vertically oriented:

32a. The chair is on the rug
   b. The chair is on the platform
33. The picture is on the wall

Similarly, above expresses lack of contact and a relationship of altitude of the Figure with respect to the Ground, but entails no particular shape properties of the Ground:

34. The bowl I want is above the refrigerator
35. The helicopter was above the tree/trees/lake

Another highly elaborated area of the English lexicon is posture predicates. Like Mixtec, English has stative verbs like sit, stand, and lie, and in fact several more which Mixtec does not have. In addition, English has participial adjectives encoding a postural state as the result of some action performed upon the Figure. The English set (i.e. including verbs and participials) is much larger than the Mixtec, and so more information is lexicalized about the physical properties of the Figure. This information in turn can restrict the possible interpretations of a cooccurring preposition, as illustrated by the following:

36a. The cloth was spread over the bed
   b. The cloth was hung over the bed

(36b) has a reading in which the cloth is, e.g., hanging on a wall, and it is this spatial relation which would be coded in Mixtec, rather than the relationship which the cloth holds to the bed.

In contrast with the closest Mixtec correlate, English does not lexically differentiate kinds of in. This English preposition is rather like the Mixtec verb hándeel in not requiring three-dimensional enclosure in all cases, as the following contrasting pairs illustrate:

37a. The coffee is in the can
   b. The fish is in the water
38a. He was standing in the batter's box
   b. The car is parked in its usual space

However, as we have seen, this distinction can be made in Mixtec, by the use of the various BPTs to hándeel.

Another difference between hándeel and in is that, while any bounded planar region can be the Ground for in, it is not the case that just any region can be chosen as its object:

39. *The cat is in the mat
With the intended reading (synonymous with the gloss of (26)), on is grammatically required, preempting in in such cases. Thus, while there is a local resemblance in the possible relations coded by hindee and in, they do not have the same conditions of application, as a consequence of the differences in the systems in which they are members.

One final difference between the two languages is that, in contrast to the Mixtec example (19), English cannot overtly express in one clause both the containment relation and the exact location of the Figure with respect to the Ground. This can only be done indirectly, by using, e.g., contained, hidden, or a posture verb such as crouching. The simple English sentence does not entail containment. That is, 'the boy is under the table' might be used even if his legs were protruding - a situation which would not be described using hindee in Mixtec.

3. Other Considerations

For the purposes of this paper, we have had to oversimplify the kinds of real-world properties which might be involved in these lexicalization patterns. One consideration which we have omitted up to this point involves the physical properties of the Figure. The posture verbs, for example (see (14)-(19)), indicate that the salient dimensionality of the Figure as well as that of the Ground can determine the kinds of spatial relations which obtain.

Another consideration is whether the Figure is singular, mass, or plural, as shown in (40):

40. Ṃazīũ ʷ̥̥ḁ̥.toDouble̥̥ ndukồ̥ nùù mesa
    people those Pl-sit face table
    The people are sitting around the table

Here, nùù is a relation distributed over each of the units of the plural Figure. That is, each person is sitting adjacent to a distinct, vertically oriented planar surface of the table.

There are English cases which demonstrate the same point. For example, the shape of the Figure in (41) and (42), below, entails other physical properties of the Figure, such that (41) can mean that the gum is in contact with the underside of the chair, while (42) cannot.

41. I found a wad of gum under my chair
42. I found a stick of gum under my chair

Obviously this minimal pair partakes of more than pure grammatical knowledge, yet the semantic properties of the lexical items employed (in particular, under) must be compatible with this world knowledge in order for the pair to contrast.
4. Conclusion

While we certainly have not done justice to the systems of either language in this short paper, one notable generalization which emerges has to do with what kinds of information each language lexicalizes, and in which lexical category. The Mixtec systems lexicalize a great deal of information about the shape of the Ground, largely by means of the BPTs and to a lesser extent through the positional verbs. They lexicalize relatively little about the exact relationship borne by the Figure to the Ground, and, with the exception of a small number of posture verbs, lexicalize relatively little about the shape of the Figure.

In English, however, much less is lexicalized about the shape of the Ground, while a great deal is expressed about the relations between the Figure and the Ground. In addition, by virtue of the exploitation of participles as statives, a reasonable amount is often expressed about the shape of the Figure. Both languages tolerate a great deal of ambiguity, largely because real-world context will disambiguate the offending elements.

In addition to these typological points, there is also a methodological moral to this story. Since each of us had previously worked on one of these Mixtec systems in isolation, it was only by virtue of our collaboration that we have achieved this level of understanding of the data. We have found that one simply cannot discover nor adequately describe a single semantic system without very careful attention to other semantic classes with which it cooccurs.

Notes

1. There are, of course, verbs of motion (see Macaulay 1985) which also entail stative locations (at the point before and/or after motion takes place). These verbs also interact with locative BPTs in interesting ways, but they will not be discussed here.

2. There are also a few verbs of location which code the semantic parameter "permanence of location," but since they do not appear to interact with the BPTs in any way significantly different from the verbs we discuss, we have omitted them from consideration in the present paper.

3. This is a special case constrained by our corpus. However, when Ground interacts with a verb of motion, we take it to be a generalization over stative location, source, path, and goal, after Talmy 1985a.

4. Re our abbreviations and diacritics: Mixtec is a tone language, and the dialect under discussion has three tones; high (\'\'), mid (unmarked), and low (\'\'). Every Mixtec verb has (at least) two aspectual stems, the Realized and the Potential. These are marked with "R" and "P" in the examples below, although in subsequent examples the Realized form will be unmarked in the gloss. There is also an inflectionally marked aspect, Completive,
which is represented by "Cp" in the examples. Other abbreviations should be self-explanatory.

5. In some cases we must distinguish between two-dimensional and planar: "two-dimensional" means only that the subpart has no salient or discernible thickness (but can e.g. be curved), while "planar" is a special case of "two-dimensional," a flat and non-thick surface.

6. If this is in fact the crucial difference between śini in (30) and (31), it counterexemplifies the claim made in Brugman 1983 that a śini must be a "tip".

7. ċusndée is a causative form of hisndeé.

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A LA RECHERCHE DU TEMPS DE VERBE PERDU:
Semantic Bootstrapping & the Acquisition of the Future
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This paper is a part of a larger ongoing research project on the acquisition of temporal reference: a project which hopes to develop a description of temporal reference adequate to the task of describing its acquisition. However, in this paper, we are simply going to discuss one problem: the acquisition of the future tense.

In her 1980 paper "The Acquisition of Time Talk: relations between child and adult grammars", Carlota Smith has argued that it is possible, on the one hand, to claim that when young English speaking children use morphological tense, they are expressing temporal ordering notions (as opposed to aspectual notions) and, on the other, to explain just those tenses which they do control by means of a Reichenbachian approach to the tense system. Smith spends much of her paper dealing with the first claim. We will here discuss only the second claim, simply assuming Smith's tense/aspect argument for the most part and referring unbelievers to Smith (1980).

Smith (1980) argues for a continuous relation between child and adult temporal grammars. She proposes that children have a restricted Reichenbachian framework for tense, and that adults instantiate the full system described by Reichenbach (1947) (cf. also Smith 1978; Hornstein 1977, 1981; McCawley 1981; Comrie 1981, 1985; Steedman 1982; among others, on Reichenbachian systems for adults). A full system involves three times, and relations between them. The times are speech time (ST), reference time (RT) and event time (ET); the relations are simultaneity (or, in some versions, overlap) and precedence. ST is the time of the utterance. ET is the temporal location of whatever it is the sentence reports. RT is (as defined by Smith in an earlier article) the time relevant for determining the truth or falsity of the sentence (proposition determined by the sentence/context pair), or (as defined by Richard Weist, in press) the temporal context which is identified. In standard Reichenbachian systems, all three times must be specified for all tenses, and no more than one of any time type is permitted.

Within the standard Reichenbach analysis, then, the simple past, present and future tenses form a
natural class in that they are the only ones wherein the RT and ET are simultaneous. They differ, obviously enough, in the relation these two have to the ST; in the past they precede ST, in the present they are all simultaneous and in the future ST precedes the other two. These three tenses can be contrasted to the perfect tenses, where the three time types are disassociated, or RT co-occurs with ST.

Smith (1980: 265) suggests "that children's early temporal ordering system differs from the adult system in two ways: only two times are involved, and orientation is fixed at ST." (1) In the adult system, there are "shifts in orientations, such as complements that orient to matrix sentences and fictional narratives" (Smith 1980: 265). There is thus an apparently clear sense in which the child's system is a proper subset of the adult's on Smith's proposal. But note that this system formally only excludes the complex tenses for which the third time type is not redundant information.

Smith concludes, after reviewing evidence presented by Bronckart & Sinclair and others, and after her own experimental investigation of the use of tense by 4- to 6-year olds, that not only do the youngest children have a restricted version of Reichenbach's system, but also that there is an intermediate stage between that restricted version and the adult fully specified system. She claims, in other words, that the course of acquisition should be seen as divided into two parts, Stage I and Stage II. Of stage one she says "[t]he syntax of Stage I is limited to verb inflections in French and English." Of stage II, Smith says that it "allows a focal point other than ST....[t]he wider range [of temporal reference possibilities] comes from flexible use of the times and relations rather than from additions to the system" (Smith 1980: 276). The example given of Stage II speech is plans about what children will/want to do, i.e. reference to the future. Note that, then, stage II describes the child who refers to future events.

Well, according to this, there is an asymmetry among the simple tenses whereby the past and present tenses are mastered before the future.

This is then the issue that we address. Smith suggests that futures are acquired later than the present and past, but neither the adult Reichenbach system nor the subset allowed the child provides any motivation for this developmental asymmetry.

A sceptic might all too quickly conclude that the Reichenbachian approach has nothing useful to add to
language acquisition studies. Let's agree for the next 10 pages to reject that conclusion. Our goal here is not to question the framework but to see what can be answered with it.

A defender of Smith might point to the fact that English does not have any verbal inflection that signals the future, and so it is no wonder that there is an acquisitional asymmetry. According to Smith (in her 1978 article) the future in English is manifested by means of a tense and time adverbial pair. As also noted, however, Smith points out that the developmental asymmetry holds with respect to French, and French does have future inflection on the verb. So, whatever is the cause of the staggered acquisition of tenses, it cross-cuts any simple reliance on morphological markings. (2)

One might wish to point to the modal nature of the future tense as a reason for the developmental asymmetry. As Gerhardt (1983) says "semantically it is an irrealsi notion, imbued with modal overtones...futurity is never a purely temporal concept". This issue has just started to be addressed in the child language literature (most completely by Gee-Gerhardt 1983), and in fact the modal underpinnings and overtones of the future tense surely could give pause to the language learner. They are not, however, reason to assume an a priori ordering of acquisition. (3)

So, there is still a place for an explanation of why, despite the formal symmetry and lack of consistent encoding strategy across languages, the future should be acquired after the present and the past in a Reichenbachian framework.

At this point we will appeal to an independently motivated acquisition theory, one that might account for the acquisition of semantic notions other than just time. We will work with a version of the Semantic Bootstrapping approach to acquisition that has been most recently elaborated by Steven Pinker (1982, 1984; although see also Grimshaw 1981; McNamara 1982; Wasow 1983 and others). There are important parallels and differences between Semantic Bootstrapping (henceforth also SB) and Organizing Principles such as those advocated by Dan Slobin, however space constraints force us to leave out discussion of the issues involved.

SB is, strictly, an approach to grammar acquisition, and this is significant: formal, syntactic stuff such as verbs, nouns, etc are the units of acquisition (rather than cognitive structures, for
example). The basic idea driving SB is this: there are a number of imperfect correlations between formal properties / categories that the grammar requires, and semantic properties / categories which a language learner might plausibly have cognitively and perceptually available antecedent to language; the child initially uses these imperfect correlations as if they were perfect, thus acquiring a subset of some grammatical category; later, purely grammatical properties are used to extend the set to those members of the category which did not enter into the initial correlation, completing acquisition. So, in particular, a child might initially acquire the categories noun and verb on the basis of semantic / cognitive categories such as physical object and physical action, respectively.

It is important to note that it is the categories of the adult grammar, noun and verb, which are acquired, not the semantic correlates, since, if it were the latter, the acquisition problem would remain, given that the adult categories do not correspond to any straightforward semantic notions. In the case of noun or verb, morphosyntactic information—distribution, co-occurrence privileges, inflectional/derivational morphology—can be used to extend membership in the category beyond the initial "semantically transparent" members.

Our strategy now is to argue that our Reichenbachian child can become a Reichenbachian adult by means of SB. Our first claim in this regard is that it is no accident that RT is the odd time out. RT is qualitatively different from the other two times; it is, as well, the rather most distinctive part of Reichenbach’s system (cf. Hornstein 1981). The difference between RT and the other two times is an ontological difference. RT is a theoretical term—it is definable only by means of the theory of tense. ST and ET, on the other hand, are observational terms definable (initially) by means of cognitive and perceptual information independent of purely linguistic knowledge. Another way to put this might be as an observation-inference distinction: knowledge of RT is much more heavily dependent on inference than is that of ET & ST. The intuition is that there exist independent of knowledge of language, events of various sorts, including speech events, with specifiable, recognizable temporal locations, while, contrariwise, the existence of reference times, with their temporal locations, depends on an antecedent means of referring to events in time (cf. Fodor 1984 on observation vs.
inference).

As of yet the putative parallel with the syntactic category example might seem unconvincing. In those standard examples, no new category is posited; an existing category has its membership extended by altering the criteria so that environmental salience of referents is replaced by formal, system-internal properties. In our case, an entirely new time, RT, is created, apparently de novo. The asymmetry is merely apparent, however. We are assuming that the child is acquiring a logical syntax, the Reichenbach tense analysis (see Hornstein 1977, 1981 for more on this very problem). We are not assuming that the child must learn the relations of precedence and simultaneity (overlap), nor that there are time types. What the child must learn is what the time types are, which of the possible tenses they realize, and now.

On this view, the analog to a syntactic category, such as verb, is the general category time type, and the specific types are analogous to subclasses of verbs (e.g., transitives, intransitives). That is, just as the child is acquiring, but not creating, the formal category verb with its specific subtypes, so the child is acquiring, but not creating, the formal category time type with its specific subtypes. The problem is to match bits of the linguistic environment with bits of the formal vocabulary provided; the SB solution is that some of the linguistic environment correlates with the non-linguistic environment in ways that are perceivable as non-random by the child, and this offers the way into the formal system.

In the specific case at hand, ST & ET are claimed to be environmentally transparent, as we might say, in a way that RT is not. We are suggesting that the child comes ready to find time types and that a developmental asymmetry is expectable vis-à-vis which types are acquired when. So, the child is equipped with some notion of time type and is ready to impose ordering relations on these things, whatever they might be. Further, we assume that the child begins to have events cognitively and environmentally available, about which to speak, and including speech events as one subtype. Given that the simple present and past are analysed as involving just ST and ET, we can see how it is that the child comes to first understand and use the linguistic encodings of just these tenses.

Well, almost anyway. Because we still have not explained why the third simple tense, the future, is not part of the system. Here things get a little more
complicated as we expand the notion of semantic bootstrapping to something we would very tentatively like to call 'cognitive bootstrapping'.

We propose that it is just the property that makes RT the oddball of the time type system that makes future the oddity of the simple tenses. That is, it is the lack of environmental transparency that explains the future's later acquisition relative to the other simple tenses. No child (nor anyone else) will have had an environmentally salient experience of the future. Fleischman (1982: 22-3), writing in a tradition that goes back at least to Aristotle (cf. Dahl 1985), notes the "...cognitively more abstract, irrealis nature of future as an ontological category vis-à-vis the more tangible and empirical past or present." So, the relating of linguistic forms to the logical syntax will initially be mediated both by the sorts of things whose temporal locations are used in the logical syntax ((speech) events) and by properties of the temporal location the tense picks out (experiencable or not). The child is faced with a multi-level problem.

Assuming, then, that the child comes to recognize that experienced times are referred to by means of a system that makes use of time-type-events, we are faced with the question of unexperienced times and nonevents. That is, how does the child come to tenses other than the past and present, and times other than ST and ET, and is there any order inherent to this process.

A strict ordering might seem required whereby the future would be acquired before any tense that requires RT, since, as has been duly noted above, future is formally on a par with past and present, and so its postulation might simply be a matter of pattern completion, as we might say. This has an odd feel to it, however, in that it presumes no cognitive change is needed to understand the concept of futurity—or, at any rate, that such a change could be driven purely by considerations of the logical syntax of the temporal reference system—and we have presumed that at least initially general cognitive abilities are crucially involved in language acquisition.

The alternative is that considerations of formal symmetry would not weigh heavily enough to push acquisition in the direction of the future? In this case, RT could be acquired next. We feel obliged to point out here that acquisition of RT does not necessarily imply simultaneous acquisition of the complex tenses—i.e. present perfect, etc. Remember that in the adult system, all three time types are
required for the specification of all tenses, simple and complex. The child just acquiring RT would not necessarily immediately experiment with them in complex configurations. We might, rather, expect experimentation with them in conjunction with one of the other time types. An examination of the typical learner errors at this stage of development would be relevant.

Notice that so far the decision is only in terms of which alternative to choose first since ultimately, of course, both must be done. In fact, whichever is done first, the problem recurs immediately, since the increased expressive power of the system is limited to one additional tense, given the one new parameter.

It is this very constrainedness which is the power of the Reichenbachian tense system, and which makes it so appropriate to describe acquisition. What we would like to do is capitalize on the formal restrictiveness in such a way as to be able to tie together the apparently independent parameters of temporal location and time type, so that the child is led to future and RT in a single step and the possibilities of other locations or types never have to arise, given the adequacy of the now doubly augmented system. In other words we are going to suggest that the semantic bootstrapping of RT and cognitive bootstrapping of the future in some way depend on each other. What we are looking for is a data driven solution to this learning problem. That is, we want to locate something plausibly in the linguistic environment of the child that would enable (or, better, require) the simultaneous extension of both the domains of time types and temporal locations. This is exactly in keeping with the SB approach we advocate, since it is new data, unanalyzable in terms of, but apparently in a paradigmatic relation with, the semantically transparent categories that have already been established, which motivate the child’s altering the intension (and extension) of the class in question (e.g. time type, as discussed above).

One place to look for this data-driven solution is in the linguistic environment of the child, and linguistic output produced by the child. We mentioned earlier that, in English, in the child’s linguistic environment--i.e speech by adults--there is no morphologically specified future but rather, according to Smith, a present tense and time adverbial pair. In the adult system it is also, according to Smith (and Hornstein) “the combination of tense [by which Smith means morphological inflection JC/RC] and adverbial
that establishes RT." As to children's speech, Fletcher (1979) reports that when will is first used to refer to the future, the support of a temporal adverbial seems to be "felt as necessary" by the child. In French, adverbs are seen in conjunction with first the present, then the periphrastic future, and finally the simple future, in children's speech to refer to posited or desired states of affairs in the future. In other words, when the future tense is first used, in both languages, it is accompanied by temporal adverbials. And it is temporal adverbials in the adult language which mainly serve to mark the RT.

So, the secret is out, and the secret word is adverbs. Not too surprising given that in many semantic domains adverbs are acquired before inflectional markings of the category. Weist (in press: 367, 373) seems to come to the same conclusion when he writes of the intermediate stage:

The restricted reference time system is characterized by the onset of temporal adverbs and the use of temporal adverbial clauses....In general, temporal adverbs are used to establish reference time and the onset of the restricted RT system is relatively stable across diverse languages.

This restricted RT system is exactly what we were referring to earlier: that stage where RT is introduced but the full Reichenbachian system (i.e. complex tenses) is not yet instantiated. What we want to suggest, then, is that it is future oriented adverbs that push the child into extending the Smith (1980) system into full Reichenbachian glory.

The story goes something like the following: The child controls a temporal system with ET and ST. Temporal adverbials occur in the linguistic environment and must be integrated into the temporal system. As Hornstein suggests, some temporal adverbials can associate with ET--this allows the integration. But not all temporal adverbials associate with ET; some associate with RT. We thus have just the sort of situation that Semantic Bootstrapping requires: a paradigmatic class (temporal adverbials) in which a subset is acquirable by means of an environmentally transparent relation (by association with ET) but acquisition of the entire class requires extending a category (time types) into an environmentally opaque domain (i.e. RT). There are, then, distributional/morphosyntactic data (the fact that some temporal
adverbials do not associate with ET) which lead the child to a third time type.

This doesn't directly address the question of the future, however. In fact, as we hinted at above, we want to suggest that Semantic Bootstrapping cannot directly address the future (don't worry if the title of the talk now sounds misleading). This is because temporal locations (past, present, future) are not formal categories, but rather conceptual categories. This is not to say that they don't have formal reflexes as Reichenbachian time type sequences; it's just that the problem here isn't extending a category, it's figuring out its interpretation. The problem for the child is: what is an 'ST precedes ET'. There is a parallel with the Semantic Bootstrapping treatment of RT: there are one opaque and two transparent objects in each domain. RT versus ET and ST, and future versus present and past. But, as noted, the temporal locations are not formal categories.

What we would like to claim, however, is that the Semantic Bootstrapping account of RT provides for the acquisition of the future as a side benefit. Among the temporal adverbials associating with ET are future oriented ones, which will be the conceptual bootstrap the child uses to answer "what is ST precedes ET". If we allow the formal asymmetry to exert pressure (bias the learner) (a somewhat weaker and perhaps more plausible claim than the strict ordering mentioned earlier) then we can suggest that the child will be inclined to try and explicate the obscure future-oriented adverbials. Further, the adverbials are useful just because they are full words or phrases with structure and denotata; they are linguistic things about which information can be easily requested and given (see the commonly reported "Mommy, is it tomorrow yet? Is it after juice yet? What is a Saturday?") unlike, say, verbal inflections.

So, future is not semantic bootstrapped: it is conceptually bootstrapped. This Conceptual Bootstrapping piggybacks on the Semantic Bootstrapping of RT by means of temporal adverbials. To put it another way, the child has found an operating principle that works and, following another operating principle, has thus applied it several times.

To sum up, we have pointed out an asymmetry in the course of acquisition of tense which is not predicted by the formal symmetry in the Reichenbachian analysis of tense. We have proposed an account that motivates this mismatch, and then resolves it.

Our next task is clearly to test our operating
principle -- acquisition of the future piggybacks on the Semantic Bootstrapping of RT -- in new linguistic environments -- more languages, and more language acquisition data -- to see whether it generalizes.

In other words, it seems to us that whether or not children are little linguists, there is one very real sense in which linguists should be big children.

FOOTNOTES

* We would like to thank Ruth Berman, Julie Gee, John Goldsmith and Dan Slobin for pre- and post-presentation discussion. The fault is all ours for not taking more account of what they said.

1. In fact, the term 'orientation' in Smith's article seems not to refer to the third time type (RT) at all but to an entirely different and obscure notion, which is not explained in this paper. What the reference point actually is, and what it might have to do with the notion of orientation is treated more extensively in Cassell (in preparation).

2. Pursuing this a bit further, it is worth pointing out that even if French, too, marked futures by means of a tense and temporal adverbial combination, as Smith has argued English does, there would still be an explanatory lacuna. First, one would require some independent explanation for the observation, in this hypothetical world, that children initially acquire those tenses that are inflectionally signalled, and only later learn those that require adverbials as well. In the absence of an independent account of the general primacy of inflections, the observation of such an effect in this case would be the statement of a problem, not a solution to one. Second, one would want to know why the tenses should have arrayed themselves as they did. That is, given the formal (logical) symmetry of the three simple tenses, it is mysterious, in this hypothetical state of affairs, why they should find themselves consistently encoded asymmetrically. Notice that this problem is independent of the first, since even if there were some account of inflectional primacy forthcoming (which, from the literature, seems unlikely), there would still need to be some other independent reason for the tenses to be matched to their particular encodings.

3. This might not be obvious, so we'll elaborate a little. As noted, Gerhardt (1983) argues for the modality of the future in child language. Without a
similar argument that the adult future is modal, the acquisition problem has only been deepened by this analysis of child language. Note that an analysis of the adult future as modal would need to explain all generalizations expressed in tense-based systems — eg. the adverb rules of Hornstein 1977, 1981. We know of no such analysis. Should there be an analysis of adult temporal systems analogous to Gerhardt's account of the child's, it is still not clear that the tense-based approach would be irrelevant. Note that Gerhardt says that "futurity is never a purely temporal concept..." which at least strongly implicates that it is always at least partially temporal. This suggests to us an interaction effect: the tense system (say, a Reichenbachian system) and the modal system come together in the expression of futurity, but each requires separate analysis. Such modular thinking is hardly novel.

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McCawley, J. (1981) Everything Linguists Have Always Wanted To Know About Logic (but were ashamed to ask). Chicago: Univ. of Chicago Press.
1. Introduction

The notion of "thematic roles", a more modern term for Fillmore's (1968) case relations, Jackendoff's (1972) and Gruber's (1965) thematic relations, and Pannini's karakas, has been appealed to by contemporary linguists in the statement of natural language generalizations about syntax, morphology, and semantics for some 20 years now. Until recently, thematic roles were invoked only in research that treated semantics non-formally (i.e. not model-theoretically). The level of rigor of semantic analysis behind these notions in this literature can be indicated by the samples in (1) from Andrews (1985) and Jackendoff (1985), which I cite here only because I take them to be quite typical of "definitions" of particular kinds of thematic roles; in fact I believe that significantly more explicit semantic characterizations than these do not exist.

(1) a. Agent - a participant which the meaning of the verb specified as doing or causing something, possibly intentionally. Examples: subjects of kill, eat, hit, smash, kick, watch.

b. Patient - a participant which the verb characterizes as having something happen to it, and as being affected by what happens to it. Examples: objects of kill, eat, smash, but not those of watch, hear, and love.

c. Experiencer - a participant who is characterised as aware of something. Example: subject of love, object of annoy.

d. Theme - a participant which is characterized as changing its position or condition, or as being in a state or position. Example: object of give, hand, Subject (and also Agent) of walk.

From Jackendoff (1985):

e. Source - object from which motion proceeds.

f. Goal - object to which motion proceeds.

However, two perennially vexing problems with the appeal to thematic roles are (i) lack of agreement among linguists as to which thematic roles exist, and the absence of any obvious way to decide this question, and (ii) the lack of any definite way to independently justify the assignment of noun phrases to thematic roles in particular sentences. It is unfortunately not at all infrequent for two researchers to propose assigning the same NP in an example to two different thematic roles, the assignments fitting the respective syntactic generalizations each wants to maintain, with no way of resolving the conflict except by choosing whose syntactic generalization is going to be preserved. This suggests that pure pre-theoretic intuitions and definitions like those in (1) are not going to take us very far toward an explicit theory of roles.
It seems obvious that if any independent justification for a substantive, motivated, and reasonably precise theory of thematic roles is going to be found, it will have to come from semantics. Characterizations like those in (1) are manifestly semantic in nature, and I know of no proposed way of characterizing thematic roles that is not equally semantic. It is encouraging that the past two years have seen the appearance of attempts by two formal semanticists (Chierchia 1984, Carlson 1985) to construct model-theoretic accounts of thematic roles. However, I am troubled that some very fundamental questions about the notion of thematic roles have not yet been explicitly raised. In this paper, I will try to explain what these fundamental questions are and why I think they are important, though I cannot begin to really answer all of them. I do not apologize if, by the end of the paper, I have raised more questions about theories of thematic roles than I have resolved.

2. Two Theories of the Predicate-Argument Relation

Here I will contrast two apparently different views of how predicates in natural language are to be associated with their arguments when they are semantically interpreted. The first theory, which I will call the ordered-argument theory, is, presumably, the theory we have inherited from formal logic, which persists in all linguistic theories employing Montague Semantics, Situation Semantics, and elsewhere. The other theory we are seeking to understand is a thematic roles theory, a theory in which thematic roles like Agent, Patient, Source, Goal, etc. are somehow involved in associating a verb meaning with arguments in semantic interpretation. The problem at hand is to figure out how to formalize these two theories so that they are empirically.

2.1 The Ordered-Argument Theory of Predicates and Arguments

The ordered-argument theory treats a verb as an unsaturated predicate wanting a particular fixed number of arguments to form a sentence. Semantically, a verb denotes an n-place relation, and when the denotations of the proper number of arguments are combined with the relation in an appropriate way, a truth value is denoted, a proposition is expressed, or a situation is described (depending on which semantic theory you use); if too few argument denotations are available, then no truth value (or proposition or situation) can result.

In this theory, it is important that the syntactic and semantic rules be constructed to combine the argument-denotations with the verb denotation in a fixed arrangement determined by the syntactic arrangement (i.e. by the grammatical relations the arguments bear in the sentence in question), though that semantic arrangement is, in a sense, ultimately arbitrary. Arbitrary, because the choice of relations to be denoted by verbs is likewise open in this theory; the inverse of a two-place relation can carry the same information as the original relation, and similarly each of the the permutations of an n-place relation can carry the same information. It doesn't matter which permutation we chose, as long as the compositional semantic rules match the right syntactic argument with its appropriate semantic "slot" in the interpretation of the verb.

In talking about an ordered-argument theory, I do not distinguish between
syntactic analyses which combine a verb with several or all of its NP arguments "all at once" (as in the syntax of most formal logics) or one at a time (as in categorial grammars and many versions of Montague Grammar), thus treating the denotations of verbs as function-valued functions (or so-called "curried" functions); both of these are ordered-argument theories.

I am also assuming that our semantic theory here allows us to describe entailments of lexical items, whether this is done by meaning postulates, by structural constraints (in situation semantics) or by lexical decomposition. The relationship between lexical entailments and thematic roles will, in fact, be a major concern shortly.

2.2. Thematic-Roles, from an Ordered-Argument Point of View.

Whatever a thematic role theory is, it should be one that differs in some way or other from this classical, "ordered-argument" picture that we are familiar with. Or perhaps I should rather say, I believe that a major interest the phenomenon of thematic roles has for semantic theory lies precisely in the extent to which it suggests or requires an account of the way predicates are associated with arguments that differs from this familiar account. In what follows, I will try to construct such a theory, with the goal of trying to satisfy desiderata of various linguists that have appealed to thematic roles in their grammatical descriptions (from the ability to state thematic hierarchy constraints, as in the work of Jackendoff and his followers, to the one-to-one relation between the NP-complements of a verb and the kinds of roles invoked in a sentence, as in GB and LFG), yet still a theory that can be is formally distinguished from the ordered-argument theory. (This is of course a hazardous undertaking, for different linguists have had very different ideas as to the role that "thematic roles" play in a grammar.)

Let me mention two things that a thematic-role theory is not. First, it is not a theory in which the only difference is that we use notations like (3) in place of (2):

\[(2) \text{give}(x, y, z)\]
\[(3) \langle \text{predicate give}, (\text{agent } x), (\text{theme } y), (\text{goal } z) \rangle\]

That is, I am not just talking about a notation in which the various arguments of a predicate are distinguished not by writing them in a fixed order but by giving each one an arbitrary but distinct label, so that one can write them in any order, but nevertheless a theory in which the labels "agent", "theme", "goal," etc. play no semantically significant part except to index the arguments. Now the notation in (3) may have advantages for certain purposes, but it is not what I'm looking for here.

A second thing that a thematic role theory is not is one in which the terms "agent", "theme", "goal" etc. merely provide a useful, and intuitively mnemonic terminology to distinguish the denotations of arguments of a verb (or if you prefer, the "semantic representations" of the argument NPs) from the linguistic expressions that denote them. Now this may be a very practical and helpful consequence of using this terminology, and I certainly have no objection to lucid terminology that is easy to use, as long as it does not delude us into thinking there is a theory behind
our terminology if in fact there is not.

For purely expository reasons, I will begin with an ordered-argument theory, modifying it in the direction of a thematic role theory. This will be a feasible, since it turns out that the ordered-argument theory is much less restricted than the eventual thematic-role theory.

I have already mentioned that I assume our semantic theory must permit us to describe the lexical entailments of verbs. For example, if a sentence $x$ builds $y$ is true, then it is necessarily also true that $x$ performs purposeful actions, that as a result of these actions a structure or other artifact $y$ comes into existence, and so on. It is surely the case that among these entailments, one will find lexical entailments about the subject $x$ of the verb which amount to the criterial properties for being an Agent, and also among them are entailments about the object $y$ of the verb which amount to criterial properties for being a Patient. Indeed, it is difficult to imagine how to describe the meaning of $x$ builds $y$ without saying something that directly or indirectly identifies the subject as Agent and the object as Patient. And of course, I believe this state of affairs obtains not just for the verb build but for all verbs. Thus we are immediately faced with two options: either we should maintain that thematic roles are determined by and derivative of the lexical meanings of verbs, or else we should say that thematic roles are somehow a separate part of the semantic description of a natural language from lexical meaning—in which case we are in some sense saying that they are redundantly specified in the semantic description of a language. Though Jackendoff long ago endorsed the position that thematic roles should be derivable from lexical semantic representations (Jackendoff 1972), the question of the exact relationship between thematic roles and “the rest of” lexical meaning has, oddly, hardly been further addressed in the large literature on roles, to my knowledge. I will here take the more conservative position that thematic roles are not redundantly specified and are therefore determined completely and solely by verb meanings. Perhaps arguments can be made that thematic roles must be a part of a theory of linguistic meaning quite separately from lexical meaning, but I will have to leave it to others to pursue such arguments, for I have no idea what they could be.

From the point of view of the ordered-argument theory, then, a "thematic role" can and probably must be regarded as a cluster of entailments and presuppositions shared by certain arguments of certain verbs; this has already been pointed out in the model-theoretic literature. In this paper, however, I will not be distinguishing presupposition from entailment but will speak as if only entailments are involved. For example, the thematic role Agent might be regarded as a set of properties including "is a rational and sentient being", "acts volitionally in this circumstance" and so on. Let's state this a bit more formally in three steps. First, we will define an individual thematic role as in (4):
(4) Given an \( n \)-place predicate \( \delta \) and a particular argument \( x_i \), the \textit{individual thematic role} \( \delta \), \( i \) is the set of all properties \( \alpha \) such that the entailment

\[ \Box[\delta(x_1, \ldots, x_i, \ldots, x_n) \rightarrow \alpha(x_i)] \]

holds.

Thus an individual thematic role is specific to a particular verb and to a particular argument-position of that verb. We might refer to the individual thematic role for the first argument of the verb \textit{build} as the "builder-role", because it is the set of all the things you can conclude about \( x \) from knowing that the sentence \( x \) \textit{builds} \( y \) is true; we can call the individual role of the second argument of \textit{build} the "builder-role", since it consists of all you can conclude about \( y \) from this same sentence.

In (4), I have not yet said what counts as a property, a denotation of \( \alpha \). If we allow properties to be defined quite generally, as for example in Montague's intensional logic (or, in theories in which some properties are primitives, if we allow the properties that can appear in (4) to include properties that are defined by abstraction), then one property that will be trivially entailed will be, for each argument of each verb \( \delta \), that property represented by the lambda-abstract in (5):

\[ \lambda x_i \exists x_1, \ldots, \exists x_{i-1}, x_i, \ldots, \exists x_n[\delta(x_1, \ldots, x_i, \ldots, x_n)] \]

For example, suppose that in (5) \( \delta \) is the verb \textit{build} and \( x_i \) is the direct object position, corresponding to the build-ee role. Then (5) is the property of being an \( x \) such that for some \( y \), \( y \) builds \( x \). I will call such a property a \textit{trivial individual thematic role entailment}. This kind of property seems pretty pointless to talk about, but I will have reason to mention such properties later on.

Building on the definition in (4), we proceed to the definition of \textit{thematic-role type} in (6):

(6) Given a set \( T \) of pairs \( \delta, i_\delta \) where \( \delta \) is an \( n \)-place predicate and \( i_\delta \) the index of one of its arguments (possibly a different \( i \) for each \( \delta \)), a \textit{thematic role type} \( \tau \) is the intersection of all individual thematic roles determined by \( T \).

In view of (6), for example, the particular thematic role-type that we want to call the Agent role-type will be the set of entailments that are common to all the individual thematic roles of the arguments, of various verbs, that we identify as "agent-"arguments. Of course, (6) defines a thematic-role type as the intersection of \textit{any} set of individual thematic roles whatsoever, and what we are interested in is the possibility that there exists a particular set of thematic role types that plays a special role in linguistic theory—the set that includes Agent, Patient, Source, etc. Let us call this distinguished set the \textit{L-Thematic Role Types}, or, when no confusion can arise, simply the set of \textit{Thematic Roles}.

It should be pointed out that not all linguists who use the terms \textit{thematic role} or \( \theta \)-role are committed to the existence of a set of \textit{L}-thematic roles of this sort; for example, van Riemsdijk and Williams (1986), in describing (their version of) GB say "\( \theta \)-theory, as outlined here, is not committed to ...a system of argument \textit{types}...[implied by] terms such as \textit{agent}, \textit{patient} (or \textit{theme}) and \textit{goal}.
" (p. 241); similarly, cf. Marantz (1984), p. 31–32. For these writers, "\( \theta \)-role" corresponds to
my "individual thematic role". But since, as I have said, what is of interest to us here is precisely the hypothesis that a set of L-thematic roles exists, I will ignore this literature here; note that many other linguists working in a GB framework do continue to appeal to thematic role types. Moreover, it will turn out, as far as I can tell, that a theory employing only individual thematic roles will be indistinguishable from an ordered-argument theory.

How can we further characterize these role-types? Presumably, this set should be non-empty but finite, and rather small; this much is obvious, but not very helpful. From the way thematic roles are used in the literature, I suggest that there are two relationships that the L-thematic role types should have to the relations denoted by natural language verbs:

(7) (Completeness) every individual thematic role contains some L-thematic role type (or as we may equivalently say, every argument position of every verb is "assigned" an L-thematic role type).

(8) (Distinctness) Every argument-position of every verb is distinguished from every other argument-position of the same verb by the L-thematic role types the two arguments-positions are assigned.

(These conditions are of course reminiscent of the θ-criterion of GB, but the conditions play a quite different role in our enterprise.) But I believe that (7) and (8) are implicit, if never explicitly stated, in the use of thematic roles by all linguists who make reference to them. Specifically, this literature often proposes that there exists one or more hierarchies of thematic role types and states conditions to the effect that the NP in the sentence bearing the highest thematic role on the hierarchy has such-and-such properties (cf. for example Jackendoff 1972, Nishiguchi 1984). This sort of statement presupposes that all arguments of a verb can be classified by thematic role, which requires the condition (7), and moreover it presupposes that they can be uniquely classified by their thematic roles, which presupposes (8).

There are actually various versions of (8) that could be adopted: (8a),

(8a) No two argument-positions of the same verb are assigned the same L-thematic role type, and every argument position is assigned only one L-thematic role type.

which is the strong condition that the GB θ-criterion adopts, or the weaker conditions (8b) and (8c),

(8b) No two argument-positions of the same verb are assigned the same L-thematic role type.

(8c) No two argument-positions of the same verb bear exactly the same set of L-thematic role types.

I include the last two because some linguists have proposed analyses in which a certain argument bears two thematic-role-types simultaneously: (8b) would for example allow the subject of the verb buy to be both Agent and Source (as once
proposed by Jackendoff), as long as neither of these two roles are assigned to other arguments of the same verb. The still weaker (8c) would permit two arguments of a verb to have one or more roles in common as long as they did not share exactly the same set of roles. (8c) would be needed if, as is sometimes proposed, we allow thematic-role-types which are sub-types of other roles, e.g. if the roles Source and Goal are to be considered subtypes of the role Directional, as suggested by Andrews (1985, p. 70).

Before going any further, I should note that I have individuated both individual roles and role-types above in terms of "argument positions", rather than in terms of the entities that are denoted in each argument-position (as in, for example, Chierchia's (1984) formal definition of thematic roles). That is, I do not classify the person John himself (or if you prefer, his "individual semantic representation") as Agent in John sang, but rather the subject argument position of sing as Agent. This is quite deliberate, however. For a complete discussion of this point I must refer the reader to Dowty (1987), but I can briefly hint at the point by calling attention to examples like John killed himself. If roles were defined only with respect to persons/entities referred to by arguments (the "bearers of the role") rather than in terms of argument positions, we would have to classify John as both Agent and Patient in such examples as this, which would cause us problems in explicitly defining Distinctness (in any of its three versions (8a)-(8c)). But surely there is a clear intuitive sense of distinctness which such reflexive examples do not violate, but to state it precisely, we must distinguish the entailments which accrue to John in John killed himself by virtue of reference to him as subject of kill (i.e. the Agent entailments) from those that accrue to him by virtue of reference to him as object (the Patient entailments). Thus semantic Distinctness in role holds for argument positions, but not their referents. With this approach, we can if desired go on to reconstruct the notion of the individual referred to in a certain thematic role position in a given sentence (i.e. reconstruct it from the definitions I have given), and to avoid confusion, I will refer to such an individual as the bearer of that thematic role. (Again, see Dowty (1987) for a complete discussion.)

However, I believe we still have not achieved the intended semantic content of L-thematic role types. To see this, note that nothing we have said so far excludes the existence of a hypothetical L-thematic-role-type X that is assigned by the subject of the verb kill, the object of the verb build, the indirect object of the verb give and the object of the verb inhabit. We could simply define the (only) entailment in the role X as the disjunction of all the trivial individual thematic role entailments of the relevant argument positions of these verbs, that is, a property equivalent to (9):

\[ \lambda x \exists y \exists z \ ( y \text{kill}(x, y) \lor y \text{build}(y, x) \lor y \exists z \text{give}(y, z, x) \lor \ldots ) \]

The problem here, I believe, is that we have not excluded the possibility of referring to meanings of particular verbs in defining L-thematic role types; hence we might collect arbitrary argument positions together into one disjunctively defined thematic role type as in (9). But I think it is clear that linguists will insist that whatever criterion individuates thematic roles must be independent of the particular kind of relation (and particular verb denoting that relation). In other words, whatever criterion identifies an Agent semantically, that criterion should be a set of properties that are common to agents of all verbs, that is, properties that can be recognized
independently of knowing exactly which verb we are identifying an Agent of. Let us describe this requirement as in (10):

(10) (Independence) The properties in an L-thematic role type must be characterizable independently of the relations (denoted by natural language verbs) that entail them.

Note incidentally that although Chierchia's (1984) way of defining thematic roles treats them as functions on events, events are for him sequences, one element of which is the particular relation denoted by some verb, so his definition as it stands also appears not to rule out "bizarre" thematic roles such as (9) that depend in an idiosyncratic way on particular verbs.

Perhaps (10) is really stronger than what we want. For example, it is sometimes suggested that the roles Source and Goal have a literal characterization "place from which/ to which something moves" with motion verbs as in (11), but only an abstract or metaphorical origin/terminus of movement with verbs like (12):

(11) John rolled the ball to the fence.
(12) Mary explained the idea to John.

Thus perhaps such roles should have one criterion for motion verbs and a different one for other verbs. However, I have no idea at present how to go about constructing a criterion that permits thematic roles to depend on what we might call natural classes of verb meanings, as illustrated by (11) and (12), without permitting quite arbitrary dependence on verb meaning, as in (9), so for now I will let (10) stand in for the independence criterion we ultimately seek.

One way of insuring (10) would be to keep our present approach and stipulate that the properties contained in L-thematic roles be taken from the set of "natural properties" suggested by Chierchia (1984) and Cocchiarella (1983) or from some other designated set. However, now that we have identified the three criteria of completeness (7), distinctness (8) and independence (10), I believe we are in a position to see that there is a quite different way of constructing a thematic role theory from which these criteria arise, if not automatically in all three cases, at least quite naturally.

3. A Neo-Davidsonian Theory of Thematic Roles

I will call this other approach to thematic roles a Neo-Davidsonian Theory of thematic roles because of its similarity to Davidson's (1967) familiar theory of adverbs in action sentences. Davidson suggested that event-sentences quantify over events and that adverbs are essentially predicates of events, as in, for example, the formula in (13b):

(13) a. Jones buttered the toast at midnight in the bathroom.

b. $\exists e (\text{buttered}(Jones, \text{-the-toast, e}) \& \text{at-midnight(e)} \& \text{in-the-bathroom(e)})$
What I will propose is that to construct a theory of thematic roles, we should stipulate that not only the modifiers but also the arguments of verbs are actually predicates of events; more precisely, thematic roles are relations between individuals and events. Hence the verb of any sentence has no arguments of its own, other than an event variable, and is likewise a one-place predicate of events, rather than something that denotes a relation. That is, example (13a) is instead to be interpreted as (14):

(14) \( \exists e \) [buttered(e) & Agent(Jones, e) & Patient(the-toast, e) & at-midnight(e) & in-the-bathroom(e)]

If thematic roles relating events to their participants are the only way we can express what we were formerly thinking of as "relations" in natural language, the three conditions on thematic-role-types we developed above will now follow: Completeness—the requirement that every argument entails some thematic-role—follows because there is no way in this theory to state that an individual is a participant in an event except by relating it to the event via some thematic role.

Distinctness—the requirement that all arguments of a verb are distinguished from one another by the thematic roles they bear, also follows automatically in this approach, for if two participants in an event are to be given any semantically distinct status at all in this method, it will have to be by means of different thematic roles which relate them to the event in question. On the other hand, one might wonder about the possibility of predicating the same role of two different individuals, as in (15); I will later have reason to rule such cases out entirely (and, incidentally, be thereby committed to (8a) rather than (8b) or (8c)).

(15) \( \exists e \) [verb(e) & \( \exists y \exists z \) [THR\(_1\)(y, e) & THR\(_1\)(z, e) & y \neq z]]

Independence—the requirement that thematic roles be semantically characterizable independently of the meaning of the verb describing the event—also follows naturally here from the fact that statements have the form of conjunctions of predications about an event: the truth conditions of each conjunct will have to be determinable independently of the other conjuncts. True, we still will need to stipulate that the relations denoted by thematic roles be something like natural properties, to be absolutely sure of ruling out exotic definitions which amount to (9), but such a requirement seems more motivated under the Neo-Davidsonian approach, since thematic roles, not verbs, denote the compositionally basic relational terms we are working with. (Under the ordered argument theory, by contrast, thematic roles are secondary (and second-order) notions, derived from verb denotations by intersecting entailments.)

A brief historical note is in order here. First, some people, for example Chomsky (1981, p. 35) seem to have thought that the theory implied by (14), rather than that implied by (13a), is what Davidson did propose. However, I find no justification for this attribution in Davidson's writings themselves, in fact Davidson argued against (14) in Davidson (1967a). The theory implied by (14) was, on the other hand, explicitly proposed as a modification of Davidson's by Terence Parsons (1980), and the theory of thematic roles in Carlson (1985) is, as far as I can tell,
equivalent to Parsons' proposal and mine. While I certainly owe a debt to both these papers, I might point out that neither Parsons nor Carlson observe that the three requirements of Completeness, Distinctness and Independence motivate the Neo-Davidsonian analysis; also, I will propose that the Neo-Davidsonian analysis applies to a different domain in natural languages from what Parsons and Carlson have assumed.

To fill out our Neo-Davidsonian theory, we will apparently need two more things. First, we may want to assume that various kinds of events are entailed to have certain collections of participants (i.e. entailed via the lexical meaning of the verbs denoting them). For example, if events of giving always have three participants, a Source, a Theme and a Goal, then we would need to be able to state that (16) is an entailment for events named by this verb, and similarly for other verbs.

(16) \( \forall e \Box (\text{giving}(e) \rightarrow \exists x \text{Agent}(x, e) \& \exists y \text{Source}(y, e) \& \exists z \text{Goal}(z, e)) \)

Also, there will seemingly be entailments about event participants that are specific to individual verbs, entailments above and beyond those that follow from the thematic role predicate itself. For example, if a person is the agent of an event of singing, then that person's vocal cords are (mostly) in motion, he is exhaling air, etc. If he is Agent of an event of whistling, then he is exhaling but his vocal cords are not moving. To describe these, we apparently need meaning postulates like (17):

(17) \( \forall x \forall \Box ([\text{singing}(e) \& \text{Agent}(x, e)] \rightarrow \text{moving-vocal-cords}(x)) \)

Such entailments as these will correspond, in the ordered-argument theory, to entailments of individual thematic roles that are not part of any L-thematic-role type. I will return to the status of entailments like (16) and (17) below.

Finally, we may want to impose a uniqueness requirement on the individuals asserted to bear thematic roles in events, to the effect that no individual other than the one mentioned bears that same role in that same event:

(18) \( \text{(Uniqueness of role-bearing)} \) For all thematic roles \( \text{TH}_i \):

\[
\forall x \Box [\text{TH}_i(x, e) \rightarrow \forall y [\text{TH}_i(y, e) \rightarrow x = y]]
\]

Both Carlson (1985) and Chierchia (1984) assume such a condition will hold; in Chierchia's formulation, it follows because thematic roles are defined as functions into the set of individuals, rather than relations. However, note that uniqueness is a different condition from distinctness; distinctness only requires that the set of entailments relative to a given argument position are distinct from that of other argument-positions. Uniqueness requires that the individual denoted by the argument in this position is the only one that bears this thematic role. Finally, note that uniqueness does not really commit us to Chierchia's (1984) position that thematic roles are functions into the set of individuals: uniqueness as in (18) means each thematic role has only one bearer, but does not rule out the possibility that the same individual may be bearer of more than one thematic role.
It might seem that this condition would cause problems with plural sentences, such as *John and Mary sang*. However, I think it need not do so, if we adopt the theory of plurals proposed in Scha (1981), Hoeksema (1983) and elsewhere, which holds that plural NPs consistently denote groups (i.e. non-singleton sets), and that distinctions between collective and distributive interpretations, as in (19), are not differences in the types of NP denotations but only differences in lexical entailments of verbs:

(19) a. John and Mary sang, fell asleep. *(distributive)*
    b. John and Mary painted the house, bought the car. *(distributive or collective)*
    c. John and Mary met, are alike. *(collective)*

That is, all three examples predicate something about the group consisting of John and Mary; however, with a distributive predicate it is entailed that whenever the predicate is true of a group, it is also true of all the members of the group individually; with a collective predicate, it is entailed that the predicate is never true of the individuals making up the group, and that with predicates like those in (19b), it is not entailed that the predicate either is or is not also true of the individuals in the group; i.e. such predicates are usually unspecified, rather than ambiguous, between group and individual predication.

If we assume that the variable *x* in (18) ranges over a domain of discourse that contains groups as well as individuals, then it seems to me to give sensible results with this theory of plurality, if we pay careful attention to the way events must be individuated when we invoke the distributivity axioms. It is required that in the case of (19a), three events are entailed to exist: the event of John and Mary's singing (which will have a group as Agent), plus the distinct event of John's singing and the event of Mary's singing: each of the last two has only an individual Agent. In example (19c), only one event of meeting is involved, and this one has as Agent the group with John and Mary as members, though neither John nor Mary can separately be Agents of this event (though we may be able to conclude that they are agents of other events, e.g. events of moving to some place, etc.) Though these ways of individuating events may be novel, I am not aware of any problems that they involve us in.

4. Relative Expressive Capacity of the Two Systems

We can now consider the question whether the two theories of predicate-argument association are equivalent in expressive capacity, or whether one is stronger than the other. First of all we must address the question whether the meanings of natural language verbs really are such that all their arguments can be semantically distinguished by a system of roles meeting criteria of Completeness (7), Distinctness (8), Independence (10), and possibly Uniqueness of Bearer (18), for this hypothesis is an empirical one which might turn out to be false. If it is false, then only an ordered-argument system (or some yet-to-be discovered intermediate one) is expressively rich enough to build what I called a strong thematic roles theory (in 2.2 above) on. (For some reasons to be skeptical of the hypothesis and some reasons to be interested in "weaker" theories of roles, see Dowty (1987), section 4.) If on the other hand natural language verbs are so characterizable, then
in principle it seems that equivalences between ordered-argument descriptions of events and the corresponding Neo-Davidsonian descriptions should hold for all verbs, for example give as in (20):

\[(20) \forall x \forall y \forall z [\text{give}(x, y, z) \iff \exists (\text{giving}(e) & \text{occur}(e) & \text{Source}(x, e) & \text{Theme}(y, e) & \text{Goal}(z, e))]\]

Whether such equivalences will actually hold depends on two further matters: whether we decide to include postulates like (16) or (17) above in our thematic role system (which entail that events of a certain type always involve certain role-bearers as participants, or which entail that role-bearers in an event-type are entailed to have properties other than just those of the role itself). As long as we do not, then these entailments about participants "above and beyond" what the thematic role predicates entail about them cannot be described in the Neo-Davidsonian theory, so it would be expressively weaker under these conditions. (As I suggest in Dowty (1987), there might be reason to view the neo-Davidsonian method as a part of a theory of how our knowledge of the entailments of event-verbs grows with cognitive and linguistic maturation: initially, it is a system in which entailments like (16) and (17) are absent, and thus a weaker system than the ordered-argument system, but later, when these kinds of entailments are fully understood, either a system where equivalences to ordered-argument descriptions hold generally, or possibly an ordered-argument system of even greater expressive power than a Neo-Davidson system, if "non-Neo-Davidsonian" verb meanings exist.)

5. Further Questions to be Answered

This completes the sketches of the two formal theories of thematic roles. The next steps in this inquiry are, therefore, to try to answer the following:

(21) a. What linguistic evidence can be found motivating one or the other of the two theories of thematic roles? Or, if neither appears wholly adequate for natural languages, is there evidence that the two theories apply to two different domains in natural languages?

b. Is the fundamental empirical hypothesis correct that underlies both theories of role-types—i.e. that all verbs in all natural languages have meanings characterizable by a small finite set of role types meeting the conditions of completeness (7), distinctness (8), and independence (14)?

c. If hypothesis (b) is not correct, how should we interpret the linguistic literature that purports to show syntactic generalizations in terms of thematic roles and hierarchies of role-types? In particular:

d. Is it reasonable to speculate about psychological explanations for the tendency of verb-argument entailments to cluster into apparent thematic-role types, explanations from language acquisition and/or the cognitive classification of events?

e. Are thematic roles in the world, in the language, or in the head?
Although these are ultimately of more interest to the linguist than the formal theories sketched out above, time limitations (and published space limitations) imposed by the format of this conference do not permit these to be pursued any further here. However, these questions are discussed in some detail in Dowty (1987). In regard to (a), it is there proposed that the ordered-argument theory is more likely to characterize the way verbs are associated semantically with their subcategorized arguments, while the Neo-Davidsonian theory is more likely to characterize the way verbs are semantically associated with adjuncts and the way all arguments of (derived) nominals referring to events are associated with these nominals. (Rappaport 1983 has proposed a similar hypothesis.) While the question (b) will surely not be settled to everyone’s satisfaction for some time to come, it is proposed in Dowty (1987) that there are reasons for skepticism about this empirical hypothesis. Consequently, question (c) is then addressed, and it is speculated (d) that the language acquisition situation and (in apparent agreement with Carlson 1986) the preliminary cognitive classification of events may be the place to look for the source of the “thematic role” phenomenon. Finally, it is shown why (d) represents a very fundamental question about the analysis of thematic roles that must be resolved before a model-theoretic semantic treatment of thematic roles will be on a sure footing, and this question has not previously been addressed; even in the theoretical and descriptive linguistic literature on roles, an apparent bifurcation among linguists can be found according to how this question is implicitly answered.

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NOTES

1At least Chierchia (1984, ms.), Dowty (1985), and Ladusaw and Dowty (1985) have explicitly suggested that thematic roles be regarded, in a model-theoretic semantic theory, as sets of entailments of lexical items.

2If some thematic role "entailments" actually are presuppositions, and if presuppositions are treated along the lines of Karttunen and Peters (1979), then the method of describing such presuppositions would not seem to differ greatly from that of the entailments discussed in this paper.

3It is often pointed out that in "standard" Government-Binding Theory, the only essential thing about thematic roles is the (one-place) predicate is assigned a \( \theta \)-role, which serves to distinguish non-\( \theta \) NPs, the dummies there and it, from other NPs. (In Dowty (1981), it is shown how the semantics of these NPs can be treated systematically in a model-theoretic rule-to-rule semantics based on a mono-stratal syntax: although such NPs have real enough denotations, the so-called "null \( \theta \)-role"
they are assigned in GB turns out to correspond semantically simply to the complete absence of entailments generated in these argument positions, hence it matters not at all what their denotations are.) Since, as pointed out in the text above, current "standard" GB does not wish to commit itself to the assumption that role-types exist at all, and since only the one-place predicate "is assigned a $\theta$-role" plays a significant part in the GB theory, I can think of nothing that distinguishes the GB theory semantically from on ordered-argument theory, where the GB predicate is assigned a $\theta$-role is understood to mean "is an NP interpreted semantically as an argument or adjunct of the verb", and is not assigned a $\theta$-role understood as "is an NP receiving no (normal compositional) semantic interpretation".

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The grammaticization of number as a verbal category*

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Introduction

It has long been known to those who study the native languages of North America that in many of these languages some verbs show quite different stem forms depending on the number of an argument (Frachtenberg 1922b:534-5 and Sapir 1922:94). For example, a language may have two forms meaning 'kill one' and 'kill more than one'. It is an interesting question whether such stem suppletion is a type of inflection. Those who have written about it seem to agree that it is not, for it is very rarely, in the many descriptions I have consulted, described as a type of agreement. In fact Boas (1911:381) has offered an alternative to viewing suppletion for number as a type of inflection:

the use of different stems for singular and plural belongs rather to the classification of nouns and verbs according to the form of objects and actors

Boas' words imply, in modern terms, that a number suppletive verb selects an argument of the appropriate number in much the same way that verbs select an argument whose referent has the appropriate form: in the same way, for example, that the English verb peel selects an object whose referent has a skin, or that massacre selects an object referring to a group of people.

I believe Boas was right, and in this paper I present arguments to show that the concord relations established by number suppletive verbs do not have the expected properties of verb agreement, but that they are compatible with a selectional interpretation, in which a morphological Number^1 category inherent to the verb is linked directly into the semantic representation of verbal argument structure. This semantic representation, specified for the number of an argument, accordingly enables the appropriate argument expression to be selected.

Now suppletion is a restricted phenomenon in the languages where it occurs, but it seems that with respect to verbal Number morphology it is like the tip of an iceberg. Not only suppletion, but productive verbal Number morphology too can have the properties of selectional rather than inflectional concord.\(^2\)

This is a result of some empirical and theoretical significance. The theoretical significance is that number may be grammaticized as a morphological category inherent to the verb: it is not inevitably a nominal category. The number of participants in an event or state can be expressed as an inherent property of that event or state, or as an inherent property of the participants themselves. The empirical significance is simply that verbal Number morphology cannot ipso facto be assumed to be an instance of agreement.
The title of this paper emphasizes its theoretical significance, but the empirical issues are probably just as important. The status of agreement in grammar is very much at issue at present, with one emphasis being on finding ways to constrain the mechanism by which agreement is achieved. If instances of inherent verbal Number morphology are wrongly interpreted as agreement, this could lead to spurious problems for theories of agreement, a lot of wasted effort for those who might try to account for these problems, and a skewed theory of agreement.³

Suppletion for number in the world's languages

Suppletion for the number of an argument is very widespread in the world's languages. I have unearthed over 40 languages from diverse parts of the world with such suppletion, but I feel I have only scratched the surface. In all cases only a restricted set of verbs supplete for number, the reported totals ranging from a few to a few dozen. Typically the set includes some transitives and some intransitives.⁴ Languages with number suppletion include Barai (Olson 1975), Fasu (Loewecke and May 1980) and Ómie (Austing and Upia 1975) from Papua; the Austronesian languages Kapingamarangi (Lieber and Dikepa 1974), Tongan and Samoan; Ainu (Batchelor 1938) from Japan; !Kung (Snyman 1970) from Africa; the Caucasus languages Georgian (Aronson 1982), Tsova-Tush (Holisky 1985) and Svan (Comrie 1981); Kaingang (Wiesemann 1972) from South America; and a rather large number of languages from North America (at least 30 that I know of) including many representatives of the Athabaskan, Muskogean, Salish, Uto-Aztecan and Yuman families (see e.g. Goddard 1911, Jeanne, Hale and Pranka 1984, Kinkade 1977, Langdon 1970, Mason 1916, and Munro 1976), and a number of languages of whose classification I am unsure, which include Tsimshian (Boas 1911, Dunn 1979), Karok (Bright 1957), Kiowa (Watkins 1984) and Ute (Ute reference grammar 1980). The list of North American languages is not by any means exhaustive.

Usually the suppletion is two-way, with a distinction between [±singular] or [±plural].⁵ However three-way suppletion is also reported, for singular:dual:plural (Karok). Sometimes a language with suppletion is reported to have certain stems which are only used in the plural or nonsingular, with no suppletive counterpart (Kinkade 1977).

The suppleties of a language will include some which show a partial phonological resemblance, so that they might justifiably be regarded as cases of irregular ablaut or reduplication: the distinction would sometimes be a very fine one. A comparable example from English is the partial resemblance of was and were in the suppletive paradigm of to be.⁶

Concord properties of number suppletion

In this section I describe properties of stem suppletion which are problematic for an agreement account, but quite consistent with a selectional interpretation.
I. Suppletion is not triggered by a surface syntactic relation; rather it selects for the number of a particular semantic role of the verb.

In every observed case of stem suppletion for number it is the the number of the principally affected argument for which the verb suppletes. The verb encodes the plurality of affect. A verb like 'kill' will supplet for the number of its object, the one killed, while 'walk' or 'die' will supplet for the number of its subject, the person undergoing the walking or dying. This gives an absolutive pattern, in which the number encoded is that of the intransitive subject or transitive object. The appearance of this pattern is quite irrespective of whatever may be the dominant case marking or agreement pattern of the language, whether ergative or accusative. In every observed case of verb stem suppletion for number it is the absolute argument for which number is marked, and in only very few of these languages is a clearly ergative pattern of case marking or agreement to be observed; one exceptional case is Tsimshian (Dunn 1979). Most have the usual accusative pattern of case marking or agreement, and some have 'active' case or agreement systems. The following example shows an absolutive system of prefixal Person-Number agreement interacting with absolutive verb stem suppletion:

(1) HUICHOL (Comrie 1982)
   a. nee-nua
      lsgS-arrive:sg
      'I arrived.'
   b. tiiiri yi-huuta-ti me-niu?aziани
      children two SUBJ 3nonsgS-arrive:nonsg
      'Two children have arrived.'
   c. Wan Maria maa-ti me-neci-mieni
      Juan Maria and-SUBJ 3nonsgS-lsgO-kill:sg
      'Juan and Maria are killing me.'
   d. nee Wan Maria maa-me ne-wa-qiini
      I Juan Maria and-OBJ lsgS-3nonsg0-kill:nonsg
      'I am killing Juan and Maria.'

   The absolutive pattern of stem suppletion is highly significant since it is quite independent of other syntactic characteristics of the languages examined. I propose that it derives from a link to a semantic role, the 'affected argument', for want of a better term. It follows from this that in Huichol promoted objects cannot trigger the inherent verbal Number morphology:

(2) HUICHOL (Comrie 1982)
   a. nee waakana ne-mec-umi?ii-ri eekî
      I chicken lsgS-2sgO-kill:sg-BEN you
      'I killed you(sg) the chicken.'
   b. nee waakana-ari ne-mec-uqî?ii-ri eekî
      I chicken-nonsg lsgS-2sgO-kill:nonsg-BEN you
      'I killed you(sg) the chickens.'
In (2) the promoted benefactive eeki\ 'you:sg' triggers regular object agreement. The promotion of a benefactive to direct object means that the object agreement is triggered by the benefactive NP, since agreement is a syntactic process, triggered by the appropriate syntactic relation. However, suppletion reflects the number of what is killed, in this case the demoted object waakana(-ari) 'chicken(s)'. The two Huichol stems for 'kill' have contrasting semantic structures, one specifying a single killing, the other a nonsingular killing, so that suppletion will always indicate this semantic distinction, no matter what syntactic or lexical process the stem undergoes.

For many of the languages reported to have number suppletion there is also suppletion or verb derivational morphology which distinguishes other semantic characteristics of the absolutive argument: typically its form, animacy or personhood. These are obviously not good candidates for agreement. For example in Georgian some verbs supplete for whether the object or intransitive subject is a person. In some American Indian languages with number suppletion, verbs systematically select for the form, substance, animacy, or other salient semantic characteristics of the absolutive argument: in Bright's English-Karok lexicon 10 verbs for 'stand' are listed, distinguished according to whether their subject is animate, a house, a long thin object, a filled container, and according to its number.

Sometimes number suppletion is reported to interact with suppletion for other semantic characteristics of an argument. In Barai there is a fourfold contrast between 'take' with [+singular] and [-animate] object. In Kaingang a fourfold contrast is reported by Wiesemann (1972:99) between verb stems meaning 'hand over': three take a singular object, selected according to its shape and stance, and one takes a nonsingular object, without regard to shape or stance. In Samoan a verb meaning 'go, nonsingular', without regard for direction, contrasts with verbs of directed motion selecting a singular argument (Pratt 1911).

II. Where there is discord between the number of participants bearing the appropriate semantic role and the strict morphological number of the syntactic relation-bearing NP, suppletion will reflect the former, agreement the latter.

In Navajo (Jeanne, Hale and Pranka 1984), comitative and partitive constructions show this property: suppletion is according to the number of participants, agreement according to the number of the subject:

(3) **NAVAJO** (Jeanne, Hale and Pranka 1984)

a. sh\f ashkii bi\-\ yi-sh-\'ash
   I boy him-with PROG-lsg-walk:dual
   'I am walking with the boy.'

b. nih\f \-a' di-iid-\'a\+1
   we subset FUT-lnonsg-walk:sg
   'One of us will go.'

In Moses-Columbian, a singular verb stem may be inflected for
nonsingular to indicate distinct, separate activity by individuals of a group:

(4) MOSES COLUMBIAN (Kinkade 1977)
   a. *yôryô -íx
      DIST:R: sit:nons-g-activity
      '(People) are sitting.'
   b. *ílôglâq -lx 1x
      DIST:R: sit:sg-activity nonsg
      'Each of a group of people has a place to sit.'

In Georgian, a NP modified by a numeral is formally singular, and controls singular Person-Number agreement, but the suppletive verb is nonsingular, as one would expect:

(5) GEORGIAN (Aronson 1982)
   a. ivane შემოვიდ-ი da და ი-დ-
      John enter-3sg and sit:sg-3sg
      'John entered and sat down.'
   b. ჩემი მშობლ-ი შემოვიდ-ი da და ქ-ი-დ
      my parent-nonsg=NOM enter-3nonsg and sit:nonsg-3nonsg
      'My parents entered and sat down.'
   c. ჩემი სამი მეგობარ-ი შემოვიდ-ი da და ქ-ი-დ-
      my three friend:sg enter-3sg and sit:nonsg-3sg
      'My three friends entered and sat down.'

In Georgian the opposite discord — nonsingular Person-Number agreement and a singular suppletive verb — occurs with the second person plural of politeness for reference to a single addressee. Here also, suppletion reflects the actual number of the intransitive subject, not its formal Number.

In Kiowa (Watkins 1984) nouns have a morphologically unmarked Number and a marked, 'inverse' (inv) Number, marked by the suffix -B3 (with several allomorphs). The inverse category's Number value is different for each of the three noun classes: for class I it is [+plural], for class II it is [+singular], and for class III, it is [+singular] or [+plural], with dual ([+singular, -plural]) as the unmarked value. The verbal system includes Person-Number agreement prefixes which treat inverse Number in the same way for all noun classes, but distinguish singular, dual, and plural when the Number is unmarked. Agreement reflects the category distinctions of nominal morphology, but suppletion follows semantic number: it ignores the unmarked:inverse distinction:

(6) KIOWA (Watkins 1984)
   a. kyây-gù ە-کە-ی-ە
      Comanche-inv 3inv-lie:pl-DISTRIB
      CLASS I
      'Comanches are camped about.'
   b. ە-د3 ە-کەl
      tree-inv 3inv-set:nopl
      CLASS II
      'A tree is standing there.'
c. á: ē-cél
   tree 3du-set:nonpl
CLASS II
'Two trees are standing there.'
d. á: Œ-s5l
   tree 3pl-set:pl
CLASS II
'Trees (more than two) are standing there.'

In the example (7c) from Mojave, the suppletive verb tayem 'go: nonsg' reflects the actual number of people going, but the syntactic subject is 'inyech 'I(sg)', as shown by the same-subject (ss) switch-reference morphology on the preceding verb havik 'be two:12

(7) MOJAVE (Pam Munro, p.c.)
   a. '-iyem-pch
      'I went.'
      1S-go:sg-PERF
   b. 'inyech
      John '-ataav-k
      I(sg):SUBJ 1S-hit:ss 1S-go:sg-PERF
      'I hit John and went.'
   c. 'inyech
      John '-havik-k
      I(sg):SUBJ 1S-two:ss 1S-go:nonsg-PERF
      'I went with John.' ('I, being two with John, went.')

III. Stem suppletion may distinguish Number features which are not nominal Number features of the language: that is, they are not formally marked in any way in the nominal morphology, neither by nouns nor pronouns.

Some clarification is in order. Not uncommonly, Number, Person, or Gender features can be specified in verb agreement morphology although demonstrably absent on the NP which 'controls' agreement (Moravcsik 1978), and of course there may be agreement with no overt NP 'controller' at all.13 I do not consider cases like these as exemplifying anything like property III, since in every case like this that I know of, the agreement morphology is restricted to encoding features which are encoded independently somewhere in nominal morphology, either in the pronouns or the nouns:14 the features that the verb encodes can rightly be considered nominal.15 For example, Kiowa class I nouns are specified for [±plural], class II for [±singular], and verb agreement morphology for both these features, whether the agreement 'controller' is class I or class II (see (6) above). In some sense which I would not want to make precise here, agreement, in contrast to suppletion, is a nominal anaphor, incorporating a complex of proper nominal features.

Examples illustrating III are not very common. Munro (1976) reports that in Mojave one verb suppletes for singular:paucal:plural, but paucal is not a nominal feature of that language. In Karok several verbs supplete three ways for singular:dual:plural, although pronouns and nouns (and agreement) only distinguish [±singular].
IV. In syntactic contexts where agreement is characteristically absent, where a language systematically omits agreement morphology to form an infinitive, stems still supplet for number. These contexts include: control constructions, imperatives and attributive usage.

The following Chickasaw examples illustrate the contrast between suppletion and agreement in control constructions (9) and imperatives (10): agreement is omitted, suppletion retained:

**CHICKASAW (Pam Munro, p.c.)**

(8) a. hilha-li 'I dance.'
    b. kii-hilha 'We dance.'
    c. malili-li 'I run.'
    d. kii-tilhaa 'We run.'

(9) a. *malili* sa-banna 'I want to run.'  
    run:sg lsg-want
    b. *tilhaa* po-banna 'We want to run.'  
    run:nonsg l nonsg-want

(10) a. *hilha!* 'Dance!' (one or more people)
    b. *malili!* 'Run!' (one person)
    c. *tilhaa!* 'Run!' (more than one person)

Kiowa stative verbs may be used attributively as adjectives. Then they lose their verbal agreement inflection, illustrated in (6), but they still supplet for the number of their thematic argument:

(11) **KIOWA (Watkins 1984)**

a. *thall-ky\ä'yi* '(one) tall boy'
   boy-tall:sg
   CLASS I

b. *thall-kî-nï* ' (two) tall boys'
   boy-tall:nonsg
   CLASS I

c. *thall-kî-nï-gó* ' (more than two) tall boys'
   boy-tall:nonsg-inverse
   CLASS I

V. Stem suppletion for number is preserved in derivational word formation, but inflectional agreement is not.

If suppletives select for, rather than agree with, an argument of the appropriate number, then this property follows naturally, since clearly a whole range of semantic characteristics of a stem are preserved in derivation, including those related to selection. **Assassinate** selects an object with human reference, and an assassination involves the death of a human being.

Causative examples are particularly common in the descriptive literature. For example Kapingamarangi *damana* 'big:sg' and *llauehe* 'big:nonsg' respectively give *hagadamana* 'enlarge one thing' and *hagallauehe* 'enlarge more than one thing'. See also Jeanne, Hale and Pranka (1984) for Hopi examples.
Kinkade (1977) provides a number of examples of deverbal noun formation in Moses–Columbian involving suppletive stems, of which the following is typical: ḍaŋ–l质感'm sit:ssg', yar–ljsx 'sit:nonsg' give respectively k–lqlx–alısın 'chair' and (n)k–yoglx–alısın 'chairs:nonsg'. The following example from Kiowa (Watkins 1984) illustrates the derivation of adverbs from suppletive stems: et 'big:ssg', bın 'big: nonsg' give ét-te 'a lot' and bın-de 'a lot, much'.16

Beyond suppletion

In the preceding sections I have argued that suppletive stems select for rather than agree with the number of their argument. The conclusion to be drawn is that suppletion encodes a Number category inherent to the verb, not a nominal category.

In many of the languages surveyed here there is evidence for a more general verbal Number morphology with properties of the sort described above: suppletion is an extreme instance of a more general phenomenon. And inherent verbal Number morphology is by no means restricted to those languages with some suppletive stems. In order to show this I will report here, in a tentative and less than rigorous fashion, some of my observations. For one language which has no reported stem suppletion, Chamorro, I will provide a more detailed account of productive inherent verbal Number morphology.

Internal and external morphology

For most of the languages with stem suppletion referred to above, verbal Number morphology can be observed which is formally internal to and distinct from the most obvious candidate for Person–Number agreement morphology. The latter is usually expressed by stem–external, formally regular affixes. The former, in contrast, can take the form of partial stem suppletion, stem ablaut, or reduplication (e.g. Mojave, Yuma, Tsimshian, Kaingang, Tsova-Tush, Kaingang, Kapingamarangi, and Samoan),17 often with highly irregular allomorphy and phonology.

Other languages with no reported suppletion show a similar contrast between external agreement and stem internal Number morphology (Chamorro (Topping 1973) and Kiwi (Ray 1932)).18

Where data was available, stem–internal Number morphology could be seen to have the concord properties described above for suppletion. For example, Kapingamarangi stem ablaut encodes the number of the absolutive argument, and is preserved in causative verb derivation (Lieber and Dikepa 1974).

Derivation v. inflection

In some of the consulted descriptions a distinction is made between derivational and inflectional processes, with the external Person–Number morphology inflectional, and the distinct Number morphology derivational. This distinction is made very explicit for Diegueno (Langdon 1970) and Karok (Bright 1957). Bright defines the noun or verb THEME as: "the end-product of all derivation and the
foundation for all inflection." This distinction is justifiable for Karok on language-internal grounds involving the ordering of rules associated with affixation. The Person-Number affixes are inflectional, and as such are ordered externally to two derivational affixes -va and -na which derive verbs requiring a plural absolute argument, and which both show the irregular semantic and phonological characteristics that one would expect of derivation, in contrast to inflection. For example -va forms verbs of various plural affects, as well as verbs requiring a nonsingular argument: ōivruhtih 'one thing) to be floating', ōivruhtihih-va 'several things) to be floating'; yuh 'to spit', yuh-va 'to vomit'; vurunih 'to flow down (in a single stream)', vurunihih-va 'to flow down (in several streams)'; taknah 'to hop', taknahnah-va 'to play hopscotch'.

Number and aspect

For several languages surveyed the stem-internal or derivational Number morphology is used for number affects more akin to aspect than concord, as well as for encoding argument number. For example Kapingamarangi stem ablaut encodes argument number for some verbs, for others a plural event: abulu 'one thing) to be sinking', aabulu 'more than one thing) to be sinking'; wele 'to burn (one thing)', welele 'to burn (more than one thing)'; dangi 'to cry, wail', tangi 'to ring, peal, of a bell'; wanawana 'sticking out, jutting out (only reduplicated)', wwananah 'to have gooseflesh, hair to stand on end'; wae 'to separate', wwanahpe 'to separate into groups'; daa 'to extract, subtract', taa 'to bail water'. Note that the type of plural event is lexicalized in Kapingamarangi to a considerable degree.

In Tsoda-Tush the aspectual category 'number of event' is for some verbs restricted to an argument number interpretation (Holisky 1985), with far weaker lexicalization than in Kapingamarangi.

Argument structure

Verb stem suppletion appears to invariably select for the number of the absolutive argument. However more productive morphologies show considerable variation in their semantic linking. Many, like Kiwi ablaut (Ray 1932) and Karok -va are absolutive, or 'affect oriented'. Others are sensitive to animacy as well (e.g. Karok -na). Many imply group activity, and select the number of the Agent or Actor (e.g. Acehnese meu- (Durie 1985), Tagalog plural Actor focus forms (Schachter and Otanes 1972), and Yuman collective plural forms (Halpern 1946). Some apply only to intransitive verbs (e.g. Chamorro and Palauan). The two commonest patterns, details aside, seem to be absolutive (plural affect) and nominative (group activity). Presumably these are the most natural ways of linking Number morphology to verbal argument structure.
Chamorro (Chung 1982, 1983; Costenoble 1940; Gibson 1980; Topping 1973)

Chamorro has two types of verb concord morphology:

a) **Bound pronominals.** For certain voice-aspect combinations of the
verb, bound pronominal markers appear before the verb stem. These
encode precisely the feature distinctions of the free pronouns:
three persons, [±singular], and an inclusive/exclusive distinction.
These markers are clearly anaphoric: a free subject pronoun is not
used when they are present, except for special emphasis:

(12) p̣̣ra u saga giya Guam (Gibson 1980)
    IRR 3sg stay LOC Guam
    'He will stay on Guam.'

b) **Verb stem formatives.** Two sets of verb stem forming affixes
encode the feature [±plural] for certain voice-aspect combinations.
These are the 'passive' or 'goal-focus' affixes which encode the
number of the Agent, and the intransitive subject plural affixes:
-um-/man- (Realis) and Ø-/fan- (Irrealis). These are not ana-
phoric: their presence does not proclude having a subject pronoun.
Compare (12) with (13):

(13) s-um-aga gui' giya Guam (Gibson 1980)
    -nonpl-stay he/she LOC Guam
    'He/she stayed on Guam.'

I will argue here that the intransitive subject plural affixes
have the concord properties of inherent verbal Number morphology,
not of agreement, and in this they contrast systematically with the
bound pronominal markers.19 The first thing to note is that the
plural affixes encode [±plural], a feature which is nowhere a
feature of nominal morphology (except where nouns are used as
predicates or are derived from verbs). Free and bound pronominals,
and a small number of human nouns, distinguish only [±singular].
There is no nominal [±plural] feature for the verb to agree with.

In Chamorro, as in many languages, a formally nonsingular pro-
nominal can be used for singular reference, but the verb must be
formally nonplural (14c), as one would expect of a selectional cat-
egory, which is sensitive to semantic, not morphological features.
(This is just what happens with stem suppletion in Georgian.)

(14) (Costenoble 1940)
    a. si̍n hu Ø-fạnagi  'I can try.'
       can 1sg nonpl-try
    b. si̍n ta fan-mạnagi  'We (>2) can try.'
       can 1nonsg pl-try
    c. si̍n ta Ø-fạnagi  'I (or we two) can try.'
       can 1nonsg nonpl-try

In controlled infinitives (15b), imperatives (16c,d) and in
attributive usage (17b,c), verbal plural morphology is retained,
but bound pronominals are absent:
(15) Adapted from Chung 1983
  a. para ta fang-anta
     IRR 1nonsg pl-sing
     'We (>2) will sing.'
  b. ta tutuhun mang-anta
     IRR 1nonsg begin pl-sing
     'We (>2) begin to sing.'
(16) (Topping 1973)
  a. para bai hu Ø-chocho
     IRR 1sg nonpl-eat
     'I will eat.'
  b. para ta fañ-ocho
     IRR 1nonsg pl-eat
     'We (>2) will eat.'
  c. chocho!
     'Eat! (nonpl)'
  d. fañcho!
     'Eat! (pl)'
(17) (Costenoble 1940)
  a. jajas 'tired:nonpl' : mañajas 'tired:pl'
  b. i jajas na tawtaw
     the tired LIG person
     'the tired person'
  c. i mañajas na tawtaw
     the tired LIG person
     'the tired people (>2)'

The plural morphology is preserved in lexical derivations, but agreement is not. (18) illustrates a causative, and (19) nominal derivatives:

(18) (Gibson 1980)
  hu na'-fañ-otchu siha
  1sg CAUS-pl-eat they:nonsg
  'I fed them (>2).'
(19) (Costenoble 1940)
  a. hanaw 'to go'; i h-um-anaw 'the goer'; i man-hanaw 'the
     (Topping 1973) goers (>2)'
  b. choma' 'to forbid'; fan-chinema' 'forbidden things' (>2)

The intransitive plural morphology of Chamorro demonstrates the properties one would expect for an inherent verbal category: it is preserved in syntactic contexts where agreement should be absent; it is preserved in lexical derivations; and it encodes the feature [±plural] which is not a nominal feature.

Conclusion

A wide variety of evidence shows that Number in natural languages is not inevitably a nominal category. By stem suppletion, and by more productive morphological devices, languages express Number categories which are inherent to the verb, linked to verbal semantic structure. This provides the potential for concord between verbal Number and NP Number, but this concord shows the expected properties of semantic selection rather than agreement.

The conceptual category of number can be grammaticized in two ways: as a property of things, a category of nouns and pronouns; or as a property of states of affairs, a category of verbs. The resulting morpho-syntactic properties are very distinct. Both routes of grammaticization can produce concord phenomena, but in radically different ways, with very different consequences.
1. For the sake of clarity I use the capitalized terms Number, Person and Gender to refer to morphological categories. Their semantic concomitants are referred to as number, person and gender.

2. I restrict myself to considering cases where the number encoded can be that of an argument. Number of event categories are closely akin to the argument number categories considered here, and not a few languages use the same formal device for both types of category, e.g. in Mojave (Munro 1976), Tsoda-Tush (Holisky 1985), Chechen and Ingush (Johanna Nichols, p.c.). In so far as the number of an argument is distinguished I have included such categories for consideration.

3. The 'agreement' data (Baker 1985) from Huichol and Chamorro are spurious: they are not true agreement, for reasons given here.

4. However in a few languages only intransitive suppletives are reported, in small numbers, e.g. in Ute, Tongan, and Kapingamarangi.

5. The feature [+plural] involves a contrast between one or two [-plural] and three or more [+plural].

6. To be shows suppletion for Person and Number (and Tense). Its suppletion shows all the expected properties of agreement which are lacking for the Number suppletives considered here. There is, for example, no alternation in infinitive forms. Presumably Person is not a natural candidate for selection, so suppletion for Person is almost always a type of agreement. However in Japanese certain verbs are socially appropriate only with a referent of the right person, and of course person-deixis is a selectional feature of verbs in some languages, with different verbs for such meanings as: 'give to me' and 'give to you'.

7. The relevant distinction is not 'intial 2-hood' (Relational Grammar), since intransitive suppletives typically include such characteristically active verbs as 'eat', 'run' and 'walk'. One exception to the absolutive pattern, noted by Jeanne, Hale and Pranka 1984, is Hopi tiimoyta/noonova 'eat', which suppletes for the number of the person eating, even when used transitively. This is not a problem if the intransitive use is in some sense basic.

8. Most glosses are self-explanatory. The feature [+singular] is glossed sg/nonsg, and [+plural] nonpl/pl. S indicates subject agreement, and 0 object agreement. SUBJ is a subject case marker or form, and OBJ an object case marker or form.

9. Theme is a useful approximation. But note that the intransitive suppletives do not seem to conform to any particular semantic category. Note also that in Barai 'give' suppletes for the number of the Theme, but in Uto-Aztecan languages 'give' typically suppletes for the number of the Recipient (Pam Munro, p.c.).

10. Bybee (1985) points out that certain English verbs select for the number of the absolutive argument, e.g. massacre and stampede. Verbs like coauthor or coadjudicate are rather harder to find.
11. I am aware that what I call agreement often has variable properties in the contexts discussed here (see e.g. Moravcsik 1978). Agreement tends to reflect the morphological Number of argument expressions, but semantic factors can cause all sorts of complications. What I am claiming is that when agreement contrasts with suppletion there will be the proposed correlation.

12. The agreement prefixes in Mojave encode only Person, so they provide no evidence about whether the subject of tayem might be formally [+singular].

13. The idea that an NP's features fully determine or 'control' its agreement features on the verb is appealing but in practice unworkable. Moravcsik (1978) describes a number of ways in which agreement features can systematically 'disagree' with, or be more specified than the features of the 'controller'.

14. In Hopi the verbal suffix -ya indicates a plural subject, and this has properties of agreement (Jeanne, Hale and Pranku 1984). The feature [+plural] is distinguished in the morphology of nouns, but not of pronouns (Whorf 1946). More often pronouns encode features which are absent from nominal morphology (e.g. Person).

15. In this respect I disagree with Frajzyngier (1985) who ignores the role of pronouns when considering whether Number is a nominal morphological feature in a particular language. I take the view that features encoded on the verb may still be instances of agreement, even when a 'controller' is not specified for that feature. The issue is whether verbal morphology is encoding nominal features, not whether in particular instances the agreement features can be 'read off' the NP. In Frajzyngier's examples (1-3) the languages in question do distinguish a Number feature for pronouns, if not for nouns. Frajzyngier seems to treat the absolutive pattern of what I would call inherent verbal Number categories under the same heading as the ergative-absolutive morphologies found in many Australian languages. This is rather too much of a good thing. Inherent verbal Number morphology is always formally distinct from Person agreement, and its tendency to an absolutive pattern appears to be unrelated to the general morpho-syntactic organization of the language in which it occurs. The ergative-absolutive agreement systems found in Australian languages have the expected properties of syntactic agreement, and they co-occur with various ergative-absolutive characteristics found in those languages, including case marking. Frajzyngier's correlation 3 is contradicted by Uto-Aztecan languages, where absolutive patterning stem suppletion for number co-occurs with extensive nominal Number morphology: an impoverished nominal Number morphology is not a prerequisite for the existence of inherent verbal Number morphology.

16. I am not certain what the semantic contrast is between the derived adverbs.

17. In some of the languages agreement is restricted to Person (Mojave), or is non-existent (Kapingamarangi).


FROM PREPOSITION TO COPULA
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1. INTRODUCTION
1.1. Justification of research
If we dismiss every case of polysemy as accidental we deprive ourselves of the possibility of ever finding out whether the two functions are in fact related or not. If, in contrast, we try to discover a relationship, in the worst case we may find that none exists. But in an optimal case we may find out that a connection exists, and the explanation of this connection may shed some light on the nature of language structure and of language change.

1.2. Purpose and scope of the paper
The development of prepositions from verbs and of copulas from demonstratives has been postulated for many languages (Lord 1973, Li and Thompson 1977). There has not yet, however, been a documented case of grammaticization from preposition to copula (cf. Lehmann 1985).

The first purpose of the present paper is to show that grammaticization from preposition to copula has occurred in several Chadic languages. The second purpose is to show the possible motivation for this process. Note that although many cases of grammaticization have been described, the motivation for the grammaticization process is still poorly understood.

In the present paper I will be concerned mainly with two types: copulas in locative clauses, equivalents of be in the clauses of the type "X is at Y," and copulas in equational clauses, equivalents of be in "X is Y" as in "John is a soldier" and "Mary is tall." I will not deal with copulas that constrain time. It appears that the motivations for the process PREPOSITION---COPULA were different for the locative copula and for the equational copula. In Section 2, I will discuss the possible direction of the change involving prepositions and locative copulas. In Section 3, I will discuss the possible sources for equational copula.1

2. LOCATIVE COPULA
2.1. Existence of locative copula
Locative copulas have been claimed to exist only in the Ron subgroup of West Chadic (Jungraithmayr 1970), represented in the chart by Fyer. In my own work I have found that the locative copula a exists also in
Bolewa. The evidence that Bolewa must have had a preposition $a$ comes from comparative study of marking locative in Chadic (Frajzyngier a.).

Whenever a claim is made about the similarity between a copula and a preposition, and when both occupy the same syntactic position, one has to show that the differentiation between the two is a fact of language and not merely an artifact of the linguist's analysis. Since the description of the syntax of Fyer in Jungraithmayr 1970 is rather sketchy, the following discussion will be based mainly on data from Bolewa. The evidence that $a$ is indeed a copula rather than a preposition comes from contrasting sentences of the type (I) "X is in/at Y" with sentences of the type (II) "X VERB Z in/at Y." If the equivalent of 'is' in (I) is a copula rather than a preposition we would not expect it to occur in sentences of the type (II). On the other hand, if there is no differentiation between preposition and copula, we would expect the same morpheme to occur in both types of sentences. Sentences of the type (I) in Bolewa have the form:

Subject $a$ Prep NP, e.g.:

1a. kòun $a$ gá ámba 'a buffalo is in the water'
   buffalo in water

1b. kòun $a$ gá ámba sà 'the buffalo is not in the water'
   Neg

1c. sùbá-nò $a$ kò réwè 'my shirt is on the tree'
   shirt-1sg on tree

1d. sùbá-nò $a$ ném-gè réwè 'my shirt is near the tree'
   near-with?

1e. kòláb ámba $a$ wètè réwè 'that bottle is under the tree'
   bottle Dem under tree

Sentences 1a-e are ungrammatical if either $a$ or the preposition following it is deleted. Although the above examples alone could be accepted intuitively as evidence for the copular status of $a$, there may be another possibility, viz., that they in fact represent two prepositions in a sequence. The necessary evidence is provided by sentences of the type (II) in which, as stated above, we should not find $a$.

2a. zéeti sùbá gá kò réwè 'put the shirt on a tree'
   put shirt in on tree

2b. ísin zòò sùbá-nì gá gá ngírki 'he put his shirt into a bag'
   3sg put shirt-3sg in in bag

2c. ísin fóôù sùbá-nì kà gá ngírki 'he took his shirt out of a bag'
   take-out out in bag
d. mêmù âmâ gâ kólba gâ gâ sárâ-nî
   person Dem with bottle in in hand-3m
   'that man has a bottle in his hand'

Sentences 2a–d are ungrammatical if â is inserted before the
prepositions or if it replaces the prepositions. These sentences are also
ungrammatical if the prepositions are deleted. There is thus evidence
that â is a locative copula in Bolewa.

Jungraithmayr 1970 gives the following examples as containing
copula in Fyer:

3 a. ma-á-na
    he-is-here
   'he is here'
   b. ma-á-ti
   'he is there' (Jungraithmayr 1970:78)
4 a. yis-a-á-tââ
    he
   'he is there'
   b. yît-a-n tââ
    she
   'she is there'
   c. sôn-a-n-tââ
    they
   'they are there' (ibid.)

My argument that â in 4 a,b,c is indeed a copula rather than a
preposition runs as follows: There exist in Chadic languages, including
Fyer, constructions consisting of two prepositions. In such
constructions, the second preposition has a spatial function, indicating
spatial relationship between objects, (cf. Frajzyngier a.) e.g.:

5 'â dîkîn ti in between with
   'between, under'
   (ibid.)

In 4 a,b, and c, however, the second preposition n or â does not
indicate spatial relationship, but has a most general meaning 'at, in,
toward'. Since two prepositions marking just the locative case do not
coccur, the first instance of â may be analyzed as a copula. There
are thus enough arguments to postulate the existence of a locative
copula in Fyer as well.

2.2. Direction of change

If we assume that there exists a connection between the locative
copula and the preposition, we are faced with two possibilities. The
first is that prepositions derive from copulas. The other is that
locative copulas derive from prepositions. I am not going to explore the third possibility, that both forms derive from some other morpheme, because I do not see what this other morpheme might have been.

Assuming that the possibility of prepositions deriving from copulas is true for Chadic would force us to accept the following scenario: Most Chadic languages had a locative copula ə; this morpheme became a locative preposition in many languages; subsequently it ceased to function as a copula in most of the languages, and moreover, its function was not replaced by another morpheme. In effect this scenario postulates two processes: grammaticization, viz., introduction of a new grammatical category (preposition), and degrammaticization, i.e., elimination of a grammatical category (locative copula). Although theoretically possible, this scenario involves at least two unmotivated changes, which makes it unlikely. The first is the change from copula to preposition. Although such changes have been postulated for Kwa languages and for Chinese, the motivation for this change in those languages is not clear. The second is elimination of the locative copula. Change from copula to preposition may cause the elimination of a copula, but one would expect the copular function to be assumed by some other morpheme. This, however, did not happen. Most of the languages simply do not have a locative copula. The other problem in accepting the copula to preposition change is the independent recurrence of the same unmotivated change in a number of languages, many not in contact with each other.

If we assume the other possibility, viz., that in one branch the locative preposition became a locative copula, we do not have to deal with the problem of degrammaticization.

Since the possibility that a few languages developed copulas from prepositions is more likely than the possibility that the majority of languages developed prepositions from copulas, subsequently lost the copulas and retained only the prepositions, I consider the change from preposition to locative copula as more likely than the change from locative copula to preposition. The only question to be resolved here is the question of motivation of this change.

2.3. Scenario and motivation for Preposition—>Locative copula

The main motivation for the emergence of the locative copula in Bolewa must be sought in the following sequence of changes: first, emergence of new prepositions indicating spatial relationships; second, emergence of new prepositions marking locative case, ga in Bolewa and n in Fyer. The evidence that ga is a locative case marker in Bolewa is
provided by examples 2a,b,d, where ga precedes spatial specifiers 'on', 'in', i.e., behaves like locative case markers in other languages. The evidence that it is an innovation comes from the comparative data on the enclosed chart.

After the new prepositions, and especially the general locative marker, are developed, the old marker *a and the new marker can co-occur as a sequence of morphemes, producing the pattern:

6. NP a Prep NP (examples 2a–e and 4a–c)

Since the "new" marker usually replaces old markers, (compare the spread of '-s' as plural marker in English), the function of the old marker a becomes unclear, or even non-existent. The form that served as preposition becomes free to assume some other function, or it can be deleted. One may ask why, out of many possibilities, the new function of a should be that of locative copula. Although I am not sure that anyone will be ever able to give a definite answer to such a question, I would like to propose that in Bolewa the locative copula made possible a better differentiation between locative prepositional phrases as (examples 2a–d), locative clauses, and equational sentences that have the form NP [+DEF] NP/ADJ, e.g.:

7 a. mèmù émè násárá
    person Dem European
    'this man is European'

    b. ìlàwò yè gádááti
       child Def tall
    'the child is tall'

    c. ítà mòndú-nò
       3f woman-1sg
    'she is my wife'

    d. yúsúfu móy
    'Yusufu is a chief'

Note that insertion of a between subject and predicate in 7a–d would produce ungrammatical sentences, e.g.:

7e *làwò émè à gádááti

3. EQUATIONAL COPULA

3.1. Two types of equational copulas

Equational copulas have been observed in all branches of Chadic. In most of the languages, equational copulas are related to demonstrative pronouns, and for some languages they have actually been claimed to be
derived from one or another kind of demonstrative (cf. Schuh 1983), thus adding to the data presented in Li and Thompson 1977. However, in the Ron and Angas groups of West Chadic, the equational copula is similar to the reconstructed (Frajzyngier a.) preposition marking locative case rather than to a demonstrative, e.g.:

8 a. yis-a ma doáhà 'he is your father'
   he-COP father (Fyer, Jungraithmayr 1970:76)
   b. wàrâ bé 'who is she?' (Mopun)
      she who

3.2. Arguments for direction Preposition---Equational copula

Evidence that Mopun once had a preposition a is provided not only by comparative data but also by archaic constructions in this language. Thus a has the function of preposition in the expressions:

9 a. a yîl 'on the farm, to the farm'
   cf. n-yîl 'on the ground'
   b. ndirît kién kié siwà âm à kûwó r
      a bird benefit chicken drinks water Prep feeder
      'The ndirît bird benefits when chicken drinks from a feeder'

Example 9b. is a proverb, and it has a in prepositional rather than copular function. The same meaning in everyday language has a different form, e.g.:

10 âs siwà âm kì kûwó r 'a dog drinks from the feeder'
      dog           with

The question to be answered is again whether the direction of change was from equational copula to locative preposition or from preposition to equational copula. In deciding this question, I would like to use again the same criteria that I used with respect to the locative copula in the previous section. The copula-to-preposition change would involve first the loss of copula *a in most of the languages and the subsequent emergence in a few languages of a new copula derived from a demonstrative. Since the probability of a change occurring in a few languages is higher than the probability of a change occurring in many languages and producing the same results, I will assume the direction preposition to copula. Whatever direction one chooses, the motivation for the change is not obvious. There are two issues involved in the
change from preposition to locative copula: The first is the motivation for the existence of the equational copula, and the second, once such motivation was found, is the question why the preposition rather than some other morpheme was chosen to serve as copula.

3.3. Motivation for the existence of equational copula

Normally a question about the reasons for the existence of a given grammatical category does not arise. When, however, we find that within the same family, and for the same semantic function, some languages have a grammatical category that others do not, the question about the reasons for the existence or nonexistence of a category has to be posed and ultimately resolved.

In Mopun the copula ə is used only in two functions: one as a contrastive focus marker, and the other in the equational function in constructions of the type ")(X) is Y," where Y may be only a nominal predicate, e.g.:

11 a. miskóom á náát, chief white man 'the chief is a white man'
b. náát ni á miskóom ni Def Def 'the white man is the chief'
c. miskóom ni á mòpún 'the chief is a Mopun man'
d. miskóom ni á láá, child 'the chief is a child'
e. mbi-sé á lúá, ík thing-eat meat goat 'the food is goat's meat'

The presence of the copula in Mopun allowed for better differentiation among several structures involving two NPs. The structure NP NP has a part-whole, or possessive function, e.g.:

12 a. flòk láá, liver boy 'a boy's liver'
b. pò cián, blade hoe 'a blade of the hoe'
c. miskóom mòpún 'a chief of Mopun' (cf. 11c)
d. láá miskóom 'a child of the chief' (cf. 11d)
e. mbi-sé ík 'goat's food' (cf. 11e)

Copula is the only element in Mopun that distinguishes between an equational construction, which has the copula, and a part-whole construction, which does not. Additional evidence for the functional
justification of equational copula comes from the fact that the copula cannot occur in sentences with adjectival predicates, i.e., when there is no possibility of semantic ambiguity, e.g.:

13 a. wür *a bál/kát 'he is strong/small'
   3sg,m strong/small
b. wâr *a rét 'she is beautiful'
   3sg,f beatiful
c. wâr *a bís 'she is ugly'

In fact, the presence or absence of copula may determine whether the following polysemic item is to be interpreted as a noun or an adjective, e.g.:

14 a. wür ráp 'he is dirty'
   b. wür à ráp 'he is garbage' (an obvious insult)

Another piece of evidence for the functional justification comes from the fact that copula usually does not occur in existential sentences with prepositional predicates, i.e., once again, when there is no possibility of any ambiguity, e.g.:

15 a. wür kí siwól 'he has money'
   3sg with money
b. dò án n-tül 'yesterday I was at home'
   yesterday 1sg Prep-home
c. mûn gêt kí wür 'we were with her'
   1pl Past with 3f

The only case when a occurs with a prepositional phrase predicate is in an interrogative sentence, e.g.:

15  d. würákí wi 'with whom is she?'
   she with who

The equational construction in Mopun may have the form of a NP, i.e., it may be lacking the first NP. This is the case when the first element of the equation is known or has been mentioned before, e.g.:

16 a. dêsì à mwês ön? 'is this wine?'
   Dem wine Interr
b. í, á mwés

'yes, it is wine'

The form a NP is typically used in response to the equivalent of the question 'What is this' accompanied by a hand or head gesture, e.g.:

17 à jép fén mò '[these] are my children'
children 1sg Pl

The fact that the existence of a morpheme is functionally justified does not imply that it must emerge, and moreover, in our case, it does not imply that a copula must emerge from a preposition rather than from some other source.

3.4 Role of contrastive focus

In many languages, the same construction that is used in an equational sentence is used as well in a contrastive focus marking, often in association with a relative clause as in example 18.

18 a. It is the cat that killed the bird, not the dog.
    b. C'est le chat qui a tué l'oiseau, ce n'est pas le chien.

I do not think that one can discuss the relationship between the preposition and the equational sentence and neglect the presence of contrastive focus constructions. In Mopun, contrastive focus marking has the form a NP, i.e., the same form as the equational sentence without the first element of equation. Unlike in I. E. languages, the focused element does not have to be fronted, and in fact an NP in any position in the sentences can be preceded by a. Moreover, in contrast with equational sentences, the focused element can be a prepositional phrase, not only a noun phrase, e.g.:

19 a. à D. amerika bá à N. kás
    Neg     Neg

'It is D. who is in America, not N.'

b. n- kwatà sii siwól bá à sii ik kás
    1SG-pay with money Neg with goat Neg

'It is with money that I paid, not with a goat'

c. à dí̄m á n-túlú bá a mákárántá kás
    1sg,m go Prep-home Neg school Neg

'go home, not to school'

d. n-tál à tíbà bá à šúgà kás
    1sg-ask tobacco Neg sugar Neg
I asked for tobacco, and not for sugar

\[ \text{n-tài tìbà à pì wùr bà ákà kás} \]

Prep 3sg 2sg,m

'I asked him for money, not you'

Assuming that preposition is an initial element in derivation, and that copula occurs in both equational and contrastive focus constructions, we have three possibilities:

20

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Preposition --&gt; Equational --&gt; Contrastive focus</td>
<td></td>
</tr>
<tr>
<td>b. Preposition --&gt; Contrastive focus --&gt; Equational</td>
<td></td>
</tr>
<tr>
<td>c. Preposition --&gt; Equational</td>
<td></td>
</tr>
</tbody>
</table>

In order to reconstruct the Stage 1 process, we may look at the Stage 2 process to find out whether it will provide some relevant information. Harries-Delisle 1978 claimed that all contrastive focus constructions have an underlying equational sentence. As evidence to support her claim she showed that in a number of languages contrastive focus constructions share many elements with equational sentences. Behind the claim concerning the direction of derivation is the intuitive assumption that equational sentences are more basic and historically precede contrastive focus constructions. Note, however, that there are contrastive focus constructions that differ from equational sentences in not having a copula. Thus in Margi, a Central Chadic language, 3 p. m. sg. pronoun nája may rarely and optionally occur in equational constructions in the function of copula, e.g.:

21 hyà kù nájá mélá 'this dog is a bitch' (Hoffmann 1963:73)

dog Dem 3sg.m. bitch

The contrastive focus construction in Margi is formed with a demonstrative pronoun nù or nù, e.g.:

22 ní nù záma ̀ gì 'I am your brother'

I brother (Hoffmann 1963:89)
In order to explain the relationship between the equational sentence and contrastive focus construction in Mopun, I propose a functional analysis. The aim of such an analysis is to find a common semantic feature that would explain their syntactic similarity. It is possible to claim that the entailment of the construction “X is Y” is that X cannot be any other thing but Y. The contrastive focus construction has a similar function in Mopun, for in most of the cases it also has the same entailment, viz., the construction “it is X that Verb” entails “and not any other thing but X.” An implication of this analysis is that the equational sentence is actually a contrastive focus construction. If one assumes that construction X is Y in Mopun is a contrastive focus, then the element that is marked as contrastive focus is the one that is preceded by a, hence it must be Y. Notice now that in equational sentences in English one can mark either of the arguments as contrastive focus, e.g.:

23 a. John is a soldier.
   b. It is John, who is a soldier, (not Peter).
   c. John is a soldier, not a student.

In the equational sentence in Mopun one can put in contrastive focus the first element, i.e., the subject but not the predicate, e.g.:

24 à näät à miskoom nì ’It is a white man who is the chief’ (cf. 11b)

Thus the constructions are similar and we are back to the question of derivation. In favor of the direction contrastive focus --- copula one can bring out the fact that in the texts that I have collected, including a lengthy conversation among three speakers, equational sentences are exceedingly rare. On the other hand, the contrastive focus constructions are very frequent. In favor of the derivation equational --- contrastive focus one may bring out only the intuitive judgment that equational sentences are somehow more basic. In any case, there is no definite solution to the direction of derivation at Stage 2.

We have to go back to Stage 1. The question then is which is more likely, that the preposition became first a copula or a contrastive focus marker?

Let us consider a scenario in which a loses its prepositional function in favor of n, the modern locative case marker. We know from the comparative evidence and from the archaic constructions illustrated in 9 that this must have happened. When n became the new locative case
marker, we had the following construction:

\[ 25 \text{ NP } a \text{ n NP} \]

The old locative case marker \( a \) did not have a clear interpretation. At this stage it might have become reinterpreted as an emphatic or a contrastive focus marker. At present this scenario appears to me to be the most likely. Note that there is really no possibility for \( a \) in 25 to become an equational copula because it is followed by a prepositional phrase. At best it can become a locative copula, but that did not happen. Locative sentences in Mopun have the form NP Prep NP, i.e., they do not have a copula. Thus for Stage 1 we have the derivation: preposition---\( \Rightarrow \)contrastive focus. Hence for Stage 2 we have to accept the counterintuitive contrastive focus---\( \Rightarrow \)equational.

It appears that in Margi, which was shown to have contrastive focus construction different from equational sentence, there are constructions that have the same form as contrastive focus, but that started to acquire the function of equational sentence, e.g.:

\[ 26 \text{ tátá ng m̀aǹgù } \text{ 'that one is good'} \]
\[ \text{ that } \text{ good} \quad \text{(Hoffmann 1963: 69)} \]

4. CONCLUSIONS

In Fyer, both locative and equational copulas seem to be derived from the preposition. Locative prepositions served as the source for the locative copula in Bolewa and for the equational copula in Mopun. For a certain stage in Proto-West Chadic there might have existed the following set of constructions involving two NPs:

\[ 27 \text{ Constructions containing two NPs in Proto-\{West\} Chadic} \]
\[ \text{ Form} \quad \text{ Function} \]
\[ \text{ NP} \quad \text{ NP} \quad \text{ Equational} \]
\[ \text{ NP} \quad \text{ NP} \quad \text{ Possessive (Schuh 1981)} \]
\[ \text{ NP} \quad a \text{ (prep) NP} \quad \text{ Locative (sentence and phrase)} \]

A series of syntactic changes resulted in the following constructions involving two NPs in Bolewa and Mopun:
Although in both languages discussed in the paper copulas were derived from the same source, the locative copula was derived directly from the preposition while the equational copula was derived from the contrastive focus construction. Thus the study indicates not only that a language may have a copula derived from prepositions, but also that a contrastive focus construction may also be derived from a preposition. Moreover, it has been shown that the equational copula may be derived from the contrastive focus construction.

An additional implication of the study points to the fact that the grammaticization process and in particular the direction of the process and the result of the process do not depend uniquely on the semantic properties of the source (contrary to claims in Bybee and Pagliuca 1985) of the grammatical morpheme, but rather are a result of a number of factors. Only the extension from contrastive focus to include also equational sentence was possible because of the semantic extension. The change from preposition to locative copula and to contrastive focus marker was in no way dependent on semantic properties of the source.

This paper points to a factor that has been totally neglected in the current studies of grammaticization, viz., the properties of the system into which the new grammatical form is incorporated. The fact that a became a locative copula in Boiewa but an equational copula in Mopun can be explained only by the grammatical systems involving two NPs that the two languages had before the copulas emerged. If we consider that the needs of communication include more than just realization of any single semantic category, then we may clearly see that the emergence of copulas in the two languages contributed to the differentiation between constructions having different functions, hence improved the system used in communication. This may well have been the main motivation by which a, rather than being deleted, acquired a new function.
<table>
<thead>
<tr>
<th>Language</th>
<th>Preposition</th>
<th>Locative</th>
<th>Equational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hausa</td>
<td>à</td>
<td>--</td>
<td>ne/ce</td>
</tr>
<tr>
<td>Bole</td>
<td>ga, ka,</td>
<td>à</td>
<td>--</td>
</tr>
<tr>
<td>Pero</td>
<td>ti</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Kanakuru</td>
<td>lâ`</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Fyer</td>
<td>a</td>
<td>á</td>
<td>á</td>
</tr>
<tr>
<td>Angas</td>
<td>ka</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Mopun</td>
<td>n</td>
<td>--</td>
<td>a</td>
</tr>
<tr>
<td>Ngizim</td>
<td>àa</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Pa'a</td>
<td>à</td>
<td>--</td>
<td>na/ya</td>
</tr>
<tr>
<td>Tera</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Ga'anda</td>
<td>ò, kò</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Hona</td>
<td>a</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Cibak</td>
<td>a, ka</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Margi</td>
<td>a</td>
<td>--</td>
<td>naja</td>
</tr>
<tr>
<td>Kapsiki</td>
<td>te</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Mandara</td>
<td>òm</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Podoko</td>
<td>da</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Lamang</td>
<td>-n, mà</td>
<td>--</td>
<td>?</td>
</tr>
<tr>
<td>Mofu</td>
<td>á</td>
<td>?</td>
<td>a la</td>
</tr>
<tr>
<td>Zulgo</td>
<td>a</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Gisiga</td>
<td>i</td>
<td>?</td>
<td>--</td>
</tr>
<tr>
<td>Gude</td>
<td>a, dò</td>
<td>--</td>
<td>nò</td>
</tr>
<tr>
<td>Logone</td>
<td>na</td>
<td>?</td>
<td>--</td>
</tr>
<tr>
<td>Buduma</td>
<td>a</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Munjuk</td>
<td>a</td>
<td>?</td>
<td>na</td>
</tr>
<tr>
<td>Kera</td>
<td>a...a</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Mesme</td>
<td>ò</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Masa</td>
<td>tâ</td>
<td>?</td>
<td>ti, mi, si (DEM)</td>
</tr>
</tbody>
</table>

FOOTNOTES

1. Work on this paper was supported by an NSF Grant BNF-8418923 and by the Center for Applied Humanities, University of Colorado. Data on Mopun, Cibak, Pero, Hona, Bolanci, and Mandara are from my own fieldnotes. I am grateful to Daniel Barreteau, Beat Haller, Theda Schumann, and Henry Tourneux for the data on Mofu, Zulgo, Masa, and Mulwi. Data on other languages were taken from sources listed in references. I am grateful to Darap Dawurung, Wesley Kumtong Damar, and Wartung Lukden, all speakers of Mopun, and to Samuel Bulus Gadaka,
2. Jungraithmayr 1970:57 attributes the difference between â and n in 4 a and b, to the gender distinction.

3. I am using 'may' rather than 'is' because the description of Fyer in Jungraithmayr 1970 is not, and doesn't pretend to be a full grammar, and there may still be some other sources for a in 4 a, b, c.

4. The emergence of other prepositions is linked with changes involving serial verb constructions, locative deictics, and verbal extensions, (cf. Frajzyngier a. and b.)

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The Development of Subordinators from Postpositions
In Bodic Languages
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University of Oregon

This paper will present data showing syncretism of case postpositions and clausal subordinators1 in languages of the Bodic branch of Tibeto-Burman.2 We will see that the syncretism is not random, but that certain postpositions match up with certain subordinators regularly enough to establish patterns, and suggest a trend of grammaticalization. The main patterns are as follows:

(1) LOCATIVE > if/although, when/while
    ABLATIVE  > when/while/after, because,
                non-final
    ALLATIVE  > purpose
    DATIVE    > purpose
    ERGATIVE/INSTRUMENTAL > because,
                when/while

These patterns of grammaticalization are explainable semantically in terms of a localistic case theory developed by Diehl (1975), and can be seen to be extensions of four basic cases to the semantic domains of spatial, temporal and logical relations. Syntactic motivation for the development of postpositions to subordinators can be at least partially explained by a strong tendency toward nominalization in these languages.

The data for this study was taken from a number of grammars and volumes of texts3, and includes information on the following Bodic languages4:

(2) **Tibetan**
    Classical Tibetan
    Western
    Balti
    Purki
    Ladakhi
    Lahul
    Lhomi
    Lhoke

    **Central**
    Sherpa
    Kagate
    Garhwal
    Jirel
    Nyamkat
    Lhasa

    **South**
    Danjongka

    **W. Himalayan**
    Kanauri
    Bunan

    **W. Central Himalayan**
    Vayu
    Chepang
E. Himalayan  
Limbu  
Thulung  
Khambu  
Khaling  
Sunwar  

Gurung-Tamang  
Gurung  
Tamang  
Thakali  
Newari5  

Three typological features of Tibeto-Burman languages are directly relevant to this study. First, Tibeto-Burman languages are rigidly verb-final, with SOV being the unmarked word order. Second, these languages are all ergative. And third, Tibeto-Burman languages are clause chaining.

Clause chains in Tibeto-Burman consist of a number of non-final clauses whose verbs lack full morphological marking, and which instead are typically marked by suffixes which link them to the final clause. I will refer to these suffixes as "non-final" (NF). The final clause in a chain is distinguished by full inflection (usually tense/aspect, modality, etc.) on the verb.

The data which I searched for in each language consisted of the full case paradigm, and a set of common subordinators:

(3) Postpositions
   ergative
   genitive
   instrumental
   dative
   locative
   ablative
   allative
   associative

Subordinators
   when
   while
   after
   before
   since
   because
   if
   although
   as, like
   purpose (in order to)
   non-final

Appendices 1 and 2 present the data on postpositions and subordinators respectively.

Many languages exhibited syncretism across postpositional categories. The most common pattern was genitive-ergative syncretism, but this is not representative of the branch as a whole; all but one of the examples came from Tibetan languages. This is the result of loss of the final -s which differentiated ergative and genitive in Classical Tibetan. Aside from this, there is a preponderance of ergative-instrumental, dative-locative, locative-allative and locative-ablative pairs. Since the ergative and instru-
mental also often share the same functions as subordinators, ergative and instrumental will be considered a single category. While some of the other pairs, particularly locative-ablative, do at times code the same semantic meaning as subordinators, they also can differ in this regard, so will be kept separate.

Equating the functions and meanings of subordinators across languages is a more difficult task than equating cases. While every grammar gives a list of case postpositions, data on subordinators is comparatively rare. And, translations are not necessarily accurate in their reflection of function. For example, a morpheme translated in a grammar as 'when' may apply to both punctual clauses ("when") and durative clauses ("while"). Similarly, a non-final marker may be glossed alternately as 'when', 'after' and 'because', due to the pragmatics of clause chains and their role of coding sequential, and often causal, events.

Consequently, we will consider 'when' and 'while' to constitute one category, unless otherwise mentioned. The morphemes glossed as 'after' are usually identical to those meaning 'when' or the non-final markers, so 'after' will not be treated as an independent category. Similarly, 'since' is either specifically temporal or causal, so will not be considered separately. There was not enough data on 'as/like' or 'although' to establish patterns of grammaticalization. Therefore, we are left with the following five categories of subordinators:

(4) when/while because purpose non-final

Not all of the subordinators are clearly related to postpositions (e.g. Classical Tibetan tsing 'while', Vayu tiling 'because', and Newari tellē 'while'). There are many examples of subordinators which seem to have verbal origin, such as a Sherpa non-final marker simaa which appears to be derived from the verb 'to finish' (Schoettleindreyer 1980). The subordinator 'when' is commonly derived from a noun meaning 'time'.

It is clear that the development of postpositions to subordinators is a productive process. In Classical Tibetan, the ablative las is used for 'while', and the other ablative nas for 'when' and 'because'. In Lhasa, the phonological reflexes of las and nas are lEE and nEE. lEE is not used as an ablative, but means 'because'. nEE is the ablative postposition, and has also grammaticalized as the non-final marker nE. Since the Classical Tibetan non-final marker is (s)te, and
since CT nas has a more specific subordinating function, these are presumably new developments in Lhasa.

Another example comes from Newari. In Classical Newari, the locative element was sa. In contemporary Newari, this has developed to the postposition 'if', and another locative, le, is showing up in combinations with other elements as a subordinator, for example bol-e 'time-LOC' 'when'. Along with these clear examples of the productivity of the grammaticalization process, there are enough different postpositional morphemes involved, to assure that the process is productive and not morpheme-specific.

One advantage of a cross-linguistic approach to this problem, is that a morpheme found as a subordinator but unattested as a postposition in one language, may be cognate to a postposition in another language. For example, the Lhomi subordinator for purpose and conditional clauses is tu, which is not attested in Lhomi as a postposition. However, ru and tu are the allomorphs of the allative in Classical Tibetan and Lhoke, are attested as the locative in Lahul, Jirel and Khaling, and related forms, ri and ti are found as locatives and allatives in Gurung, Tamang and Thakali. Thus, given evidence from other languages for allative markers as a source for purpose marking, we can hypothesize a locative/allative source for the Lhomi subordinator.

However, there are notorious problems in equating the phonological forms of grammatical morphemes across languages (DeLancey 1984). Little work has been done on Bodic comparative phonology. The relevant forms are often of a simple CVC or CV structure, and it is unclear to what extent a single consonant can be taken as evidence for cognacy. Furthermore, many Tibeto-Burman case forms are etymologically bi-morphemic (DeLancey 1984), and it seems likely that this is the case for some subordinators as well. My hypotheses concerning relatedness of forms are based solely on inspection. While there are many forms which are clearly phonologically and semantically related, the details of the etymologies are yet to be worked out, and it could be that some of the equations of forms are unjustified, or remain unmentioned. However, the patterns of syncretism turn up frequently enough that the suggested generalizations seem justified.

I will now exemplify the major patterns of syncretism between postpositions and subordinators, and mention some less frequent patterns and exceptions. While I will here mention only a few of the languages for each pattern, more complete data is given in the appendices.
Ergative/Instrumental. The ergative/instrumental is found most commonly as a subordinator meaning 'because'. In Newari, 'because' is gūl-i, which is clearly derived from the nominalizer gūl plus an allomorph of the ergative/instrumental/ablative morpheme no. In Khambu, the same derivation is found; om-ā consists of the nominalizer om and the ergative ā. In Bunun it is the instrumental dang, as opposed to the ergative tsi, which is the causal subordinator.

The ergative/instrumental is also found functioning as the temporal subordinator 'when/while'. In Thakali, the morpheme ce codes ergative, instrumental, and ablative as a postposition, and 'while' as a subordinator. In Thulung, 'when' is derived from the noun 'time' suffixed by the ergative/instrumental. In Limbu, the ergative/instrumental jillê can mean either 'if', 'because' or 'when', so codes a causal sequence.

Ablative. The ablative is used for many of the same subordinating functions as the ergative/instrumental. Most commonly it is found as 'when/while/after'. It also codes 'because', 'if', temporal and causal 'since', and functions as a non-final marker.

As a marker of 'because', it is found, for example, in Lhasa lêp Classical Tibetan nas, Purki no, and Gurung serô. In other languages the subordinator meaning 'because' looks like a Bodic ablative, but is not attested as such in that language. For example, Ladakhi pasang appears to be composed of the nominalizer pa and a morpheme sang; the latter may be related to the Classical Newari ergative sê, the Limbu non-final marker (s)lang, and the Chepang ablative geY.

The ablative appears in the derivation of temporal subordinators in Ladakhi, Classical Tibetan, Purki, Lhomi, Kagate, Vayu and Thakali. In most of these it combines with some other element, such as the non-final marker in Kagate, or the genitive/ergative/instrumental ki in Lhomi. Vayu nana 'while', appears to be related to the ablative na attested in many of the Tibetan dialects, as well as in Limbu and Newari.

The ablative is found as a non-final marker in Khambu, Limbu, Jirel and Lhasa, and is a likely source for the non-final markers in Purki, Balti and Thulung.

Locative. The most common syncretism in my data is that between the locative and 'if', which is found thirteen times. For example, in Classical Tibetan and most of the Tibetan dialects, the locative na is used for 'if'. While the Thakali locative is ri, the morpheme for 'if' la-na appears to be cognate to widespread TB locative elements *la and *na. In Ladakhi, Purki, and Lhasa, the morpheme is present in 'although'; all three are concatenations of the
locative na and the particle yang 'even, also'. Outside the Tibetan family, we find, for example, modern Newari sa, which is clearly derived from the Classical Newari locative, and Thulung la, which is both locative and 'if'.

The locative is also commonly found as 'when/-while', as in Balti na/nam, and Ladakhi zana. Outside of the Tibetan languages, this morpheme doesn't act alone as a temporal subordinator, but is found in conjunction with other elements. Examples are Sunwar's bela-mi 'when' from 'moment' plus the locative (c.f. Newari bole 'when'); and Newari tolle 'while', which could be derived from the Classical Newari noun ta meaning 'long time' and the locative le. In Bunar, the locative/allative/dative marker tog is one element of the subordinator as-tog 'when'; the first morpheme is probably an allomorph of the nominalizer -as. In Chepang the morpheme 'when' is tok (which looks to be cognate with the Bunar form), and the morpheme for 'while' is tok-hang, where hang is also attested as a locative noun meaning 'in, inside'.

Allative. The allative morphemes, when functioning as subordinators, appear most frequently on purpose clauses. Allative markers with this function were found in Lhasa, Lahul, Lhoke, Bunar, Thakali, and Thulung. Examples are the Bunar allative/purpose marker de, and the Lhasa purpose marker -ter, which appears to be derived from the Classical Tibetan allative ru. The allative is also found as 'if' in Lhomi and possibly Lhoke, but there is not yet enough evidence to establish this as a general pattern.

Dative. Since there is often syncretism of dative and allative case, the two categories cannot be clearly separated, and it is not surprising to find them coding the same function as subordinators. The dative is used to code purpose in Ladakhi, Balti, Lahul, Sherpa, Nyamkat, Garhwal, Jirel, Thakali, Sunwar and Newari. When the large number of allative sources for purpose markers are considered, it is clear that this is a goal-marked category. The only dative morpheme which grammaticalizes to anything other than a purpose marker is the Bunar locative/allative/-dative tog used as 'when'. This use could be associated with the locative rather than the dative meaning.

Associative. There is not enough evidence of associative morphemes being used as subordinators to determine any patterns. The little evidence available is that the associative is used for 'when/while' in Ladakhi; 'as soon as' in Ladakhi and Classical Tibetan; and is a non-final marker in Vayu, although there the associative and locative are the same morpheme.
Summary. The major patterns of co-occurrences of postpositional and subordinating morphemes are presented below. The most common patterns are listed first, others in descending order of frequency:

(5) LOC > if/although, when/while/after
     ABL > when/while/after, because, NF
     ALL > purpose
     DAT > purpose
     ERG/INST > because, when/while/after

Now that these grammaticalization patterns have been established, it is necessary to account for both the process of semantic extension which these patterns suggest, and the syntactic mechanism which allowed for the development of nominal to verbal morphology.

The semantic explanation which I will propose to account for the patterns of grammaticalization relies on a localistic theory outlined by Lon Diehl (1975). Diehl's theory is similar to those of Gruber (1976) and Anderson (1971), in that his schema uses four deep semantic cases -- Theme, Location, Source and Goal7 -- to account for all basic case relations in all sentence types.

While Diehl's theory differs from other localistic approaches on a number of points, his primary innovation is the introduction of four semantic spheres or 'spaces', in which the four basic case relations function. The four spaces account for the morphosyntactic and semantic similarities between, for example, expressions of action, movement through space, and movement through time. While the relations between the cases remain stable, the interpretation of a given case is dependent upon the semantic space in which it is located.

There are four spaces in Diehl's theory. The first space is 'social' (SOC), and indicates "location with respect to positions defined or interpreted to be (human) beings" (1975: 98). The second space is 'location' (LOC), and locates physical objects in space. The third space is 'temporal' (TEM), and locates events in time. The fourth space is 'logical' (LOG), and concerns the relations of propositions. Diehl (1975: 103) discusses the inherent ordering of the four spaces -- SOC-LOC-TEM-LOG -- which is based on what he calls the "egodeictic hierarchy" as well as on relative abstractness. The main focus of Diehl's paper is the application of his schema to account for regularities in word order cross-linguistically. At this point, however, I will limit myself to discussion of the logical space, how it relates to the other three
spaces, and how it applies to the patterns of grammaticalization presented above.

The logical space is related to the other three by the regularities which exist between temporal and logical relations. Diehl (1974: 162) presents the following quote from Kimball (1973: 8-9):

There is a manifest regularity between the relations expressed by a word in its temporal and logical uses. Namely if a word W says that event El occurs earlier than E2 in time, then in its logical use a statement P1 W P2 means that P1 is a condition of P2. Where El W E2 says that El is temporally prior, P1 W P2 says that P1 is logically prior.

This suggests the process by which postpositions can become grammatically extended to subordinators. A postposition coding social, spatial or temporal relations becomes extended to a more abstract field, and broadens its semantic scope. However, the basic relationship it codes between arguments (here propositions or clauses) remains the same. The following chart displays how the different case relations code slightly different semantic meanings depending on the space in which they are expressed (Based on Diehl 1975):

<table>
<thead>
<tr>
<th>Location</th>
<th>Source</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC</td>
<td>associative</td>
<td>Source</td>
</tr>
<tr>
<td>SPA</td>
<td>locative</td>
<td>ergative</td>
</tr>
<tr>
<td>TEMP</td>
<td>when/while</td>
<td>ablative</td>
</tr>
<tr>
<td>LOG</td>
<td>if</td>
<td>since (abl)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>because</td>
</tr>
<tr>
<td></td>
<td></td>
<td>until</td>
</tr>
<tr>
<td></td>
<td></td>
<td>purpose</td>
</tr>
</tbody>
</table>

The assignment of 'because' as the logical extension of source is straightforward. If one clause is semantically the source of another, then it is also the cause. Similarly, if one clause represents the semantic goal of another, it is the purpose. The extension of the locative to 'if' is not as obvious. For now, this question will be put aside, while I discuss the application of the Space Case schema to the patterns of grammaticalization presented in (5).

Diehl's schema easily accounts for many of these patterns. DAT and ALL are both semantic goals, with purpose as their logical extension. ERG/INST and ABL are both sources, so their functions as 'since' (both temporal and causal) and 'because' are also predicted by the schema. The ABL use as a non-final marker also follows from the standard interpretation of clause
chains as having a sequential and causal connection. Locative case in the temporal space produces 'when/while'. The patterns which seem to contradict the schema are the source categories coding 'when/while'. Also a general explanation of the LOC-'if' syncretism is called for.

Some background concerning Tibeto-Burman clause chains offers one possible explanation for source categories extending to 'when/while'. In at least some Tibeto-Burman languages a morphological distinction is made between clauses related sequentially, and clauses whose temporal relations are simultaneous (Scott DeLancey, p.c.). The natural interpretation given to sequential clauses in a sentence, is that one followed as a consequence, or was the source of, the other. Thus one hypothesis is that ablatives would develop into sequential markers, and locatives into markers of simultaneity. The problem with this is that in Jirel and Vayu, the two languages in which I found a clear distinction made between sequential and simultaneous, all simultaneous markers were derived from the ablative, and one of the sequential markers was locative. While this flatly contradicts the hypothesis, my data is limited, so the hypothesis should not be completely rejected until further research is done. The use of ablative to code 'when/while' could still be attributed to an extension from source to sequence, regardless of whether this difference is distinguished by separate non-final markers.

One other possible explanation is that the ablative may be used for 'while', whereas the locative would be used for 'when'. This seems plausible in light of the fact that the ablative is also sometimes used for path, as in 'by way of' or 'through'. Thus if it denotes an extended spatial relation it may also denote extended temporal relation.

We now turn to the question of why 'if' seems to be the appropriate interpretation of the locative in the logical space. First note that, of the twenty-two examples where 'if' appeared to be derived from postpositions, thirteen have clearly locative origins. This seems to provide evidence that the locative in the logical space does indeed code condition. The question is the nature of the semantic extension from spatial or temporal location to condition. For now I can offer only a tentative suggestion.

The subordinator 'when' in past tense sentences denotes a temporal relationship between two clauses, from which a causal relationship is often inferred. However, due to the irrealsis nature of all future clauses, 'when' in the future is necessarily hypothe-
tical. If two future events are expressed in two clauses joined by 'when', the event denoted by the 'when' clause must occur prior to the other; it is interpreted as a precondition. The use of 'when' to denote hypothetical precondition thus seems like one possible derivation for 'if'. From the future, this use can then be extended to other hypothetical situations, and the subordinator takes on a clearly logical use. However, in order to fully understand the semantic derivations of these morphemes, more information is needed on the fine semantic distinctions coded by subordinators in these languages, including work on hypotheticals, counter-factuals, and modality.

Now that we have seen that the semantic extensions suggested by the grammaticalization patterns can be accounted for, it remains to consider the syntactic mechanism by which such a process can occur. This can be explained at least in part by typological features of Tibeto-Burman syntax. All Tibeto-Burman languages are rigidly verb final and postpositional. They also have a strong tendency to nominalize clauses. In Newari, for example, the nominalizer -gu not only marks relative clauses and adjectival phrases, but is frequently used on subordinate and complement clauses, on verbs before copulas indicating speakers judgement, and even on independent verbs sentence-finally (Kolver 1977, see also Matisoff 1972 for an extensive discussion of a very similar and probably cognate pattern in Lahu). Verb phrases or whole clauses are thus treated as noun phrases syntactically. When whole clauses can function as nominal constituents in a sentence, they allow for the suffixing of nominal morphology, in particular case suffixes and other postpositions.

NOTES
1. As noted by Haiman and Thompson (1984), we need an adequate typology of what are now considered 'subordinate clauses'. Here I am working with hypotactic, adverbial clauses; more work is needed to characterize these more precisely.
2. This research was supported in part by the National Science Foundation, grant BNS-8313502, and by a grant from the Joint Committee on South Asia, of the Social Science Research Council and the American Council of Learned Societies, with funds provided by the Ford Foundation and the National Endowment for the Humanities. Scott DeLancey has offered invaluable assistance in all aspects of this project. I alone am responsible for errors and inconsistencies.
3. A fair amount of data was taken from the Linguistic Survey of India, much of which is not necessa-
rily reliable in phonetic detail. Newari data is my own. Lhasa data was provided by Scott DeLancey.
4. The classification is roughly based on Matisoff's (1974) list of Tibeto-Burman languages arranged by the genetic affiliations proposed by Shafer. Additional suggestions were provided by Scott DeLancey.
5. Newari appears to be a Bodic language, but at this point there is no strong evidence for grouping it into any of the proposed subfamilies.
6. Information regarding transcription is given in the introduction to the appendices.
7. Diehl uses the terms IT, AT, FROM and TO.

REFERENCES
Francke, A.H. 1903. Sketch of Ladakhi Grammar. JASB 70.
Hale, A., ed. 1973. Clause, Sentence and Discourse Patterns in Selected Languages of Nepal. SIL.
Hodgson, B. 1857 & 1858. Comparative Vocabularies of the Broken Tribes of Nepal. JASB 26:317-522,
27:393-442.
Pike, K. and E. Pike. 1982. Grammatical Analysis. SIL.
APPENDICES

Due to limitations of space, I have included in the appendices only the forms which appeared to be relevant to the grammaticalization process discussed above. Forms for which there is allomorphic variation are marked by an asterisk following the citation. Optional elements are enclosed in parentheses.

Transcription is from the original sources; tone was rarely marked, so is not included. I consistently used the following symbols to represent the IPA:

\[ \emptyset, [\emptyset], \varepsilon, [\varepsilon], \theta, [\theta], \varphi, [\varphi], ?, [?] \]

The languages are arranged with respect to probable genetic affiliation.

Appendix One: Bodic Postpositions

<table>
<thead>
<tr>
<th>Language</th>
<th>erg</th>
<th>inst</th>
<th>dat</th>
<th>loc</th>
<th>abl</th>
<th>all</th>
<th>assoc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cla.Tib.</td>
<td>kyis*</td>
<td>kyis*</td>
<td>la</td>
<td>na/la</td>
<td>nas/las</td>
<td>ru*</td>
<td>dang</td>
</tr>
<tr>
<td>Balti</td>
<td>si</td>
<td></td>
<td>la</td>
<td>kha</td>
<td>na</td>
<td></td>
<td>na-yambo</td>
</tr>
<tr>
<td>Purki</td>
<td>is*</td>
<td>na</td>
<td>la*</td>
<td>la/ka</td>
<td>nɛ*</td>
<td>sa</td>
<td></td>
</tr>
<tr>
<td>Ladakh</td>
<td>yi*</td>
<td>nang*</td>
<td>la</td>
<td>na/nɛ</td>
<td>nas/ne</td>
<td>nang*</td>
<td></td>
</tr>
<tr>
<td>Lahul(KL)</td>
<td>l ai*</td>
<td>ai*</td>
<td>la</td>
<td>na/ru*</td>
<td>ne</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lahul(KK)</td>
<td>su/h i</td>
<td>su/si</td>
<td>la</td>
<td>la</td>
<td>na/sang</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garhwal</td>
<td>go(?)</td>
<td></td>
<td>la/ba</td>
<td>la</td>
<td>su</td>
<td>la</td>
<td>nyibo</td>
</tr>
<tr>
<td>Jirel</td>
<td>gi/ki</td>
<td></td>
<td>la</td>
<td>du/pa*</td>
<td>la</td>
<td></td>
<td>la/tang</td>
</tr>
<tr>
<td>Kagate</td>
<td>i/gi</td>
<td></td>
<td>la</td>
<td>la/na</td>
<td>sale</td>
<td>la/sala</td>
<td></td>
</tr>
<tr>
<td>Lhasa</td>
<td>qi*</td>
<td>qi*</td>
<td>la*</td>
<td>la*</td>
<td>nɛE</td>
<td>la*</td>
<td>dang</td>
</tr>
<tr>
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<td></td>
<td>lo/lu*</td>
<td>la/na</td>
<td>r/tu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lhomi</td>
<td>ki</td>
<td>ki</td>
<td>la</td>
<td>na/ni</td>
<td></td>
<td>tang</td>
<td></td>
</tr>
<tr>
<td>Nyamat</td>
<td>su/k/gi*</td>
<td></td>
<td>la*</td>
<td>nɛ/su</td>
<td></td>
<td>dang</td>
<td></td>
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<td>s/k/i/ re/s</td>
<td></td>
<td>laa</td>
<td>nɑ/laa</td>
<td>nɑ/sur</td>
<td>laa</td>
<td></td>
</tr>
<tr>
<td>Danj.K.</td>
<td>ii</td>
<td></td>
<td>lo</td>
<td>la</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kanauri</td>
<td>as*</td>
<td></td>
<td>nu*/pang</td>
<td>o</td>
<td>ts/ch/dok?ts</td>
<td>nang*</td>
<td></td>
</tr>
<tr>
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<td>tsi*</td>
<td>dang</td>
<td>ro̱g*</td>
<td>mang</td>
<td>ch/ro̱g de</td>
<td>nang*</td>
<td></td>
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<tr>
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<td>di*</td>
<td>di*</td>
<td>lai</td>
<td>ri</td>
<td>le*/ser62</td>
<td>ri/sam̥mָa</td>
<td>ne</td>
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<td>sa</td>
<td>an*/nɑ ke</td>
<td>va</td>
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<tr>
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<td>nq*</td>
<td>tɔ̼</td>
<td>le</td>
<td>nq*</td>
<td>le</td>
<td>ke</td>
</tr>
<tr>
<td>Tamang</td>
<td>se*</td>
<td>se*</td>
<td>da*</td>
<td>ri*</td>
<td>ma*</td>
<td>kyam-se ri</td>
<td>chhyam</td>
</tr>
<tr>
<td>Thakali</td>
<td>ce</td>
<td>ce</td>
<td>ca(ri)</td>
<td>ri</td>
<td>ce</td>
<td>ca(ri)</td>
<td></td>
</tr>
<tr>
<td>Thulung</td>
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<td>ka</td>
<td>lai</td>
<td>Da*/la</td>
<td>lam*</td>
<td>Da*</td>
<td>nung</td>
</tr>
<tr>
<td>Limbu</td>
<td>LE*</td>
<td>LE*</td>
<td>n*</td>
<td>le*</td>
<td>o*</td>
<td>le*</td>
<td>nu(le)</td>
</tr>
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<td>Ɪ</td>
<td>lai</td>
<td>bi*</td>
<td>la</td>
<td>(la)ka/bika</td>
<td>kai</td>
</tr>
<tr>
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<td>Ɪ</td>
<td>Ɪ</td>
<td>bi/tu*</td>
<td>kaa</td>
<td>thaa</td>
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<td></td>
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<td>*</td>
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<td>kali</td>
<td>m*</td>
<td>ga*</td>
<td>le</td>
<td>mi*</td>
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<td>khen/nognana</td>
<td>nong</td>
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<td></td>
</tr>
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<td>i</td>
<td>kay</td>
<td>hang</td>
<td>sɔ́y</td>
<td>tang</td>
<td>ka*/kus</td>
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Appendix Two: Bodic Subordinators

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<th>because</th>
<th>if</th>
<th>NF</th>
<th>purpose</th>
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<td>la/nas</td>
<td>kyis</td>
<td>na</td>
<td>te/par</td>
</tr>
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<td>na(m)</td>
<td>e/se</td>
<td>nare</td>
<td>e/se</td>
<td>la</td>
<td></td>
</tr>
<tr>
<td>Purki</td>
<td>nə</td>
<td>banq</td>
<td>nə</td>
<td>sə*/sənə</td>
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<td></td>
</tr>
<tr>
<td>Ladakhi</td>
<td>zana(s)*</td>
<td>la/pasang</td>
<td>na</td>
<td>te</td>
<td>chesla</td>
<td></td>
</tr>
<tr>
<td>Lahul</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>nə/e/ste*</td>
<td>na/tu/cela</td>
</tr>
<tr>
<td>Garhwal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>yangna</td>
<td>tin</td>
</tr>
<tr>
<td>Jirel</td>
<td>jini</td>
<td></td>
<td></td>
<td></td>
<td>la</td>
<td>la*/gin*</td>
</tr>
<tr>
<td>Kagate</td>
<td>atesu</td>
<td></td>
<td>na</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>duugangla3</td>
<td>phardu</td>
<td>1EE/</td>
<td>na</td>
<td>nE/cEE</td>
<td>r</td>
</tr>
<tr>
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<td>i</td>
<td>lə</td>
<td>nə/nu</td>
<td>di/te/nə</td>
<td>r</td>
<td></td>
</tr>
<tr>
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<td></td>
<td>tu</td>
<td>tu</td>
<td></td>
<td></td>
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<tr>
<td>Nyamkat</td>
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<td></td>
<td>yangna</td>
<td>we/wa</td>
<td>la</td>
<td></td>
</tr>
<tr>
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<td>bubelaa</td>
<td>ni/yin</td>
<td>na/si</td>
<td>ni/yin</td>
<td>la</td>
<td></td>
</tr>
<tr>
<td>Danj.k.</td>
<td></td>
<td></td>
<td>na/nu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>ən(?)</td>
<td></td>
<td>ma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bunau</td>
<td>astog/(s)tag</td>
<td>bonthreg4/</td>
<td>nang</td>
<td>ji*</td>
<td>de/</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(s)yang</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Gurung</td>
<td>ma(le)</td>
<td>sero5</td>
<td>ya/dubiya</td>
<td>i/si</td>
<td>elxagiri6</td>
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<td>bôle/ki tölle</td>
<td>gulî</td>
<td>sa/sā</td>
<td>a</td>
<td>tə</td>
<td></td>
</tr>
<tr>
<td>Tamang</td>
<td>chhyam</td>
<td>mā/min se</td>
<td>se/sam</td>
<td>si/se*</td>
<td>ri</td>
<td></td>
</tr>
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<td>Thakali</td>
<td>kaahngri7</td>
<td>maa/ce</td>
<td>lana</td>
<td>si</td>
<td>ri</td>
<td></td>
</tr>
<tr>
<td>Thulung</td>
<td>lo na/hongnga/belaka</td>
<td>la</td>
<td>na</td>
<td>Da</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limbu</td>
<td>1E*</td>
<td>1E*</td>
<td>1E*</td>
<td>(s)ang</td>
<td>sE*</td>
<td></td>
</tr>
<tr>
<td>Khambu</td>
<td></td>
<td></td>
<td>omā</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khaling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>yō/ka*/sa</td>
<td></td>
</tr>
<tr>
<td>Sunwar</td>
<td>nu sha/senu/</td>
<td>nganu belami</td>
<td>sha</td>
<td>tsa-kali</td>
<td></td>
<td></td>
</tr>
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<td></td>
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<tr>
<td>Vayu</td>
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<td>khen/he/sa</td>
<td>nana/ha/nong</td>
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<td></td>
</tr>
<tr>
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<td>tok/</td>
<td>tokhang ti/</td>
<td>yakay/yati ti/?ak</td>
<td>lang</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td>tokbelahang</td>
<td>dharna(nang)</td>
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</tr>
</tbody>
</table>

Notes

1. Roerich (1933) discusses two Lahul dialects, Kolong (KL) and Koksar (KK). While he differentiates between the two when citing postpositions, he does not distinguish them in his discussion of subordinators.
2. This form and the samma allative are temporal.
3. phar: 'place in between'.
4. bon-threg is the benefactive.
5. sero is the temporal ablative. That the temporal ablative is the one to grammaticalize is nice evidence for grammaticalization as a process of abstraction.
6. This morpheme has the following derivation:
   e GEN +lxagI 'sake' + ri LOC.
7. khaang: 'time'.

INDEPENDENT VERBS and AUXILIARY FUNCTIONS in NEWARI

David Hargreaves
Northrop University Language Institute

1.0 INTRODUCTION

The lexical origins of aspectual morphology are well attested cross-linguistically and especially transparent in pidgin/creole studies (Givón 1982). Just how and why grammaticization takes place as it does, and with enough cross-linguistic similarity to be of typological interest, remains problematic in many respects, although several recent studies have begun to focus on the issues involved (Bybee 1985; Heine and Reh 1984). Grammaticization of an independent lexical item is presumed to proceed in stages, from "discourse preferences for syntactic structures" (DuBois 1985:349), through intermediate stages involving semantic bleaching, reanalysis and phonological reduction, to potential incorporation as bound morphology. In understanding what a stage is, and what it represents in the synchronic grammar of a language, of particular interest are "versatile" verbs (Matisoff 1973), which function both as independent and auxiliary verbs, depending on context. Versatile verbs are especially clear illustrations of how lexical resources are deployed to encode meaning and function. In this paper, we will look at two versatile verbs in Newari, con- "stay, remain" and to- "put, place, keep", which take on auxiliary functions in verb concatenation constructions. In their auxiliary uses, we can identify aspectual/attitudinal functions for con- "stay, remain", and aspectual/evidential functions for to- "put, place, keep".

The versatile status of the two verbs allows us to see more clearly the relationship between their inherent semantics and the meanings and functions they encode as auxiliaries. As we shall see, a single verb may realize different auxiliary values in different environments. Characterizing these different values and their contextual determinants will be the primary goal of the paper. While this paper is primarily descriptive, we will find it useful to recognise two distinct (but not necessarily contradictory) perspectives on the linguistic category of aspect: (1) viewpoint specification (DeLancey 1982; Lloyd, 1979). (2) discourse grounding (Hopper 1979;1982).
2.0 PRELIMINARIES

2.1 Inflectional Morphology

Before proceeding, it will be necessary to briefly outline the morphological coding of the tense/aspect/modality complex in Newari, and give a brief overview of the patterns of discourse organization which occur in the texts used as data for this study. The inflectional paradigm is a two-way system encoding tense/aspect/modality on the one hand, and a person/volitionality based evidential system on the other. The forms are given below using the verb won- 'go'.

<table>
<thead>
<tr>
<th>PAST</th>
<th>NON-PAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONJUNCT</td>
<td>won-a</td>
</tr>
<tr>
<td>PERFECTIVE / IMPERFECTIVE</td>
<td></td>
</tr>
<tr>
<td>DISJUNCT</td>
<td>won-0</td>
</tr>
</tbody>
</table>

With active verbs, the perfective disjunct (PVD) form -0 marks completed actions; in third person narratives it performs the basic function of signaling the termination of sequential discourse units. With stative verbs, it marks arrival at a state. What I am labeling imperfective disjunct (IMPD) is generally identified as having habitual meaning with active verbs and stative meaning with stative verbs (cf. Malla 1985). It is also a preferred form with negation. The two conjunct forms (past and non-past) generally reflect direct (usually first person) knowledge of volitional actions.4

2.1 Clause Chains

Newari discourse, particularly narrative, is characterized by chains of two or more clauses, where the finite marking for the entire sequence occurs on the final clause in the chain (Genetti to appear a). Non-final clauses are marked with a variety of subordinating suffixes, the most common being a temporal sequence (participial) marker -a:. In addition to the subordinating suffixes, non-final clause boundaries are marked with a rising, non-terminal intonation contour. In the example below, the perfective disjunct form -0 marks the final verb in the chain and (along with the hearsay evidential h0) signals the termination of this particular discourse unit.5
1) laksmi narayan-ō he:ka-hik-a: -ERG console-RDP-NF
   bona-bin-a hōy-a: bona-bin-a hōy-a: lead-RDP-PC bring-NF lead-RDP-PC bring-NF
   wanglsima-e tōl-0 hō put-PVD EVD pipaltree-LOC

"It's said that Laksmi and Narayan, consoling (Laksmi's sister), led her along, and leading her along placed her at the pipal tree."

2.3 Multiverb Constructions

Multiverb constructions in Newari involve a single clause in which initial non-verbal constituents are followed by two or more contiguous verbs under a single intonation contour. Non-final verbs in the sequence are marked with the vowel form -a, homophonous with the past conjunct form. The final verb in the sequence carries the inflectional morphology which marks the status of the entire clause. Sequence-initial verbs serve as the semantic head, although they are not distinguished morphologically as such. The auxiliary functions of versatile verbs occur when the verb appears non-initially in the sequence. In the example below, hōya "bring" and bilō "give" function as directional and benefactive auxiliaries, respectively.

2) wō: ji-tō dhōu jon-a hōy-a bil-0 3-ERG 1-DAT curd grab-PC bring-PC give-PVD
   "He carried over some curd for me." (EX)

In examples like (2) above, "independent" and "auxiliary" readings for the verbs are barely distinguishable. In many contexts, supersegmental features alone distinguish the two.

3.0 AUXILIARY FUNCTIONS

3.1 con- "stay, remain"

As an independent verb con- can be glossed as "stay" or "remain". This lexical meaning is realized differently in different environments. In non-initial position in a multiverb construction with an active principal verb, it marks an internal or non-terminal viewpoint on the action, i.e. continuous aspect.
3) Ram yele-e  \text{con-0}  \\
\text{Patan-LOC stay-PVD}  \\
"Ram stayed (behind) in Patan." (EX)

4) Ram yele-e  \text{con-a}  \text{con-0}  \\
\text{stay-PC stay-PVD}  \\
"Ram is/was staying in Patan." (EX)

In the example below, a Newari version of the "Lion and the Mouse" (retranscribed from Hale & Hale 1970), the use of \text{con-} marks a specific discourse relation; it indicates overlapping sequential events.

5) ch0-gu tarhā:-gu  ha:ku-gu gū:-e  \\
\text{one-CL big-CL black-CL forest-LOC}  \\
ch0-mho siŋ0  m0st0 jui-ka  den-a  \text{con-0}  \\
\text{one-CL lion well be-ADV sleep-PC stay-PVD}  \\
u-thae:  chū  ti:  j0k0  w0-ya-gu  mh0-e  \\
that-time mouse slow only 3-GEN-CL body-LOC  \\
g0y-a  \text{mhit-a}  \text{con-0}  \\
climb-PC play-PC stay-PVD  \\
chū:  \text{mhit-a cō:-gu}  siŋ0-nō  cay-a:  \\
mouse play-PC stay-NOM lion-ERG feel-NF  \\
chū:-t0  jon-0  \\
mouse-DAT catch-PVD

"In a large, dark forest a lion was sleeping soundly. Meanwhile, a mouse slowly climbed up on his body and was playing. The lion felt the mouse playing and caught him." (HH:3.1)

In this context of chronologically ordered actions, \text{con-0} indicates an on-going action with respect to the one that follows. The form \text{cō:-gu} indicates a nominalized clause which also encodes an on-going action with respect to the following discourse event. It is these uses of \text{con-} which hold together the actions, relating them to each other within a unified action sequence. This function of distinguishing "unbounded" events from "bounded events" is suggested by Hopper (1982) as being a primary function of aspect. What is significant here is that while it is encoding the external facts of the action sequence, \text{con-} is simultaneously performing an aspectual discourse function. In these situations, the lexical representation of external temporal dynamics is mapped directly into a
discourse context. The discourse function follows directly from the inherent semantics of the verb and the external facts of the action sequence.

While con- regularly marks a continuous aspect with active verbs, with a set of punctual change-of-state verbs e.g. "be broken", "be torn", etc., it takes on an attitudinal meaning of surprise or counter-expectation. It functions in these situations to signal viewpoint rather than discourse relations.

6) tho salinca t0jyat-0
   this cup   break-PVD
 "The cup broke/became broken" (EX)

7) tho salinca t0jyan-a con-0
   break-PC stay-PVD
 "The cup is broken" (to my surprise) (EX)

As a typical use, my consultant suggested the following situation where he reaches into his pocket to pull out a 100 Rupee note and finds it torn, and thus of dubious value.

8) tho not- gun-a con-0
   this note tear-PC stay-PVD
 "The note is torn." (to my surprise) (EX)

The interpretation suggested by my consultant is remarkably consistent with the notion of "unassimilated knowledge" discussed by Slobin & Aksu (1982), Akatsuka (1985), Lee (1985) and DeLancey (to appear). Although the event is complete, it is un-assimilated at the time of utterance. Since the punctual change-of-state verbs have no internal dynamics to speak of, the scope of operation appears to be that of a conceptual space within which the representation of the event is "in process". The external facts are not at issue here; the use of con- appears to imply a particular experiential perspective, i.e. a non-terminal viewpoint on the assimilation of knowledge. Significantly, similar interpretations arise with "pure" statives. For example:

9) wo m0nu khű kh0:
    that man thief be-IMPD
 "That man is a thief" (fact) (EX)

10) wo m0nu khű kh0v-a con-0
    that man thief be-PC stay-PVD
 "That man is a thief" (it turns out) (EX)
With the verb ju- "become", con- commonly appears in certain types of narratives to indicate a fortuitous occurrence or appearance by an important character. In one sense this can be viewed as a "suprisal" function related to non-terminal viewpoint. At the same time, however, it serves a definite discourse function by introducing characters and situations which will play important roles in the events to follow. In example (11) below, the entire nominalized clause is predicated by the juya con0 construction.

11) ch0-nhu ch0-mho ha: sara:sar one-day one-CL bee along bwoy-a woy-a c0:-gu juy-a con-0 fly-PC come-PC stay-NOM become-PC stay-PVD

"One day, it so happened there was a bee who came flying along." (HH:6.1)

12) khoue khunu wo ph0ethu0-ya ch0-e next day that shepherd-GEN house-LOC ch0-gu thara0:-gu bwae jya juy-a con-0 one-NOM big-NOM feast work become-PC stay-PVD

"The next day, it so happened, there was a big feast being held at the shepherd's house." (HH:11.7)

The use of the juya con0 construction suggests "suprise" or "coincidence" as conventionalized components in a story schema. The durational component or sense of "becoming" which the construction encodes suggests the not-yet-completed establishment of a discourse identity for the characters or situations. In examining the value of con- in this construction we find that "unassimilated knowledge" and "incompletely established discourse identity" are closely related notions.

3.2 t0- "put, place, keep"

In the preceding section, we examined how the verb con- took on different meanings and functions in multi-verb constructions. In the discussion, we assumed a single "core" meaning for the verb and suggested how the inherent semantics were mapped into the different auxiliary functions. As our framework, we referred to two perspectives on the role of aspect: viewpoint specification and discourse grounding. In this section we
will look at the auxiliary functions of *t0-* "put, place, keep" which, in its auxiliary capacity, marks a kind of resultant state.

As an independent verb *t0-* encodes meanings variously translated as "put, place, keep". Although the exact details will not concern us here (cf. Genetti to appear b), the meaning distinctions generally correlate with a "procedent" interpretation for "put" and a "finitive" interpretation for "keep" (Lloyd 1979). In either case, its use suggests an explicit or implicit locative goal. The locative goal and resultant state components of *t0-* appear to motivate its auxiliary function. As an auxiliary, *t0-* occurs with transitive principal verbs, indicating the maintenance of a state of affairs brought about by the action encoded in the transitive principal verb. In the example below, the independent use of *t0-* encodes the simple action "put out", whereas the auxiliary use indicates that food was prepared and is in a state ready for serving. In this respect it shares much with the discourse characterization of the perfect (cf. Li, Thompson & Thompson 1982).

13) ale b0ji gha:sa:-ghisa: jore yan-a *t0:-gu*
then rice food-RDP preparation do-PC put-NOM

chu chu du wo phukk0: *t0y-a:
what what be-IMPD that all put(out)-PC

"Then, the beaten rice and items of food which have/had been prepared, whatever there is, we put out." (HH:27.77)

The auxiliary use of *t0-* often implies a being-in-location that exists as a result of a previous action. In this capacity, it often functions in discourse to relate a previous action's results to the following action or event. A preliminary examination of its co-occurrence patterns in Late Classical Newari texts shows a decided preference for verbs with implied locative resultant states, e.g. "cover", "hang", "pile", "tie-up" etc. As with *con-* , the representation of the concrete external facts which the verb encodes leads directly to a particular discourse relation, in this case "currently relevant resulting state". The following example, from Jorgensen (1939), is a transliteration of an 18th century text; as my translation implies, the use of *taya* suggests a more literal precursor for the auxiliary function.
14) hum-hum simas khasyaṃ tayā-hma mṛtak cha-mha such tree hang put-body corpse one-body
chinaṃ ko kāyāva bi-hune you down take give

"In such and such a tree, there is a corpse which has been put there by hanging. Take it down and bring it (to me). (B 35.28)

The function is similar to con- in that the resultant state is unbounded with respect to the following action. It is distinct from con- in that it reflects overlapping states rather than overlapping actions. For example:

15) bhun-a t0-e ma: ka cover-PC put-INF need-IMPD EMPH
ale yak0n0 wa-i ka then quick come-NPD EMPH

"(You) need to keep (the pot) covered. Then, (the fermenting) will come quickly."

The use of t0- is more likely to reflect attention being devoted to the goal of an action rather than its source. In fact, with non-first person agents, in certain pragmatic contexts, its auxiliary use suggests that the speaker has not witnessed the event itself, and is inferring the action from its result. In the text segment below, the auxiliary use of biya "give" by speaker A implies that speaker B has purposefully removed the paper. Speaker B's reply, and use of t0ya, implies innocence, i.e. being unaware of the cause. The segment begins when speaker A interrupts B's conversation to inquire about the paper which is used to clean up chicken droppings.

(16) A: wo athī chae li-k0y-a biya-gu that stuff why away-take-PC give-NOM
khaki...athī chickenshit...stuff

B: suna..chu..bhī li-k0y-a t0l-0 dhaya-gu la who? what? paper away-take-PC put-PVD say-NOM Q
A: That stuff, why did you take it away? (there's) chickenshit...and stuff.
B: Who? What? You mean the paper's been taken away?
In this capacity, the clearly reflects a viewpoint specification. Unlike the more concrete uses where implies a locative resulting state, in the example above, there is no concrete, visible, affected patient. The resulting state is the absence of the paper from where both speakers expect it to be. The use of by speaker B indicates that her only knowledge is of the result. This evidential function clearly emerges when we examine its use with first person patients. My consultant would only accept examples like (17) below with the interpretation that the speaker was somehow unconscious or unaware at the time of the action.

17) \text{wō}: ji-t0 dal-0  
3-ERG 1-DAT beat-PVD  
"He beat me." (EX)

18) \text{wō}: ji-t0 day-a to1-0  
3-ERG 1-DAT beat-PC put-PVD  
"He beat me/had beaten me"  
(as a child) or (when I was drunk) (EX)

The close relationship between the discourse function of resultant state and the viewpoint specification function can be seen in examples like (19) below where the resultant state clause occurs as a nominalized complement of the perception verb \text{kh0n}-. In the text segment that follows, the thirsty crow is flying along looking for water.

19) \text{b0la}: b0la: ch0-gu kasi-e gh0 ch0-g0  
at last  one-CL roof-LOC pitcher one-CL  
t0y-a to:gu kh0n-0  
put-PC put-NOM see-PVD

"At last, he spied a pitcher (of water) which had been placed on an (open) roof." (HH:6.5)

In an example like (19) above, viewpoint is specified through the perception verb which represents both the narrator's and actor/subject's perspective; only the resultant state is evident. In terms of the following discourse, the pitcher of water will become the object of the crow's desire.

4.0 SUMMARY

This paper is a preliminary look at the grammaticization process with two versatile verbs in Newari. As
we have seen, different values for the auxiliary functions of the verbs arise in relation to different parameters, including the inherent semantics of the principal verbs and the discourse/pragmatic environment. We have loosely labeled these functions as "aspectual", "attitudinal" and "evidential", although we may wonder, as does Wallace (1982), to what extent they represent distinct linguistic "categories". In our discussion we have found it useful to highlight two perspectives: viewpoint specification and discourse grounding. Although we have barely touched upon the issue, we have seen that these two notions may not be entirely distinct. It remains the task of further research to refine these notions and see how they might be utilized in understanding the development of aspectual and related values. To the extent that we can understand better the manner in which lexical items are recruited to serve semantic and discourse/pragmatic functions, we can see more clearly the motivations and constraints (DuBois 1985), cognitive and communicative, which shape the development of linguistic systems.

1 Newari is a Tibeto-Burman language spoken primarily in the Kathmandu Valley of Nepal. Unless otherwise indicated, data for this paper were collected during 1984-85 in Kathmandu. A very special thanks goes to my primary consultant, Rajendra Man Shrestha, for his friendship, enthusiasm and valuable insights. Elicited examples are labeled (EX), all others come from tape-recorded monologues or dialogues involving Newari speakers. Special thanks also to Susanna Cumming, Cece Ford, Hyo Sang Lee, and Sandy Thompson for valuable comments on an earlier draft of the paper. Errors and shortcomings are, of course, my own.

2 The symbol O indicates a mid-central to low-back vowel whose degree of rounding varies with the environment.

3 This division, of course, is an oversimplification. In the tense/aspect volume (1982) edited by Hopper, these two perspectives emerge primarily as a result of the clear and unambiguous claims which the authors make. As we shall see, both perspectives will prove to be valuable in accounting for the data.

4 Although I have retained the somewhat misleading labels, my description differs slightly from past accounts of the Newari paradigm (cf. Malla 1985). At the risk of skewing the deceptively symmetrical standard "box-four" arrangement of CONJUNCT/DISJUNCT vs. PAST/NON-PAST, I have included the imperfective disjunct in the paradigm. For more details on the Con-
junct/Disjunct distinction see Hale (1980); I have also departed slightly from past literature in my use of the bare infinitive stem (minus infinitive suffix) as my citation form in the text.

Abbreviations: DAT dative, EVD evidential, ERG ergative, CL classifier, GEN genitive, IMPD imperfective disjunct, INF infinitive, LOC locative, NF non-final, NOM nominalizer, NPC non-past conjunct, NPD non-past disjunct, PC past conjunct, PVD perfective disjunct, RDP reduplication.

Nepali rahecha serves a similar function in Nepali and is also derived from a durational verb, rahanu "stay, remain".

I have altered Jorgensen's translation slightly in favor of a more literal one.

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A SEMANTIC TYPOLOGY DERIVED FROM VARIATION IN GERMANIC

John A. Hawkins, USC

1. Introduction

In his 1921 book *Language* Sapir drew attention to the 'drift' of the Germanic languages, by which he understood: the progressive reduction of inflectional morphology, including the loss of case inflections ('the drift towards the invariable word'); and the fixing of basic word order, eliminating earlier syntactic rearrangement possibilities. Modern English has gone the furthest in this direction, Modern High German is the most conservative, while languages like Modern Dutch and Danish occupy an intermediate position. This drift continuum is exemplified in the following tables:

<table>
<thead>
<tr>
<th>Table 1 Morphological Distinctions on the Definite Article</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>German:</strong> 3 genders (in Sg:M/F/N); 2 numbers (Sg/Pl); 4 cases</td>
</tr>
<tr>
<td><strong>Dutch:</strong> 2 genders (in Sg:M+F/N); 2 numbers (in Neut:Sg/Pl); 0 cases</td>
</tr>
<tr>
<td><strong>Danish:</strong> 2 genders (in Sg:M+F/N); 2 numbers (Sg/Pl); 0 cases</td>
</tr>
<tr>
<td><strong>English:</strong> 0 genders; 0 numbers; 0 cases</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2 Word Order Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>German:</strong> considerable word order freedom at the sentence level</td>
</tr>
<tr>
<td><strong>Dutch:</strong> less &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot;</td>
</tr>
<tr>
<td><strong>Danish:</strong> less &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot;</td>
</tr>
<tr>
<td><strong>English:</strong> least &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot; &quot;</td>
</tr>
</tbody>
</table>

| **German:** verb-subject inversions very productive |
| **Dutch:** " " " " " " |
| **Danish:** " " " " " " |
| **English:** " " " " less " " |

| **German:** verb-final structures very productive |
| **Dutch:** " " " slightly less " " |
| **Danish:** " " " not " " |
| **English:** " " " not " " |

What Sapir did not discuss was the large set of additional syntactic changes that are also part of this drift, that now distinguish Modern English from Modern German, and that are also found in typically intermediate degrees in Modern Dutch and Danish. Nor did he discuss (apart from a few observations) the semantic consequences of the profound morphological and syntactic changes that constitute drift. This paper will accordingly consider semantic and pragmatic aspects of change and variation in Germanic. It will broaden the range of grammatical phenomena that need to be considered. And I will argue that there is a semantic generalization underlying the typological drift in Germanic with suggestive consequences for a semantic typology of languages in general.

The paper concentrates on Modern English and Modern German (the two most extreme languages in the drift continuum) and first summarizes the major contrasts between them. These contrasts turn out to be remarkably precise, with the set of relevant grammatical
forms or structures in the one language typically properly including the corresponding set in the other. It is then argued that there is a unity to all these contrasts, involving the degree of correspondence between semantic representation and surface form in the two languages.

2. Grammatical Morphology

German has richer inflectional morphology than English. In fact, all the grammatical distinctions that are drawn in English inflectional morphology are drawn in German as well, though not vice versa. For example, both English and German express a singular/plural distinction on their nouns (E. book/books; G. Buch/Bücher), and verbs carry a present/past tense distinction (E. say/said; G. sage/sagte). But German has inflectional morphemes distinguishing four cases within the noun phrase, nominative/accusative/genitive/dative (cf. der Mann/den Mann/des Mannes/dem Mann(e)), whereas English has collapsed its earlier nominative, accusative and dative forms into an invariable the man (though it still retains a separate genitive the man's). German still has an indicative/subjunctive distinction on its verb, whereas English employs (almost exclusively) a single form for both (G. gab/gäbe; E. gave). The German verb also carries person and number markings, whereas the bare stem in English is used for all persons and numbers except for the third person singular, and for both imperative and non-imperative forms.

In consequence, many semantic distinctions that are drawn in surface form in German are not drawn in English. E.g. the irrealis/realis and reported/non-reported speech status of clauses is carried by subjunctive/indictive marking in German. A directional/static distinction is carried by Acc/Dat marking (G. hinter den Tisch = directional, hinter dem Tisch = static; E. behind the table = both). As a result, English surface forms are that much more ambiguous (or vague) than their German counterparts, and semantic distinctions that are expressed formally in German must be recovered pragmatically in language use in English, by exploiting context plus real-world knowledge.

3. Word Order Freedom

It is often observed that word order in German is freer than in English. The greater productivity of the relevant German movement rules does not extend to rules crossing clause boundaries (cf. below) and hence we need to restrict our claim to clause-internal movements only. It is plausible to argue that the case system of German is responsible for this contrast, for across languages the existence of rich surface case marking typically correlates with extensive word order freedom (cf. Keenan 1978:120-1).

Notice in the present context that the relative rigidity of word order in Modern English has important consequences for the relationship between form and meaning. Languages whose morphology makes possible the kinds of word order permutations that exist in German can use these options for pragmatic purposes, marking old versus new information, topic, focus, etc. (cf. Comrie 1979, Firbas 1971, Hawkins 1986,
Lenerz 1977, Thompson 1978). If we assume that such pragmatic differences exist, it follows that the fixed word orders of English are correspondingly more ambiguous (or vague) with respect to these pragmatic functions. I.e. many pragmatic distinctions that receive their own distinct encoding in German or Russian do not receive distinct encoding in English, and one and the same syntactic form in English ranges over pragmatic differences in meaning which can be disambiguated in these languages.

4. Basic Grammatical Relations and their Semantic Diversity

There is greater semantic diversity to the basic grammatical relations in English than in German. Consider first direct objects. The class of direct objects in English has expanded relative to German. German verbs which are two-place predicates most often take an accusative-marked direct object NP as their second, non-subject argument. But there are many verbs which take a dative- or genitive marked NP (which do not function as direct objects):

1) a) She loves the man/him.
   b) Sie liebt den Mann/ihn.     (Acc)
2) a) She helped the man/him.
   b) Sie half dem Mann/ihm.     (Dat)
3) a) She needs the man/him.
   b) Sie bedarf des Mannes/seiner. (Gen)

As a result, a larger class of semantic arguments can surface as direct objects in English.

The same holds true for subjects. Subjects can regularly be semantic agents in both languages. But English and German contrast over the extent to which non-agentic semantic roles can be mapped onto the subject relation. Rohdenburg (1974) argues (on the basis of an extensive empirical study) that the subject-forming possibilities of German are in general a proper subset of those in English. Wherever German has grammatical subjects expressing non-agentic semantic roles, so does English, but not vice versa.

4) a) The king visited his people.
   b) Der König besuchte sein Volk.     (SU = agent)
5) a) The garden swarmed with bees.
   b) Der Garten wimmelte von Bienen.  (SU = locative: in the garden)
6) a) This hotel forbids dogs.
   b) *Dieses Hotel verbietet Hunde.   (SU = locative: in this hotel)
7) a) My guitar broke a string.
   b) *Meine Gitarre (zer)riß eine Saite.    (SU = locative)
8) a) A penny once bought 2 to 3 pins.
   b) *Ein Pfennig kaufte früher 2 bis 3 Stecknadeln.    (SU = instrumental)
9) a) This advertisement will sell us a lot.
   b) *Diese Anzeige verkauft uns viel.    (SU = instrumental)
10) a) The latest edition has added a chapter.
    b) *Die letzte Ausgabe hat ein Kapitel hinzugefügt. (SU = ?)
11a) I like the book. (SU = experiencer)
   b) Mir gefällt das Buch. (mir = dative non-subject)
   c) Ich habe das Buch gern. (Ich = nominative subject)
12a) Tomorrow will be rather cold in most places. (SU = time specification)
   b) *Morgen versperrt meistenorts ziemlich kalt zu sein. (ication)
13a) Johann hat sich im Krieg das Bein verwundet. (SU = dative)

Even where subject formation is fully grammatical in the two languages
Rohdenburg's corpus of literature in translation shows that non-agentive roles are converted to subjects significantly less frequently than they are in English, and that English subjects correspond regularly to prepositional phrases or to dative-marked NPs in German (e.g. mit einem
Pfennig kaufte man früher 2 bis 3 Stecknadeln 'with a penny one once
bought 2 to 3 pins' for 8), in diesem Hotel sind Hunde verboten 'in
this hotel dogs are forbidden' for 6)). Both in terms of grammaticality
and in terms of frequency, therefore, the subject-forming possibilities of non-agentive arguments in English are greater than those of German.

I argue in Hawkins (1986) that the loss of the case system and
the fixing of basic word order are plausibly responsible for this
increased semantic diversity of basic grammatical relations in
English. In the present context notice an important consequence of
this contrast. Transitive and intransitive surface structures in
English (i.e. SU-V-DO and SU-V) can now be mapped onto a considerable
diversity of semantic propositions. SU-V-DO can be realized as
I love him, he helped him, I like the book, this hotel forbids dogs,
my guitar broke a string, a penny once bought 2 to 3 pins, John
wounded his leg, etc., i.e. a variety of predicate types selecting
argument types with different semantic roles. In any mapping, there-
fore, between surface structure and a semantic representation which
specifies these semantic roles, the surface structure SU-V-DO is
going to be potentially ambiguous between a variety of interpret-
tations, and there is nothing in the surface structure itself to
indicate the appropriate interpretation. The sentence interpreter has
to rely on knowledge of the semantics of the verb and its arguments
in order to assign the appropriate interpretation. By contrast, the
German translations regularly force a disambiguation, either on the
basis of case marking alone (mir gefällt das Buch/ich sehe das Buch
versus I like/see the book), or by a structural rearrangement of
the whole sentence in which the subject in English shows up as an oblique
NP (an meiner Gitarre riss eine Saite versus my guitar broke a string,
i.e. OBL-V-SU versus SU-V-DO). Hence, the German surface structures
exhibit less ambiguity than English. There is greater differentiation
between distinct predicate types in surface, and less collapsing of
diverse semantic structures onto one and the same surface structure.

5. Raising Structures

   English has a productive rule of Subject-to-Subject (S-S) Raising,
operating as illustrated in 14) and triggered by some sixty or
more predicates according to Postal (1974:292). German, according to
König (1971), presents apparent S-S Raising in surface structure only for scheinen 'seem' and for a handful of other (obligatory) triggers which are exactly properly included in the corresponding English class.

14) John seems (\(\Delta\) to be ill) cf. it seems (that John is ill)

15a) John seems to be ill.
    b) John happens to be ill.
    c) John continued to be ill.

16a) Johann scheint krank zu sein.
    b)*Johann geschieht krank zu sein.
    c)*Johann fuhr fort krank zu sein.

Even for scheinen Ebert (1975) has argued that 16a) involves clause-union rather than raising since the 'raised' constituent need not always be a subject.

Postal (1974) has also argued, convincingly to my mind, for a rule of Subject-to-Object (S-O) Raising, operating as illustrated in 17) and triggered again by some sixty verbs. German has no translation equivalents here, and any attempt to construct them results in violent ungrammaticality.

17) I believe John (\(\Delta\) to be ill) cf. I believe (that John is ill)

18a) I believe John to be ill.
    b) I believe the farmer to have killed the cow.
    c) I understand him to be stupid.

19a) Ich glaube Johann krank zu sein.
    b)*Ich glaube den Bauer die Kuh geschlachtet zu haben.
    c)*Ich verstehe ihn dumm zu sein.

Tough Movement (or Object-to-Subject Raising), whose operation is illustrated in 20), is quite productive in English, but limited in German. The limitations involve the number of triggering predicates, the class of NPs which undergo the rule, and its boundedness versus unboundedness.

20) Linguistics is easy (to study \(\Delta\)) cf. (to study Linguistics) is easy

21a) He is easy to convince.
    b) Linguistics is boring to study.
    c) The boy is easy to help/to work with.
    d) This book is easy for me to force Harry to read.

22a) Er ist leicht zu überzeugen.
    b)*Die Linguistik ist langweilig zu studieren. (fewer triggers)
    c)*Der Junge ist leicht zu helfen/mitzuarbeiten. (raise DO only)
    d)*Dieses Buch ist leicht für mich Heinrich zu lesen zu zwingen. (bounded)

The net result is a precise proper inclusion relation between Tough Movement structures in the two languages: whenever German can tough-move, so can English, but not vice versa.

The three raising rules of English involve a change in grammatical relations whereby a subject or non-subject in one clause assumes
the subject or object relation in the higher clause. But the semant-
ic interpretations of these surface sentences involve, in effect,
undoing the relation-changing rule, by interpreting the derived sub-
jects and objects as arguments of the lower, embedded clause out of
which they have been raised, and not as arguments of the predicates
within the clause that most immediately contains them. John in the
S-S Raising structure did not continue in any sense (and he could
scarcely happen or seem!), but he WAS ill and this whole event then
continued in T5c). Similarly, in the S-O Raising structure it is not
being claimed that I believed the farmer in any way, but rather that
the farmer killed the cow, and this whole proposition then stands in
the belief relation to me in 18b). And in the Tough structure of
21b) it is not necessarily claimed that Linguistics is boring - only
that studying it is.

This situation contrasts with Equi-NP Deletion structures, in
which the surface (matrix) subject or object IS interpreted as an
argument of its immediate clause as well as of the embedded clause:

23)a) John wants to be ill.
b) I persuaded John to be ill.
c) John is eager to please.

In 23a) John does want something, and so is an argument of want, and
his desires do not necessarily extend to anyone else being ill apart
from himself, and hence he is also an argument of be ill. In 23b) John
is the individual who is being persuaded, and hence he is an
argument of persuade, and it is his rather than anyone else's illness
that the matrix subject I is trying to bring about through persuasion
and so John is also an argument of be ill, and similarly for 23c). German
and English are, in general, equally rich in Equi-structures, but German
is clearly resistant to raising.

As a result English now has regular syntactic ambiguities
involving raisings and Equi-NP Deletion:

24)a) NP-V-to-VP        S-S Raising     John continued to be ill
       Equi            John wanted to be ill
b) NP-V-NP-to-VP       S-O Raising     I believe John to be ill
       Equi            I persuaded John to be ill
c) NP-be-Adj-to-VP     S-S Raising     John is certain to please
       Equi            John is eager to please

This is reminiscent of the greater ambiguity of SU-V-DO and SU-V
structures in English (i.e. NP-V-NP and NP-V), resulting from the
semantic diversity of basic grammatical relations. The raising
structures extend this semantic diversity even further by requiring
the raised argument to be interpreted as belonging in an altogether
different clause from the one in which it is physically situated in
surface. But since the semantic diversity of subject and object has
been considerably expanded in English quite independently, it is
predictable that it should be English rather than German which has
the productive raisings. By contrast, the structures corresponding
to 24) in German are almost always assigned Equi interpretations only.
Once again, there is that much less structural ambiguity in German, and that much more of a one-to-one mapping between surface form and semantic representation.

6. Extracts and Deletions

Unbounded movement rules such as Relative Clause Formation, Cleft, Question Formation, etc. (i.e. Chomsky's 1977 WH-Movement) apply in more environments in English than in German. In fact, it is argued in Hawkins (1986) that the contrastive situation is as precise as in the raising examples: wherever German can extract, so can English, but not vice versa. In this context I will merely illustrate the direction of contrast with one or two examples.

Extractions out of finite (i.e. tensed) object complement clauses are possible in English, but typically impossible in German. 25a), which derives from 25b), is perfectly grammatical in English. Its counterpart in German, 26a), is ungrammatical.

25a) The man who you believe that you saw is my friend.
    b) the man \((\text{who you believe } \text{that you saw } \Delta )\) is my friend

26a) *Der Mann, den du glaubst, dass du gesehen hast, ist mein Freund.
    b) der Mann \((\text{den du glaubst } \text{dass du } \Delta \text{ gesehen hast})\) ist mein Freund.

The effect of WH-Movement is similar to that of Raising and Tough Movement in an important respect: even though this rule does not create derived grammatical relations, it can still move an NP (the WH-element) into a clause in which it is not interpreted as an argument of that clause. Who is semantically an argument of saw in S2, and is in no sense a semantic argument of believe in S1. Thus, the WH-argument contracts no semantic relation with the predicate of the clause which most immediately contains it in surface structure, and the language interpreter must, in effect, skip over believe and assign who to the lower predicate saw. In a similar way, John must skip over seems and continued in raising structures such as 15).

The descriptive regularity which unites both bounded and unbounded clause-external movements is one of 'argument trespassing'. In all these contrasting structures, the moved NP is situated in a surface clause in which it contracts no semantic relation with its immediate predicate. We will say that an NP "contracts no semantic relation with" its immediate predicate, iff "the argument to which the NP corresponds in semantic representation is not an argument of" this immediate predicate. And an "immediate predicate" can be defined as "that predicate separated from the NP constituent in question by fewer branches than any other predicate in the surface structure tree". We can now define the contrastive Argument Trespassing Generalization as follows:

27) The set of German surface structures in which an NP c(onsituent) -commands an immediate predicate with which it contracts no semantic relation is properly included in the corresponding English set.
Another precise contrast between English and German which is related to these extraction contrasts involves Pied Piping rules. This time it is German that is more productive: wherever English can pied pipe, so can German, but not vice versa. For example, German has a rule of VP Pied Piping, which is without parallel in English.

28) a) der Mann, den zu töten ich öfters versucht habe, ...
   'the man whom to kill I often tried have'
   b) der Mann \textit{vp(den zu töten) ich \Delta öfters versucht habe}
29) *the man to kill whom I have tried ...

In terms of the Argument Trespassing Generalization it is no accident that it should be German rather than English which has the rule of VP Pied Piping. For this rule enables moved NPs to keep as their immediate predicate that predicate of which they are an argument. And it is consistently German that is reluctant to move its NPs into positions where they contract no semantic relation with their immediate predicates.

Hawkins (1986) suggests that the greater tolerance for argument trespassing in English may result from the loss of the case system. The absence of a rich morphological case system facilitates the extraction of surface NPs out of their immediately dominating categories. More generally, it is argued (following Lightfoot 1981) that the number of morphological case distinctions drawn in a language correlates negatively with the possibility of removing NPs from the c-command domains that assign case.

This negative correlation can be extended to cover NP deletions as well, which are also more restricted in German compared to English. For example, differently case-marked NPs typically cannot undergo conjunction reduction where in English they can (cf. 30)-(31)), and the deletion of case-marked NPs is frequently blocked in environments such as PPs from which extraction is also blocked (cf. 32)-(33)):

30) a) Fred saw the king and thanked the king.
   b) Fred saw and thanked the king.
31) a) Fritz sah den König und dankte dem König.
   b) *Fritz sah und dankte dem König.
32) a) He is the father of the boy and the friend of the boy.
   b) He is the father of and the friend of the boy.
   b) *Er ist der Vater von und der Freund von dem Jungen.

Notice now the semantic consequences of these contrasts. In previous sections we have seen that some major English/German contrasts conspire to create greater ambiguity in surface forms (morphological and syntactic) in English. The extraction and pied piping contrasts, on the other hand, do not appear to be packing a greater number of semantic or pragmatic types into a limited set of common surface forms in English, thereby making these more ambiguous or vague. But they do have another interesting effect from the point of view of the mapping between surface form and meaning. If we think (following Keenan 1978) in terms of the 'conservation of
logical structure in these surface structures, we can say that the effect of argument trespassing is precisely not one of conserving logical structure in surface, but rather of destroying it by rearranging arguments and predicates. English frequently permits arguments in surface structure in positions where they do not belong semantically, while German allows less rearrangement, and rearrangement over smaller syntactic domains.

The freer deletions of English are also relevant here. If a deletion process removes an argument of logical structure from surface, the relevant clause will be lacking an argument which belongs logically in it, and which will be assigned to it in the process of semantic interpretation. But both removal of an argument from a position in which it does belong logically, and insertion of an argument (by raising etc.) into a position in which it does not belong logically, would seem to be two complementary ways in which a surface structure can deviate from its corresponding logical structure and thereby fail to conserve it.

7. The Unity of English/German Contrasts

The comparative typology of English and German can be summarized as follows:

<table>
<thead>
<tr>
<th>German</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>More grammatical morphology</td>
<td>Less grammatical morphology</td>
</tr>
<tr>
<td>More word order freedom</td>
<td>Less word order freedom</td>
</tr>
<tr>
<td>Less semantic diversity of GRs</td>
<td>More semantic diversity of GRs</td>
</tr>
<tr>
<td>Less raising</td>
<td>More raising</td>
</tr>
<tr>
<td>Less extraction</td>
<td>More extraction</td>
</tr>
<tr>
<td>More pied piping</td>
<td>Less pied piping</td>
</tr>
<tr>
<td>Less deletion (of NPs)</td>
<td>More deletion (of NPs)</td>
</tr>
</tbody>
</table>

I would argue that the distribution of the 'more' and 'less' values in 34) admits of a unifying generalization, as follows:

35) Where the grammars of English and German contrast, the surface forms (morphological and syntactic) of German are in closer correspondence with their associated meanings in the following ways:

a) Ambiguity (and/or Vagueness)

There is greater ambiguity (and/or vagueness) of surface forms in English, i.e. greater collapsing of semantic distinctions and of different semantic types onto common surface forms. The result is more of a one-to-one mapping between form and meaning in German, with distinct forms carrying distinct meanings to a greater extent:

cf. ambiguity (and/or vagueness) in English morphology;
pragmatic ambiguity (/vagueness) in fixed word order;
ambiguities in semantically diverse SVO and SV sequences;
ambiguities in Raising and Equi structures.

b) Destruction of Semantic Clause Structure

There is less correspondence between surface clause structure and semantic clause structure in English:
1) The arguments of an immediate predicate (V or Adj) in English surface structures are to a greater extent than in German not arguments of this predicate in semantic representation, but must be matched with a predicate lower in the sentence. I.e. German allows less rearrangement of arguments and their predicates, and rearrangement over smaller syntactic domains:
   cf. more raising in English;
   more WH-extraction;
   less pied piping.

ii) Conversely, there is greater removal in English surface structures of arguments which are present in semantic representation, i.e. greater deletion of arguments from surface structures in which they do belong semantically:
   cf. more deletions (of NP) in English.

German is therefore giving us a 'tighter fit' between surface form and semantic representation. Even though linguists may differ over what they consider a semantic representation to look like, they are all agreed on the following essentials: semantic representations cannot be ambiguous; arguments must stand 'together with' the predicates with which they are associated semantically; and material that is semantically understood, even though deleted or absent from surface structure, must be present in semantic representation. Now it is precisely these essentials that we are concentrating on in our comparative study. German has less surface ambiguity, less rearrangement of arguments and predicates, and less deletion of arguments than English.

8. Conclusions: Inferring a Typological Parameter

What I have presented in this paper is essentially a descriptive regularity underlying contrasts between two extremes in the continuum of variation within Germanic. This regularity now poses two further questions, one empirical, the other theoretical.

Empirically, does this clustering of properties exemplified by English and German have more general validity outside of Germanic? Obviously, there will be many language-particular and idiosyncratic differences between individual languages. But is there still evidence for a similar underlying generalization, such that e.g. the existence of more grammatical morphology compared to English will regularly correlate with more word order freedom, less semantic diversity of GRs, less raising, less extraction, fewer deletions, etc? Impressionistically I believe that the correlations between many of these features in other languages and families are quite good. But we need to look at many more languages from this point of view in order to establish precisely what the nature of the clustering is, by formulating implicational universals such as "if a language has no morphological case system, then it will have such and such", or "if a language allows preposition stranding, then it does such and such", etc. In the meantime, the contrasts of Modern Germanic point to an intriguing regularity, suggesting that variation throughout a whole grammar may be constrained by rather abstract typological principles involving the degree of correspondence between surface form and semantic representation.
Theoretically we must then ask why it is that languages should differ over the degree of correspondence between surface form and meaning in this way. I believe that what we are witnessing here is an interesting interplay between the two fundamental parts of the grammar: between the rules generating linguistic forms on the one hand; and those assigning meanings to these forms on the other. For English, the assignment of meaning to form can be argued to be more complex than in German (both in the grammar and in actual use). More surface ambiguities must be resolved. Vagueness must be supplemented with contextual information to a greater extent. Argument-predicate relations that have been undone in the syntax must be reconstructed in the semantics. And semantically relevant material that is deleted in surface must be reconstituted.

But the English forms themselves, and the rules which generate them, can be argued to be correspondingly simpler than their German counterparts. For the morphology this is self-evident: more extensive use is made of fewer forms. But so too in the syntax. Small numbers of common surface patterns in English can do service for semantic types which require distinctive encoding in German. English makes greater use of its 'basic' phrase structure patterns, whence greater ambiguity. And in addition, the productive movement and deletion processes which effect changes in these basic patterns can 'run freer'; i.e. they apply in more environments, subject to fewer restrictions and constraints, whence the greater destruction of semantic clause structure.

I would therefore argue that the simplicity and generality of the rules of grammatical form are negatively correlated with the simplicity and ease with which meanings can be mapped onto their corresponding forms. And this tension between the two fundamental parts of the grammar results in a continuum of possible variation. Languages can make extensive use of more limited formal means, thereby complicating the assignment of meaning to form, or they can add more formal distinctions, thereby simplifying the mapping to meaning and increasing semantic transparency. And over time they can drift from one part of the continuum to the other, in response to independent changes which have clear consequences for the mapping between form and meaning, such as the phonological changes in Germanic that reduced unstressed syllables and resulted in case syncretism.

References
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When Is a Classifier No Longer a Classifier? ¹
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American Sign Language (ASL) is a predicate classifier language (see McDonald (1982) for arguments, see Allan (1977) for general discussion of types of classifier languages). Each verb in the language is inherently motion/location (M/L) based and has associated with it a classifier. This classifier indicates the object which moves or is located with respect to the relation specified by the verb. For example, in the verb GO the motion string is "TO+AT"² (motion of the hand to proximity with a specific location). The moving element or "lexical theme" of this verb is "vertical g-CL" (the fist with index finger extended) which indicates long thin objects and in the vertical orientation is most frequently taken to refer to human beings. The same M/L string occurs in the verb DRIVE-TO, but the classifier in this case is "3-CL" (index, middle finger and thumb extended) which indicates vehicles. WALK-TO is identical except for a "vertical v-CL" classifier (index and middle finger spread apart in an upside down V shape) indicating person by legs. Notice in all three examples the classifier marks the moving element.

All of the above examples involve literal M/L verbs. The relation of the classifier to the interpretation of such verbs tends to be transparent. This transparency becomes less and less obvious the further a given lexical item is extended from the basic M/L class to other semantic classes such as cognition, emotion, perception, etc.. ⁴ In fact, in many instances, classifiers hold no obvious relation to the verbs with which they co-occur. This is to be expected with any grammaticized system of classification. Anyone familiar with gender systems (which might be considered less robust and diversified variants of classifier systems) will recognize that, although there may be "core" or "prototypical" uses of a given gender marking, there are many peripheral or even unexplainable members of every gender class.

Despite our inability to assign a consistent meaning to certain classifiers, they can continue to function as morphemes in the sense of Aronoff (1976), which rejects the traditional notion of morphemes as "minimal meaningful elements of language" in favor of a less meaning-based characterization. For Aronoff (1976:15) what is essential about a morpheme is "not that it mean, but rather that we be able to recognize it. A morpheme is a phonetic string which can be connected to a linguistic entity outside that string." That linguistic entity could be a constant meaning, the triggering of a phonological rule (as is the case with the latinate stem =mit which triggers softening (t => s: remit- remissory) where the non-latinate "mit" at the end of vomit does not), a phonological rule itself (see Harris (1951) for an
argument that the ablaut rule is a morpheme), or a constant form which consistently serves the same grammatical function (e.g., ASL classifiers which consistently serve as "lexical themes").

When is a classifier no longer a classifier? Or, when does it lose its morpheme status? This is a question which has drawn much attention in the literature on ASL linguistics in the last few years. The general consensus, with which we disagree, is that a classifier only retains this status in so far as it can be tied to a constant form and meaning. This position follows from traditional non-Aronovian assumptions concerning the definition of a morpheme. The claim is that when a classifier's relation to a sign is no longer transparent, when it occurs in a frozen lexical item which has undergone some semantic shift, or when it begins to exhibit some allo-morphic variation; then, a classifier is no longer a classifier but rather simply another phoneme of the language. Newport (1982:465) states the disputed claim as follows:

a limited number of discretely different morphemes can be used in 'mimetic depiction,' each with its own consistent meaning. The handshape of a sign within 'mimetic depiction,' then, is itself a morpheme. (This is not generally the case within the frozen lexicon; for frozen signs, handshape is a phonological parameter with no associated meaning.)

Much attention has been given in the ASL literature to this distinction between a frozen and a productive lexicon (Supalla 1982, Newport 1982, Liddell 1984, Johnson and Liddell 1984, Liddell 1983, Padden 1983). The ASL lexicon is supposedly split into two parts—a productively formed set of M/L verbs (Supalla 1978), and the "frozen" lexicon, consisting of what Newport (1982) characterizes as "single-morpheme signs well standardized among signers, typically listed in standard dictionaries of ASL, learned by adults and children acquiring ASL, borrowed for use in Signed English." The productive portion of the lexicon has been referred to by some as "mimetic depiction" and opinions differ as to whether it is considered to be part of ASL proper. We accept Supalla (1978,1982) which argues that the M/L component of the ASL lexicon is part of ASL proper, with discrete formative elements and systematic word formation rules. However, we will diverge from Supalla's analysis (and the other analyses cited above) in several respects.

Instead of treating the productive and frozen portions of the lexicon as structurally distinct, with independent word formation rules and separate phonologies, we argue that a single set of formational rules characterizes both the M/L forms and the remainder of the lexicon. While the literal M/L forms may be novelly produced by a set of word formation rules, items in the frozen lexicon are related by a parallel set of lexical redundanc
rules.

Frozen lexical items in ASL have been claimed to be monomorphemic, but are better seen as multi-morphemic and non-decomposable. Individual sub-lexical formational units may have morphemic status (much like the latinate stem -mit in remit, commit and emit) without systematically contributing to the meaning of the word as a whole. This is comparable to the behavior of members of a lexical compound, or to the individual words which comprise a syntactic idiom. In fact, the parallel between sub-lexical sign structure and syntactic idioms (phrasal units which in reality behave as a single lexical item: let the cat out of the bag, kick the bucket, keep tabs on, take advantage of, make headway) is striking. Although the individual components of an English idiom like kick the bucket may have individual interpretations, they do not contribute to the meaning of the word as a whole. ASL signs consist of a potentially infinite set of M/L strings (sentential verbs) embedded within M/L strings. These embedded strings, while retaining a recognizable sub-lexical structure, behave as lexical islands which can become restricted in meaning or can stray from their initial literal interpretation to yield a more idiosyncratic and idiomatic interpretation, one which may have no compositional relation to its parts.

Our study focusses on the status of classifiers embedded within frozen signs. We will argue that sublexical "classifiers" inside frozen lexical items do not change their status from "morpheme" to "phoneme." Instead, they continue to function as morphemes (in the sense of Aronoff 1976; a characterization which does not make "consistent meaning" a prerequisite for morphemehood). Much like the words in the English idioms mentioned above, classifiers can often be associated with an interpretation which is plausible internal to the embedded M/L string with which they occur, but which has no relation to the interpretation of the word/sign as a whole. And, even when the relation of a classifier to an embedded M/L string is not transparent, we find evidence of its morphemehood in the fact that it consistently fills the same lexical theme slot with respect to embedded strings and that it patterns with other verbs where the classifier is more obviously serving a classifier role.

We will focus upon a comparison of two signs: CL-CL#PUT-SMALL-OBJECT-INTO-A-CONTAINER and VOTE. They are representative of the morphological relatedness rampant in the ASL lexicon. Although the glosses of these two signs are dissimilar, the signs themselves prove to be morphologically related. In fact, as we will eventually demonstrate, the first actually appears as an embedded subcomponent of the second. Our focus will be on the function(s) of the classifiers/phonemic handshapes which these two signs share and on the idiomatizing effect of embeddedness.

First, we will evaluate each sign according to Newport's criteria for membership in the frozen lexicon. We will begin with
VOTE which is a prototypical frozen sign. Since our disagreement concerns morpheme status, we will leave aside for the moment what in Newport's terms constitutes a single sign and simply state that she would consider this a single-morpheme sign. Except for the normal amount of regional variation, this sign is well standardized among signers. It appears in standard ASL dictionaries (Stokoe, Casterline and Croneberg (1976 [1965]:266), is learned by both children and adults acquiring ASL, and is borrowed for use in Signed English (See the illustration below from Riekehof (1978:192), a Signed English dictionary. This illustration is identical to the form used by ASL signers and appearing in ASL dictionaries.)

(1) VOTE: 

The o-handshape in this ASL sign is identical to the handshape of the classifier indicating containers (o-CL). The configuration of the right hand is identical to the handling classifier indicating the handling of a small thin object (handling th/g-CL). However, these notions of "handling" and "containers" play no literal role in the meaning or use of the sign. For example, one can vote by placing a ballot (handling) in a box (container), but one can also vote by pulling a lever, raising one's hand, or any other number of methods. The sign VOTE can be used for any of these.

Now consider cl-CL#PUT-SMALL-OBJECT-INTO-CONTAINER. This is a typical candidate for membership in the productive portion of the lexicon. This sign is never listed in standard ASL dictionaries, nor is it borrowed for use in Signed English. Children acquire the rules which allow them to produce such signs but don't seem to master the fine nuances of when to use it and how to inflect it until around nine years of age (Kantor (1977, 1982)). Adults learning ASL as a second language frequently mis-use or never acquire this sign. It is clearly not "well standardized among signers." In fact, not even its gloss can be easily agreed upon.

The sign is also highly variable depending upon its use. The choice of the classifier articulated by the left hand is dependent upon properties of the container (its size, shape, etc.). The
choice of the handling classifier articulated by the right hand is
dependent upon physical properties of the object being handled--
handling a small object vs. handling a flat non-flexible object
vs. handling a cylindrical object, etc.. The proclitic (cl-CL,
signed by the left hand) attached to the beginning of the sign
indicates that this verb requires the presence of an argument in
the syntax which functions as an object of the verb and receives
the thematic role Goal. Furthermore, its presence forces the NP in
object position to be dislocated to sentence initial position. The
proclitic must be co-indexed with (articulated at the same point
in space as) its NP antecedent (see Kegl in press a). The sign is
productively formed and yet all this information must be available
to the user. This explains why even if some version of the sign is
learned as a "frozen" sign by a child or adult, it will not be
mastered in all of its forms until the ASL syntax and classifier
system have been mastered.

Below is an illustration of cl-CL#PUT-SMALL-OBJECT-INTO-A-
CONTAINER. As mentioned above, many variations are possible
depending upon the context and upon the referents of the
classifiers, but for purposes of comparison we have chosen one
form of the sign which utilizes the same handshapes as the sign
VOTE above.

(2) cl-CL#PUT-SMALL-OBJECT-INTO-CONTAINER:

Contrary to (1), where voting can have little to do with
containers or handling, (2) cannot stray in meaning with respect
to the interpretation of the classifiers involved. There must be
an argument in the sentence which serves as a container. There
must be literal handling involved. It is this requirement for
literal interpretation that is the hallmark of items in the
productive lexicon.

There is no doubt that there are both frozen and productively
formed signs in ASL. Furthermore, it is of no surprise that those
signs which are most productive come from the class of M/L verbs.
But, should we assume from this that there are two (or more)
distinct lexicons in the language, with separate word formation
rules and separate phonologies? Should what looks like exactly
the same form serve as a morpheme (a classifier) in one lexicon and only as a phoneme (a handshape) in the other? What if, like in the case of the English idioms, these formatives in the "frozen" lexicon have a plausible interpretation or a morphological function internal to the sign which is irrelevant to its meaning as a whole. For example, VOTE seems to have in its sublexical structure the complete sign cl-CL#PUT-SMALL-OBJECT-INTO-CONTAINER. This is a generalization which would be missed if we assume the handshapes and movements internal to VOTE to be nothing more than phonemes. The sign VOTE can be transliterated as "at some person a dropping of a ballot in a box occurred." Furthermore, "dropping a ballot in a box" functions as an idiom for voting. To understand this last point and the argumentation related to it, we need to introduce a notation that reflects the actual sub-lexical structure of these signs rather than relying on mnemonic glosses.

Gee and Kegl (1982a,b) propose a notational system which is referred to as "MOV-LOC notation." This system is revised and explicated in detail in Shepard-Kegl (1985). We will not attempt to introduce the entire system here, but will explain only as much as we need. Basically, this notation represents the ASL sign in terms of movements (FROM, TO), termination relations (AT, IN, ON, WARD), a terminal anchor point (LOC), overt referential indices (i, j, k,...n) and classifiers (g-CL, o-CL, etc.). Signs have the following set of possible combinations of M/L relations, LOCs, indices and classifiers (which appear in the lexical theme slot):

LEX.

<table>
<thead>
<tr>
<th>THEME</th>
<th>LOC INDEX</th>
<th>TERM. FROM TO TERM. LOC INDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X X X X X X X X X</td>
<td>source/goal verb</td>
</tr>
<tr>
<td>X</td>
<td>X X X X X</td>
<td>goal verb</td>
</tr>
<tr>
<td>X</td>
<td>X X X X X</td>
<td>stative</td>
</tr>
<tr>
<td>X</td>
<td>X X X X X</td>
<td>source verb</td>
</tr>
<tr>
<td>X</td>
<td>X X X X X</td>
<td>stative opposition</td>
</tr>
<tr>
<td>X</td>
<td>X X</td>
<td>noun</td>
</tr>
</tbody>
</table>

The classifier/lexical theme is the last morpheme added onto a verb stem to make a word. Notice that every sign has a lexical theme. The element in the lexical theme slot can be a simple classifier, a handling classifier, or an entire nominalized sentential verb which consists of a fully formed sign plus its associated object proclitic. We will not focus here on the word formation rules for building up an ASL motion/location verb stem, but rather will focus on the role of the classifiers that occur in embedded nominalized sentential verbs and those that occur inside the proclitics associated with these nominalized sentential verbs.

Let's begin by examining the MOV-LOC representation of the sign for VOTE. The representation appears in (1a) below:
Even with our brief introduction this transcription takes some explaining. First of all, the elements under the triangles are the lexical themes. They are realized concurrent with the M/L string which dominates them. Let's start with the stack of triangles on the left. The bottommost triangle dominates two classifiers: th-CL and g-CL. The first is the "thumb classifier" or "copy classifier." This classifier when it occurs in conjunction with another classifier indicates either itself (thumb) or a copy of the classifier it occurs with. The second classifier is the "long thin object" classifier which can classify anything from a telephone pole to a line of thought. In this case, it classifies the index finger itself. At this point we have just two classifiers which we know will hold a theme relation to the dominating M/L string. They will indicate a physical characteristic of the thing that moves with respect to a verb of motion or is located with respect to a verb of location.

Move up to the next string (ON LOC\textsubscript{a}). At this point we see we have a stative locational ON string. A contacting relation holds between the thumb (th-CL) and what is located at location\textsubscript{b} and between the index finger (g-CL) and what is located at location\textsubscript{b}. We also have information about what is located at location\textsubscript{b}. The line "__" preceding ON LOC\textsubscript{b} indicates that an object proclitic has been moved from that position. All proclitics gravitate to verb initial position—even from embedded M/L strings frozen within a lexical item. They are interpreted, however, as if they remained in their embedded string. They play no role in the literal interpretation of the verb and have no consequences for the syntax. Their role is to be distinguished from true matrix proclitics which do play a role in the syntax. The proclitic associated with this string is the next sign to the left. Again, in the lexical theme slot, we see g-CL and th-CL—but this time in
the reverse order. Moving up to the dominating string \((\text{AT LOC}_{b})\) we discover that two relations hold again: \(g\text{-CL}\) is \(\text{AT location}_{b}\) and \(\text{th\text{-CL}}\) is at \(\text{location}_{b}\), simultaneously. If we plug this information back into the bottommost \(M/L\) string in the rightmost stack of triangles, we find that \(\text{th\text{-CL}}\) and \(g\text{-CL}\) are simultaneously serving as both the classifier in an object proclitic (as what is located at the anchor point for the contacting relation) and as the element which is located. Simultaneously the thumb is in contact with the index finger and \textit{vice versa}. The marking of this string as reciprocal is redundant.

Move up to the next \(M/L\) string (\(\text{ON LOC}_{c}\)). Everything under the two lower triangles serves as the lexical theme of this locational contact string. Thus, what is at \(\text{location}_{c}\) is contacted by means of the index finger and thumb which are in contact with each other. Nothing in the sign tells us what is at \(\text{location}_{c}\), but the classifiers used to contact it indicate that the object handled must be small and thin. The entire structure discussed so far (namely, all the material under the bottom three triangles in the rightmost stack) constitutes a handling classifier. Although handling classifiers are morphologically complex, they are frozen forms and are treated in a wholistic fashion. This whole unit indicates "the handling of a small thin object."

Move up to the next \(M/L\) string (\(\text{___TO+IN LOC}_{c}\)). Here we have a motional relation (\(\text{TO}\)) to a goal (\(\text{LOC}_{c}\)) which terminates in containment (\(\text{IN}\)). The element which moves with respect to this motional relation is the entire handling classifier. Thus, the handling of some small thin object moves into what is located at \(\text{location}_{c}\). Again, to find out what is located at \(\text{location}_{c}\), we look for the object proclitic co-indexed with \(\text{location}_{c}\) which has climbed into pre-verbal position. We find it to be the second of the four stacks of triangles. It tells us that an \(\text{O-CL}\) (a container classifier) is located at \(\text{location}_{c}\). So, plugging this back into its embedded clause we find we have a hand holding some object between its index finger and thumb moving into a container at \(\text{location}_{c}\). None of the locations referred to thus far are actually indexed into the signing space (an area about waist height extending outward horizontally in front of the signer). They are indexed relative to their own embedded \(M/L\) strings. Only matrix locations receive a discourse or syntactically relevant referential index. As an aid to deciphering the notation, matrix locations are indexed with numbers and embedded locations with letters.

Move up to the topmost \(M/L\) string (\(\text{AT LOC}_{10}\)). Here we have the matrix \(M/L\) relation of the verb. It is a locational proximity relation which asserts that the entire event (a clausal lexical theme) indicated in the stack of triangles it dominates occurs at \(\text{location}_{10}\). Thus, at \(\text{location}_{10}\), a putting of a small thin object into a container occurs. Of course, the entire stack of embedded strings is idiomatized to mean "voting." So, we have "a voting
occurred at location 10.

Up to now, we have ignored the initial sign in this structure, the one whose bottommost element is SBP. SBP stands for "signer's body position." This is a special classifier which indicates the person who has role prominence with respect to the action of the verb. It serves as the lexical theme of a second proclitic which attaches to the beginning of the verb. This proclitic generally marks subjects, but also frequently gets an ethical dative reading: e.g., "The cup fell off of the table on me" (non-locative reading). The interpretation of this proclitic is role prominence at location 10. Plugging this clitic into the verb, we get "a putting of a small thin object into a container occurred at the location of a person associated with location 10;" or "person 10 voted." 12

The entire representation in (1a) is traditionally labeled by ASL linguists with the gloss VOTE and has traditionally been described as mono-morphemic. It is the handshapes "o", "g" and "th" which are considered by Newport to be "phonological parameters" and not morphemes, particularly not classifiers. This would also be true of all the sign internal movements and both of the proclitics. This seems hard to reconcile with the fact that she considers the next sign to be totally productive and multi-morphemic. It seems to us a sign can be frozen and still multi-morphemic.

(2a) o-CL#PUT-SMALL-OBJECT-INTO-A-CONTAINER

' to put a small thin object into a container,' 'to put a marble into a cup,' etc.

\[ \begin{array}{c}
\text{AT LOC} \quad \text{AT LOC} \\
\text{ON LOC} \quad \text{ON LOC} \\
\text{th-CL/g-CL} \\
\end{array} \]

\[ \begin{array}{c}
\text{SBP} \\
\text{g-CL/th-CL} \\
\text{ON LOC} \\
\text{ON LOC} \\
\text{th-CL/g-CL} \\
\end{array} \]

\[ \begin{array}{c}
\text{TO+IN-LOC} \quad \text{RP-CL role} \\
\text{cl-CL matrix} \\
\text{cl-CL non-matrix} \\
\text{verb} \\
\end{array} \]

\[ \begin{array}{c}
\text{proclitic} \\
\text{proclitic} \\
\text{proclitic} \\
\end{array} \]

We will leave the deciphering of this representation as an exercise for the reader except to point out the few instances where it differs from the preceding example in (1a). Notice that everything is the same except that TO+IN LOC 20 is now a matrix string. It is no longer embedded under the intransitive locational
string AT LOC10. As a result, its associated proclitic (container at location20) is now also a matrix proclitic. As we said earlier, this has consequences for both the interpretation of this sign and for its role in the syntax and discourse. This string is no longer opaque with respect to the syntax. Now the container classifier and the inserting of some object are taken literally. Furthermore, the container classifier and the locative agreement marker on the verb are indexed into the signing space and agree with NP antecedents. This would be impossible were they embedded. The choice of classifier in the object proclitic and the choice of handling classifier are also now more variable and are highly constrained by physical properties of the NP antecedent. One final difference is that the role prominence clitic is no longer co-indexed with the verb. It still retains its subject status, however, because the presence of a handling classifier as the lexical theme of a matrix verb forces construal of some [+human] argument, preferably one with role prominence, as an agent of causation (for details see Kegl (1985)).

Four examples below illustrate grammatical and ungrammatical uses of VOTE and cl-CL#PUT-SMALL-OBJECT-INTO-A-CONTAINER. In order to save space and keep the transcription simpler, we have substituted an indexed gloss for the signs in question. A full transcription can be had by substituting (1a) and (1b) minus their role prominence proclitics for these glosses. Sentence (3) shows a grammatical use of the intransitive verb VOTE. Notice that it allows only one NP argument.

(3) 'Sue votes.'

\[
\text{Sue} \quad \text{INDEX}_{10} \quad \text{RP-CL}_{10} \quad \text{verb}_{10}
\]

Sentence (4) shows a grammatical use of cl-CL#PUT-SMALL-OBJECT-IN-CONTAINER which because of its matrix proclitic requires an additional NP argument corresponding to the container which serves as the goal of the verb.
(4) 'Sue put a small object into a box.'

\[ \text{AT LOC}_{20} \text{ AT LOC} \text{ TO+AT LOC}_{10} \text{ PUT-X-INTO-A-CONTAINER}_{20} \]

\[ \text{BOX} \text{ s-u-e} \text{ WARD LOC} \text{ g-CL} \]

Box\textsubscript{20} Sue INDEX\textsubscript{10} put X into the box

The next two sentences show the ungrammaticality that results if these two verbs are substituted for one another in these sentence contexts. At this point, all the transcriptions are simplified by glosses. Sentence (5) is bad because cl-CL#PUT\textsubscript{13} SMALL-OBJECT-IN-CONTAINER occurs with one too few arguments.

(5) 'Sue put a small object into a container.' [no goal NP]

*\text{SUE+INDEX}_{12} \text{ PUT-X-INTO-A-CONTAINER}_{20} \]

Sentence (6) is ungrammatical because VOTE is intransitive and the sentence has an extra NP argument.

(6) 'Sue voted a box.' [extra argument]

*\text{BOX}_{20}, \text{ SUE+INDEX}_{10} \text{ VOTE}_{10} \]

The syntactic behavior of the above verbs in differing sentential contexts demonstrates that embeddedness of a given string makes it opaque with respect to the syntax. We also see that only the topmost M/L string determines the internal arguments a given verb will select for. Such observations can only be made, by the way, if we view signs, both "frozen" and productive, as morphologically complex—not as mono-morphemic.

From the above examples, we have syntactic evidence of this opacity effect which is independent of any evidence from semantic interpretation such as literal vs. idiomatized readings. We can then add that the semantic effects further support the opacity of embedded strings.

We also see here a structural account of what it means to be "frozen." This is distinct from the symptoms exhibited by frozen signs. The opacity effects can be attributed as much to the fact that embedded strings become lexical islands as they can to the arbitrary distinctions between frozen and non-frozen signs. However, the fact that a sign is "frozen" does not mean that its sub-lexical morphological structure is eradicated. In the remainder of the paper we would like to discuss two additional pieces of evidence in favor of the morphemehood of sublexical
elements internal to "frozen" signs. The first concerns internal reanalysis of frozen signs and the second concerns recreolization of ASL by Deaf children of non-native Deaf ASL signers who are exposed primarily to data from the "frozen" lexicon. We will mention these issues only briefly, referring the reader to additional sources for further details.

When an ASL sign is "frozen" and begins to acquire a more idiomatized interpretation, it should be a prime candidate for reanalysis. If the sign internal units are realized as phonemes, we should expect a reanalysis which allows a less constrained sequencing of motions, locations and handshapes than we find in productive signing. On the contrary, reanalysis of ASL signs most frequently favors reanalysis of the internal structure of a sign to a form which would be another allowable output from the highly constrained set of word formation rules. Numerous cases of reanalysis are discussed in terms of MOVE-LOC notation in Shepard-Kegl (1985). But, many supportive examples can also be found in Frishberg's (1975) analysis of compounding and historical change in ASL.

A more interesting piece of evidence for the morphological integrity of sub-lexical sign units comes from cases of recreolization. Only 6% of the U.S. deaf population learn ASL from deaf native signing parents. A majority have hearing parents and their earliest communication is "home sign" (Goldin-Meadow (1979), a gestural system which resembles a pidgin in having little internal morphology, with grammatical relations indicated by isolated words in a fairly rigid order. Newport (1982) noted that 1st generation signers go on to learn mostly items from the "frozen lexicon" of ASL because they are primarily exposed to Pidgin Sign English (PSE; a pidgin between hearing and deaf signers.) In this respect they share characteristics with L2 learners of ASL.

The complex morphology and syntax of ASL shows up only in second generation signers. Newport claims that a "complex morphological analysis is performed by second generation signers on an input that does not itself contain this morphology." She argues that the "frozen lexicon" of ASL (also the primary input for second generation signers) contains, as formational entities inconsistently associated with meaning, handshapes and movements which in ASL are morphological components of verbs of motion and location. Second generation signers regularize these associations ending up with productive form-meaning components uncharacteristic of the parent language. The learning process is said to contribute structural characteristics to languages resulting in an output more highly structured than the input.

If we recast Newport's insights concerning ASL recreolization in a morphological framework more consistent with Aronoff (1975) which recognizes that to be a morpheme a unit need not have a consistent association with some meaning; we find that the
recreolization process is triggered by sub-lexical morphological regularities still evident in "frozen signs." The crucial point here is that the signing of children of deaf native signers of ASL is indistinguishable from the signing of children of deaf second language learners of ASL, even though the language of the parents differs greatly—the latter being composed of primarily frozen signs. These children are not just creolizing a pidgin, they are creolizing to a specific language target. A creolization process should leave more degrees of freedom in terms of the language output. What we see here is an instance where the children creolizing the language have access to language specific information unattended to by second language learners. Kegl (forthcoming) argues that it is the sub-lexical structure of M/L strings and their associated proclitics present in the frozen lexical items used by the parents of these children that provides the data with which these children are able to set the parameters for ASL. The can extend regularities in the frozen signs to the morphology and syntax of the language as a whole, and thus acquire the full productive fluency comparable to children of native signers.

This phenomenon seems to indicate that classifiers and motion/location relations internal to frozen signs never really lose their morpheme status, even if they make no contribution to the meaning of the sign. They continue to exhibit morphological regularities which may be accessible for lexical redundancy rules or for contribution to the child's acquisition of grammatical structures. All in all classifiers, despite the effects of lexical freezing, appear able to maintain their classifier status.

FOOTNOTES

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2 Rather than a complex set of symbols for the transcription of ASL signs or glosses which obscure any formational characteristics they may have, we adopt the notation proposed in Gee and Kegl (1982) which represents simple motion by a set of two glosses. The first specifies whether we have movement to a goal ("TO"; =>X) or movement from a source ("FROM"; X=>). The second indicates the type of relation held at the anchor point (source or goal) of that movement: "AT" = proximity/location at the anchor point; "ON" =
contact with something located at the anchor point; "IN" = containment within something located at the anchor point; and "WARD" = orientation toward an anchor point.

In reality, the two motions "TO" and "FROM" constitute the same relation "MOVE" (for arguments see Shepard-Kegel (1985)). We retain the TO/FROM distinction to aid reading of our transcriptions. The physical articulation of the movement is invariant at the most abstract level. It is simply motion along a path. However, the details of articulation may vary depending upon co-articulation effects and other effects of context. For example, signs can have multiply embedded and concurrently articulated motion/location strings. The topmost motion/location relation is generally articulated by a whole arm movement involving the shoulder. The same movement more deeply embedded may involve elbow, wrist or even finger movement. With respect to these "phonetic" variations, our notation can be said to be phonemicized. As a result, it is often difficult for the non-signer to reconstruct the exact physical articulation of the sign from its morpho-phonemic transcription. For this we apologize. However, since this is a discussion more within the realm of morphology and syntax, we hope you will bear with us and realize that we are more concerned with making the sub-lexical regularities of signs apparent than we are with providing a narrow phonetic transcription.

Structurally, the classifier is prefixed to the beginning of a verb. However, classifiers are handshapes and verb stems are movements and the two do not occur independently of one another. Therefore, like the dependency relation between tones and vowels, we find that handshapes are mapped onto movements. So the surface realization of a sign has the classifier realized concurrent with the movement component of the stem rather than preceding it.

All signs in the ASL lexicon, whether productive or not, show evidence of being structurally related to a basic M/L class.

Following Gee and Kegel (1982a,b) and Shepard-Kegel (1985) we will assume that the frozen portion of the ASL lexicon is derived from the M/L component by processes of metaphorical extension from a basic set of M/L forms. These extensions are frequently signalled by association with a body part (head = cognition, eye = vision, mouth = locution, chest = emotion, etc.). Causation is indicated by constructions in which a handling classifier co-occurs with a M/L stem. Kegel (1985) argues that these verbs are comparable to serial verb constructions where causation is marked by the merger of a verb of "manipulation" (handle, hold, take) with a typically unaccusative verb. An analysis of metaphorical extension within the single sub-class of verbs of cognition can be found in Dexter (1982).

Words in all capitals are glosses for ASL signs. In instances where a single word gloss will not suffice, circumlocutions are indicated by a string of hyphenated English words. Such strings
reflect nothing structural about the ASL sign other than its resistance to a single word translation. Glosses have little relation to the phonological or morphological properties of the signs themselves. They are simply the most frequent English gloss associated with the ASL sign. Glosses reflect no information about the inflectional or derivational characteristics of a sign. They are simply a mnemonic for recognition of a lexical item by signers/sign language researchers. We use them in our discussion in place of actual transcriptions of the signs for purposes of expediency, particularly to save space and make it easier on readers who are not yet adept at reading ASL transcriptions. As will be seen below, in most cases sole reliance upon glossing will obscure crucial similarities between signs and will generally omit that grammatical information which is most helpful in proceeding with any linguistic argumentation.

This sign usually involves an o-handshape (left hand) set in front of the signer's body and a movement of the right hand, in a configuration with index finger and thumb touching, such that the tips of the thumb and index finger are contained within the aperture of the o-handshape of the left hand. Some signers assimilate the handshape articulated by the the left hand to the handshape articulated by the right hand. Others, according to Supalla (p.c.) use a closed fist instead of an o-handshape on the left hand. There are no instances of this second variation among my language informants.

The proclitic is a word containing the o-classifier for container as its lexical theme. Its behavior is most comparable to the types of clitics found in Romance languages. For details on proclitics and enclitics in ASL see Kegl (in press b). It is a pronominal object clitic which, instead of being specified for gender, indicates some physical characteristic of the non-theme object by means of a classifier. This clitic also absorbs case. Objects receiving the role theme do not have corresponding clitics, but are frequently incorporated into the verb by a process of noun incorporation (Kegl (1985)).

For a near-exhaustive list of ASL classifiers and their properties see Supalla (in press).

This position allows for infinite recursion and thus we get M/L strings within M/L strings. There is no performance restriction on the number of embeddings.

Referential indices in ASL are overtly realized.

The tense here is unmarked. Tense in ASL is marked by an independent time adverbial. Only aspect is marked on the verb.

This sentence is grammatical if an implied NP is assumed. The reading would be "Sue put a small object into some kind of a container."
Bibliography


Argument Forms in Lexical Semantics  
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I. Introduction.  
The purpose of this paper is to show that many of the same kinds of argument forms found in other areas of theoretical linguistics can be applied to lexical semantics. When this is done systematically, a very different picture of the lexicon emerges -- one in which the lexicon turns out to be highly structured by semantic principles of a general nature. Those principles are not mere redundancy rules. Rather, they are very general cognitive or conceptual principles.  

Our chief source of evidence comes from polysemy -- cases where "one word" has a number of related senses. We will be looking chiefly at polysemous words whose most basic senses occur in easily-circumscribed semantic fields. Our purpose will be to show that there are principles relating one sense of a lexical item to other senses of the same item, and that the same principles relate senses of other lexical items in the same semantic field. Most of the argument forms discussed here have been used implicitly by modern semantic theorists like Fillmore, Talmy, Langacker and others. Our purpose is to make these argument forms explicit.  

Above all else, it is the search for general principles that makes theoretical linguistics a scientific enterprise. Methodologically, argument forms play a central role in this enterprise, since they provide tests for the adequacy of proposed general principles. In some cases argument forms provide us with justification for proposed analyses. In other cases, they show us that proposed analyses fail.  

The argument forms we will be discussing have been used widely in syntax and phonology. We will show that they apply to lexical semantics as well, and allow us to establish principles relating senses of polysemous lexical items. What follows from this finding, which we take as a major result, is that the lexicon is not just a repository of random, idiosyncratic information, structured only by principles characterizing lexical redundancies. Rather, the lexicon is structured by general semantic principles.  

We should point out in advance that the argument forms we are discussing are independent of particular linguistic theories. They apply cross-theoretically, and provide constraints on the adequacy of linguistic theories in general. For example, consider the common generalization made in phonology that in a certain environment voiced stops are neutralized and the corresponding voiceless stops appear. The methodology requires that a single general principle be stated. Analyses that state such a principle are supported by the argument. Analyses that fail to state such a principle are ruled inadequate. And any theory in which such generalizations cannot be stated for essential reasons is also ruled inadequate. Though the argument form cannot tell us exactly which theories are right, it provides an adequacy criterion for theories. Such argument forms tell us a great deal about the kinds of structuring that we should expect from an adequate theory of phonology.  

II. Major Argument Types.  
The major kinds of arguments found in phonology and syntax and replicated in our findings include the following: basic distribution arguments, anti-abstraction
arguments, complex interaction arguments, and naturalness arguments. We will
discuss each type first as it applies in phonology or syntax, and then demonstrate
its applicability to polysemy. First we will give some examples in which generali-
ization is a decisive criterion.

Consider the final devoicing of obstruents in German, in which word-final
/d/, /b/ etc. are pronounced [t], [p], etc. One can either describe this situation
with a list of correspondences (d-t, b-p, etc.), or one can state a general principle
that relates voiced and unvoiced obstruents. The basic generalization criterion
simply says that the general principle is to be chosen over a list of specific cases.

In semantics, one can find similar examples of general principles. One such
element involves the class of English prepositions which code a path. These words
can also code the endpoint of that path, as shown in examples 1 - 5:

1. a. Sam walked over the hill.
   b. Sam lives over the hill.
2. a. Harry walked through that doorway.
   b. The office is through that doorway.
3. a. Louise ran around the corner.
   b. Louise hid around the corner.
4. a. The truck sped past the post office.
   b. The truck is parked past the post office.
5. a. The helicopter flew across the bay.
   b. The helicopter landed across the bay.

Each of these sentence pairs exemplifies a single relationship between two senses of
a preposition: in the (a) sentence of each pair, the preposition expresses the shape
of a path relative to a reference location, and collocates with a motion verb. In
the (b) member, the preposition expresses a stative location which is understood to
be the endpoint of a path of the same shape as that coded by the motion sense of
the preposition. The systematicity of the relationships between senses of these
prepositions justifies the hypothesis of a single principle, which we call an image-
schema transformation, relating path-focus to end-of-path focus.

It is important to notice that there are some plausible but nonoccurrent
cases, where this principle does not hold. One of these is given in 6:

6. a. Sam walked by the post office.
   b. *Sam lives by the post office. (by = ‘near’; ≠ end of path)

However, the existence of nonoccurrent cases does not invalidate the general prin-
ciple. Exceptions to linguistic generalizations have long been noted in both pho-
nology and syntax (cf. Lakoff 1970). While exceptionality must be described, and
should be explained if possible, it does not affect the argument for the existence of
a principle that covers the majority of cases. In this case, the nonexistence of an
end-of-path reading for by suggests that only prepositions which code the shape of
the path relative to the shape of the reference object are available for end-of-path
readings. Here the existence of a putative exception provides the motivation for
characterizing the generalization more precisely.

There are many other cases where relationships among the senses of lexical
items can be accounted for by general image-schema transformations. First, there
is a systematic relationship between sequences of points (SEQ) and lines (LINE),
which covers cases like the following:
7.a. There are guards posted along the road. (SEQ)
   b. There is a fence along the road. (LINE)
8.a. He coughed throughout the concert. (SEQ)
   b. He slept throughout the concert. (LINE)
9.a. There were stains down his tie. (SEQ)
   b. There were stripes down his tie. (LINE)

There is also a systematic relationship of lines (LINE) to moving points (MP):

10.a. Sam ran through the forest. (MP)
    b. There is a road through the forest. (LINE)
11.a. Sam walked across the street. (MP)
    b. There was a rope stretched across the street. (LINE)
12.a. Sam went to the top of the mountain. (MP)
    b. The road went to the top of the mountain. (LINE)

In positing general image-schema transformations relating (1) lines and sequences of points and (2) lines and moving points, we are providing the general principles that relate the senses of the italicized words in these examples.

A. General Distribution Arguments.

Distribution arguments concern the existence of systematic structural correspondences. In syntax, the structural correspondences are taken as holding among grammatical constructions. These argument forms were originally developed within transformational grammar and used as constraints on the statement of general grammatical principles within that theory. Though new theories of grammar regularly appear, they are constrained by the same argument forms. Thus, for example, the same argument form used to justify the passive transformation in transformational grammar applies equally well to justify the corresponding redundancy rule in Lexical-Functional Grammar or the corresponding metarule in GPSC. The distribution argument in this case demonstrates the need for a general principle of structural correspondence, though it says nothing about the theory in which the general principle is to be stated.

In the case of the relation between active and passive constructions, the correspondences are the following:

The object of the active corresponds to the subject of the passive; the subject of the active corresponds to the object of the passive by-phrase.

The argument form can be sketched as follows: Certain distributional properties of active sentences are preserved under the postulated correspondences, in particular, selectional and subcategorization restrictions. Without the postulated correspondences, those distributional properties would have to be described twice (once for active sentences and once for passives) and a set of distributional generalizations would be missed.

The proposed correspondence thus constitutes a general principle, in that it permits the distributional properties of passives to be seen as systematic consequences of the distributional properties of actives. Examples are selectional restrictions and certain lexical idiosyncrasies. For example, idiosyncratic direct objects in certain active idioms have counterparts as passive subjects, as in *The hachet was buried, My day was made, The tide was turned*, etc.

This argument form as it is used in syntax does not demand a perfect correspondence between actives and passives. It permits individual lexical
exceptions (like have, which has no passive, and rumored, which has no active),
exceptional classes (cost, weigh, etc.), and idioms that do not fit the pattern (kick
the bucket, give me a pain in the neck, etc.). It tolerates other imperfect fits on the
grounds that they can be accounted for by other principles. Thus, the two passives
of keep tabs on NP is assumed to be attributed to the possibility of analyzing the
active in two different ways. The lack of reflexive passives is taken as following
from general crossover principles. And the unacceptability of certain pronominal
passives (e.g., *Bill was hit by you) is seen as having a general explanation in terms
of conversational principles. None of these imperfect fits warrants giving up on
the general principle relating active and passive constructions. The argument
form tolerates imperfect fits of all these kinds.

Most importantly, the distribution argument makes use of the hypothesis
that the correspondences are asymmetric. It is argued that if the correspondence
is asymmetric, so that the distribution in the passive is dependent on that in the
active, then one can explain the absence of intransitive passives such as *John
was slept on the grounds that there is a partial correspondence between active and
passive -- that is, not all passives will have corresponding actives. Given the
hypothesis that subjects of passives correspond to direct objects of actives it fol-
low that, if the active is intransitive, there is no corresponding passive.

There are distribution arguments embedded in our description of image-
schema transformations. For 1 - 5, for example, we noted that prepositions such
as over and across can cooccur with either verbs of motion or verbs of state.
When they cooccur with verbs of state, they have an end-of-path sense. To
account for this distributional regularity, we hypothesized an image-schema
transformation that related path focus to end-of-path focus.

A set of distributional facts of a different kind can be used to justify the post-
tulation of metaphorical mappings. Let us consider perhaps the simplest case of
such a mapping, the MORE IS UP metaphor. This is a mapping from the domain of
verticality to the domain of quantity, and it has two simple correspondences:

UP corresponds to MORE; DOWN corresponds to LESS

Within the semantic field of verticality there are a considerable number of lexical
expressions besides up and down. There are rise and fall, peak and low point, soar
and plummet, and many more. Within the semantic field of verticality, these
words are related to one another in a systematic way: rise refers to motion
upwards, while fall refers to motion downwards; peak is the highest point on an
object; plummeting is rapid falling, and suggests the strong possibility of some-
ting injurious happening.

The postulation of a single general mapping from verticality to quantity
predicts that all these distributional relationships will be preserved. The argument
form justifies the postulation of a general mapping by arguing that the distribu-
tions are, indeed, preserved. In a distribution argument, one would point to cer-
tain facts:

"Prices are rising" means that prices are going "up" not "down".
"Prices reached their peak" means that prices are at their "highest point".
"Prices plummeted" means that prices "fell" rapidly, and suggests that
something injurious may happen.

A great many such examples could be given. Correspondingly, inferential relations
from the verticality domain are mapped onto the quantity domain. Thus, if prices
rose, they are higher than they were before. If prices are at their peak, they have never been higher. In each such case, a distributional relationship in the semantic field of verticality is preserved under the mapping to the domain of quantity. In order to explain such regularities, one must postulate a general mapping that transcends particular lexical items: this is what we have called a metaphor. It must be a single general mapping at the conceptual level relating spatial concepts to concepts of quantity. The preservation of distributional relationships among particular words follows from the mapping principle. The polysemy of rise, fall, plummet, etc. is thus systematic, and the result of a single general principle.

B. Anti-Abstraction Arguments.

So far, we have considered two very different kinds of general principles: correspondence principles and abstraction principles. Metaphorical mappings are correspondence principles, as are syntactic transformations (or redundancy rules, metarules, etc.). They attempt to account for regularities via systematic correspondences between two structures. Abstraction principles, on the other hand, attempt to account for regularities by claiming that there is something in common among two or more structures.

All distinctive feature analyses embody abstraction principles. For example, phonetic distinctive features embody the claim that there is something in common among the vowels /i/, /e/ and /æ/, and that phonological rules can refer to what is in common among them. Another kind of abstraction principle is the positing of a single syntactic structure, rather than two or more such structures, to account for a class of examples.

Anti-abstraction arguments show that a proposed abstraction principle cannot be correct. Such arguments can be made on one of three grounds: (a) Significant data cannot be explained if the abstraction principle is adopted. (b) The proposed principle rules out the possibility of stating other valid generalizations. (c) The proposed principle cannot be stated sensibly.

Anti-abstraction arguments are common in syntax. Many of them are demonstrations that constructions that superficially look alike are not really the same. For example, sentences 13 and 14 appear to have the same basic clause structure, and based on these sentences alone, one would be tempted to claim that the WH-clause in the complement of the verb is an example of the "same construction" in both cases.

13. I don't know what John eats.

However, attention to a slightly more complicated range of environments reveals that, while there are striking similarities in both the form and the function of these complements, they are by no means identical:

15. *I don't know whatever John eats.
16. I don't eat whatever John eats.
17. I don't know what else John eats.
18. *I don't eat what else John eats.
19. I don't know what the hell John eats.
20. *I don't eat what the hell John eats.

The insertion into the complement clauses of various types of elements shows that the two clauses are quite different. Based in part on the distributional differences shown above, the first has been identified as an embedded question, and the second
a free relative clause. The suffix -ever appears with the WH element of a free relative clause, and the element else and expletives like the hell appear after the WH element in embedded questions. This same distinction is exhibited across the set of WH expressions, with the exception of how, which does not appear (at least in formal registers) introducing free relatives, as shown in 21 - 22:

21. I don't know how John eats.
22. #I don't eat how John eats.

Thus we can see that to claim that the two WH complements in 13 and 14 are instances of a single construction would render it impossible to capture, in any principled way, the differences in distribution either of the WH phrases themselves or of the inserted elements noted above. Positing only one structure would make incorrect predictions about English. And recognizing the distinction between embedded questions and free relatives does not preclude the statement of other generalizations that do adequately explain why they look alike in many ways.

Anti-abstraction arguments are also used in semantics. There they serve to justify polysemy analyses over proposed analyses where a single "abstract" general sense is proposed. Such an argument is made in Brugman's (1984) analysis of the hedge very as being polysemous, rather than having a single abstract meaning. The hedge (not the degree adverb) very has, among other senses, one which "picks out" a unique endpoint on a scale, either lexically or pragmatically constructed:

23. He begins his vituperations on the very {first / *second} page.
24. The photographers were standing on the very {edge / *side} of the basketball court.
25. The very {thought / ??nomination / *election} of Rambo as President strikes terror into the heart of any thinking American.

There is another sense of very which "picks out" a previously-determined and unique member of a set of possible referents:

26. She's wearing the very dress I tried on last week.
27. He caught her at the very moment she was stuffing the shoes into her purse.

These two senses are very similar semantically, and one might claim that the hedge very is not polysemous at all, but is used simply to pick out some unique, previously-established referent from a set of possible referents. However, such a claim would make two incorrect predictions: first, it would predict that the starred versions of 23 - 25 would be grammatical, since an abstraction analysis could not make reference to an end of scale. Second, because it would not distinguish the two senses of very, it could not predict that an entailment relation holds between sentences 25 and 28, while no such relationship exists between 26 and 29:

28. The nomination or election of Rambo as President should (also)
   strike terror into the heart of any thinking American.
29. She's wearing every dress.

Sentence 25 entails 28 exactly because there is an end-of-scale reading for the expression containing very. (This was called the "implicational scale" use of very in Brugman 1984.) Because the expression containing very in 26 does not pick out an end of scale, 26 does not entail 29.

In addition to the incorrect predictions made, an abstractionist account of very would make two types of generalizations impossible to state: The first of
these is that the implicational-scale reading exemplified in 25 is really the result of a very general pragmatic principle, and is available for a large class of morphemes which express an end of scale (such as the superlative inflection; see Fauconnier 1975 for other examples). The second is that the nonscalar sense of very requires either a deictic expression of a particular type or a particular type of relative clause modifying the same noun on which very operates. Again, recognizing the distinctions between these two does not preclude our capturing the similarities between the two senses: in fact, the claim that very is an instance of polysemy, rather than homonym, amounts to the claim that there is a higher-level generalization to be found.

Another class of anti-abstraction arguments is used in semantics to justify the postulation of metaphorical mappings, rather than a potential abstractionist analysis. One general objection that is commonly made against semantic analyses using metaphorical mappings is that the data can always be accounted for by abstractionist analyses. For example, it might be argued that the word rise is not polysemous between its verticality use in The balloon rose and its quantity reading in Prices rose. Rather, it has the same abstract meaning in both. Lakoff and Johnson (1980) contains a collection of anti-abstractionist arguments in defense of metaphorical analyses, some of which we sketch briefly here.

One argument against an abstraction analysis is that it cannot be stated adequately or sensibly. The abstractionist position is that there is no MORE IS UP metaphor; rather there is something abstract in common between VERTICALITY and QUANTITY. The response is that there is no sensible concept that is natural between VERTICALITY and QUANTITY and covers both.

This argument is given more force when combined with other abstractionist positions on VERTICALITY metaphors. The persistent abstractionist would be forced to argue in addition that other proposed metaphors like HAPPY IS UP, VIRTUE IS UP, CONTROL IS UP, REASON IS UP, NORTH IS UP, etc. do not exist and that in each case there is something in common between UP and HAPPINESS, VIRTUE, CONTROL, REASON, and NORTH, as well as MORE. In other words, for the entire collection of cases in which we have postulated a metaphorical mapping from verticality, the abstractionist position would require a single concept which would subsume all the domains onto which verticality maps. Clearly, there can be no such concept.

In other areas, an abstractionist analysis makes false predictions. Where the metaphorical analysis proposes a partial mapping from a structure in one domain to a structure in another, the abstractionist analysis claims that there are not two structures but one neutral structure. This fails in all cases where there is only a partial metaphorical mapping. Take, for example, the IDEAS ARE FOOD metaphor. There are raw facts and half-baked ideas, but no sauteed, broiled or poached ideas. The domain of ideas and food are separate domains with distinct structures, not a single domain with a common structure. If such distinct structures are recognized, the nonoccurring or exceptional cases can be noted; but if no distinction is made, there can be no basis on which to note such exceptions.


There are many cases in syntax where simple general principles interact in complex ways. The basic idea behind generative grammar was to account for such interactions. Every argument for complex interaction relies on the establishment and exploitation of previously existing, independently motivated principles to
account for complex cases with no additional machinery except for the principle of combination or composition. One consequence of complex interactions is the positing of "intermediate structures": structures or partial structures in which some but not all of the relevant principles apply. Sometimes such intermediate structures correspond to actual structures in the language; sometimes they do not.

Complex interaction arguments are also widespread in phonology. Consider the constraint in English to the effect that a vowel preceding a voiced stop will be considerably longer than the same vowel preceding the corresponding voiceless stop; thus beat is phonetically [bet], while bead is phonetically [bi:d]. Another fact about American English, usually stated as a phonological rule rather than a phonetic constraint, is that the voicing feature of the alveolar stops is neutralized when that consonant occurs between a stressed vowel and an unstressed vowel. However, the pronunciation of such pairs as writer and rider is still differentiated in some dialects by the maintenance of the vowel length distinction associated with voicing of the following consonant: thus the first is [raiDr] and the second [rai:Dr]. Here the effect of both correspondences is seen, even though for some such dialects no intermediate cases (that is, [raitr] and [rai:dr]) occur. The recognition of each principle, independently motivated from other environments, allows for the description of this complex case with no additional machinery.

Examples from syntax abound. Sentences like 30 exhibit a complex of syntactic properties:

30. He is believed to have stolen a lot of money.

This sentence exhibits properties both of the passive construction and a control phenomenon which used to be called "raising". But there is no need to take this sentence type as a justification for a "passive-raising" construction: that is, we do not need an additional principle relating this sentence to a corresponding active sentence, or to a corresponding "unraised" sentence. The already-hypothesized principles which relate passive sentences and raising sentences separately to their active and unraised counterparts can combine to explain the distribution of properties in sentences like 30. Besides the existence of other simple passive and simple raising sentences, we can observe that there is a simple passive and a simple raising version of 30:

31. That he has stolen a lot of money is widely believed.
32. We believe him to have stolen a lot of money.

On a nongenerative model, either 31 or 32 is a sentence which can be taken as corresponding to an intermediate structure for 30. However, there are other sentences which bear systematic structural resemblances to 30, but for which one of the intermediate structures is not available:

33. He was said to have stolen a lot of money.
34. That he has stolen a lot of money is said by his closest confidants.
35. *His closest confidants say him to have stolen a lot of money.

This is a case in which one possible intermediate structure does not correspond to a grammatical sentence. However, this exception is merely an idiosyncrasy of say, which cannot appear in active form with all complement types. Note that we must still state the correspondences between active and unraised sentence types and between passive and/or raised sentence types even in cases like this, because of the perceived relationship between 33 and both 34 and 36:
36. His closest confidants say that he has stolen a lot of money.

Since the badness of 35 is reduced to an exceptionality on say, the exceptionality of the example does no damage to the argument for the interaction of independent principles, which is justified by the majority of cases in which the interaction is fully general.

Complex interaction arguments are extremely prevalent in polysemy analyses. If there are two principles relating one sense of a word to another, it may be that both principles will relate one sense to still a third sense. For examples, there is a path sense of over in 1a. We have seen that the principle relating path senses to end-of-path senses accounts for the sense of over in 1b. There is another principle, which we call a metaphor, relating a GOAL-ORIENTED ACTIVITY to MOTION ALONG A PATH TO A DESTINATION. Part of this metaphor is that DIFFICULTIES correspond to PHYSICAL IMPEDIMENTS. It is hypothesized to account for such examples as It's an uphill battle, We have smooth sailing from now on, There's nothing in the way of our achieving our goal, We're stuck, That's become a stumbling block, etc. This metaphor links the endpoint sense of over to the over of:

37. He's finally over the most difficult part of the job.

Since the metaphor imposes a spatial structure on an abstract domain, it is not surprising to find that the same image-schema transformation which relates path-focus to end-of-path focus for spatial uses of prepositions can also apply to metaphorical uses. Thus, we have three senses of over that are linked to one another by two general principles.

The situation with through is largely parallel to that of over. There is a path sense in (38), and an end-of-path sense in (39):

38. He hiked through the jungle. 39. He is finally through the darkest part of the jungle.

There is also a sense based on the GOAL-ORIENTED ACTIVITY metaphor:

40. He is finally through the most difficult part of the job.

But, interestingly enough, there is a lexical difference between through and over. Within the GOAL-ORIENTED ACTIVITY metaphor, through can be used to focus on the path, while over may not.

41. He is going through the most difficult part of the job.
42. *He is going over the most difficult part of the job.

In 42, going over may mean "looking over" but not "performing". Over exhibits a lexical gap where through does not. This is akin to the kind of lexical gap we found with say in our discussion of raising and passive above. As in the syntactic case, the existence of such a gap in no way impugns the general principles, though it must be stated.

Extremely long chains of this sort have been described by Brugman (1981). We have already discussed the senses of over exemplified in the following sentences:

43. He walked over the hill.
44. He lives over the hill.
45. He's finally over the most difficult part of the job.

We characterize these as a motion schema with contact, a stative end-of-path schema, and a metaphorical projection of the end-of-path schema, respectively.
Some other senses of *over* include the following:

46. I threw the ball over the fence.
47. The jet plane flew high overhead.
48. We hung the canopy over the bed.
49. We spread the cloth over the table.

These link up to the previously-mentioned schemata in the following ways: 46 exemplifies a motion schema, like 43, except that the figure is not in contact with the ground. 47 is another motion schema, but here the path is unspecified for shape rather than being curved. In 48 we have another stative schema, but unlike in 44, this schema is a stative "above" configuration rather than an end-of-path focus. 49 differs from 48 in that it codes contact between figure and ground.

The *MORE IS UP* metaphorical mapping applies to the stative "above" sense of 48, yielding a quantity sense of *over*:

50. Our sales were over $20 million last year.

There are many more senses of *over* in the spatial and various metaphorical domains, but we will not review them here. Here we want only to show that each of the senses mentioned is linked, by image-schema transformation, abstraction, or metaphorical mapping, to the sense adjacent to it. By a series of such linking relations, each of them simple and independently motivated, we can arrive at a structure of senses which characterizes the complexity of the overall polysemy of this lexical item.

Such polysemy chains are hypothesized to account for synchronic connections in the semantic knowledge of the user. The arguments for these chains are basically of the same kind as the arguments for relationships among grammatical constructions. These chains exist statically to structure semantic information in the lexicon. We are not proposing them as parts of "semantic derivations", nor are we proposing them as recapitulations of historical change, any more than a syntactician who proposes a transformation (or lexical redundancy rule or metarule) is proposing either a mechanical manipulation of a "deep structure" or a recapitulation of historical development.

Image-schema transformations and metaphorical mappings share one thing with redundancy rules: they all characterize the structure of the lexicon. And the argument forms we have just given allow us to demonstrate that lexical structure is far more intricate than is commonly assumed.

D. Naturalness Arguments.

It is common in phonology to argue that proposed phonological rules are phonetically natural. Examples are cases like nasal assimilation and voicing assimilation, which are taken as being motivated by the nature of the speech apparatus. Nasal assimilation and voicing assimilation do not occur in every language. But when they do occur, it seems to be a natural kind of thing to happen, given phonetic constraints.

Naturalness arguments can also be found in semantics. Image-schema transformations are claimed to be natural given certain constraints on perception, motor activity, and visual processing. For example, when we walk to a place, we commonly focus on the endpoint of our intended path. Similarly, when we see something else moving, we commonly judge what the endpoint of its path will be. The relation between a path and its endpoint is not merely a principle that
structures the English lexicon. It is a general cognitive relationship having to do with our perceptual capacities. Similarly, the relationship between a moving point and the line it traces is an object that we have the ability to calculate when we see something in motion (Langacker (this volume) calls this "summary scanning"). The MP-LINE transformation is based on this capacity, and that makes polysemy based on that transformation natural. To our knowledge, all image-schema transformations that there is lexical evidence for are natural in this way, though they may not be reflected in every language.

There are also naturalness arguments for metaphors. Because a metaphor is a highly-structured set of correspondences between a concrete domain and an abstract domain, many subgeneralizations must be explained for each metaphor. For example, we must explain why a given source domain (for instance, VERTICALITY) is paired with a particular target domain (e.g., QUANTITY), and why, within that mapping, a given correspondence (such as MORE with UP, but not DOWN) occurs. Similarly, we want to characterize why purposeful activity should be understood and described in terms of motion toward a destination, and why the mapping should be made from PURPOSE to DESTINATION rather than to EMBARRASMENT.

These concerns are answered in terms of regular correspondences in constant everyday experience. When you pile on MORE objects, the level of the pile goes UP. If you want to accomplish a PURPOSE, you often have to go to a particular DESTINATION to accomplish it. In other words, a metaphorical mapping often constitutes a distillation of commonly cooccurring events or states. There are an enormous number of these regular correspondences in our experience, providing a natural motivation for the mappings which structure our lexicon. Each argument for the experiential determination of such a structure constitutes a naturalness argument in semantics.

III. Further Argument Forms.
We have briefly exemplified only some of the argument forms used in contemporary semantic research. What such argument forms have in common is the assumption that finding generalizations is a chief goal in science. While we recognize that generalization in one area of a theory often creates complexities or precludes generalization in another area, we nevertheless work to maximize the statement of general principles.

Some scholars have argued explicitly against the goal of finding generalizations in linguistic research. One particularly important class of arguments against the goal of generality often arises. It is based on the grounds that people have large memories, larger in fact than they can use. The argument goes that people have such large memories that they don't need to use the generalizations found by analysts. Maybe people actually work with much less general principles, or even with completely unstructured lists.

This argument has been made against general rules of the sort argued for in generative phonology. The same argument has been made against the existence of principles that relate syntactic constructions to one another. The alternative is that we just have a big list of constructions that we use, without there being any psychologically real principles relating them to one another.
Within most contemporary syntax and phonology, such anti-generalization arguments have not been taken seriously. The one area where such anti-generalization arguments have not only been taken seriously, but have been widely assumed to be correct, is in lexical semantics. There, the argument goes, we have large memories and know lots of words. Why not assume the lexicon is just a list (perhaps with a characterization of redundancies), and that all the generalizations we have argued for are just the concoctions of analysts without any cognitive reality? The mood of the times seems to be:

Reject anti-generalization arguments for syntax and phonology and accept them for the lexicon.

Such a position is inconsistent both with assumptions made about other areas in linguistics and with assumptions about science in general. While we would not argue against the characterization of the semantic lexicon as the repository of "random" information, that randomness is not different in nature from such "random" facts as the consonantal inventory of a language, or the basic word order of a language, or whether a word synonymous with possible allows for "raising" in a given language. Pro-generalization arguments can be given for lexical semantics – at least for a certain range of phenomena.

Moreover, an anti-generalization position has no more force in the area of semantics than it has in the area of syntax. For instance, the claim in favor of an active-passive relationship is made in order to capture generalizations about cooccurrence restrictions for both forms of verbs. But if there is no value to the generalization argument for semantics, there is no reason to apply it in syntactic explanation. From an anti-generalization viewpoint, a grammar would be nothing more than an unstructured list of constructions. Linguists have rightly rejected such a view for syntax and the same considerations should lead us to reject this view for semantics.

There are also arguments against the anti-generalization position which are particular to semantics. The first of these is that the existence of a large memory does not explain the existence of polysemy at all. In fact, if anything, it would favor rampant monosemy rather than polysemy, since it should be equally easy to remember words with single senses, and continually add new lexical items, each with only one sense. The evidence suggests, rather, that it is easier to learn and use new motivated senses for old lexical items than completely new lexical items.

Another response to the anti-generalization position is that the kind of polysemy that we have described above needs to be explained. It cannot be explained on historical grounds by recourse to item-by-item innovations, as Sweetser (1984) has conclusively demonstrated. She observes that certain general metaphorical principles must have been present in the minds of speakers of various Indo-European languages before certain item-by-item metaphorical extensions could have taken place.

A third response is that such a view cannot account for the production and comprehension of a wide class of novel or at least nonconventional utterances. Take Searle's well-known case: Sally is a block of ice. Such a sentence is understood in terms of a general metaphorical mapping that is part of our conceptual system and that structures our conventional lexicon. According to that mapping, AFFECTIONATENESS corresponds to WARMTH and LACK OF AFFECTIONATENESS corresponds to COLDNESS. This general principle accounts for conventional utterances like She's a warm person, He's been cold to me, She's cooled toward me, etc.
It is the mapping principle that explains why we understand * Sally is a block of ice* to mean that Sally is unaffectionate.

The fourth response is that an anti-generalization view cannot account for the way we reason using such novel sentences. We infer from *Sally is a block of ice* that Sally would not be pleasant to be romantically involved with (given our normal cultural assumptions about romance). This inference can be explained given the general AFFECTIONATENESS IS WARMTH metaphor. Much poetic or rhetorical language depends for its comprehensibility on the exploitation, in a novel way, of such existing principles. This argument from novel utterances is analogous to one given in syntax, that the structure of any novel utterance is an instantiation of general syntactic principles, that justifies the proposal of principles of syntactic combination.

In summary, even if we did not begin by assuming that seeking lexical generalization is a worthwhile endeavor, we would be led to such a conclusion by considerations like these.

IV. Conclusion.

What we hope to have shown is the following:

The argument forms used in lexical semantic research are the same as the argument forms used in syntax and phonology.

To the extent that those argument forms are justified in syntax and phonology, they are also justified in lexical semantics.

There is additional motivation for believing that such argument forms are being correctly applied. That motivation concerns the existence of polysemy of the sort that exists, as well as our ability to construct, understand, and reason with novel utterances.

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References


Abstract Motion
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A well-known fact of language change is that verbs meaning 'go' often evolve into markers of future tense. The French construction illustrated in (1) and its English translation are among the numerous examples that could be cited (cf. Givón 1973).

(1) Il va finir bientôt. 'He is going to finish soon.'

This semantic shift is commonly attributed to spatial metaphor, wherein the meaning 'motion away from the speaker' is transferred from the spatial to the temporal domain. While accepting the basic validity of this analysis, I would nevertheless argue that as it stands it is insufficiently precise. For example, who should we take to be the mover, the speaker or the subject? In what sense is it meaningful to speak of 'motion through time'? My objective is to answer these questions, and to show how the shift from 'go' to 'future' is related to a variety of other phenomena. I will argue that the shift receives a natural and explicit characterization granted a number of independently motivated concepts and analyses available within the framework of cognitive grammar.1

Basic Concepts and Assumptions

My initial assumption is that meaning is properly equated with conceptualization, in a suitably broad sense of the term. Moreover, conceptualization can be analyzed at either of two levels: the phenomenological level (i.e. that of mental experience), and the level of cognitive events (i.e. neurological activity). I assume, in other words, that having a particular mental experience resides in the occurrence of some pattern of neural activation. Conceptualist semantics has thus far concerned itself primarily with the phenomenological level, as a matter of necessity. Still, the structures at this level must eventually be explicated with reference to neurological events. Though we can hardly hope to pin things down to the firing of specific neurons, we might at least hope to determine the functional architecture of those events whose occurrence could conceivably constitute a given experience.

In this spirit, I make the further (and I think quite plausible) assumption that any conception involving ordering or directionality at the experiential level implies some type of seriality at the processing level; an ordered conception necessarily incorporates the sequenced occurrence of cognitive events as one facet of its neurological implementation, and this sequencing is taken as being constitutive of the conceptual ordering. As an obvious and convenient example of an ordered conception, consider our ability to mentally recite the alphabet. The mental recitation of any individual letter must reside in the occurrence of some pattern of neural activation, which we can treat
as a single cognitive event (despite its internal complexity). It is apparent, moreover, that our knowledge of the alphabet as an ordered structure reduces to our ability to recite the letters in proper sequence. Clearly, in performing this mental exercise of running through the sequence \(a > b > c > ... > x > y > z\), we activate in serial fashion those cognitive events that constitute the recitation of the individual letters.

To avoid confusion, we must distinguish between the conception of time on the one hand, and the fact that conception takes place through time on the other hand. I will therefore speak of **conceived time** (symbolized \(t\)) and **processing time** (symbolized \(T\)), pertaining to the phenomenological and the event levels, respectively. Conceived time is time as an object of conceptualization; I conceive of time when I consult my watch, when I use a word like **before**, or even when I see something happen (e.g. an object falling to the ground). By contrast, processing time is time as a medium of conceptualization: every cognitive event requires some span of processing time for its occurrence (however brief it might be), including events that constitute the atemporal conception of static situations. Despite their obvious relationship, these two sorts of time are functionally distinct and must be separated for analytical purposes.

We shall also need a convenient way of referring to the relationship between a conceptualizer and the conceptualization he entertains at a given moment. I will call this the **construal relation**, and adopt for it the notation in (2), where \(C\) stands for the conceptualizer, and \(Q\) for his immediate mental experience:

\[
(2) \quad \begin{bmatrix} \[Q\] \\
\[C\]T_1 \end{bmatrix}
\]

Formula (2) simply indicates that conceptualizer \(C\) carries out conceptualization \(Q\) at moment \(T_1\) of processing time. Using this notation, we can now offer at least a partial representation of what happens when somebody mentally recites the alphabet:

\[
(3) \quad \begin{bmatrix} a \end{bmatrix} \quad \begin{bmatrix} b \end{bmatrix} \quad \begin{bmatrix} c \end{bmatrix} \quad ... \quad \begin{bmatrix} x \end{bmatrix} \quad \begin{bmatrix} y \end{bmatrix} \quad \begin{bmatrix} z \end{bmatrix} \quad \begin{bmatrix} C \end{bmatrix}T_1 \quad \begin{bmatrix} C \end{bmatrix}T_2 \quad \begin{bmatrix} C \end{bmatrix}T_3 \quad \begin{bmatrix} C \end{bmatrix}T_4 \quad \begin{bmatrix} C \end{bmatrix}T_5 \quad \begin{bmatrix} C \end{bmatrix}T_6
\]

The import of (3) is that \(C\) first activates the conception of \(a\), then that of \(b\), and so on; \(C\)'s recitation of the alphabet occupies span \([T_1, T_2, T_3, ..., T_6]\) of processing time. Observe that conceived time has no intrinsic role in this mental exercise; at any one moment, \(C\)'s conception is merely that of some letter of the alphabet. Though \(C\) may be aware of the passage of time, and may even pay heed to his own participation in a temporally-extended activity, neither sort of awareness inheres to the recitation task per se.

Despite its subtlety, this matter of self-awareness is rich with implications for both semantic and grammatical structure (cf.
Langacker 1985), and since it is central to our later concerns, we must find a way of dealing with it. It is helpful to start from the ideal (and possibly non-existent) situation in which the conceptualizer manifests a total lack of self-awareness: C is completely absorbed in the conception of Q, to the extent that he loses all awareness of himself, and even of the fact that he is engaging in the conceptualization process (i.e., what C conceptualizes is simply Q, and not at all C conceptualizing Q). With respect to this idealized situation, I will say that the role of C is fully subjective, whereas that of Q is objective. Full subjectivity and objectivity thus stand in polar opposition, being defined for instances involving maximal asymmetry between the roles of conceptualizer and object of conceptualization. In practice, of course, the roles are commonly mixed, as the conceptualizer himself is often an object of conceptualization. To the extent that C creeps into the conceptualization, the subjectivity of his role declines; when C indulges his notorious egocentricity, and makes himself the focus of attention within Q, the basis for the subjective/objective distinction is eroded entirely.

The alphabet once more provides convenient illustration. Formula (3) represents the situation where C is totally absorbed in mentally reciting the alphabet and loses all self-awareness; the letters of the alphabet are thus fully objective entities (as I am using that term here), while C's role is maximally subjective. Suppose, on the other hand, that C not only mentally recites the alphabet, but also consciously monitors his facility and accuracy in doing so—in this case, C conceptualizes not only the alphabet (letter by letter), but also C conceptualizing the alphabet. There are consequently two levels of conceptualization:

\[
\begin{align*}
\left[ \begin{array}{c}
[a] \\
[C]_1 \\
[C']_1 \\
\end{array} \right] & > \left[ \begin{array}{c}
[b] \\
[C]_2 \\
[C']_2 \\
\end{array} \right] & > \left[ \begin{array}{c}
[c] \\
[C]_3 \\
[C']_3 \\
\end{array} \right] & > \ldots & > \left[ \begin{array}{c}
[z] \\
[C]_{26} \\
[C']_{26} \\
\end{array} \right] \\
\end{align*}
\]

Since all of (3) now functions as an object of conceptualization, it is embedded as such in a higher-order construal relation. Note that there are two conceptualizer roles, one for each level of organization: the conceptualizer's role in mentally reciting the alphabet (indicated by C'), and his role in the self-monitoring of this process (indicated by C').

Because C is the object of self-observation in (4), this role is no longer a subjective one. Moreover, the processing time required for C to run through the alphabet qualifies as conceived time from the perspective of C', and is thus represented \([t_1, t_2, t_3, \ldots, t_{26}]\). Role C', by contrast, is purely subjective (provided that the conceptualizer does not add yet another layer of conceptualization by thinking about the fact that he is monitoring his recitation). Formula (4) can also be applied to the situation where C and C' are different individuals, which would be the case if C' were to imagine somebody else reciting the alphabet. The
status of C in this situation depends on whose viewpoint is considered: from the standpoint of C', C is fully objective; from his own vantage point, however, C is simply running through the alphabet (without self-awareness), and is therefore subjectively construed.

The Characterization of Verbs

I believe that fundamental grammatical classes, including nouns and verbs, are subject to semantic characterization. Having argued the matter elsewhere at considerable length (cf. Langacker in press, to appear), I will limit myself here to sketching the proposed characterization of verbs. This description will allow the analyses that follow to be reasonably precise and explicit.

A crucial aspect of semantic structure is the phenomenon I refer to as profiling, which contributes to the meaning of every linguistic expression. The basis for an expression’s meaning is a cognitive domain (roughly equivalent to what Fillmore (1982) calls a frame, and Lakoff (to appear) an idealized cognitive model); any kind of conceptualization is capable of being invoked to serve in this capacity. An expression’s profile is some facet of its domain that is singled out and accorded a special type of prominence. Intuitively, the profile defines the focus of attention within the domain; it can also be described as that substructure which the expression designates. To take a favorite example, the expression hypotenuse invokes the conception of a right triangle as its domain, and profiles the side of this triangle which lies opposite the right angle. The domain for orphan is the conception of a parent-child relationship in which both parents have died; the profiled entity is the child.

The expressions that concern us do not profile things, but rather relations. The simplest kind of relational expression profiles a single consistent configuration in some domain. We can refer to such a configuration as a state; a relation consisting of only one state is a stative relation. An example of a stative relation is the preposition near, which profiles a relationship of proximity between two entities in space or some other domain. Another example is the adverb fast: its domain is the notion that processes vary in terms of their rate, and the profiled relationship is one in which a process exceeds the norm in this regard. A relation is complex when it cannot be reduced to a single consistent configuration, i.e. when it can only be represented as a sequence of states. An example of a complex relation is the preposition over in a sentence like (5):

(5) The dusty traveler trudged wearily over the bridge.

This use of over locates a mover with respect to an extended path. It implies that the mover occupies all the points along this path, but since the mover is small by comparison and cannot occupy all these points at once, the locative relationship cannot be reduced to a single configuration. Instead, the mover is construed as
occupying the points along the path successively with the passage of time—hence the profiled relation involves not just one state, but a continuous series of states, no two of which are precisely identical.

If one believes, as I do, that a notional characterization is possible for the class of verbs—i.e. that there is some semantic commonality manifested by all verbs but nothing other than verbs—then the existence of prepositions that profile complex relations is seemingly problematic. Since most verbs describe some kind of change, it is natural to propose that the property identifying a verb as such is that it profiles a series of states extending through conceived time. But why, then, is over not a verb when used with the meaning it has in (5)? What is it that semantically distinguishes the verb cross from the preposition across in sentences like (6)?

(6)(a) A black dog crossed the field.
(b) A black dog walked across the field.

Examples like these suggest that the difference perhaps does not lie in the conceptual content of the expressions, but rather in how this content is accessed.

My working hypothesis is that the difference between verbs and other complex relations is attributable to certain mental abilities that are both independently established and introspectively apparent. Suppose that somebody throws a ball, and that I watch it sail through the air. The flight of the ball represents a complex relation, as defined above: with the passage of time the ball occupies a series of distinct locations constituting a spatial path; the relationship of the ball to its surroundings does not reduce to a single consistent configuration (state). Now in observing this event, I may simply follow the ball’s flight from its starting-point to its destination, so that my conception at any one instant is focused on the momentary position of the ball in relation to its position an instant before. This mode of viewing an event will be referred to as sequential scanning—the states comprising the event are accessed in sequence, and the conception representing any one state is only momentary. However, I also have the ability to construe the process more holistically, either while watching it or during a mental "replay". I can pay specific attention to the ball's trajectory, seeing its trajectory "grow" from instant to instant as the ball sails along its path; at the end, I have built up a conception of the full trajectory that functions as a single gestalt and is manipulable as a simultaneously available whole (e.g. I can observe its shape and assess its degree of curvature). I will use the term summary scanning for this second mode of tracking an event. The states comprising the event are still accessed in sequence, but once activated the conception corresponding to a given state remains active throughout. Thus the full conception grows progressively more complex, the end result being the simultaneous activation and accessibility of all the component states.
The notations previously introduced are capable of representing the difference between sequential and summary scanning. Consider the complex relation diagrammed in Fig. 1(a), which we can interpret as an object falling to the ground. Only four component states are explicitly shown (labeled a, b, c, and d), but they stand for what is actually a continuous series.4 The circle indicates the extent (heavy lines will be used throughout to identify the entity that moves or whose location is being specified). The sequential scanning of this complex relation can be formulated as follows:

\[
\begin{align*}
(7) & \\
& \begin{bmatrix} a \\ C_T1 \end{bmatrix} > \begin{bmatrix} b \\ C_T2 \end{bmatrix} > \begin{bmatrix} c \\ C_T3 \end{bmatrix} > \begin{bmatrix} d \\ C_T4 \end{bmatrix}
\end{align*}
\]

At moment \( T_1 \) of processing time, the conceptualizer activates the conception of state a; at \( T_2 \), he activates conception b; and so on. Observe that each conception begins to decay as the next one is activated, so that only one is fully active at any one instant. In summary scanning, by contrast, each state remains active as the next one in the series is accessed:

\[
\begin{align*}
(8) & \\
& \begin{bmatrix} a \\ C_T1 \end{bmatrix} > \begin{bmatrix} a \\ C_T2 \end{bmatrix} > \begin{bmatrix} a \\ C_T3 \end{bmatrix} > \begin{bmatrix} a \\ C_T4 \end{bmatrix}
\end{align*}
\]

The resulting conception grows progressively more complex, so that finally (at \( T_4 \)) all the component states are superimposed and simultaneously active, as sketched in Fig. 1(b). The directionality in this conception is due to the order in which the states are activated in building up to it.

My proposal for the semantic distinction between a verb and a complex preposition (e.g. cross vs. across in (6)) is that the former is characterized by sequential scanning, and the latter by summary scanning. Even if members of the two classes comprise the same series of states and thus have the same conceptual content, they differ in how this content is construed with respect to its pattern of activation through processing time.5 More specifically, I analyze a verb as profiling a process, where a process implies the sequential scanning of a complex relation whose component states are taken as being distributed through conceived time.
Letting $r_1$ stand for a stative relation, and using the notation $[r_1]t_1$ to indicate that relation $r_1$ holds at point $t_1$ of conceived time, I offer formula (9) as a semantic characterization considered valid for all members of the verb class:

$$[r_1]t_1 > [r_2]t_2 > [r_3]t_3 > \ldots > [r_n]t_n$$

A verb is therefore claimed to profile a complex relation $[r_1, r_2, r_3, \ldots, r_n]$ extending through span $[t_1, t_2, t_3, \ldots, t_n]$ of conceived time. The conceptualizer $C$ (identifiable as the speaker and/or hearer) scans sequentially through this complex configuration during span $[T_1, T_2, T_3, \ldots, T_n]$ of processing time.

Actually, we must distinguish two basic classes of verbs, depending on whether they profile a **perfective** or an **imperfective** process (cf. Langacker to appear). Roughly speaking, perfective verbs are those that take the progressive, as illustrated in (10), but normally do not occur in the simple present tense; imperfectives do occur in the simple present, as in (11), but resist the progressive.

(10)(a) My neighbor is washing his car again.
(b) The coach is screaming at his players.
(c) A young couple was walking along the beach.

(11)(a) I know that she understands the difficulty.
(b) Alice definitely likes tuna.
(c) Phil believes that Jason resembles his father.

In a perfective, the component states constitute a bounded series, and generally they involve some change through time (i.e. there are adjacent states in the sequence where $r_i \neq r_{i+1}$). By contrast, imperfectives are not specifically bounded, and all the component states are construed as being identical. Formula (9) can be revised as follows to highlight the characteristic properties of imperfectives:

$$\ldots > [R]t_1 > [R]t_j > [R]t_k \ldots$$

Formula (12) represents the special case of (9) in which no initial or final state is distinguished, and where $r_i = r_{i+1}$ throughout. An imperfective thus tracks through conceived time (by means of sequential scanning) the continuation of a stable situation, given as R in the formula.

**Objective Motion**

At long last, we are ready to consider verbs of physical motion, such as trudge, walk, swim, climb, roll, etc. The only facet of their meaning that directly concerns us is the mover's
spatial trajectory; we may ignore such factors as the method and rate of locomotion. For our purposes, then, a motion verb can be regarded as a special sort of perfective process, namely one in which each component state specifies the relation between the mover and his immediate location. Starting from formula (9), we can therefore obtain the representation for a verb of spatial movement by substituting for each instance of ri the more specific notation [m]li, which indicates that the mover m occupies location li:

\[
\begin{align*}
([m]l_1)_{t_1} & > ([m]l_2)_{t_2} & > \cdots & > ([m]l_n)_{t_n} \\
C & T_1 & C & T_2 & \cdots & C & T_n
\end{align*}
\]

Thus, \( m \) occupies location \( l_1 \) at moment \( t_1 \); he occupies \( l_2 \) at \( t_2 \); and so on. Through span \( [t_1, t_2, t_3, \ldots, t_n] \) of conceived time, the mover traverses the spatial path \( [l_1, l_2, l_3, \ldots, l_n] \). Formula (13) is highly schematic and expresses what all verbs of physical motion have in common. The meaning of go may well be limited to this schematic content when it functions as a maximally generic motion verb.

Consider now some uses of go that do not pertain to spatial motion:

\[
\begin{align*}
(14)(a) & \text{ Roger went through the alphabet in 7.3 seconds.} \\
(b) & \text{ This milk is about to go sour.} \\
(c) & \text{ The concert went from midnight to 4AM.}
\end{align*}
\]

Though one’s first thought is to treat such sentences as instances of spatial metaphor, it is not obvious to me how strongly or consistently speakers perceive them as such; moreover, to describe a metaphor we must in any case characterize both the source and the target domains, together with the mapping between them (cf. Lakoff and Johnson 1980; Langacker in press, ch. 4). One way or another, we must therefore attribute to go a conventionally-established range of values that indicate change in non-spatial domains.

Actually, there is no need to alter formula (13) to accommodate such examples—we need only interpret the notations in a suitably abstract manner. Under this generalized interpretation, \( [l_1, l_2, l_3, \ldots, l_n] \) is not to be construed as a spatial path in particular, but simply as an ordered sequence of entities within the relevant domain, such that the "mover" \( m \) is capable of interacting with each of these entities individually; \([m]l_i\) then indicates the momentary interaction of \( m \) with \( l_i \) in this domain. The notions entity and interaction are admittedly vague, but their intended application to the present examples is reasonably straightforward: in (14)(a), the entities are letters of the alphabet, and Roger interacts with a given letter by reciting it; in (b), the entities are points along a scale for evaluating freshness/sourness, and the milk interacts with such an entity by being fresh or sour to a specific degree; in (c), the entities are points in conceived time, and the concert interacts with a point
when its duration extends to include it. What we have done, in effect, is to characterize a maximally schematic concept of motion, with respect to which physical movement through space is just a special case (though clearly prototypical). Let us speak of abstract motion when this schematic conception is applied to non-spatial domains, as in (14). Formula (15) thus describes the abstract motion of somebody going through the alphabet: the mover first recites the letter $a$ at moment $t_1$ (this is represented formulaically as $[[m]a]_{t_1}$), then the letter $b$ at $t_2$, and so on.

$$[[m]a]_{t_1} > [[[m]b]_{t_2}] > ... > [[[m]z]_{t_{26}}]$$

$$C \quad T_1 \quad C \quad T_2 \quad C \quad T_{26}$$

For our later purposes, example (14)(c) holds particular significance. The concert is an abstract mover, making contact with an ordered series of points in time as its duration extends. The formulaic representation of this abstract motion is (16), which is exactly parallel to (15) except that the abstract path of motion is the temporal sequence $[t_1, t_2, t_3, ..., t_n]$ rather than the letters of the alphabet.

$$[[m]t_1]_{t_1} > [[[m]t_2]_{t_2}] > ... > [[[m]t_n]_{t_n}]$$

$$C \quad T_1 \quad C \quad T_2 \quad C \quad T_n$$

Observe that conceived time plays two distinct roles in (16). One is the role it has in any process, as defined in (9): the component states of the process are distributed through a continuous span of conceived time (and scanned sequentially through processing time). Its other role pertains to the internal structure of the component states: time serves as the cognitive domain with respect to which the profiled relation is characterized, and is thus analogous to space in verbs of physical motion, or the alphabet in (14)(a). Since the same span of conceived time is involved in both roles, it is perhaps superfluous to indicate $t_i$ twice at each stage; $[[m]t_i]_{t_i}$ could perfectly well be collapsed to $[m]t_i$. Still, it is important to emphasize the dual role and the parallelism of (14)(c) to other motion predications. The only thing special about this example is that conceived time is itself the domain in which the profiled relation manifests itself.6

A possible objection at this juncture is that the definition of abstract motion is so general that any change whatever could be construed as an instance. If so, I am inclined to believe that this consequence might be appropriate rather than unfortunate, for it is not at all obvious that change and motion are ever strongly dissociated in our conceptual world. It would be interesting in this regard to see if there are cases in which a verb meaning 'go' evolves into a pro-verb for the class of perfective processes, or conversely (see Langacker 1981 for a possible example).
Subjective Motion

A perfective motion verb profiles change through time in the spatial location of the mover. There are also verbs that profile the static location of an entity:

(17) (a) A statue of Johanna Nichols stands in the plaza.  
(b) The United States lies between Mexico and Canada.

Here stand and lie are imperfective, i.e. they profile the continuation through time of a stable situation. In (12), the general formula for imperfective processes, the profiled relation scanned sequentially through conceived time was represented by R. To accommodate the special case where the profiled relation is locative, we need only substitute for R the more specific notation [M][L], indicating that entity M occupies location L:

(18) \[ \ldots \to [[[M][L]t_i]_C]_T_i \to [[[M][L]t_j]_C]_T_j \to [[[M][L]t_k]_C]_T_k \to \ldots \]

Though M does not move, it is analogous to a mover in being the entity whose location is specified. Observe that C's conception at any one instant is of the form [[[M][L]t_i], which is basically the same as it is in the case of motion verbs, namely [[[M][L]t_i] (cf. (13)). What distinguishes the two types of verbs is whether the locative specification differs from one state to the next, or remains constant throughout.

Consider now the following pairs of sentences:

(19) (a) The roof slopes steeply upward.  
(b) The roof slopes steeply downward.
(20) (a) The hill gently rises from the bank of the river.  
(b) The hill gently falls to the bank of the river.  
(21) (a) This highway goes from Tijuana to Ensenada.  
(b) This highway goes from Ensenada to Tijuana.

Like the ones in (17), these sentences describe stable situations in which nothing is portrayed as moving or otherwise changing. The felicity of the simple present tense confirms their analysis as imperfective processes: each profiles a single, constant configuration and follows its continuation through conceived time. Obviously, though, something more is going on. In (19)-(21) there is in each instance a clear semantic contrast between (a) and (b) that cannot be attributed to objective properties of the profiled configuration, since precisely the same configuration is designated by the members of each pair. Intuitively, it seems evident that these sentences incorporate a sense of directionality that is lacking in (17)--the (a) and (b) sentences contrast semantically because they imply opposite directions. But how can we meaningfully speak of directionality when nothing moves or changes?
This is another instance where a semantic contrast does not reside in the conceptual content of two expressions, but rather in how that content is accessed (recall cross vs. across). For instance, (19)(a) and (b) describe precisely the same situation pertaining to the spatial orientation of the roof, and both portray this situation as extending through conceived time without essential change; in this sense their conceptual content is identical. However, the profiled spatial configuration has a certain degree of internal complexity, because M (the roof) is itself an elongated, path-like entity. We can reasonably suppose that the conception of such a configuration requires a certain span of processing time for its full activation: rather than springing instantaneously into full-blown existence, the conception might be built up incrementally, with all facets of it being active only at the conclusion of this build-up phase. If so, the directionality we perceive in such sentences is attributable to the order in which the various facets of the configuration are activated. Moreover, since different orders of activation can lead to the same overall configuration, we have a way of accounting for the semantic contrast.

In Fig. 2, I have sketched the overall locative configuration [ML] whose continuation through conceived time is profiled by the sentences in (19). The domain for this conception is oriented space, i.e. space organized into the horizontal and vertical axes. The roof, M, is an elongated object whose alignment with respect to these axes is being assessed. Let us refer to the points along the spatial extension of M as \([m_1, m_2, m_3, \ldots, m_n]\); in the diagram, \(m_1\) is equated with the roof's lower extremity, and \(m_n\) with its upper extremity. Each point \(m_i\) along the roof's extension occupies location \(l_i\) in oriented space; \(l_i\) reduces to the combination \((h_i, v_i)\), where \(h_i\) is the horizontal projection of \(m_i\), and \(v_i\) its vertical projection. L, the spatial location of M, therefore does not consist of a single point, but rather the path-like set of points \([l_1, l_2, l_3, \ldots, l_n]\).

\[
\begin{align*}
M &= [m_1, m_2, m_3, \ldots, m_n] \\
L &= [l_1, l_2, l_3, \ldots, l_n] \\
\text{where } l_i &= (h_i, v_i)
\end{align*}
\]

I am assuming that every conception involving directionality at the experiential level implies some kind of seriality at the processing level. The directionality in (19) is attributed to the build-up phase leading to the full activation of configuration.
That is, in building up to the full conception, C first activates subconfiguration \([m_1]l_1\), then \([m_2]l_2\), and so on. Summary scanning is employed, so once initiated each subconfiguration remains active throughout; as a consequence, the conception grows progressively more complex with the passage of processing time, until the full configuration \([M]L\) is simultaneously active at \(T_n\). Experientially, it is as if the roof "grows upward" starting from its lower extremity \(m_1\), eventually reaching its full extension.\(^{7}\)

The analysis of (19)(b) is identical except that \(m_1\) is equated with the roof's upper extremity, and \(m_n\) with its lower end. The sequence in (22) is then manifested experientially as the roof "growing downward" from top to bottom. But either sequence of activation results in the same overall configuration \([M]L\), whose extension through conceived time is scanned sequentially. Observe that conceived time plays no inherent role in the build-up phase, as \([M]L\) itself is atemporal. The perceived directionality of (19) derives instead from the order in which its subconfigurations are accessed through processing time.

We can of course speak of motion in sentences like (19), but motion of a special sort. As \(M\) "grows" upward or downward from its starting point, its leading edge can be thought of as moving through space in much the same way that the concert moves through time in (14)(c). However, as (22) shows, the position of \(M\)'s leading edge changes only through processing time, not through conceived time; only by taking into account the time axis of the construal relation itself do we obtain the temporal component necessary for considering this to be a type of motion. Once we invoke processing time in this fashion, additional instances of motion can be discerned in (22). For these latter, the mover is not \(M\), but rather \(C\).

The conceptualizer can be thought of as moving along either of two paths: \([m_1, m_2, m_3, \ldots, m_n] (= M)\), or \([l_1, l_2, l_3, \ldots, l_n] (= L)\). This motion on the part of \(C\) is both abstract and subjective, as these terms were defined earlier. Let us focus on \(M\) (the case of \(L\) is exactly parallel). \(C\)'s conception of \(M\) counts as an instance of abstract motion according to the following rationale: (i) \([m_1, m_2, m_3, \ldots, m_n]\) constitute an ordered set of entities; (ii) during the build-up phase, \(C\) accesses these entities in sequence, i.e., he first activates the conception of \(m_1\), then that of \(m_2\), and so on; (iii) by activating the conception of a particular entity \(m_1\), \(C\) can be regarded as interacting with it
mentally (just as one interacts with the letters of the alphabet by reciting them—cf. (14)(a)); and (iv) each such interaction takes place at a distinct point in (processing) time. We need only restate these interactions in the format [C][M][T] to see that they qualify as an instance of abstract motion, with C as the mover.

C's motion in (22) is not only abstract but also subjective. The reason, quite simply, is that C does not conceive of himself as moving along a path: as (22) clearly reveals, C's conception at any instant is limited to some portion of the locative relationship [M], and his own role in this relation is purely subjective. It is only from the external perspective of the analyst that C moves abstractly along a path. Barring self-analysis (where C would play a dual role, as in (4)), the conception that C himself entertains is merely the directional construal of a static configuration.

Avenues of Semantic Extension

The sentences in (20), (21), and (23) illustrate a common type of semantic extension:

(23) A white fence runs/stretches/reaches/extends from one end of his property to the other.

In each case, a perfective verb of physical movement has developed an additional, imperfective value in which it describes the continuation through time of a static configuration. The conception of motion has not disappeared entirely, however; a shadow of it remains in the directionality with which the static configuration is construed, as characterized in (22). Whereas the basic meaning profiles physical motion by an objectively-constrained mover (namely the subject), one (unprofiled) facet of the extended meaning is abstract motion by a subjectively-constrained mover, specifically the conceptualizer. The pivotal factor in this type of semantic shift is therefore subjectification: an originally objective notion is transferred to the subjective axis of the construal relation itself.

A second common avenue of semantic extension is for the profile of a complex relation to be restricted to its final state; the extended meaning then constitutes a stative relation. The prepositions in (24) represent complex relations—each of them profiles a series of states that do not reduce to a single, consistent configuration.

(24)(a) The prisoner ran to the fence.
(b) Abernathy crawled through the tunnel.
(c) The scouts hiked over the mountain.

The corresponding stative relations are illustrated in (25). Each preposition profiles only a single locative configuration, but one that is construed as the last in a series of configurations defining an extended spatial path.
(25)(a) The prisoner is already to the fence.
    (b) Abernathy must be through the tunnel by now.
    (c) The scouts were over the mountain by noon.

The profile of a complex relation is similarly restricted to its
final state in the case of adjectival past participles (e.g.
swollen designates the final state of the process swell); here, of
course, the relationship involves derivation rather than semantic
extension.

Consider now the following sentences:

(26)(a) A stray dog walked across the plaza, through the
    alley, and over the bridge.
    (b) The Linguistics Hall of Fame is across the plaza,
        through the alley, and over the bridge.

Both incorporate the complex locative expression across the plaza,
through the alley, and over the bridge, which describes an extended
spatial path. Since (26)(a) profiles spatial motion by an
objectively-construed mover, the occurrence of such a locative is
quite natural. Why, however, should a path locative appear in
(26)(b), which does not describe motion at all, but only the
static, point-like location of its subject?

![Figure 3](image)

My proposal is that the locative in (26)(b) receives a special
interpretation that combines the two types of semantic extension
previously discussed. The normal value of a path locative,
corresponding to the objective spatial motion of (26)(a), is
depicted in Fig. 3(a): with the passage of conceived time, the
objective mover (i.e. the subject) occupies successively all those
points that constitute the extended spatial path (indicated by the
broken arrow). The effect of subjectification is to replace the
objective spatial motion of the subject with abstract, subjective
motion on the part of C in building up to his conception of a
stable objective configuration. We observed this effect in (19)-
(21), and we observe it again in (26)(b). The difference between
the two cases resides in whether or not the second type of semantic
extension—profile restriction—also applies. It does not apply in
(19)-(21), where the profiled objective configuration essentially
"telescopes" all the component states of Fig. 3(a); the subject is
an elongated entity (a roof, hill, or highway) that simultaneously
occupies all the points along the extended spatial path. In
(26)(b), by contrast, the subject occupies only the endpoint of the
path, corresponding to just the final state of Fig. 3(a); we obtain
this result by first applying profile restriction and then applying
subjectification to its output. The product of these two semantic
extensions, as applied to Fig. 3(a), is thus the structure
represented in 3(b). Through time, the subject is stably located
at the endpoint of a path anchored at the other end by the position
of C, whose abstract and subjective motion along this path allows
him to compute the location of the subject relative to his own.

Finally, let us consider sentences in which a finite motion
verb takes an infinitival complement (see Lamiroy 1983 for
insightful discussion):

(27)(a) Il monte se coucher. 'He is going up to go to bed.'
(b) Il court le regarder. 'He is running to look at it.'

Semantically, it is specified that the subject traverses a spatial
path, at the end of which he initiates the process indicated by the
infinitival complement. Formally, these sentences are precisely
parallel to those in which a verb meaning 'go' comes to indicate
futurity. Thus, while (28) might be construed as indicating
spatial motion that terminates in the process of door-opening, it
is far more likely to be interpreted as a 'gonna'-type future, just
as in the English translation:

(28) Il va ouvrir la porte. 'He is going to open the door.'

This example brings us back to our original question: what is the
proper way of describing the common semantic extension from 'go' to
'future'?

To account for this development, we need only combine the two
avenues of semantic extension just considered with a third one that
is massively attested in natural language: the application of a
spatial term to the temporal domain (recall the discussion of
(14)(c)). The extension from 'go' to 'future' is therefore
captured by the difference between Figs. 3(a) and 3(b), provided
that the path of motion is interpreted as being spatial in the
former and temporal in the latter. With the path construed as a
spatial one, Fig. 3(a) represents the movement sense of (28); at
the endpoint of his motion, the subject initiates the process
specified by the infinitival complement. With the path construed
as a temporal one, Fig. 3(b) represents the futurity sense of (28).
Under this interpretation, (28) profiles the continuation through
time of a stable configuration whose domain also happens to be that
of conceived time. What is this temporal configuration? It is one
in which the subject's initiation of the infinitival process lies
downstream in time from the location of the conceptualizer; since C
is the speaker and/or hearer, C's location is the time of the
speech event. Moreover, C computes the position of the infinitival
process relative to his own (the time of speaking) by sequentially
activating, during the build-up phase, his conception of the
temporal path linking the two.

In sum, it is not the subject who moves through time when a
sentence like (28) indicates futurity, but rather the
conceptualizer, whose motion is both subjective and abstract. I
suspect that subjectification, as witnessed by the shift from 'go'
to 'future', is a recurrent factor in the semantic "bleaching" that
accompanies grammaticization.

Footnotes

1For discussion and illustration of this framework (also called
Space Grammar), see Casad and Langacker 1985; Hawkins 1984;
Lindner 1982; Tuggy 1981; Vandelooise 1984; and papers by myself and
others in Rudzka-Ostyn to appear.

2Though time may not be salient in such a conception, it is
nonetheless invoked as an axis along which the action unfolds.

3Rather than being understood in any standard philosophical sense,
this term must be given some appropriate cognitive interpretation.
It pertains to the structure of conceptualizations, not to the
relation between language and "the world".

4The discreteness implied by the diagrams and formulas is purely
for expository convenience, and is not intended as a claim about
cognitive representation.

5The subtlety of this contrast is consonant with the fact that
languages often fail to make a formal distinction between verbs and
complex non-verbal relations.

6Many other expressions have time as their primary domain, e.g.
before (They finished before I got there), which is a stative
relation according to the definition given earlier.

7Of course the entire sequence in (22) occurs in a matter of
milliseconds; despite the seriality, it is almost instantaneous
experientially.

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1. Introduction

The work begun here concerns the nature of a special class of morphemes found in Hmong, which are akin to what have been called expressives in other South East Asian and Malaisian languages. These form a large class of morphemes with varying characteristics, which I attempt to characterize below. Others have noticed this class of morphemes, most especially Heimbach (1979), but the investigations have been primarily limited to compiling lists of them. As far as I know, the work I begin here is the first investigation as to the principles organizing the entire class of post-verbal expressives. Martha Ratliff (unpublished) has done some good work on the sound and tone symbolism of the onomatopoetic post-verbal expressives (hereafter, PVEs). I will not be looking at the details of sound symbolism in this paper, though sound symbolism clearly plays an important role in expressive language, as I discuss in section three. Given the scope of the entire class of expressives and the space limitations here, I will look only sparingly at certain expressives which help exemplify particular points or sub-types of PVEs.

2. Post-verbal expressives

Hmong has three primary means of adding additional expressiveness or emphasis to the sentence: reduplicating the verb, adding post-verbal or sentence final intensive particles, or through the addition of a PVE, which I characterize in this paper. Reduplication and the use of intensive particles serve basically the same function: that of intensifying the meaning of other elements of the sentence. For this reason, the Hmong speaker can usually choose either strategy for approximately the same effect, and usually cannot use both strategies in the same sentence without sounding awkward or redundant. In contrast to intensive particles, PVEs add additional sense or meaning to the sentence, although what this difference is may often be very subtle. All of these processes are by their very nature optional, though they may be required to express any particular notion.

This part of the paper is divided into two main sections: a primarily syntactic description of PVE behavior, and a preliminary attempt at sorting out the various PVEs according to their semantics. Section 3 will discuss general issues involved in characterizing the class of PVEs and expressive language in general.

2.1. The syntactic characteristics of PVEs

The class of PVEs consists of a mixed bunch of morphemes with often differing behavior. Still, a few general characteristics can be given which enable us to decide whether a morpheme is a PVE or not. First, without exception, PVEs must follow a verb (or a verb used adverbially). This should
be considered a primary defining characteristic of the class. There is no requirement that the PVE occur clause-finally. Because of the SVO word-order in Hmong, this allows verbs which have been modified with PVEs to take objects:

1) Yawg ntaus kuv tus me-nyuam. "He hit my child."
   man hit 1ps CLF child
2) Yawg ntaus ntxhias kuv tus me-nyuam. "He spanked my child
   man hit PVE 1ps CLF child without warning,
   (just bam bam bam!)."

Verbs with PVEs cannot be modified by adverbial or adjectival verbs or even by intensive particles.

3) Yawg ntaus (*ntxhias) kuv tus me-nyuam phem (hwv).
   man hit PVE 1ps CLF child badly PTC
   "He hit my child (really) badly."
4) *Yawg ntaus ntxhias kuv tus me-nyuav hwv.

This is not what we might expect since, as in the above examples, there is often little or no semantic overlap between the PVE and the prohibited adverbial or intensive particle. It seems that PVE use monopolizes the verb’s satellite positions to become the focal point of the quality of the verbal action, indeed of the sentence as a whole. This is in sharp contrast with intensive particles, which give the feeling of being less the focus of attention and add merely extra force to the expression of the verbal action.

Perhaps the most striking feature of the syntactic constraints on these post-verbal expressives is that they can neither be negated nor occur with a negated main verb.

5) Yawg tsis ntaus kuv tus me-nyuam. "He didn’t hit my child."
   man NEG hit 1ps CLF child
6) *Yawg ntaus tsis ntxhias kuv tus me-nyuam.4.
   man hit NEG PVE 1ps CLF child
7) *Yawg tsis ntaus ntxhias kuv tus me-nyuam.
   man NEG hit PVE 1ps CLF child

Adverbials (that is, adverbial verbs), may be negated:

8) Me-nyuam noj tsis qeeb tsis nrawm.5.
   child eat NEG slowly NEG quickly
   "The child eats not too slowly, not too fast."

This should not be as surprising as some people I have spoken with seem to find it. Something similar to this restriction occurs in a variety of languages. Matisoff (1973) points out that in Lahu

Intensified adjectives...cannot be followed by [verb particles], and they are not negatable. (It is not surprising that negativity and intensification should be mutually antagonistic notions.)

p. 296
These notions are potentially antagonistic, but obviously many if not most languages can have negated intensifiers. The intensifying particle heev in Hmong can be readily negated. However in Hmong, PVEs cannot be negated, so we can hypothesize that for Hmong, negativity and this type of expressivity are mutually antagonistic notions.

A similar, though weaker constraint on negation of expressive elements occurs on expressive elements in English. For example, if I am walking along the edge of a cliff, where falling would mean plummeting to my death, and my friend sees that I suddenly disappear from view, it would not be very natural to say the latter of these two sentences.

9) It's alright, I didn't fall.
10) *It's alright, I didn't plummet.

Similarly (to take an example from Hinds 1974), something may be a sin or not a sin, but something is either an abomination before God or the phrase is not applicable.

PVEs also cannot occur with a verb which is in future tense. For example:

11) Yawg yuav ntaus kuv tus me-nyuam. "He will hit my child."
   man will hit 1ps CLF child
12) *Yawg yuav ntaus nttxhias kuv tus me-nyuam.
    PVE

However, PVEs can occur in representations of beliefs and thoughts even if they are contrary to fact.

13) Yawg xav tias kuv kwv nttxhias hauv dej mus lawm,
    man think COMP 1ps ford PVE into water go PERF
    tab-si kuv tsis tau mus.
    but 1ps NEG CMPLT go
    "He thinks that I forded the river against better judgement
    (because of the danger), but I didn’t (cross the river)."

The clause which contradicts the belief can even precede the quoted belief:

14) Kuv tsis tau mus raws li yawg xav tias kuv kwv nttxhias
    1ps NEG CMPLT go way NOM 3ps think COMP 1ps ford PVE
    hauv dej mus lawm.
    into water go PERF
    "I didn’t do as he thought that I had rashly forded
    the river. (i.e. I didn’t cross it.)"

I have been unable to find any way however to say the equivalent of "He thought that I rashly forded the river, but I didn’t (I forded it wisely and appropriately)". That is, there seems to be no way that only the expressive part of a belief can be incorrect; the entire verbal action must be incorrect. These data imply that PVE use is strongly grounded in a realis mode. If it is not actually a true statement in the real world, it must be expressed as true within someone’s beliefs or as asserted by someone as true, despite what may
really be the case.

Because a PVE’s semantics sometimes seem so tied to those of the verb, it might be suspected that the PVE is actually part of a verb compound. This is reasonable given the restricted nature of PVEs: a PVE may combine with most, many, a few, or only one verb. Particularly when the PVE combines with very few main verbs it is tempting to consider it part of a compound. For example, with a PVE like ntixhias it is quite tempting to call its occurrences compounds. It is accepted by my informant in the following combinations, and probably very few others.

15) kam agreeable + ntixhias "immediately willing"
nrov + ntixhias "the making of a sudden loud noise"
make-noise kwm + ntixhias "to readily ford dangerous water"
ford pob + ntixhias "to guarantee (typically on the spot)"
9
ua hluas + ntixhias "to act young and desirable"
do young [when normally not that way] ntaus + ntixhias "to hit without warning"
hit peem+10 + ntixhias "to push into an area where one is not allowed"

However, a compounding analysis can’t explain why the hypothetical verb + PVE compound can’t be negated and why the compound can’t be modified adverbially or intensified. Further, this doesn’t explain why some PVEs are virtually unrestricted as to which verbs they can combine with—though these are far less common.

The selectional restrictions on which verb can combine with which PVE are not in any apparent way syntactically controlled. There are clear semantic principles motivating these restrictions with most PVEs, but, as with ntixhias above, there are a number of PVEs which cannot be explained with predictive accuracy. In the next section, I shall give a few case studies which demonstrate the semantic motivation behind the selectional restrictions.

2.2. Semantic sorting of PVEs

Using the syntactic criteria arrived at in the last section, we have a non-semantic means of deciding on membership in the class of PVEs. Most PVEs in Hmong divide into five semantic types.
Onomatopoetic (nrov "to sound" + toog = "the sound of something heavy hitting the ground")
Color-descriptive (dawb "[to be] white" + lig = "to be off-white"
Emphatic (qias "to be dirty" + ntsuav = "to be disgustingly dirty")
Manner (chaws "to enter" + nphlo = "to enter by ducking")
Aspect-like (tos "to wait" + ntsoov = "to wait steadfastly")

Because of the space limitations here, I will exemplify only two types, Aspect-like and Manner, as these are the most apt to be confusing. I do not mean to suggest that all PVEs will fit into one of these five types, but these seem to be the main ones encountered.

2.2.1. Aspect-like PVEs

I include in this grouping PVEs which convey senses of the verbal action which are traditionally called aspectual, such as compositive, iterative and progressive, and those senses which are semantically related (constancy, continuing and sudden initiation of action). However, none of these aspectual categories are part of the aspectual system of Hmong, which employs tau, a pre-verbal compositive particle, and lawm, a final perfective particle. These occur regularly and unrestrictedly and should be considered the 'proper' aspectual markers in Hmong. The 'aspect-like' PVEs are more akin to the only partially systematic particles up and out in the English eat up, knock out, etc.. Like up and out, these PVEs in Hmong are motivated in their use, but the verbs with which they occur are not predictable.

I will be considering here some of those aspectual PVEs which express or are associated with 'suddenness of action'. We have already seen ntxhias in section 2.1. It occurs with human subjects initiating an action unexpectedly, on the spot, and perhaps rashly, inappropriately, or against some sanction. While the morpheme has a reasonably unified sense, there are no apparent reasons why virtually any action could not be described as being performed in that way, and yet ntxhias is only used with a small number of verbs. Let us now consider two other PVEs which are of this generally 'sudden' nature: dheeve, and plaws.

Dheeve, which lacks any independent meaning, can only occur with verbs of mental activity and perception in humans:

17) xav +dheeve "to think"
pom +dheeve "to see"
tsim +dheeve "to awaken" [And so on]

The particular use of dheeve, while regular, has no motivation from other
parts of the language. Which verbs it combines with must also be learned because it cannot be used with all verbs of mental activity:

18) *Kuv paub dheev (lawm).
   1ps to-understand PERF
19) Kuv paub lawm. "I got it. I understand now."

Plaws also combines with verbs according to a semantic principle, but it is not one that is as readily apparent.

20) tawm +plaws to come out "to suddenly come outside"
dim +plaws to be freed "to be suddenly freed, escape"
sam +plaws to jump "to jump upon"
phua +plaws to split "to split through (as through a crowd)"
cig +plaws to catch fire "to flare up"

There are many other verbs that plaws can combine with, but first let's consider those above. In all of these, there are two common elements (which the translations are designed to bring out): suddenness and translocation in space. This is most simply used with verbs like tawm and dim which inherently involve translocation, and gain the additional component of suddenness with additional emphasis on the change of location. Sam is inherently sudden, but does not necessarily involve a change in location (such as jumping up and down). The most salient type of relocation for a jump is to jump onto, that is, to land upon something\textsuperscript{11}. There is also the highly salient notion of to jump across (a stream, log, etc.), but Hmong has many words specifically for crossing and crossing over, so plaws fills a larger semantic gap by being applied the way it is. Phua, which by itself can be used as to split (wood, etc.) is basically a sudden action, but involves no translocation. With plaws it becomes extended to movement which can be seen as 'splitting' through a medium. Cig is used to describe something igniting. While fire can move both up and out, its moving up (flaring up) is certainly the more sudden and cig plaws accordingly describes that situation.

Plaws occurs with other verbs that now can be seen as metaphoric extensions of this basic notion of sudden translocation. For example, kaj ntug plaws (daylight + plaws) daybreak\textsuperscript{12} is a highly salient change of state, conceptualized as a change of location (from night into day).

2.2.2. The Manner PVEs

As mentioned above, the Manner PVEs denote physical attributes of an action, e.g., loudly, in a straight manner, vertically, all acting together, and so on. There are surprisingly few of this type; usually a verb plus adverbial verb
construction is used with the second verb expressing a more specific manner than the first (like the English *go crawling*). This second verb is typically reduplicated for emphasis, which indicates that it is a verb and not a PVE.

21) Nws mus/nqa nkoov nkoov\textsuperscript{13}. "He went/carried (something) in a stooped manner."

The manners that are usually expressed with PVEs are those which are not typically expressed by verbs. For example, *pawg-lug* or sometimes just *pawg* does not appear as a verb, and has a distributional sense that is unlikely to be conveyed by a verb.

22) Tub rog zaum pawg-lug. "The soldiers sat all about (filling the area)."

This distributive sense cannot be applied to the temporal actions of verbs. That is, there is no way to use *pawg* in a sentence like the following.

23) Kuv saib ob yas xis-ne ua-ke. "I watched both movies together (one after the other)"

24) *Kuv saib pawg ob yas xis-ne.

In addition to occurring with verbs like *zaum, muaj* to have, and *nyob* to reside, *live, pawg(-lug)* can occur with *ua* to make, do. The effect and usefulness of this is that any social spatially-distributed action can be modified by *pawg*.

25) Tub rog noj mov ua pawg. "The soldiers ate rice together (about the area)."

*Tsees* is another PVE, but one with a far more restricted use: it only occurs with the verb *sawv* to get up. The fixed expression *sawv tsees* has a very specific sense or image associated with it. It is used to describe the situation when a person gets up having been roused by a noise or other unexpected happening which was beyond the subject's immediate vicinity. This is something like the English "getting up startled". However, no sense of haste or suddenness is necessarily conveyed in the person's getting up, from being roused. For example, *sawv tsees* can be used to describe a person who gets up to investigate a noise which just woke her up. Similarly, it is used in the expression

26) Nws sawv tsees (los) hais tias, "....."

"He got up and said, '.....' [In protest to what had just been said]"

Again, the sense expressed by the Manner PVE seems less likely to be readily expressible by available verbs than simple manner adverbials like *in a curled manner*. It is important to note that this is not because the manner is abstract. The manner can be quite concrete and grounded in a highly specific image. For example, *nkuj-nkis* is used to describe someone who is eating very slowly:
27) Yawg noj nkuj-nkis. "He is eating ('painfully') slowly."

man eat

However, this use of nkuj-nkis is quite distinct from

28) Yawg noj qeeb qeeb. "He is eating very slowly."

man eat slow

by virtue of being grounded in a specific image of eating with minute bites and scarcely swallowing any food. My informant describes this way of eating by bringing his hands to his mouth and making very small biting motions accompanied by a tsk tsk tsk sound. And indeed this is the PVE used to describe the manner of eating used by rats. The physical action is not slow, but the result is that food is eaten slowly.

2.3. Expressive use

As the name suggests, expressives are used in image-rich and flowery language. They are certainly used in normal conversation and writing, but they seem to occur with a much higher frequency in literature (including oral literature). For example, the following, which is actually from a play, was taken by my informant to be a sentence in a very well written and beautiful love letter, where the use of PVEs greatly enhances the richness and hence the effect of the letter:

29) Nco tsoov hais-tias kuv txawm ncaim koj mus lawm los remember PVE COMP 1ps though separate 2ps go PERF come xij-peem, kuv lub siab yeej khi nrnaim rau ntawm koj mus kom kawg. however 1ps CLF liver still tie PVE to/with LOC 2ps go CAUSE finish "It is always on my mind that even though I left you behind and came here, my heart is still bound tightly to you until the very end."

The sense expressed by a particular PVE in a simple sentence in isolation is often not as strongly felt in more complex sentences or specific contexts. For example, in the following sentence, tsees certainly cannot be used to suggest that every morning the subject is startled into getting up (cf. (26)). Rather it seems to merely carry over some of the original flavor into this particular use, where it serves to emphasize the entry into the work day.

30) Tag-kis yawg sawv tsees noj mov tas nws cia li morning man get-up PVE eat rice CMPLT 3ps put-aside NOM rov-qab mus ua Suav zog lawm. return go do Chinese work PERF "Every morning, he gets up and eats, then he goes to work for the Chinese."

Learning to master the use of PVEs in Hmong is clearly a major prerequisite to learning how to speak expressively.
3. Towards characterizing expressives

Diffloth has suggested in his work that in addition to a characterization of language as having ‘cognitive meaning’, where sentential meaning is determined by well-defined relations between non-symbolic words with definite referents in the real world, we need a separate system for ‘expressive’ meaning. He bases this conclusion on his and others’ work on ideophonic expressions in languages such as Semai and Korean. In these languages, minimal changes in the phonetic form of an expressive expression results in a significant and precise change of meaning according to sound-symbolic principles which are unique to each system. For example, in Korean, a medial -II- in an expressive connotes a swaying or back-and-forth motion. There is a large system of expressives based around this sound, but to take just a few:

31) collahng  "sound of many thin metallic objects hitting each other"
      ccollahng "sound of larger heavier objects hitting each other from close together"
      chollahng  "water tossing (and possibly overflowing) in a shallow container"

[From: Diffloth (1972)]

To account for this linguistic behavior, which is so different from the behavior of ‘normal’ nouns and verbs, Diffloth invokes the notion of ‘lexical discreteness’.

All noun and verb roots have one property in common which may be termed "lexical discreteness." That is, given a meaning and a corresponding root, any modification in the phonology of the root will give a completely different meaning (or a meaningless form), any modification of the meaning will correspond to a completely different root (or to no existing root). (Diffloth 1976, pp. 250-51)

The normal ‘cognitive mode’ of meaning is subject to this, but expressive meaning is not. This implies that it is not adequate to hold to a model of one-to-one word to meaning correspondences, as these meanings need to be described as networks of related and variable meanings. There is a fundamental difference between expressive and prosaic language, a difference that he calls "iconicity"14, to wit, the systematic use of sound symbolism in the linguistic forms to derive meaning. And it is this iconicity that "is the very raison d'être of the whole word class called Expressive (p. 50)."

Ratliff equates the Hmong expressive system with the expressive systems that Diffloth discusses. She has found a wide system of sound symbolism in Hmong’s onomatopoetic expressions, and they too may not be fully subject to the principle of lexical discreteness and can be characterized as iconic15. However, these onomatopoetic expressives are not syntactically distinct from the other semantic classes of expressives which I outlined above. The entire class of expressives in Hmong are clearly akin to expressives in Korean, Japanese, and the Mon-Khmer languages. Certain expressives like ntxhias and dheev
are fully subject to the condition of lexical discreteness and are not sound-symbolic in any obvious systematic way. If we consider syntactic similarity an adequate means of characterizing this word class, and we believe that there are large sets of sound-symbolic expressives which belong to this word class that may not be fully subject to lexical discreteness, (thus akin to the expressives in Mon-Khmer and Korean) as Ratliff’s work suggests, then we must question whether there is indeed a separate system of ‘non-cognitive’ meaning, as Diffloth has suggested. However, this expressive system in Hmong has a system of meaning which can be distinguished from that of the prosaic language. The meaning of a particular expressive is dependent upon the particular verb with which it is combined, and the total meaning of the V + PVE is seldom, if ever, completely decomposable. Further, unlike normal nouns and verbs, PVEs are consistently difficult to paraphrase or translate. A use of a PVE does not describe the world in a true or false way, rather its use is more or less appropriate depending upon the effect that the speaker is trying to create. The PVE system is used for nuances of expression beyond what is readily possible with the rest of the lexicon, and contains, not surprisingly, a large amount of sound-symbolic material. Some of this material will be fully onomatopoetic, as in vwg roaring like the wind, but much will be only partially so. For example pl- is used in the following onomatopoetic expressives [from Ratliff]:

32)
plig plawg  "a bird rising from its nest on the ground"
plig plog   "someone jumping into water"
plib pleb   "wood crackling"
plij plej   "a little popcorn popping in a big pan"
plij ploj   "bullet impact; bamboo bursting"
plij plooj  "heavy raindrops"

All of these have suddenness as a prominent feature, so it should not seem surprising that plaws is used for sudden motion through space, as we saw above.

This implies that rather than two separate systems of meaning in Hmong expressives—one subject to the condition of lexical discreteness and one which is not—there is just one system of expressive meaning which can vary as to the degree of sound-symbolism in the morphemes. The greater the sound-symbolism, the less subject to Diffloth’s notion of lexical discreteness the morphemes become. In other words, the class of PVEs includes non-iconic, semiotic, as well as fully iconic words. Thus the class of expressives in Hmong implies that it may be wiser to view iconic words as lying at one end of a continuum with non-sound-symbolic words at the other, than to view the two as belonging to disparate systems. This gives us the further, perhaps more complicated problem of how to integrate the variety of expressive forms into a single linguistic description.
1. Before beginning this paper, I would like to thank all those who have helped me with their discussions and support, especially: Susan Herring, Annie Jaisser, Jim Matisoff, M. C. O'Connor, Martha Ratliff, and Leonard Talmy. More than anyone else, I wish to thank Mr. Ma Xiong (Mab Xyoob) without whom this paper would not be possible, and who has helped me tremendously in learning about his language. This paper is essentially excerpted from my M.A. thesis in Linguistics at UC Berkeley.

2. cf. Diffloth (1972, 1976)

3. Ts'au Ts'ui-yûn (1972) has also looked at expressives in Blue Hmong. He argues that these expressives are words in contrast with "non-grammatical" interjectives and sound effects. I trust that I needn't prove to the reader that these expressives are indeed words. Unfortunately for the present study, I have been able to find few clear examples in Blue Hmong with cognates in White Hmong, and many of the examples in Blue Hmong are thereby difficult to compare.

4. Tsis the negative marker, occurs before the verb or noun it negates, while adverbial and adjectival verbs, as well as PVEs, occur after the verb or noun they negate.

5. Note that tsis qeeb (not slowly) would not normally be used when not compared with tsis nrawm (not quickly) because tsis qeeb and nrawm mean effectively the same thing and it would be more natural to say simply Me-nyuam noj nrawm.

6. English does allow expressive phrases and lexical items to be negated given a context allowing exact contradiction of the expressive element ("No! It is NOT an 'abomination before God'! How can you say such a thing?") or metalinguistic negation (He didn't cross the stream with 'gutwrenching fear', merely understandably strong concern.) In Hmong, such negation strategies are less common and appear to not be used at all with expressives.

7. Of course, there would be other ways to express this general notion, but none which actually make use of the expressive.

8. Heimbach lists a couple of others which are not accepted by my informant.

9. Pob alone, is a noun ball. It does not appear to be used as an independent verb. Thus it looks very much like a compound that has frozen historically; however, all the other verbs in this list appear in isolation.

10. Heimbach translates peem as to force oneself to do something one feels physically unable to do. However, in my data, I have no examples of independent use of peem.

11. This is the definition that Heimbach gives, however this may not be a very common use, in fact, my informant does not use the verb sam except in the fixed collocation with phaws when it means to mount (a
horse or buffalo). Bertrais (1964) also gives this meaning: sam phlaw rau saum nees sauter d'un coup sur le cheval. (Note there is often a middle/low tone alternation in connected speech.) It takes a certain amount of attention to not confuse plaws with plhaws, and it is certainly possible that the two are related.

12. Kaj ntug plaws may at first glance seem to violate the constraint that PVEs follow only verbs. However, historically at least, ntug seems to function as a verb, where kaj is a noun meaning light as in kaj hlis moonlight. While ntug no longer seems to be used without following kaj, it is easy to imagine that it once had a broader use as a main verb.

13. Heimbach includes nkooov in his list of "post-verbal intensifiers", and it easy to see how one might think that it is a PVE, since it is typically used in conjunction with another verb. In addition to being reduplicatable. nkooov can occur after a verb + noun:

    Yawg noj mov nkooov nkooov.
    man eat rice
    "The man ate the rice stooped over (it)."

This further indicates that nkooov is actually a verb.

14. On the notion of iconicity he follows Jakobson (1966) who was in turn pursuing the ideas of Charles Pierce before him.

15. I am not aware of any clear phonological differences between these expressives and the rest of the Hmong vocabulary, other than the fact that there is often clear sound-symbolism in the case of the expressives. Of course, the final results on Hmong Expressive Phonology are far from in.

References


Observations on Reference Object Geometry in Emai Path Expressions*

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The semantic analysis of Path expressions has become a topic of linguistic investigation over the last decade (Miller and Johnson-Laird 1976, Jackendoff 1983 and Talmy 1983). Conveyed in English by prepositional forms of the class into, on, in front of and the like, Path notions function as one structural element in the representation of spatial scenes, where in Talmy's terms, the disposition of one object, the Figure, is specified relative to a second, the Reference Object. Though identification of both entities is required for accurate specification of a scene, their complete nature is not and cannot be specified, i.e., knowing whether the house in A man walked through the house is made of brick or wood is not essential to indexing the Figure's motion relative to the Reference Object. Instead, as Talmy argues the elements of a spatial scene are idealized in a schematic, abbreviated form wherein certain aspects of that scene are selected and others disregarded.

As with any schematic representation, it is natural to inquire about the nature of those aspects of a spatial scene which are selected or disregarded by a language. One way to explore this issue is to examine the nature of the constraints governing Path forms and their Reference Objects. For instance, one can normally say walk through the house but not walk through the road. Moreover, Talmy's analysis of English suggests that these constraints have a geometric character of the kind found in the study of topological space. In the following, Path forms in Emai, an Edoid language of Nigeria, are examined in an initial attempt to explore different surface level avenues whereby this geometric character is expressed.

There is a set of verbs in Emai which encode concepts of Motion and Path when occurring alone or with a Manner specifying verb (Schaefer 1985). At the surface level, Path Verbs are immediately followed by...

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complements consisting of either a noun or the grammatical marker vbi and a noun. In order to explore the geometric characteristics which these verbs assume about their Reference Objects, it has proved useful to adopt formulas posited by Talmi as specifying a universal portion of the schemas underlying expressions of motion. Complementing these formulas are language-specific structures that we have attempted to flesh out for Emai. In doing so, four geometric characteristics have come to the fore.

The first characteristic to be considered is the proximity relationship between Figure and Reference Object (RO). To appreciate its role, consider the motion constructions in Table I.[1]

Table I. Path Verb Constructions in Emai.

<table>
<thead>
<tr>
<th>Path Verb Construction</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qli omqhe la o vbi ukpa-ode.</td>
<td>the man run move into at road</td>
</tr>
<tr>
<td>Qli omqhe za vbi oa la shg re.</td>
<td>the man be-located at house run move out</td>
</tr>
<tr>
<td>Qli omqhe la se vbi ukpa-ode.</td>
<td>The man ran up to the road.</td>
</tr>
<tr>
<td>Qli omqhe za vbi oa la raalg.</td>
<td>The man ran away from the house.</td>
</tr>
<tr>
<td>Qli omqhe la shan vbi ukpa-ode.</td>
<td>The man ran throughout the road.</td>
</tr>
<tr>
<td>Qli omqhe la shan ukpa-ode.</td>
<td>The man ran through the road.</td>
</tr>
<tr>
<td>Qli omqhe la raa uhai re.</td>
<td>The man ran past the well.</td>
</tr>
<tr>
<td>Qli omqhe la fan ukpa-ode ze.</td>
<td>The man ran across the road.</td>
</tr>
<tr>
<td>Qli omqhe la nong udekem.</td>
<td>The man ran along the wall.</td>
</tr>
<tr>
<td>Qli omqhe la ye oa.</td>
<td>The man ran toward the house.</td>
</tr>
<tr>
<td>Qli omqhe la lagaa uhai.</td>
<td>The man ran around the well.</td>
</tr>
<tr>
<td>Qli omqhe la heen oko.</td>
<td>The man ran up the hill.</td>
</tr>
<tr>
<td>Qli omqhe la kpoon oko.</td>
<td>The man ran down the hill.</td>
</tr>
</tbody>
</table>

A significant grammatical property of these constructions is the variable distribution of the marker vbi. It occurs with only a subset of Path Verbs. Closer examination of constructions where vbi does occur indicates that the RO is idealized as a point
with respect to which the Figure is in a state of contact, either at the outset of the motion event or at its completion. For instance, the Path Verbs o and sho re, though referring to opposing directions of movement relative to the RO, both demand vbi.

One might object to the association of vbi with contact between Figure and RO by contrasting the examples of za vbi ukpa-ode 'move up to the road' and o vbi ukpa-ode 'move onto the road'. In the former, contact may actually not occur between Figure and RO, just as there may be no contact between Figure and RO in za vbi oo la raale relative to za vbi oo la sho re. However, if the Figure is not actually on the road or in the house in the first member of each pair, he is "at" the road, in a state of proximity which makes no assumption about the geometric character of the RO beyond its idealization as a point in space, ignoring the enclosure quality of oo 'house' and the planar quality of ukpa-ode 'road'.

Path Verbs which do not accept vbi are those where movement of the Figure occurs either on an extent specified as the Reference Object, i.e., fan ze, shan, heen, kpoon; or on an extent defined by the Reference Object, i.e., raa re, nong, ye, laga. Not one of these Path Verbs conveys movement initiated or completed "at" a RO idealized as a point in space. The characteristics of pointness and contactness are thus conveyed by a member of the verb complex, vbi, not by the verb itself.

Clarifying this interpretation is the presence of vbi with the Path Verb shan. Notice that shan occurs with and without vbi, the resulting sentences both seeming to refer to movement on the bounded extent ukpa-ode 'road'. Nonetheless, there are shan vbi constructions which more clearly reveal a point and contact quality. For instance, the Figure's movement in (la) is conceptualized as occurring along an entire expanse of weeds which lead to the road. In contrast, (lb) with vbi conceptualizes the weeds as one position via which the Figure's movement is specified. Establishing this perhaps more definitively is (lc), which has no grammatical counterpart with shan alone, and which more easily allows us to idealize the RO of shan vbi as a point with which there is contact. Our initial understanding of the Table I construction with shan vbi must then be tempered by the realization that the Figure is moving, as in a drunken sway, from point to point, the discontinuous nature of which is obscured by the continuous extent ukpa-ode 'road'.

1. a. Oli omgohe la shan iumi ye ukpa-ode.
   the man run move thr. weeds toward road
   'The man ran through the weeds toward the road.'

b. Oli omgohe la shan vbi iumi ye ukpa-ode.
   the man run move thr. at weeds toward road
   'The man ran via the weeds toward the road.'

c. Oli omgohe la shan vbi uhai ye ukpa-ode.
   'The man ran via the well toward the road.'

A second characteristic is of special interest
since it fails to appear as an inherent semantic aspect
of Path Verbs. In a language like English, enclosure is
a characteristic in great demand, witness phrases such as
into the house, and through the tunnel. Some
investigators have even established it as the keystone
of their analysis (Miller and Johnson-Laird);
nonetheless, enclosure is not a characteristic any Emai
Path Verb requires of its associated RO. Support for
this is derived from the compatibility of the verb o
'move into, onto' with the enclosure noun o and the
planar extent noun ukpa-ode in (2a), and a like
compatibility of these nouns with sho re 'move out,
off'.

2. a. Oli omgohe la o vbi o/a/ukpa-ode.
   the man run move into/onto house/road
   'The man ran into the house/onto the road.'

b. Oli omgohe la shan o/a/egbua.
   the man run move through house/backyard
   'The man ran through the house/backyard.'

c. Oli omgohe la o vbi egbua.
   the man run move into inside house
   'The man ran into the inside of the house.'

Enclosure might also be expected to play a role in
other Path expressions, such as the form equivalent to
the enclosure sense of through in English. The Emai
verb shan conveying this meaning occurs with two- and
three-dimensional configurations, as the ROs o and
egbua in (2b) suggest. These and other examples argue
that enclosure is a semantic quality ignored by Emai
verbs with respect to their ROs.

Though enclosure is not inherent in the meaning of
any Path Verb, it can be designated at the surface
level. In this case, the Path Noun egbua 'inside' is
inserted into the noun phrase of the RO, as shown in
(2c).
A third geometric characteristic of Reference Objects occurring with Path Verbs concerns their boundedness. Most Path Verbs require their RO to be a bounded, non-partitive entity. Where this is not the case, syntactic modification of one sort or another is required. For instance, *ikpeshe* 'beans' is conceptualized in Emai as a mass aggregate of bean units. When it occurs as the RO of a Path Verb that idealizes its RO as a point, the verb complement is restructured such that the single noun *ikpeshe* becomes the subject of the location verb *ri* in a Place Clause. Thus (3a) and (3b) without the Place Clause markers *ebe* and *ri* would be ungrammatical.

3. a. Oli ofen za vbi ebe ikpeshe ri la sho re.
   "The rat be at where beans be run move off"
   'The rat ran off the beans.'

   b. Oli ofen la ye ebe ikpeshe ri.
   "The rat run move toward where beans be"
   'The rat ran toward the beans.'

   c. Oli ofen la shan ebe ikpeshe ri.
   "The rat ran through the beans.'

Likewise when a Path Verb demands a bounded extent on which movement must occur, the unbounded aggregate *ikpeshe* is subject to similar syntactic modification. Therefore, (3c) without the clause markers *ebe* and *ri* would be ungrammatical.

Reconceptualizing the boundedness of a RO can be achieved by other syntactic means. In particular, the Path Noun *egbe* 'side, beside' can occur in collocation with the aggregate noun *ikpeshe*, as (4a) indicates.

4. a. Oli ofen la ye egbe ikpeshe.
   "The rat run move toward side beans"
   'The rat ran toward the beans.'

   b. Oli ofen la lagaa ikpeshe.
   "The rat ran around the beans.'

Syntactic modification of *ikpeshe* and similar nouns is not required with every Path Verb however. For example, no syntactic modification is required with the Path Verb *lagaa* in (4b), though why only this Path Verb exhibits this behavior is not clear. One might speculate that such exemplars occur since the RO of *lagaa* fails to act as a bounded extent on which the Figure moves or as a point at or via which movement is defined.

A final characteristic revealed by analysis of Path Verbs centers on an implicit Secondary Reference Object (SRO) as a complement to the Principle Reference
Object(PRO) manifested at the surface level. For some Path Verbs the earth assumes this function. For instance, the axis of the plane on which movement is specified by the Path Verb fan ze must be parallel to the axis defined by the earth. When this is not the case, as when an insect moves along the side of a wall from one end to the other, an ungrammatical structure results, as with udeken in (5), where the Figure moves on a plane perpendicular to the earth.

5. Aenhienmi la fan *udeken/ewa ze.
   cockroach run move across wall/floor mat
   'A cockroach ran across the wall/floor mat.'

Other Path Verbs also depend on the earth as a SRO, though in a more obvious manner. Take heen and kpoon for example. Each specifies movement on a plane whose axis intersects the plane of the earth. Their PRO specifies the extent on which movement occurs: heen specifying movement away from the horizontal plane of the earth, i.e., 'to ascend' and kpoon specifying movement toward the plane of the earth, i.e., 'to descend'.

Of interest in this regard are constraints affecting heen and kpoon. Both require that the moving Figure achieve his destination: the uppermost and lowermost parts of the hill, respectively. In neither case does the PRO indicate the achieved destination, it instead specifies the bounded extent on which movement occurs. If the movement being specified is not an achievement of this type, for instance motion toward the top of the hill, the top not being attained, then extensive syntactic modification is required. Instead of the heen structure seen earlier in Table I, (6a) would be used, where the verb specifying limited movement on a bounded extent, ye, is combined with a compound noun indicating direction, okpen-okhum. Similar syntactic modification is demanded when the bottom of the hill is not achieved, but movement is in a downward direction on the hill, as in (6b) with the compound okpen-otgi. It should be noted that in these compounds, the SRO maintains a degree of presence at the surface, since the forms okhum and otgi also mean 'sky' and 'ground', respectively.

    the man run move toward top hill
    'The man ran toward the top of the hill.'

   b. Oli omhe la ye okpen-otgi oko.
      'The man ran toward the bottom of the hill.'
Our investigation now turns to positional expressions. In constructions of this type, a noun or a noun in combination with other grammatical elements expresses the Path by which a Figure can be located. Most Path Nouns in Emai are derived from body part terms, though a few have their source in more general terms of the environment, earth and sky, while still others at the surface level show syntactic complexity in addition to semantic extension. Those forms involving lexical derivation only are shown in Table II.

Table II. Path Noun Constructions in Emai.

Qoli ughu ri vbi okhumi udo.
The vulture be-located at above stone
'The vulture is above the stone.'
Qoli udo ri vbi okpen-otgi oko.
The stone is at the bottom of the hill.'
Qoli udo ri vbi idama ukpa-ode.
The stone is in the middle of the road.'
Qoli ughu ri vbi agban eda.
The vulture is at the edge of the river.'
Qoli ughu ri vbi egbe oka.
The vulture is beside the house.'
Qoli udo ri vbi egeen gie itebu.
The stone is below the table.'
Qoli udo ri vbi isao isi oka.
The stone is in front of the house.'
Qoli udo ri vbi uokho isi oka.
The stone is behind the house.'
Qoli udo ri vbi esegese isi eli areo.
The stone is between the idols.'

An observation concerning the syntax of these forms is pertinent. Each requires the marker *vbi* in contrast to Path Verb constructions; yet, not all express contact between the Figure and RO itself, as one would expect from our earlier analysis. Instead, contact is specified relative to an area abstracted from the RO, amending in some manner an immediate proximity relationship.

Support for the latter contention is the unmarked positional construction, shown in (7), whose chief features are the location verb *ri*, the marker *vbi* and a RO. As examination of the two ROs in (7) suggests: *vbi* idealizes its RO as a point, ignoring the enclosure quality of *oa* and the planar quality of *ukpa-ode*. 
7. Oli uso ri vbi oa/ukpa-odę
   "the stone be at house/road"
   'The stone is in the house/on the road.'

Besides being idealized as a point, the RO occurring in the neutral form exists in a state of contact with the Figure. With either RO in (7) the Figure uso must exist in a proximity relationship best captured by the neutral preposition 'at', not 'beside' 'top' etc. Hence the interpretation of vbi as indicating a proximity relationship of contact is constant across the two types of Path expressions examined herein.

A further point along these lines is that only a particular geometric aspect of the RO dictates the appropriate interpretation. For example, the version of (7) with oa cannot mean that the Figure object is on the house, the roof for example or beside it, where it may still be 'at' the house; the Figure must be in the house. Similarly, the version with ukpa-odę cannot mean that the Figure is for some reason in the material of the road. It is as if in the unmarked structure the Figure is positioned with respect to a RO as prototypically construed.

The unmarked structure, as we have seen, expresses a relationship of contact between Figure and Ground. This is not the only manner in which a contact relationship can be indicated in positional structures. For example, addition of the Associative marker isi to the egbe construction in Table II expresses a contact relationship wherein the Figure is affixed to the side of the house, as in (8).

8. Iogn ri vbi egbe isi oa.
   "feather be at side ASSOC house"
   'A feather is on the side of the house.'

Despite the meaning of this construction, it is only with the Path Noun egbe that the Associative marker indicates contact between Figure and RO. For example, expressions in Table II with the Path Nouns isao 'front' uokho 'back' and ese-esẹ 'among' employ isi obligatorily but do not specify immediate contact of Figure and RO. Moreover the behavior of isi is puzzling due to its variability in Table II. Though the formal facts are on record, it is not clear why isi manifests this variable distribution, i.e., what meaning isao, uokho and ese-esẹ have in common that would exclude the meanings of egbe 'side', agban 'edge of' and others where isi does not occur. It is thus
obvious that the presence of isi is not a consistent barometer of a relationship of immediate contact, as presence of vbi is not. Nonetheless, these two grammatical forms affect a proximity relationship differently: the immediate proximity level indicated by vbi is weakened by the presence of a Path Noun, whereas the addition of isi to a Path Noun construction can serve to intensify the proximity relationship between Figure and RO.

Another surface level strategy for specifying contact between Figure and RO involves a more complex clause level specification of the RO noun phrase. Take the okhumi udo example in Table II for example, which specifies only that the vulture is above the stone. In the event that the vulture is actually touching the stone, then the syntactic restructuring shown in (9) is required: an ebe clause with the verb kpen and the grammatical marker li. In this example, the form isi plays no role and the contactness suggested by vbi is ignored in view of the Path Noun okhumi.

9. Oli ughu ri vbi ebe o kpen okhumi li udo. The vulture be at where it next top to stone 'The vulture is on top of the stone.'

Moving to another characteristic discussed for Path Verbs we come to enclosure. As shown earlier in this section, one need not specify the enclosed nature of an object with the unmarked locational construction, ri vbi N. In order to indicate enclosure, however, the Path Noun ekein, as in (10), is available and its associated RO must be capable of being idealized as an enclosure, since substitution of the noun ebe 'leaf' for oa in (10) leads to ungrammaticality. Enclosure, therefore, is a feature of geometric character which is available for emphatic but not obligatory marking.

10. Oli omoge ri vbi ekein oa. The man is inside the house.'

Of all Path Nouns, it is only ekein 'inside' which has this optional status. For purposes of RO idealization, ekein is thus different from its paradigmatic brothers and sisters, which are obligatory at the surface level when the geometric selection they express is being conveyed.

In contrast to the similar behavior of Path Nouns and Verbs regarding enclosure is their differing behavior with respect to RO integrity. No Path Verb requires that its RO be a non-integrated dispersed entity. One of the Path Nouns, however, requires that
its RO be idealized in this manner. When, for instance, the RO occurring with ese-ese 'among' is marked as an integrated entity with the singular determiner oli in (11), the resulting sentence is ungrammatical. Only the plural determiner eli, reflecting a diffuse, partitive RO is acceptable.

the stone be at among ASSOC the idol  
'The stone is among the idols.'

A less severe partitioning of ROs is found with a number of other Path Nouns. Instead of partitioning among entities, these Path Nouns partition a single RO and advance one portion, for example front, top, as relevant for locating the Figure. Path Nouns from Table II performing this function include isao 'front', uokho 'back', egbe 'side', okhumi 'above', and eggenggeen 'below'.

A final characteristic of Path Nouns to which our attention is drawn concerns the use of Secondary Reference Objects. For some Path Nouns such as okhumi 'above', one might assume that the earth and its vertical plane provide the orientation for locating the Figure. To a degree this is true, but there are constructions which indicate that this aspect of meaning can be ignored. Thus in contrast to the okhumi construction in which the Figure is located on a vertical orientation relative to the RO, there is the construction in (12a), where localizing the Figure requires orientation on the horizontal, not vertical plane. A similar contrast prevails with okpen-otgi in (12b).

the village be at forward road  
'The village is up ahead on the road.'

b. Oli egbo ri vbi okpen-otgi ukpa-ode.  
'The village is back down the road.'

The degree to which a vertical orientation, i.e., the earth as SRO, is equally primary for okhumi and okpen-otgi is unclear however, since only the former, by demanding additional lexical units to form a compound referring to a horizontal orientation, reveals its initial embedding in the vertical.

A number of other Path Nouns also assume the earth as a Secondary Reference Object, though these are less susceptible to modification. The forms in question refer to one and only one portion of the RO, as that object is positioned relative to the earth. Thus egbe
'side' can only refer to an axis perpendicular to the earth, not horizontal and parallel. Likewise, the earth as SRO plays a role in the meaning of isao 'front' and uokho 'back' and egeengeen 'below'.

In the preceding examples the Secondary Reference Object has been implicit, discovered by positioning the Figure in various spatial arrangements. Another set of Path expressions exhibit explicit reference to a SRO and in fact do not employ a Path Noun. For convenience, these expressions can be discussed in terms of two subsets, both employing the grammatical marker li seen in a few earlier constructions. In one set, the grammatical marker li relates the PRO to a pronoun indicating the SRO, the latter being the speaker and his location. The particular orientation of the speaker in this case is projected onto the PRO and by this means the Figure is localized. Consider example (13), where uhai is the PRO and the pronominal forms ean 'here' and evbo 'there-yonder' indicate different speaker orientations leading to the resultant meanings 'nearside, this side' in the former and 'farside, that side, beyond' in the latter.

     the man be at where it next here to well
     'The man is on this side of the well.'

   b. Oli omohe ri vbi ebe o kpen evbo li uhai.
     the man be at where it next there to well
     'The man is on that side of the well.'

   In the other set, the grammatical marker li relates the PRO to a compound noun indicating the Secondary Reference Object, which again is the speaker. In this case the speaker's left or right orientation is projected onto the PRO. In (14) the compound nouns ogon-obq, literally 'crooked hand', and obq-odion 'hand senior', serve to project a left or right orientation onto uhai 'well' and thereby localize the Figure. It thus appears that only the speaker as SRO, not the earth, attracts explicit surface level designation.

     the man be next lefthand to well
     'The man is to the left of the well.'

   b. Oli omohe si kpen obq-odion li uhai.
     the man be next righthand to well
     'The man is to the right of the well.'

   In the preceding, geometric concepts reflected in constraints governing Path forms and their associated
Reference Objects in Emai were investigated. As suggested by Talmy, these constraints reveal topological characteristics such as proximity, boundedness, enclosure, in addition to notions of orientation imposed by Secondary Reference Objects. Of particular interest, however, was the manner in which these characteristics were expressed at the surface level, e.g., optional marking of the enclosure property of a Reference Object, obligatory marking of the speaker as Secondary Reference Object. These it is hoped will serve as a further basis for cross-linguistic exploration of the types of lexicalization processes which support the schematic nature of spatial representations.

FOOTNOTES

1. Emai data are presented in the orthographic form suggested in Schaefer(n.d.), which reflects general IPA conventions except for the use of vb for a voiced bilabial approximant, y for a voiced alveopalatal affricate and the indication of tone only where it serves the purpose of disambiguation.

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Classifiers, Verb Classifiers, and Verbal Categories

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Worora, an Australian Aboriginal language of the Northern Kimberley coast of northwestern Western Australia, shows a pattern of finite verb inflection that is characteristic, in different degrees, of the whole continent and particularly of a vast region of northern and western Aboriginal Australia (see Dixon 1976:12-14;613-768). If we look at the examples tabulated in (1), it is clear that different verbs seem to belong to classes such that [a] they are conjugated with the obligatory occurrence of one of about ten distinct verbal auxiliary stems, that themselves also generally serve as full verbs, plus the lexical head of the verb phrase that is either uninflected, or inflected in some particular fashion, along with the auxiliary; and [b] the different verbal lexemes select particular fixed and restricted sets of auxiliaries (from one to about three at most) as the range of possibilities for inflection. This means, I shall argue, that in effect Worora and other such languages have a system of verb classifiers more particularly, not just a periphrastic Verb-plus-Auxiliary type of inflection.

Our discussion must establish, first, the nature of such verb classifiers, on analogy with the notion of noun classifiers which is more familiar in the descriptive and theoretical literature. We must see what kind of characterization of classifiers in general emerges from such a comparison. We must, most of all, try to understand the metatheoretical implications of our ability to draw the analogy, seeing what kind of approach---and only what kind of approach---makes the parallelisms that exist clear.

I shall conclude from this examination that classifiers as a possible category-type in languages can be defined only by a jointly formal-functional definition. Classifiers are distinguishable from the phenomenon of semantic classes as such only by attention to how certain coding properties of language specifically and differentially "solve," as it were, a particular problem of how the denotational functions of language are superimposed on the indexical (or pragmatic) dimensions of language use. (This is not an argument against morphosyntax, note; it is not a reductive functionalism, as I have elsewhere termed it [Silverstein 1985]. It merely says that universal grammar is either a formal-functional model-fitting empirical science, or it is nothing; neither purely formal nor purely functional modeling amounts to a theory of language as code.)

But let us start with the more well-known phenomena, those of nominal classification and nominal classifiers. Is it possible to make precise the nature of these two semantic codings? One writer on the subject, R. M. W. Dixon (1982:157-233), proposes a characterization of noun classes that is of interest as a starting point for our discussion. "[T]he category of noun classes," Dixon (1982:
(1) Worora (Western Australia) "auxiliary" verbs as classifiers:

$\text{[S]}_S^{-\text{WA}} - (\text{involuntary}) \ \text{precipitous motion, action (of S[subject])}''$

gawana \ [=ga_S^{-\text{WA}}-\text{na}] 'he ran off''

adja njimbana \ [=nji_{S}^{-\text{WA}}-\text{na}] 'she sat down''

da'.a \ [=ba-WA] 'go in!' [sg. imper.]

do'.ra \ [=gu_{S}^{-\text{WA}}-\text{na-i-ri}] 'it(n.sg.) was running out''

$\text{gu(N)}_S^{-\text{WA}} - [D] - '\text{motion, action (on D[ative] experiencer)'}$

lar gumbanu \ [=gu_{S}^{-\text{WA}}-\text{na-(a)nu}_D] 'it pleased you(sg.)''

$\text{[S]}_S^{-\text{NI/NU}} - \text{continuing states, results (of S)}$

(ba'dawa'da) \ [=ga_S^{-\text{NI}}-\text{nu-na}] '(red ochre) it(m.sg.) was/was there' 

adja \ [=i_S^{-\text{NI}}-\text{nj}(dj)-i-ri] 'who(m.sg.) is sitting/is seated''

wa'. layburu \ [=ba-yi-(a)r_{S}^{-\text{NI}}-\text{n}] 'we(excl.) do/will not know'

bu'.bu'.ba \ [=ma_{S}^{-\text{NI}}-\eta-i-ri] '[wind] it(loc.) is blowing about''

$\text{[S]}_S^{-\text{NI/NU}} - [D] - \text{continuing states, results (of S) (to/toward D)}''$

dja'.a \ [=gu_{S}^{-\text{NI}}-(\text{N}U-\eta-\text{anaa}D_{D}-i-ri)] 'you(sg.) always pick on him(sg.)''

bim'ulmu \ [=ga_{S}^{-\text{NI}}-\eta-\text{anaa}u_{D}] 'we(excl.) take care of them(pl.)''

$\text{[S]}_S^{-\text{YI}} - '\text{motion, movement, action (of S)}''$

ge'.a \ [=ga_S^{-\text{YI}}-\eta-\eta] 'he went''

djo. \ [=ga_{S}^{-\text{YI}}-(a)-a-\eta(u)-i-ri] 'we(du.excl.) were drinking''

djo. liyo\cdot \text{li ware}. \ [=w-ar_{S}^{-\text{YI}}] 'let us(incl.) return!' [pl. imper./hort.]

bu'.ba \ [=ga_{S}^{-\text{YI}}-\eta-i-ri] 'I was gliding/flying slowly''
\( [S \text{-} \text{VERB} \# [S \text{-} \sqrt{\text{VERB}} \text{-} \text{state of motion, movement, action (of S)}] \)
\( \eta_n_S \text{-} \text{wal} \eta_n \text{-} \text{ne \text{-} ri} [=\eta_n_S \text{-} \text{YI} \text{-} \text{ga-i \text{-} ri}] \text{ 'I am standing'} \)
\( \text{gu(N)}_O \text{-} [A \text{-} \sqrt{\text{VERB}} \text{-} \text{(A[gent]) do, make; say (something 0[subject])}] \)
\( \text{gunjdi \text{-} ri} [=\text{guN}_O \text{-} \emptyset_A \text{-} \text{Y(I) \text{-} ri}] \text{ 'he(m.sg.) is saying'} \)
\( \text{ba \text{-} d} \text{ gumne \text{-} n} [=\text{guN}_O \text{-} \emptyset_A \text{-} \text{mnja+YI-\eta(a)}] \text{ 'he stood stiff, still'} \)
\( \text{gapo \text{-} n} \text{ gubadia \text{-} li \text{-} ri} [=\text{gu(N)}_O \text{-} \text{war(A) \text{-} (Y(I) \text{-} a1 \text{-} ri)] \text{ 'they(pl.) are flying hither'} \)
\( \text{djaban} \eta \text{ gunjdi \text{-} ri} (\text{qule} \eta \text{ gu}) [=\text{guN}_O \text{-} \emptyset_A \text{-} \text{Y(I) \text{-} ri}] \text{ '(your tongue) it(m.sg.) is parched, dry'} \)
\( \text{gu(N)}_O \text{-} [A \text{-} \sqrt{\text{VERB}} \text{-} \text{-} [D \text{-} \text{ 'A do to, make for (D)'} \)
\( \text{da} \text{-} \text{ gunjdja \text{-} te \text{-} ri} [=\text{guN}_O \text{-} \emptyset_A \text{-} \text{Y(I) \text{-} a \text{-} ta \text{-} ri}] \text{ 'he(m.sg.) is carrying me on his back'} \)
\( [L \text{-} \text{A} \text{-} \sqrt{\text{VERB}} \text{-} \text{-} \text{NURU} \text{-} \text{ '(A) bring (O); (A) convey (O)} \)
\( \text{wa-wa} \text{ djo \text{-} li} \text{ banjara \text{-} nuri \text{-} ri} [=w+(g)a_O \text{-} \text{njar} A \text{-} \text{NUR(U) \text{-} ri}] \text{ 'will we(incl.) not bring him (m.sg.) back?'} \)
\( \text{nuru} \text{ ga} \text{-} \text{nbarga \text{-} nuri \text{-} ri} [=\text{ga}_O \text{+n} \text{ war} A \text{-} \text{GA} \text{-} \text{NUR(U) \text{-} ri}] \text{ 'they(pl.) are listening to them(pl.)'} \)
\( \text{gu(N)}_O \text{-} [L \text{-} \text{A} \text{-} \sqrt{\text{VERB}} \text{-} \text{-} \text{NE} \text{-} \text{NA} \text{-} \text{ '(A) be conscious of (something); (A) have feeling of (something)} \)
\( \text{guranenala} [=\text{gu}\text{-} \text{ra}_A \text{-} \text{NE-NA-la}] \text{ 'you(pl.) all knew it(n.sg.)'} \)
\( [L \text{-} \text{A} \text{-} \text{VERB} \# \text{gu(N)}_O \text{-} \emptyset_A \text{-} \sqrt{\text{VERB}} \text{-} \text{ '(A) have feeling about (O)} \)
\( \text{gapo-l} \text{ gune} \text{-} \eta \text{-} \ri} [=\text{ga}_O \text{-} \eta_A \text{-} \text{WUL} \text{ gu} \text{-} \emptyset_A \text{-} \text{NE-\eta-i-ri}] \text{ 'I am frightened of him(m.sg.)'} \)
\( [L \text{-} \text{A} \text{-} \sqrt{\text{MA}} \text{-} \text{ '(A) seize (O); (A ["ground") make contact with (O ["figure")} \)
\( \text{ga} \text{-} nana} [=\text{ga}_O \text{-} \text{\eta_A-MA-\eta}] \text{ 'I caught them(pl.)'} \)
\( \text{walumb} \text{ \eta\text{-}n} \text{ \text{-} \ri} [=\text{ga}_O \text{+n} \text{ war} A \text{-} \text{MA-i-ri}] \text{ 'he(m.sg.) loves me'} \)
\( \text{bu-l} \text{ \dja\text{-}n} \text{ \text{-} \ri} [=\text{dja}_O \text{+n} \text{ war} A \text{-} \text{MA-i-ri}] \text{ 'you(sg.) are sorry for me'} \)
\( \text{madri} \text{ ga} \text{-} \text{nbad\text{-}ri} [=\text{ga}_O \text{+n} \text{ war-MA-i-ri}] \text{ 'they(pl.) are sneaking up on them(pl.)'} \)
gu(N)₀-[A]$\sqrt{MA}$- '(A) feel (something)
  djiyan gubadbe·riŋguri [=gu(N)₀·war$_A$-MA-i·ri(ŋg)-uri] 'they(pauc.) are ashamed'

[O]₀-[A]$\sqrt{MA}$- '(O) be seized/overcome by (something)
  djarara ɣame·ri [=ŋa₀·n$_{\text{Inv}}$-Ø-MA-i·ri] 'I have a cramp (sc., in some body part)'

[O]₀-[A]$\sqrt{WU}$- '(A) strike (O); (A ["figure"]) make abrupt contact with (O [="ground"])
  muga ganjdjo·na [=ga₀-(ŋj)dja$_A$-WU-na] 'you(sg.) kissed him(m.sg.)'
  duru ɪmno· [=i₀·mnja+WU] 'cut it(m.sg.) [with a stroke of axe or knife]!' [sg. imper.]
  bûd [=br] banjdjawli [=w+(g)a₀-(ŋj)dja$_A$-W(U)-a-l] 'you(sg.) might fall hither on him(m.sg.)'
  maṭa ɳunbûna [=ŋun₀-Ø-W(U)-na] 'he(m.sg.) found you(sg.)'
  baynj gapo·na [=ga₀-ŋa$_A$-WU-na] 'I shot him(m.sg.) [sc., with gun]' (cf. English "bang!")
  balug mo·na [=ma₀-Ø-WU-na] '(the flood) covered [place=] it(loc.)'

[O]₀-Ø$_A$-$\sqrt{WU}$- '(A) be struck by/be overtaken by (something)
  bayə· ᵇanbi·ri [=ŋa₀·n$_{\text{Inv}}$-Ø-W(U)-i·ri] 'I am hungry'
  dindjir go·i·ri [=ga₀-Ø-WU-i·ri] 'he(m.sg.) is sneezing'

Note: In phrasal inflection, lexical verb precedes auxiliary. Within auxiliary, Patient-Agent ([O]₀-[,A]$_{\text{Agent}}$), Subject ([O]$_{\text{S}}$-), and imperative/optative/irrealis affixes precede the root, highlighted here in 'UPPER CASE'. Tense (in several conjugation-classes) follows root, then optional directionals. Dative (-[A]$_{\text{D}}$-) and aspect ('progressive' -i·ri) follow, as well as any number suffixes relating to at least one of the pronominal cross-references, differentiating 'plural' (-u·ri), 'paucal' (-uri), 'dual' (-[g]a-ndu) from 'singular' ([no suffix]).
160, 163, 165) concludes,

"is (1) a grouping of all the nouns of a language into a [de-
limited] number of classes, (2) [so that there is some overt
indication of the class of a noun within [certain types of sen-
tece] in which it occurs with one of a certain set of syntac-
tic functions], (3) and this indication is not entirely within
the noun word."

(I include in brackets the revisions of wording in Dixon's discus-
sion itself, found at the indicated places.) Let us examine these
criteria, trying to distinguish between what we might term the
formal bases and the substantive ones, in the usual understanding
of the distinction between these two aspects of a theoretical dis-
course about linguistic signs.

The first criterion presupposes that we can identify the formal
and substantive category of nouns in a language, and asserts that
the totality of nouns will be formally differentiated in some way,
lexically. This is, of course, what Whorf (Carroll 1956:93) called
the existence of selective classes of the lexicon, primary selec-
tive classes being the parts of speech, e.g., nouns, verbs, etc.,
and various nonprimary semantic categories cross-classifying dif-
ferent subsets of the total primary selective categories, making of
each lexical item a formally noncompositional lexicalization of
some specific intersecting (Boolean [?]) set of semantic categor-
izations, which it can be said to "code."

What Dixon really wants to say, however, is that noun classes
as such in effect partition the total lexicon of some part-of-speech
such as nouns (with some sloppy but regular crossovers and overlaps
of course). This, it seems, is the essence of noun classes in
terms of semantic selectivity, not merely the existence of cate-
gories or classes (which may be modeled by cross-cutting 'features'
for example in a multidimensional semantic space).

Let us look at this relationship more carefully, in terms of
semantics and the way such semantics is coded by noun phrase struc-
ture. In particular, let us concentrate on the distinction between
lexical partition---as required by the notion of noun classes---and
lexical categorization more generally, as implied in the totality
of formal morphosyntactic differentiations of types of nouns in any
language.

As should be well understood on the basis of contemporary the-
ory of reference and categorization (see Putnam 1975; Searle 1969;
Rosch 1979; and refs. there), we must make a distinction among
three perspectives on how linguistic forms relate to the problem of
categorization of denotata by language. First, there is the per-
spective of FORMAL categorizations, principles of morphosyntactic
arrangement, the stable, rule-governed regularities of which imply
the existence of what Bloomfield, in his wisdom, termed (1933:146)
simply form-classes. Making clear our modern understanding that
both local paradigms of contrasting forms and configurational para-
digms of constituent order and grammatical nexus type can equally
well serve to code linguistic distinctions, we might term these form-order classes as the general label. FORMAL categorizations are implied by the totality of the grammar (morphosyntax) of a language. In the rightmost column of (2) are indicated some of the widely-evidenced FORMAL categorizations applicable to either Nouns as a primary selective class or to Noun Phrases as the endocentric projection of Nouns.  

(2) Perspectives on categorization of nouns and noun phrases:

<table>
<thead>
<tr>
<th>Differential reference to</th>
<th>Notional</th>
<th>Formal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woman</td>
<td>Female</td>
<td>FEMININE</td>
</tr>
<tr>
<td>Man</td>
<td>Male</td>
<td>MASCULINE</td>
</tr>
<tr>
<td>Social status/role</td>
<td>Human</td>
<td>PERSONAL</td>
</tr>
<tr>
<td>Beast</td>
<td>Large being</td>
<td>ANIMATE</td>
</tr>
<tr>
<td>Spirit, weather</td>
<td>Potent/Volitional</td>
<td>AGENTIVE</td>
</tr>
<tr>
<td>Small creature</td>
<td>Thing</td>
<td>NEUTER</td>
</tr>
<tr>
<td>Inanimate manipulables</td>
<td>Shape or other physical characteristics</td>
<td>SHAPE, MANIPULABILITY</td>
</tr>
<tr>
<td>Food, artifacts</td>
<td>Edibility, utility</td>
<td>THING</td>
</tr>
<tr>
<td>Segmentable wholes</td>
<td>Enumerability</td>
<td>COUNT</td>
</tr>
<tr>
<td>States-of-being, ideas</td>
<td>Abstract thing</td>
<td>ABSTRACT</td>
</tr>
</tbody>
</table>

A second perspective is provided by what Lyons (1968:317-319) terms "notional" defining principles correlated with such form-order classes. These may be in simple and direct, one-to-one correspondence with a FORMAL categorization, or they may be configurationally complex and indirect in correspondence, a notional principle corresponding only to some grammatically-specifiable interaction of several distinct form-order classes. Observe that the simplest and easiest cases of correspondence to analyze and describe are those where a notional category correlates with something like a simple affixal alternation in explicit morphosyntactic form. By contrast, the correspondence of a structure of interactions of notional categories to a paradigm of configurations of form-order classes, presents a difficult situation, relatively opaque to any inductive procedures of analysis. In (2), the notional correlates of the FORMAL categories are given in the middle column, with their names in the usual semantic metalanguage. 

But it should be observed that such notional principles of classification are essentially intensional, class-specifying characteristics with respect to the denotational extension of any of the FORMAL categorizations. In the canonical case traditionally treated by naive referential semantics, these notional category labels are identifying descriptions predicable as true of the members of the class of denotata within the category, the 'necessary and sufficient conditions' for membership in the extensional set. In
a somewhat more sophisticated semantics, such intensionalized characterics at least form the basis for constructing a class with some internal structure, e.g., a "prototype"-plus-probabilistic-fadeout intensional structure of a category. In this kind of structure, there is at least probabilistically true predicability of such intensional characterizations for denotata, in a gradient way with a center or "focus" (see Kay & McDaniel 1978 on color categories as lexicalized by basic word-stems, for example). There are, of course, many different types of such internal structure to categories in denotation. But in any such case, this 'notional' or intensional class-characteristic form of specification is generally what linguists and others are talking about by speaking of the "sense" of linguistic categories and lexemes.

Now the third kind of perspective on categorization rests upon the interesting empirical fact about linguistic classes in particular, namely, that asymmetries of formal machinery connected with the contrasting members of form-order classes correlate differentially with a so-called specified and a so-called non-specified value at the level of 'notional' categories. As 'notionally'- or semantically-valuated linguistic structures, categories tend in this way to nest into what we now call hierarchical structures of markedness, just as in phonology (cf. Trubetzkoy 1939:66-80 on phonology; Jakobson 1936, 1939, 1958 on morphology and syntax). (Whorf [Carroll 1956:100] called the linguist's tendency to see language in terms of asymmetric binary oppositions "enantiomorphism").

The consequence of this 'notional' structure of markedness is, as is well known, that we must make a distinction between the intensional or 'notional' categorizations and categorizations of extensional application, in particular of denotational extension, i.e., sets of denotata (however these are to be demonstrated as individual entities) to which a form-order category "correctly" applies, with a very specific correspondence relationship between them, as shown in (3): within a denotational universe (as indicated by the Venn diagrams), the extension of the 'unmarked' member of an exhaustive markedness opposition is ambiguously realized in actual discourse instantiation, as either [a] the set of denotata of the total universe of possibilities, or [b] the set of denotata intensionally characterizable as lacking the intensional property specified in 'notional' perspective.

(3) Denotational ranges of 'marked' vs. 'unmarked' categories:
For the kind of nested categories like those that typically characterize the universe of noun-phrase referentiality, the categories of denotational universe of noun phrases, there is, in this third perspective, the structure of a denotational partition that we can induce on the markedness structure of intensional or notional categorizations insofar as these are extensionalizable. It is this: the partition of the universe of denotata into categories of entities that are typically and differentially extended by each category (as determined by the correspondence to FORMAL and 'notional' principles) and by no other such category. Frequently, these are found to constitute little intensionalizable subcategories—or paradigms of them—locally nested or nestled within the larger hierarchical markedness structure. They become the representative points of mutual opposition (in phonology, Trubetzkoy's "effectively equipollent" type), the fundamental "kinds of things" for the speakers of a language, who map such total partition structures onto many other realms of experience as a language-and culture-specific set of "metaphors" by analogy (Lakoff & Johnson 1980), etc. And they become the way that native speakers try to start from certain "givens" of a universe of concretely or "naturally" partitioned objects of experience "out there" (that are thought to exist as such independent of language or equivalent semiotic systems) and to intensionalize upon them with what we might term folk-intensionalizations. Native speakers come up with some predictable (intensional) characteristics that unite the members of each of the partition-classes of objects one with another to the exclusion of other such partition-classes, and they use these characterizations as "stereotypes" (Putnam 1975; = Rosch's [1979:36] "prototypes") of what members of the structurally-determined categories—those categories grounded in a linguistic analysis of FORMAL and 'notional' correspondences—ought, of a right, in the "basic" case to have as properties.

Hence, the problems for positivist philosophers (and for other unsophisticated natives) with referring to "feminine" tables in French, or "animate" raspberries in Menomini (Bloomfield 1933:272; cf. Greenberg 1954:15-16)—or even three-legged lions and tigers in English! And hence, also, the field of "ethnoscience" as it once was (Tyler 1969), seeking inductively to extract intensional principles of classification empirically from instances of attributive denotation (Donnellan 1966) of "scientifically" describable objects of experience.

Such structures of correspondence across the three perspectives as are sketchily outlined in (2) give an approximation to what underlies some of the commonest noun-classification systems. Note, for example, that systems of FORMAL GENDER in its basic type corresponds to certain subdivisions within the notional universe of 'Animate' designation. The marked member seems universally to be FEMININE, and hence extensionally there is a denotational asymmetry between formally MASCULINE and formally FEMININE.
However, at the level of a partition of notionally 'Animate' denotata, MASCULINE denotes males and FEMININE denotes females, whatever else these categories also differentially denote, whether by extending the FORMAL classes to the whole universe of nominal reference by "metaphorical" superimposition of this bipartite partition, or by their obligatory character in linguistic FORM. Hence, the folk-'notion' or re-intensalization of a criterion of 'male' vs. 'female' vs. '...' at the "notional" level derives from the differential extension of categories seen as a partition of the universe of all possible denotata: GENDER as part of a system of true noun classes must have this partitonal structure, correlated with some FORMAL principle(s) of coding---not merely an hierarchi-cal markedness structure of categories, not merely a cross-cutting 'feature'-like set of categories, but an asymptotically disjoint partition of the universe of nominal denotation.

Let us turn to the second of Dixon's characteristics for noun classes. It is simply that there be some differential FORMAL morphosyntactic treatment of the noun-class membership of every noun somewhere in the language, though whether every opposition of classes must be specified by a single, uniform morphosyntactic paradigm of FORMAL oppositions is not specified, perhaps just assumed. The idea here, however, is that we can find morphosyntactic tests (principally involving the inflectional apparatus of languages) that will correspond to the partition of nouns into classes, as per criterion [1]. Dixon attempts (1982:164) to restate his conditions [2] and [3] jointly "[i]n classical transformational grammar terms" in the following way:

"If there is some symbol, say AGR[eement], which is in deep structure immediately dominated by the same node as NOUN, and which is moved by an ordering rule to be an affix to (that is, is not separated by a word boundary from) some other symbol; and if AGR has at least two realisations, such that certain nouns select one, and certain other nouns the other (independently of person and number considerations) then the language has noun classes."

Note that by excluding categories of "person and number" Dixon is, of course, introducing substantive considerations into this, as well as into his first, purportedly formal, criterion.

But further, critical to the argument, Dixon wishes to exclude English GENDER from noun-class phenomena, because it "is manifested solely through pronouns that can substitute for, but do not normally occur with, nouns" (1982:164). He seems here to be re-striciting noun classes to languages with cross-referencing (concord) and morphological "agreement" (i.e., strict case-relation or thematically-based governance) within certain syntactic formations, principally 'dependent-marking' ones in Nichols' (1986:57) phrasing, up to but not including the actual clause or sentence level, where English pronouns freely operate. This would unfortunately seem to exclude various clear phenomena bespeaking noun
classes that Dixon himself cites, e.g., Apachean (Athapaskan) classificatory verbs (see Young & Morgan 1980:367-89, 395-407 for Navajo), where the stem-formation agrees "ergatively" with some subject or object noun class shape, extensibility, manipulability, etc., and would require something like the GB-type "INFL" node, within a constituency of the X-bar (or endocentric) type, it would appear, to describe in Dixon's terms---a constituency arrangement these languages are otherwise not thought to manifest.

So it would appear that perhaps the reason for Dixon's exclusion of English pronouns comes from the fact that they are basically discourse- or pragmatically-controlled/constrained devices for reference maintenance (along a cline of denotational richness from complex NP to zero; cf. Bolinger 1979, Silverstein 1986), which substitute for, but never cooccur in the same NP with the nouns/noun phrases they represent. As such, the only differentiation from, say, Djirbal noun-class markers (Dixon 1972: 44-47, 60-61, 70-73) both cooccur with a noun in some relevant noun projection and also substitute for a noun. So the differentiation from pronouns in English comes down to the fact that in English the pronoun cannot be specified from some "AGR" element or equivalent in an endocentric projection of the noun itself in some non-discourse-controlled/constrained function of the particular projection. How coherently to reconcile this with the desirability of being able to include the Athapaskan facts under the rubric of noun classes (where the projection must be the whole clause to include both subject agreement and object agreement), is certainly not clear, at best. These are grave difficulties with the attempt to state a purely FORMAL set of morphosyntactic criteria as diagnostics of noun classes, even setting aside the admittedly substantive distinction between categories of "person," "number," etc. as non="class" categories and categories that go into noun classes.

In fact, it should be clear that such a differentiation of nouns and noun projections in languages with split ergative/accusative inflectional morphosyntax, in which noun phrases of various categorial make-up in the referential universe have distinct kinds of case-marking oppositions, would certainly qualify as an indicator of putative noun classes under this conception, particularly where the markings are cross-referencing morphemes or similar mechanisms. And, arbitrarily, this would not be such a putative system where only the nouns themselves were morphologically case-marked! But clearly, Dixon does not want to have this conclusion follow from his second criterion. For while every language has some tendency to mark formally (even by exclusionary distribution) the asymmetries of category-types in the universe of denotational possibilities for noun-phrase codings (akin to the universal phonetic space in the plane of phonological structure, and thus a type of 'feature' space), using this as a criterion---in keeping with Dixon's second definitional point---would make of "noun classes" categorizations
that, in the nature of things, would be [a] non-partitionable and [b] universal, thus losing the analytic power of the distinction between languages with, and languages without, noun classes.

Many examples of the lack of differentiating power of this second criterion can be brought forth. So it is particularly interesting to see that Dixon's understanding of noun classes includes "any language whose verb contains some pronominal reference to subject or object or both" where "third persons," i.e., the cross-referencing pronominals, are distinct for various noun types (1982:163-64). This indicates, of course, that from a purely formal syntactic point of view—just the constituency topology, as it were, the graph structure—Dixon does, in fact, want to include the highest clause- or sentence-level projection of the lexical items as within the diagnostic scope of determining the existence or not of noun classes. So we have a real dilemma. And we might ask, what criterion of a formal sort do we really want to impose that would usefully differentiate the fact of a language having noun classes as such, instead of just cross-cutting and hierarchically-structured categories ('notional'—"features") of denotation? I would argue that none is possible, until we narrow the formal stipulation to include just the construction types functioning in crucial (proto-typical, if you will) diagnostic ways in the particular language (adjusting for morphosyntactic typological variability across languages, of course).

But this is exactly parallel to the definition of any other kind of morphosyntactic category as well, and hence to be expected. Since categories in language are coding categories, that is, asymmetric ways in which certain differences of form (and hence, derivatively, certain distinct forms) specifically and differentially signal some specific meaning, we never know that we "have" an actual example of some category—note, not "form-class" merely—unless we can find some structurally-specifiable environment or context in which the specific categorial value at issue is unequivocally signalled. This means finding also the functional specification—what meaning/value is differentially communicated by the presence of the category—as well as the formal specification—what constituency-arrangement(s) of formal structure minimally does the signalling by the presence of forms correlated with one or another member of the category. And both the function or meaning and the stipulation of formal arrangement must be given in terms independent of the specific language at issue in any case to be decided. This entails, for obvious reasons, stipulating a prototypical functional and formal correlation, with orderly principles of hierarchical fadeout under related, though non-prototypical circumstances. A type of universal-level definition of any category of the necessary-and-sufficient-condition variety, we now understand, will just never be able to constitute the discourse of universal grammar as an empirical science.

Thus, in defining for example case categories in universal gram-
mar, we find that the diagnostic stipulation is that [a] formally, specific case-markings (in whatever particular ways this is done in various language-types, as is now understood) in such-and-such formal constituencies of certain classes of lexical projections, differentially code [b] functionally, stipulated predicate-argument (case-relation) dependencies. Languages may vary in the number of case distinctions they make, from two or three to quite a few, perhaps somewhere up to a score, and languages may vary in how they assign various nondiagnostic predicate-argument configurations to certain case-markings in such-and-such other formal constituencies. But, at a given level of delicacy, that is, for a language having some $n$ distinct CASES for $2 \leq n \leq ca.20$, comparable diagnostic configurations will be found in this language with differentially-expressed comparable case-markings in other languages, all other things being equal. And similarly for any category.

For the realm of noun classes as a category type, it seems to me that the purest or prototypical expression of the phenomenon is, in fact, found in the lexicalization of noun class into a paradigmatic set of classifiers, which appear to be a kind of taxonomic prime in the semantic system of the noun lexicon. Taken together, the classifiers yield a kind of disjoint partition of the denotational universe into types of things that can be labeled by nouns. Dixon attempts to distinguish between the property of having noun classes and the property of having nominal classifiers, in the following way (1982:218):

"Classifiers comprise a largish (often, semi-open) set, whose members may not be exhaustively listable; each classifier is either a free form or else a root, to which a numeral affix or clitic may be added. Not every noun may take a classifier; many nouns may occur with one of a number of different classifiers, sometimes with differences in meaning and sometimes not. Classifiers, but not noun classes, may be used in different ways in different speech styles, within a language."

In (4) are shown the critical distinctions Dixon here draws:

(4) Comparison of noun classes and classifiers (Dixon):

<table>
<thead>
<tr>
<th>Noun Classes</th>
<th>Classifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphosyntactic formal mark</td>
<td>Lexical item (stem-type)</td>
</tr>
<tr>
<td>Closed class</td>
<td>Open class (i.e., more open)</td>
</tr>
<tr>
<td>Rigid partition of lexicon</td>
<td>Less rigid partition of lexicon</td>
</tr>
</tbody>
</table>

As is seen in (4), the critical distinctions---leaving out the indexical-functional plane of speech style---are that classifiers are essentially lexical items, even if a minor form-class within the major, classified stem-class's phrasal projections; by contrast, taking account here of Dixon's third criterion on noun classes themselves as quoted above, noun classes are signalled by non-stem morphosyntactic codings. Secondly, there is relatively greater "openness" of the classifier set, in that new classifiers presumably can
come into being, like other lexical items. But we should be wary of bringing this essentially diachronic perspective into a synchronic analysis of a phenomenon, and we must reject this statistical test, which is really inapplicable to language at the level of morphosyntactic analysis. The third criterion here concerns the gradient of characteristic rigidity in the partitions of the lexicon by noun classes vs. classifiers; but this criterion turns out also to be merely a statistical estimate on the "absorptive" quality of certain classifications, and on the multiple membership possible of classified nouns through the independent semantic contribution of the classificatory mechanism: **buxom men** are, to that extent, "re-classified" in gender specification.

This is really not much to go on in the way of differentiating classifiers from noun classes. What remains is lexicalization, plus a gradient of tendencies, with much more overlap in the "center" of the dimensional scales than the kind of neater distribution we ought to get in a sample of languages with a more empirically viable concept: it is alleged, for example, that there are languages with ca. 100 noun classes, just as there are languages with only ten-to-a-dozen classifiers; etc. So I think that rather than to gradient tendencies, we must look to the nature of classifiers as such in their clear cases.

Doing so, we would find, with Lyons (1977:463), that substantively, i.e., in terms of semantic coding, there are basically two types of classifier. One, akin to the terms cup, grain, pound, short ton, block, etc. in the English measure phrases of the type three cups of sugar, etc., is something that stipulates that the denotatum so classified comes in---should be considered as---such-and-such 'intervals' or 'lumps' or whatever when individuable qua denotatum. Such mensural classifiers denote the way that individuation (and hence, in terms of logically extensional reference, quantification) can be satisfied as a guaranteeable property of the denotatum. By contrast, sortal classifiers differentiate denotata into fundamental types, like a partition by most superordinate basic-level taxa in an elaborate taxonomic scheme. Such sortal types constitute, in effect, a denotative guarantee that there are such-and-such type of individuals in the universe of extension of the noun phrases where the classifiers occur.

Taken together, these two types of classifiers really correspond to presuppositions on referring, the conditions that are indexically signalled in the speech act of referring (Searle 1969:72–96) by the felicitous occurrence of the referring expression. As we can rephrase the Strawsonian and Searlean understanding, there are certain preconditions on consummating true reference---not just the "attributive" use of descriptions---that inherently involve what I term its existence, quantifiability or identifiability, and characterizability. As to the precondition of existence, referring presupposes that the referent (or referents) be an entity (or some entities) in some universe of discourse. As to the precondition of quantifiability (indi-
viduation), referring presupposes that the referent(s) be individual(s), sets of which being formable in various ways. As to the precondition of characterizability, referring presupposes that there be at least some "identifying description" that would uniquely characterize the referent(s).

Note then that mensural and sortal classifiers bring these indexical relationships of referring expressions into the very plane of denotation: relative to some other presentation of denotatum with which it cooccurs, e.g., the head noun in construction with it, the classifier [1] either gives a characterizability condition presupposed to be so of the denotatum and by virtue of which the application of the other characterizability condition, as contained in/coded by the "head" noun, can be evaluated; [2] or gives an individuating/quantifiability condition presupposible to be so of the denotatum; [3] or gives a combination of the two. And referring is, it will be recalled, the one pragmatic implementation of denotational language that is prototypically the function of noun phrases, i.e., of the basic projections of Noun as a grammatical and lexical major form-class. So that we might indeed expect that classifiers will appear in a language when the particular syntactic projection-type, the noun phrase, has its reference-function above all others, e.g., in mensuration, signalled by measure phrases, in topical or other reference-maintenance, signalled by pronominals or deleted head nouns, or other similar devices in which the classifier stems or lexical items as such emerge as the only positive signal form remaining in the form-class as it has lexical realization ("How much sugar do you need?" "Three cups."---shows both of these tendencies intersecting in the mensural classification of English).

In (5), then, we may give an approximation to a definitional characterization of classifiers and classes independent of the association with nouns in particular.

(5) Classifiers vs. classes:

Classifiers are a set of lexicalizations (a minor projection-class) of the basic propositional or other pragmatic/semantic functional characteristics (the dimensions of the "space" of possibilities for extensionalization or routine perlocutionary success) of the major projection-class of which they are the classifiers. They must occur in those construction types where the language denotes what is indexically presupposed in the type of speech act for which the classified projection-class is functionally always available (i.e., for which the classified projection-class is the prototypical form associated with that type of speech act). Classes are a closed paradigm of partitioned morphosyntactic markings of these dimensions, the occurrence of which need not be implicationally-centered in the constructions of prototypical functional value for the so-classed major projection-class.

In (5), the elements of the definition are drawn from [a] the
notion of a projection-class, an hierarchical constituency in morphosyntax concatenatively built around any one of the primary (or relatively more primary) selective form-classes in the lexicon; [b] the notion of the prototypic morphosyntactic coding of the functionally unmarked pragmatic or speech-act usage of the constructions containing the projection-class, for example Nouns and their endocentric projections for referring, Verbs for assertion of predicates, etc.; [c] the differentiation of denotation as one of many planes of semiotic meaningfulness of linguistic forms, and in particular the understanding that denotation can be related to the indexical meanings of forms as a kind of metalanguage used in referring and asserting. (Since classifiers in particular have lexical FORM, this last condition explains the often-observed fact that classifiers seem to be taxonomically superordinate lexical items with respect to sets of Nouns they classify, which, from the perspective of denotational content, seem to be hyponyms of classifiers. It also allows us to understand that some Nouns may in effect function syntactically like classifiers as well as ordinary Nouns, and hence have no subordinate taxa---a situation Dixon terms "not taking any classifiers," which is precisely backwards, as I see it.)

Classes as a definable phenomenon seem to retain all of the properties of partition, but relax the requirement of lexicalization and the requirement that the formal markings of the partition always appear in the prototypical functional use. They really should be seen as the general category, of which classifiers are then the privileged prototype and differentiating 'notion' in grammatical metatheory. The lexicalization requirement on classifiers, in particular, yields certain gradient properties that I do not elaborate here, of rigidity of partition, multiple classifier usage (cf. certain serial verb construction-types) appearing as classifiers-of-classifiers, etc.

In (6), finally, we make the transfer from nominal to verbal phenomena, giving a table of parallel ways that the two principles of denotational coding of indexical presuppositions of the major projection-classes might be expressed.

(6) Comparison of nominal and verbal classifiers:

<table>
<thead>
<tr>
<th></th>
<th>Nominal</th>
<th>Verbal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantifier</td>
<td>mensural classifier</td>
<td>aspectual classifier</td>
</tr>
<tr>
<td>Characterizer</td>
<td>sortal classifier</td>
<td>argument-structure &amp;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>predicate-perspective classifier</td>
</tr>
</tbody>
</table>

From the data tabulated in (1), it would appear that the verbal auxiliaries in Worora function as such classifiers. They constitute the lexical form-class that takes the inflectional markings, as in many languages, and they are always present as the nondeletable com-
ponent of the finite verb phrase, even where the lexical verb head of the projection does not appear. Observe that in Worora, as we would predict, auxiliaries/classifiers have a quantificational or "mensural" characteristic, in giving the aspectual classification (the topology of interval characteristics presupposed for the extensionality of predicate denotation) of the various classes of verbs. And they have a qualitative, "characterizing," or "sortal" characteristic, in giving the argument-structure classification (the number of arguments [1,2,3] in particular case-relation distributions ['Agent'-'Patient', 'Experiencer'-'Patient', 'Agent'-'Recipient', etc.] and the predicate-perspective classification (markedness structure of argument realization in case-marked Noun Phrases in basic and derived sentence-types and other predicate-argument construction types, e.g., English X buy Y from Z/Z sell Y to X as an opposition of basic construction-types for this pair of verbs). Note that the auxiliaries in Worora code values along both dimensions of classification simultaneously, since each auxiliary root has a paradigm of inflectional possibilities, and each lexical verb occurs with from one to two or three different auxiliaries that jointly exhaust its total paradigm along these dimensions, particularly that of the "sortal" or aspectual sort. Thus, note that adja 'sit (down), take sitting position, be seated, be in sitting position; live (at a place)' is inflected with auxiliary S-\$/WA\$ as a telic, change-of-state predicate coding, as in the nonprogressive past tense form adja njimbana [njiN\$ 'she', -\$na 'past'] 'she sat down'. But coding the resultative state following such change-of-state (or coding the denotation 'live!'), this same lexical verb is inflected with the auxiliary [], -\$/NI/NU\$, as in adja inganinjdji ri [i\$ 'subord.(m.sg.)', -\$nga 'subordinator', -\$nj(dj) 'subord.present', -\$ir 'progressive'] 'who(m.sg.) is sitting/is seated; who(m.sg.) is living [someplace}'.

The auxiliaries/classifiers of Worora further obey the regularity that in various nonfinite derivational constructions used with no specifically verbal indexical presuppositions, they do not appear. The lexical verb, with its appropriate derivational apparatus, here appears alone.

The Worora example is interesting because it shows with an elaborate delicacy of explicit classifiers what the dimensions of verb classes—the less explicit situation that is, alas, the condition of most languages encountered—in language consist of. In this it also provides a demonstration at a more general level about the formal-functional anchoring of universal grammar as an empirical study. Understanding categories like classifiers and classes to be of necessity defined in this dual manner of linking functional principles to formal correlates gives to the study of categories of universal grammar a primacy both with respect to "semantics" and with respect to "syntax." Generalizations in either of these approaches are, in effect, ungrounded until they are related, through the study of universals of categorial structure, to those of the other.
References


ON THE EVOLUTIONARY PATHS OF LOCATIVE EXPRESSIONS

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Spatial location has been traditionally studied indirectly as a consequence of studying the structurally coherent categories of prepositions and case inflections. This particular semantic domain, however, is expressed by a diverse selection of means - within one, and across languages - ranging from grammatical, closed-class items, such as adpositions (prepositions and postpositions) and case inflections, to open-class items, such as adverbs and nouns. According to the same tradition, languages are different in surface form only (Lyons 1968), implying that each language "selects" a particular means of expressing locative notions from a basket of universally-available means.

There are some problems with this theoretical orientation. First, while it is true that location tends to receive grammatical expression across languages, and in many languages closed-class items (prepositions and case inflections) share structural properties, it is not the case that members of a closed class, such as prepositions, express meaning in the same semantic domain. Also, the set of meanings expressed by prepositions in one language is not the same as the set of meanings expressed in another. As a consequence, comparison of languages based on structural similarities would result in a view according to which languages are very different from each other in expressing locative notions. Second, this theory does not explain nor predict why a language utilizes one particular means of expression over another, thus implying an unmotivated, arbitrary system of selection. Third, this theory faces great difficulty in explaining how a form expressing some locative notion can be used lexically and grammatically at the same time. A theory that presupposes a strict categoriality of forms has a hard time dealing with peripheral effects.

Recent theoretical innovations regarding grammatical categories, proposed by Bybee & Pagliuca (1985, in press), and Bybee (1985b), require MEANING to be the driving force of any linguistic activity. Within a specific semantic domain, languages are diverse in the means of expression they employ. The reason for this structural diversity is that different means of expression reflect different evolutionary stages that languages are at in a particular synchronic stage. Grammatical forms develop out of lexical forms via a gradual process of fusion and phonological erosion accompanied by semantic generalization. The paths of development of forms within a semantic domain are universal. Partial synonymy exists because the forms are in different developmental stages.

Following the alternative view, and as a test of its general theory, I argue that expressions of location, such as "in", "in
front of", "in back of", "outside", evolve in a specific way following a predictable path, going from concrete and specific to abstract and general in both semantic and morphological domains. Nouns referring to concrete entities evolve to become adpositions and bound affixes with no referential ability, by gradually losing structural autonomy and meaning specificities, and by undergoing concomitant phonological erosion.

Diachronic and cross-linguistic studies by Kahr (1975), Givón (1975), and Heine & Reh (1984) have shown that universally there are a number of sources for locative adpositions including nouns, verbs, adverbs, adjectives and participles. In this paper I will concentrate on the nominal source of locative expressions without that being a statement for primacy, greater frequency or typological distinction (although the latter might turn out to be true) as occurring in the languages of the world, but simply a restricting device for a very wide domain. These studies have shown that new locative expressions can emerge from combining already existing adpositions or case inflections with nouns. In addition, Miller’s (1985) data from a variety of languages show that prepositions not only develop from nouns, but that they share certain syntactic and morphological properties with nouns on a synchronic level.

The theory of the evolution of grammatical meaning proposed by Bybee & Pagliuca, which I outlined earlier, provides the theoretical support for the reconstruction of universal evolutionary paths of locative expressions. The assumption that the evolution of linguistic material is gradual leads to the representation of that evolution as a continuum where various points, in a stroboscopic view, are intervals and constitute stages only for the purpose of clarity of presentation. The other assumption - that meaning is the driving force of any linguistic change - requires there to be two aspects of the continuum of the evolution of locative expressions, represented by two continua, one of the evolution of meaning and the other of the evolution of the form, which must be thought of as being parallel.

I will start with the presentation of the continuum of the morphological evolution of locative expressions.

MORPHOLOGICAL EVOLUTION OF LOCATIVE EXPRESSIONS

FIGURE 1: Morphological evolution of locative expressions - nominal source

LEXICAL GRAMMATICAL

noun > genitive construction > adverb > adposition > bound affix

According to Figure 1, lexical material in the form of a noun becomes grammatical in the form of a bound affix after first passing through a stage where it is frequently used in genitive constructions as the "possessed" noun, followed by a stage where
it behaves as an adverb, and then by a stage where it is an adposition. The underlying dimension of this continuum is the AUTONOMY of the evolving material: lexical forms, which are syntactically autonomous and relatively free to appear in many positions, become grammatical by becoming dependent on some lexical form and by assuming a fixed position, passing through intermediate levels of autonomy. The claim that this continuum makes is that the various stages are ordered, so that lexical material cannot become grammatical without passing through the intermediate stages. The empirical support for adjacent stages of the proposed continuum comes from a number of unrelated and randomly-selected languages.

Noun > adposition

Many languages have adpositions which are homophonous with nouns. Data from ten languages are given in Appendix A. Here, I will demonstrate with data from two languages only.

In Abkhaz (Hewitt 1979), a NW Caucasian language, the noun a-c'ǜ "mouth" is used as a postposition with locative meaning as in (1).

(1) a-vok'zāl a-c'ǜ də-q'o-w+P'  
the-station 3spro-mouth he-be- (stat.)
"He is at the station"

The noun āpxā "front" is also used as a postposition as in (2):

(2) a-yōn- [a]-āpxā də-t'o-w+P'  
the-house-[3spro]-front he-sit- (stat.)
"He is sitting in front of the house"

And the noun ā-Šta "trace, footprint", compounded with a more general bound locative affix, expresses the notion 'behind', as in (3):

(3) a-yōn- ā-šta-x' də-q'o-w+P'  
the-house-3spro-trace he-be- (stat.)
"He is behind the house"

Vai, a Mande language of the Niger-Congo family, provides further evidence for the nominal source of adpositions. This language has been described (Welmers 1976) as having relational nouns, which can be used as nouns, as in (4), and as postpositions, as in (5):

(4) sēŋe mā kpàindí'ā  
rock's surface is hot
"The surface of the rock is hot"

(5) kā'āää be sēŋe mā  
snake is-at rock's surface
"The snake is on the rock"

The noun 'ō "inside", which demonstrates its nominal character in (6), is behaving as a postposition in (7):

(6) laa 'ō nőz'ā  
pot's inside dirty
"The inside of the pot is dirty"
(7) ənú be féŋ ənə dönə kənə
they be-at eat house's inside
"They're eating in the house"

Furthermore, the noun kənə "buttocks", in a compound form with
the ənə "inside" form in (7), gives the nominal form kənə'ənə,
which specifies the area behind something; in (8), this compound
has a prepositional meaning:

(8) ə nū'ə kənə kənə'ənə
he hid tree's buttock-in
"He hid behind the tree"

The other eight languages on which I have data relate the
nominal and adpositional uses of those terms along similar lines.
The adpositions are either identical in form with the nouns, as
in the Abkhaz examples (1) and (2) and the Vai examples (4)
through (7), or they appear in a compound complex with some other
locative affix, as in the Abkhaz example (3) and the Vai example
(8), depending on the available mechanism in each language.

Kahr (1975), Givón (1975), Miller (1984), and Heine & Reh
(1985) provide more examples of adpositions emerging out of nouns
from many more languages.

The genitive construction stage

Givón has suggested a genitive construction stage in the
evolution of postpositions from nouns in Niger-Congo languages,
and Heine & Reh support this claim for other African languages.
This phenomenon seems not to be restricted to the languages of
Africa, however. The general idea is that there is a genitive/
possessive marker mediating between the adposition and the noun
that acts as its object. The position of the marker seems to
vary, appearing either on the adposition or on the object of the
adposition, corresponding to head-marking and dependent-marking
patterns proposed by Nichols (1986). But let's look at some
examples.

In Abkhaz, all postpositions carry an affix which expresses
3rd person singular, refers to non-humans and is used as an
indirect object pronoun affix. This affix marks the possessed
noun in phrases like (9), but it is also present as an affix on
the postposition in (10).

(9) ə-lə a-xə
the-dog 3sPro-head
"The head of the dog"

(10) a-xə cə'kə a-yeₐa a-yeₐa+c'ə a yeₐ-xəmər-wə-we- yə'
the-child-(pl) the-house (3sPro)-house+in they-play(dyn)(fin)
"The children are playing inside the house"

A similar pattern appears in Tajik (Miller 1985), an Indo-
Iranian language, where prepositions which are identical in form
with nouns form prepositional phrases, as in (12), obligatorily
via the "izafet" construction, which also relates the possessor
and the possessed, as in (11).
The Abkhaz and Tajik patterns would be examples of head-marking languages. Other languages that exhibit similar phenomena are Hungarian, as in (13), and Hausa, as in (14) (Kahr 1975).

The dependent-marking pattern is exemplified by languages like Vai, which obligatorily marks the possessor, as in (15)i., or the object of adpositional phrases, as in (15)ii. below.

Other languages that exemplify this pattern are cited by Givón, and include Fula, Ewe and Ijo.

An interesting example of a language that actually does not have any marker for genitive in adpositional phrases, but where the corresponding relation is implied, is Papago (Mason 1950). Papago exhibits a pronominal/nominal suffix -ga, which marks possession as in (17),

but which has a restriction on its use: it cannot be affixed to nouns denoting body parts, kinship terms or manufactured objects, where the sense of possession is more or less inherent or natural. In other words, -ga marks alienable possession. Since body parts are very frequently treated in discourse as being possessed inalienably (Hopper & Thompson, 1984), and since, as we will see later on, it is body part terms that are very frequently used as adpositions, there is good reason for the lack of a marker for genitive/possessive, as is shown in (18)i. and ii., since the notion is inherent to the meaning of the nouns.
(18)i. ki· -ba·c0
house-breast
"in front of the house"

ii. 'a·ki· -t'koA
arroyo-forehead
"at the edge of the arroyo"

The adverb > adposition sequence

As I mentioned earlier, the adverbial and adpositional uses emerge almost simultaneously. I consider as adverbs expressions that relate some entity to some given place by pointing at it deictically or anaphorically, and as adpositions, expressions that relate some entity to some place which is explicitly mentioned. In most languages I studied, the majority of locative adpositions can be used as adverbs. In some languages adverbs and adpositions have the same form. Compare the Abkhaz examples in (19).

(19)i. a-x·cā'-kō'ā
the-child-(pl)

a-yəⁿā
the-house
a-yəⁿā+c'q'a
(3sPro)-house+(loc) they-play-(dyn)(fin)
"The children are playing inside the house"

ii. a-x·cā'-kō'ā
the-child-(pl)

a-yəⁿā+c'q'a
(3spro)-house+(loc) they-play-(dyn)(fin)
"The children are playing inside"

In others, however, the adpositions seem to have an additional locative marker, not present in the adverb. Compare, for instance, the Tigre forms below (Leslau, 1945):

<table>
<thead>
<tr>
<th>adverb</th>
<th>preposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>la'αl &quot;upwards&quot;</td>
<td>mən la'αl &quot;above, over&quot;</td>
</tr>
<tr>
<td>täḥat &quot;downwards&quot;</td>
<td>mən täḥat &quot;under, below&quot;</td>
</tr>
</tbody>
</table>

The strongest evidence for the development of adpositions from adverbs comes from historical data on languages such as English and Greek. According to the OED, in English, across, a compound of the preposition a "in" and the noun cross, first appears in the late 15th century as an adverb meaning "in the shape of a cross, crossing each other". Only later, in the following century, does it occur as a preposition with motion verbs meaning "from side to side of". behind has had a similar history: it is a compound of the OE preposition bi/be plus the adverb hindan (hind "back"+adv.suff.-ana). In the 10th century it functions as an adverb with the meaning "in the place whence those to whom the reference is made have departed", and only later, in the 13th century, it acquires a prepositional function and means "in a place left by".

In Modern Greek, all of the compound prepositions are formed with an adverb, which is or comes from an Ancient Greek adverb, plus one of the prepositions apo, or s(e), which are very general in their use covering many relational notions (Andriotis 1983). Some examples are given below.

<table>
<thead>
<tr>
<th>AG adverb</th>
<th>MG preposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>andikri &quot;opposite&quot;</td>
<td>andikri s' &quot;opposite&quot;</td>
</tr>
<tr>
<td>péran &quot;yonder&quot;</td>
<td>péra s' &quot;over at&quot;</td>
</tr>
<tr>
<td>hamái &quot;on the ground&quot;</td>
<td>hámo s' &quot;under&quot;</td>
</tr>
<tr>
<td>epáno &quot;on top&quot;</td>
<td>páno s' &quot;on top of&quot;</td>
</tr>
<tr>
<td>opiso &quot;in back&quot;</td>
<td>piso apo &quot;in back of&quot;</td>
</tr>
<tr>
<td>ékso &quot;out&quot;</td>
<td>ékso apo &quot;out of&quot;</td>
</tr>
</tbody>
</table>
Additional evidence comes from Melanesian Pidgin English (Hall 1943), where most prepositions are complex, formed by an adverb plus a very general preposition ลํา which expresses location.

<table>
<thead>
<tr>
<th>adverb</th>
<th>preposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>antap &quot;above&quot;</td>
<td>antap ลํา &quot;above&quot;</td>
</tr>
<tr>
<td>arade &quot;along the edge&quot;</td>
<td>arade ลํา &quot;beside&quot;</td>
</tr>
<tr>
<td>งงนิต &quot;underneath&quot;</td>
<td>งงนิต ลํา &quot;beneath&quot;</td>
</tr>
<tr>
<td>งงsjt &quot;outside&quot;</td>
<td>งงsjt ลํา &quot;outside of&quot;</td>
</tr>
</tbody>
</table>

**The genitive > adverb sequence**

The only evidence for the claim that the genitive construction stage precedes the adverb stage would be cases in which an adverb would bear a marker of genitive construction. This kind of evidence can be found in head-marking languages which have a genitive marker present in relational expressions. In Abkhaz, indeed, such a marker exists as is shown in (20).

(20) a-xאכט-ךא a-yכנה+c′q’a ยə-xו’mär-we-yt'
    the-child-(pl) (3spro)-house+(loc) they-play-(dyn)(fin)
    "The children are playing inside"

**The adposition > bound affix sequence**

Evidence for the adposition > bound affix sequence comes from data showing adpositions becoming bound affixes to verbs. In Abkhaz the postposition า-כ� "at", as in (1), appears as a preverb with various meanings: a locative meaning for things on the face in (21), as a progressive marker in (22), and with a metaphorical meaning in (23).

(21) a-pac'-א (இ-)yə +כ′ו -w+p'
    the-moustache (it)his+face-on-(stat)
    "He has a moustache"

(22) a-מאר-רAo d-a+כד -w+p'
    the-play-(masd) he-it+in-(stat)
    "He is playing"

(23) aצוa נs-a א-מ- ba- т$
    word saying the-not-see-(gerund)(it)her+mouth-in-(stat)
    "She is a fine/eloquent speaker"

In Chechen, a NE Caucasian language, the postposition ы "in" as in (24), has started 'migrating' towards the verb, as in (25), the latter being the preferred structure (Nichols,1986:84).

(24) ҳay-na ы ҳiekar ыsatan
tea-(dat) in sugar(nom) sprinkle(inf.)
    "Put sugar in tea"

(25) ҳiekar ҳay-na ы-тасан
sugar(nom) tea-(dat) in-sprinkle(inf.)
    "Put sugar in tea"

Furthermore, from the history of English we can see the development of the Old English preposition ই/be to a prefix, in forms like behind, before, below, etc. According to the OED, in Old English the preposition had two forms: the accented ый and
the unaccented bi/be, and they were used as adverbial particles of place. In Middle English, the accented form developed into the preposition bi/by, while the unaccented form be- was retained only as a prefix on verbs and nouns, as it is today.

According to the theory presented earlier, the bound material should be reduced in form. Although this is hardly the case in the examples we just saw (except the English one) in languages with case inflections this is true. Case inflections are usually monosyllabic and so reduced that they bear no similarity to a lexical form. Such is the case with the Turkish locative case inflection and its allomorphs (Lewis 1967).

- de ev-de kaldi "he has stayed in the house"
- da tarla-da kaldi "he has stayed in the field"
- ta kitap-ta "in the book"
- tte serha-tte "in the frontier"

THE EVOLUTION OF THE MEANING OF LOCATIVE EXPRESSIONS

The stages of the evolution of locative expressions that were presented do not make much sense unless there is some motivation for the succession of each stage. I propose that the motivation for morphological/syntactic change is the change in meaning that the forms undergo following a predictable path as is represented by Figure 2.

FIGURE 2: The evolution of the meaning of locative expressions

nominal source

object

abstraction metaphorical extension

part of object

inherent

perspectival

location in contact w/ part of object

inherent

perspectival

location near part of object

inherent

perspectival

According to Figure 2, a noun which refers to a concrete entity starts being used in contexts where it denotes a part of an object, WHICH particular part is more or less predictable from the original semantics (see below). In a later stage, it denotes a location in contact with a part of an object, and only after that can it denote a location near the part of an object. At this point the noun can be used in semantic domains other than spatial location, to denote other grammatical relations, to introduce embedded clauses and to convey metaphorical relations. In the last three stages, whenever an assymetrical axis of orientation, such as the front-back or the up-down axes, is required for the interpretation of locative notions, the inherent interpretation, which takes into consideration the configuration of the object
used as the reference frame, comes before the perspectival, which depends on the viewer's position with respect to that object.

An example from the development of the English locative expression in front of will illustrate the various stages. According to the OED, the noun front was borrowed from Latin in the 13th century with the meaning "forehead". A century later it was found used in a possessive construction the front of to denote the foremost part of objects, for instance in buildings where the inherent front is the entrance side, and later on to denote any side of the building depending on the viewer's perspective. Not until the 17th century is it found in a locative expression (in the front of) to denote a location in contact with the front part of an object. And only later, in the 18th century, was it used to specify a location near the front part of an object, finally acquiring the meaning of its present form in front of.

Assuming the continuum in Figure 2, I argue that it is not odd that nouns referring to concrete entities become markers of locative relations, if we consider the kinds of nouns that undergo this development. Three classes of nouns can be distinguished according to their referents: the BODY-PART class, which includes nouns that refer to the head, mouth, back, breast, etc., the OBJECT-PART class, which includes nouns meaning front, top, edge, middle, etc., and the ENVIRONMENTAL LANDMARK class, which includes nouns referring to things such as sky, canyon, field, house, etc. (See Appendix B for a more detailed list). A common property of all these nouns is that they can have a relational meaning. While this is obvious for object-part nouns like front, inside, top, which require some reference frame for their interpretation, it is not so obvious for body-part and environmental nouns. Body-part nouns, however, as Hopper & Thompson (1984) have suggested, very frequently appear in discourse as non-individuating, non-manipulable entities, as a part of a whole, carrying a relational notion in their inherent semantics. As for the environmental landmarks, their position with respect to other environmental elements assures the relational character of the nouns that describe them. Thus, this particular property of the nouns, which allows them to denote not only an object but also the relative position of the object, makes them appropriate ancestors of locative expressions.

Furthermore, the evolution of such nouns into locatives seems a natural consequence of their character. If the entities denoted by the nouns are most of the time perceived as being parts of wholes, then the genitive markers and constructions in locative expressions are nothing more than the reflection of the part-whole relations. Even the extension to denote a similar part of any object and the metaphorical use to indicate a location in contact or non-contact with that part of the object, seem to be natural consequences of the relational character of the nouns. Once it has reached the stage where it denotes some location, the form has lost its concreteness, now expressing a relation which
is abstract. This particular property makes it appropriate for appearing in many contexts in discourse where location is expressed but also where other semantic domains, such as time, are expressed. Its frequency of use over many contexts strips it of its specificities thus leaving it with only a very general meaning. It is at this point that the form has become grammatical, and that phonological erosion and allomorphy become apparent.

An interesting parallel to the evolution of the meaning of locative expressions is provided by the literature on the acquisition of locative expressions. Studies on different languages done by Kuczaj & Maratsos (1975), Johnston & Slobin (1979), Tanz (1980), Johnston (1981,1984) and others show that children exhibit parallel cognitive and linguistic development in the comprehension and production of locative expressions which is amazingly similar to the evolution of meaning of such expressions proposed here. Johnston (1981) isolates some stages of cognitive development according to which the 15-18 months olds conceive of objects as having an independent and relatively permanent existence. When they reach two years of age, they start to construct relationships among objects that are the natural consequences of their inherent properties. During the 30-42 months period they start constructing relationships that do not depend on specific object properties, but rather take into consideration frames of reference and landmarks. At first these relationships involve only whole objects which are likely to be in actual contact. Later on, children can make use of object parts as landmarks and understand that objects might be related even if they do not touch. English children follow a similar linguistic development and the meanings they express with spatial prepositions emerge in an order that is PARALLEL to the emergence of non-verbal locational concepts. The order of acquisition suggested by Johnston (1984) is:

on - in - under - next to - back object invisible - back inherent
featured - front inherent - back deictic - front visible -
front deictic.

Everything I have mentioned above suggests that the comparison of languages, if it is to bring coherent results has to take into consideration a diachronic dimension. Languages are similar in the way they evolve because the paths of change are universal and are governed not only by linguistic principles but by more general cognitive principles. Furthermore, the postulation of semantic domains as islands of linguistic activity allows for a comparison of languages on a more general basis, without requiring the artificial classifications traditionally imposed on linguistic forms.
NOTES
1. At first sight, manufactured objects seem not to fit with the body parts and kinship terms in exemplifying inalienable possession. If, however, we consider inalienable possession as a graded notion, then the three categories of entities are similar: body parts, due to their natural attachment to the body, are the best examples of inalienable entities; kinship terms express genetic/social relations and are second best examples, while manufactured objects are even more distant from inalienable possession, but still within the domain of their creator, as if they were carrying his "signature", being his product.

APPENDIX A

ABKHAZ (Hewitt, 1979) [NW Caucasian]
- a-c'ta "at"  <  a-c'ta "mouth"
- âpxâ "in front of"  <  âpxâ "front"
- a-z-aa-y-g'-a-ra "near to"  <  a-g'o "heart"
- a-yo-n-o-c'q'a "inside"  <  a-yo-n-o "house"
- â-šta+x' "behind"  <  â-šta "trace, footprint"
- a-xâ+x' "above/over"  <  a-xâ "head"
- â-koc'a "on"  <  â-koc'a "top"
- â-vara "beside"  <  â-vara "side, flank"

PREVERBS
- ɣra- "inside"  <  a-ɣrâ "stomach"
- x'la- "inside"  <  a-x'da "neck"
- ša- "on"  <  a-šap'o "foot"

VAI (Welmers, 1976) [Mande, Niger-Congo]
- mà "on"  <  mà "top surface"
- ì "along"  <  ì "edge"
- tê "between"  <  tê "half"
- l'o "in"  <  l'o "inside"
- kpááša "behind"  <  à kpáá "his buttocks"
- k'ò "under"  <  à k'ò "his back, area behind him, area under him"

- ja'â "in front of"  <  âjá "his eyes"

PAPAGO (Mason, 1950) [Uto-Aztecan]
- 'e'da "in"  <  'e'da "interior < 'e'eda "blood"
- ba-cO "in front of"  <  bacO "breast"
- koA "at the edge of"  <  koa "forehead"
- ca'g'-l' "between"  <  ca'g'-l' "canyon"
- hu-hu'ta "on the side of"  <  hu-hu'ta "heart"

TIGER (Leslau, 1945) [Semitic]
- yasr "after"  <  'atr, 'asr "trace" (Semitic & Ethiopic rt.)
- haqo "after"  <  Ghez haqo "loins, inferior part" ('át) ra'as "on, above"  <  ra'as "head"
- (yá) sômân "at the side of"  <  Ghez sômân "flank", Amhar. sômân "flank"

BURIAT (Poppe, 1960) [Ural-Altaic]
- xazuu-da "beside"  <  xazuu "side"
MELANESIAN PIDGIN ENGLISH (Hall, 1943)
arade/arare lossen "along/beside" < arade/arare "edge"
Insajd lossen "inside of" < Insajd "inside"

YAGARIA (Renck, 1975) [Central New Guinea]
hitagipi' "underneath" < hita"bed" + gina"opening" + pi"in" agovetulo "on top of" < agovetu "top"

VIETNAMESE (Thompson, 1965) [Mon-Khmer, Austro-Asiatic]
trong "inside" < trong "inside"
trước "in front of" < trước "front"
trên "above, on top of" < tren "top"

KANNADA (McCormack, 1966) [Dravidian]
mēle "on top of" < mēl "top"
horag(e) "outside" < hora "exterior"
(v)olag(e) "inside" < (v)ola "interior"

ENGLISH [Indoeuropean]
beside < be + side
aside < a + side
behind < be + hindan (hind "back" + adv.suf. anna)
in back of < back
in front of < front
on top of < top

APPENDIX B: NOUNS THAT DEVELOP INTO ADPOSITIONS

BODY-PART NOUNS: head, heart, anus, mouth, face, neck, ear, forehead, back, loins, rib, body, breast, chest, blood, foot, waist, belly, stomach.

OBJECT-PART NOUNS: front, edge, top, back, bottom, side, flank, end, middle, entrance, circumference, outside, interior, exterior, upper space, space in between.

ENVIRONMENTAL LANDMARKS: field, ground, canyon, sky, house.

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Polysemy vs. Abstraction:  
Mutually Exclusive or Complementary?  

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Given a word with several clearly related uses (i.e., an undoubted case of non-homonymy), a lexical semanticist can choose between two recognized alternative ways of accounting for the many-to-one mapping of function to form: polysemy and abstraction. Polysemy refers to a grouping of related but distinct senses of a single lexical item; often there is an observable direction to the relationship between these senses, one being more central than, or prior to, others. Such a situation is in sharp contrast to the case of a lexical item with a single, highly abstract sense, which is simply broad enough in meaning to apply to many different surface referents, or which happens to have many different pragmatically predictable uses. In specific cases, such as the English prepositions or modal verbs, debate continues as to whether to posit a single abstract sense for a word, or to take one surface sense as basic and the others as derivative. Some analysts have favored an abstractionist approach precisely to avoid bringing such controversial devices as metaphor or cognitive schemata into word meaning. This paper argues, however, that both abstractionist and metaphorically or prototypically structured polysemy analyses are necessary, and proposes some criteria for choosing the appropriate analysis for a given word.

Since the next section will make some fairly strong claims in favor of an abstract analysis for certain lexical items, let us first briefly recall the class of cases where no abstract meaning could reasonably be postulated to account for the facts of polysemy. As a reductio ad absurdum, consider for a moment the two senses of cardinal in English, referring to priests and to numbers. These two words have a common origin in a Latin word which meant "hinge": cardinals were priests on whom the rest of the church hinged, and cardinal numbers were the numbers on which the rest of the number system hinged. At one point, the relationship was a clear synchronic fact - not just a historical one, like the current relationship between the two English senses. But no abstractionist analysis of the English or the Latin word could ever succeed in uniting the two meanings of priest and number: since it would be hard to find any uniquely shared objective properties of priests, hinges, and numbers, any semantic structure abstract and unspecific enough to include all three as referents would.perforce also be broad enough to include all sorts of other referents which have nothing to do with the actual use of the word cardinal. Only a metaphorically structured polysemy analysis can appropriately represent the one-time relationship between the senses of cardinal, presumably using statements like, "A cardinal (priest) is to the church as a hinge is to a door." Similar arguments can be made for countless other cases of polysemy, such as the use of see to mean "know," which I have discussed elsewhere (Sweetser 1984).
The question, then, is not really whether, but where a metaphorical rather than an abstractionist analysis is called for, in accounting for multiple uses of a word. Let us now turn to some cases for which an abstract analysis might more naturally be proposed.

I. Some abstract, pragmatically ambiguous cases.

Perhaps the classic example of the need for an abstractionist analysis is the negative morpheme (English not). Horn (1985) argues in detail that negation is not polysemous between two senses exemplified in (1) and (2), but rather has one sense, which is "pragmatically ambiguous" between the two uses.

(1) She's not happy, she's sad.
(2) She's not happy, she's ecstatic.

Note that while (1) entails "she's not happy," (2) entails "she's happy" - a radical difference which might be taken as prima facie evidence for a difference in truth-conditional meaning between the two nots. It seems unusual, at least, to claim identity of sense between the initial clauses of examples (1) and (2), if each of those clauses is to be taken as consistent with the truth conditions of the following clause. Yet the two senses of not seem intuitively related, the first negating content (and thus entailing "she's not happy"), and the second negating some other feature (assertability?) at the metalinguistic level. For some other, general, assertability to come into question, truth has to be presupposed, since a false statement would ipso facto be unassertable as well. Would we wish to argue that sense (1) is basic, and sense (2) derived, or vice versa? Horn counters such suggestions with the observation that no language has distinct morphemes to mark these two "senses": if they were semantically distinguishable, one would expect them to be somewhere distinct. Instead, it appears that human languages just use one basic negative morpheme for both these functions, suggesting that its meaning is simply abstract enough to apply to both content and metalinguistic structures, given appropriate pragmatic context.

A second reason to suppose that not is monosemous is that pragmatic principles predict its different uses. We have independent reasons for believing that any speech act is so structured as to involve propositional content, speech act force, and form, and it appears that any one of these three aspects of speech act structure can be negated: the first two are exemplified above in (1) and (2), and here are further examples of possible ways to negate:

(3) She's not [Maria], she's [Maraya]. (form)
(4) I don't regret that John left, because I don't believe it's true. (presupposition)

Finally, and importantly, negation does seem inherently abstract; whether or not one believes that natural language is structured like logic, it seems clear that there was reason for negation's importation into logic as a higher, more abstract operator, rather than as a predicate.
A second likely case of inherently abstract meaning may be found in the domain of conjunction. Grice (1978) has argued that the different "senses" of and and or are largely to be explained in terms of pragmatics. Haiman (1978,1980,1985) has argued that iconicity, as well as Gricean principles, is relevant to the interpretation of conjunction: the order of conjoined clauses may be iconic for temporal or causal sequence. The difference between the "symmetric" and of Sam was dancing and Mary was singing and the asymmetric and of (5) or (6) is that the content of (5)-(6) pushes us towards an iconic interpretation of the order of conjuncts. The sense of and has not changed, but we have added to it a temporal or causal interpretation which depends on order, rather than on the presence of a conjunction: compare the interpretations of the unconjoined sequences in (7).

(5) She came into the room and closed the door.
(6) She slammed the door and woke up the dog.
(7a) She came into the room. She closed the door.
(b) She closed the door. She came into the room.

In support of Haiman's claims about the semantic unity of and, Horn (1985) remarks that there seems to be no language which cannot use its basic coordinating conjunction asymmetrically. If and had asymmetric meanings of "and then" or "and so", one might expect some language to have a conjunction which just happened to have the symmetric meaning of and, but lacked the asymmetric meanings. The nonexistence of such a language argues for (a) a general abstract concept of coordination ("putting things side by side") and (b) some universal iconic interpretive principles which further contribute to our actual understanding of conjoined clauses.

In Sweetser (1984) I proposed that another essentially pragmatic dimension must be taken into account in our understanding of conjunction, namely the different domains in which conjuncts can be taken as linked. In (8), one may say that the content of the two conjuncts is what is conjoined by if: Mary's real-world action is taken as dependent on John's. In (9), the conditional relationship is not in the content domain, but in the epistemic domain: Mary's action is no longer conditional (it has already happened or not happened), but my conclusion that Mary went is conditional on my belief that John went. And in (10), the only conditional relationship is in the speech act domain: the quality of the food at the deli, and my beliefs about it, are alike independent of whether you are going to the cafeteria - but my speech act of telling you that the deli food is better is presented as conditional on your being headed for the cafeteria.

(8) If John goes, Mary will go.
(9) If John went, Mary (probably) did too.
(10) If you're headed for the cafeteria, there's better food at the deli.

The same possibility of applying in different domains exists for basic coordinating conjunctions like and and or. Taking or as having a general abstract meaning of alternativeness, it seems clear that (11) involves alternative real-world events in the content domain, while (12) involves possible
alternative conclusions in the epistemic world - note that (12), unlike (11), would not be bizarre if both conjuncts happened to be true. (13) involves speech-act conjunction: it is not that the real-world existence of one restaurant is an alternative to the existence of the other, or that my belief in the existence of one is an alternative to my belief in the other - rather, these statements are indirect offers or suggestions, and the speaker presents the suggestion of going to one restaurant as alternative to the suggestion of going to the other. It is the conjoined speech acts in (13) which are seen as mutually exclusive. As with negation, and, and if, the possible readings of or depend on the (independently motivated) pragmatic structuring of speech acts as having content, representing epistemic states, and bearing speech-act forces. And the relevant truth conditions of these conjoined examples' constituent clauses fall out automatically from the domain over which conjunction is taken as applying: for example, the fact that both clauses of (13) are taken as true follows from the fact that they must both represent VALID alternative offers, rather than alternative claims about the real world.

(11) John eats eggs or ham for breakfast every morning.

(12) The letter hasn't come: so they must have delayed the decision, or the mail's just slow.

(13) There's a great new Chinese restaurant on Solano; or there's the Thai place around the corner.

For conjunction, as for negation, it seems most reasonable to posit fairly abstract underlying senses with various surface applications: an abstract idea of "joining side-by-side" for and, of "alternativeness" for or, and of conditional dependence for if. Negation and conjunction are both good candidates for basic higher-level organizing principles of semantics - and hence for an abstractionist analysis. Furthermore, not only their meanings, but some of their pragmatic uses, appear to be universal and predictable from independent pragmatic principles such as word-order iconicity and the structure of speech acts.

II. Prepositions: a more problematic case.

Herskovits (1985) has argued that English prepositions such as in and on have single abstract geometric senses, at least for their literal physical (and locational, rather than goal) ranges of meaning. This is an intuitively attractive approach which offers hope of unifying apparently disparate senses such as those in (14)-(16).

(14) The wine is in the bottle.

(15) The pear is in the basket.

(16) You are standing in the doorway.

Bottles and doorways are very different objects, but one might extract some abstract notion of surrounding/containment which is exemplified by both (14) and (16). What I would like to argue is not that such an approach fails for the above examples, but that it is insufficient to account for the broader
range of meanings manifested by spatial prepositions.

Herskovits rightly notes that a significant number of pragmatic principles must be invoked to ensure the correct range of interpretations for spatial prepositions: for example, to understand why we use *in the bowl* to describe the pear's location in (17) but not in (18), we must invoke some notion of *canonical* or *normal* containment: this notion is probably rooted in the functional, rather than the geometric, aspects of our understanding of containers. An upside-down container does not give support to its contents, or allow them to be carried as a unit.

Another important factor noted by Herskovits is *viewpoint* or perspective. Although a person inside a supermarket building may be correctly said to be either *in* or *at* the supermarket, to say *at* is to adopt a more distant perspective wherein the supermarket is a POINT on a larger map, while *in* takes a closer perspective and sees the building as a container. The modifiability of viewpoint might be taken, like functional notions of containment, as being an essentially pragmatic parameter, which structures possible pragmatic uses of spatial prepositions, rather than affecting their semantics.

However, let us consider some more complex uses of spatial terms in English. The difference between (19) and (20) lies in the interpretation of *over* as meaning "at a point above" in (19), but "on a path passing through a point above" in (20).

(19) The bird is hovering over the hill.
(20) The bird flew over the hill.

The relationship between these two senses of *over* is regular (cf. Lakoff and Brugman, this volume): many though not all English spatial prepositions share this ambiguity, which may be described in terms of an *imageschematic transformation* relating a point to a path. But such ambiguities are not universal or completely predictable; although image-schematic transformations are certainly rooted in the human perceptual system’s ability to relate constructs such as point and path, different languages and even different words may show different image-schematic links actually present in polysemy-structures. It does not seem necessarily the case that the path use of *over* follows automatically from the locative use, given universal pragmatic principles. Other image-schematic transformations involved in the semantics of English prepositions include that relating the sense of *in* in (21) to that in (22)-(24):
(21) John was in the room.
(22) John came in the room.
(23) John came in the door.
(24) John looked in the window.

In (21) in marks the landmark of a stative relation; in (22) it marks the end-point of a path (landmark of a final stative relation); in (23)-(24) it marks the point of entry of the trajector into the landmark (or end of path). Since French, which has the use of in (21), does not extend it to the senses in (22)-(24), it would be necessary to claim that whatever principles are at work here are language-particular, which would significantly diminish the similarity to our ideal abstractionist cases. In particular, if the relationship between (21) and (22) is part of the structure of English, who is to say it is not part of the semantics of English: which leads us rapidly towards the conclusion that in is really polysemous. Given that prepositions are an area where highly abstract semantic entities have frequently been recognized as universals, polysemny in this case may be a motivation for more concrete universal semantics in this domain - the universal part of the meaning of in is the physical spatial meaning, although there may also be very general cognitive motivations for some of the extensions of that meaning.

Venturing further into dangerous territory, we can finally take up the case of examples like (25)-(27):

(25) There are wrinkles in the shirt you ironed.
(26) I'll be with you in 5 minutes.
(27) Can she be in love again?

The "containment" relation between the shirt and the wrinkles is a far from straightforward one, and surely not straightforwardly geometric. The temporal in of (26) is a metaphorical projection of spatial structure onto temporal structure - a seemingly semiuniversal (cf. Clark 1973) but nonetheless directional process, involving the transfer of basically spatial concepts and vocabulary to the abstract domain of time, rather than the application of common abstract concepts to both domains. An abstractionist analysis cannot reflect the directional nature of the relationship between spatial and temporal in as effectively as a polysemny analysis.

(27) is an even clearer case for polysemny: we metaphorically describe ourselves as being contained by mental or emotional states. There are no common objective features, geometric or otherwise, shared between a physical container and a mental state. It is not that emotion and space happen to be structured alike, so that the same abstract concepts apply to both. Where polysemny is structured by a metaphor, an abstractionist analysis has to give up. Only a metaphorically structured polysemny analysis can appropriately describe the earlier synchronic relationship between the meanings of cardinal -- or the current relationship between the spatial and non-spatial senses of English prepositions.
III. The English Modals: pragmatics and polysemy.

It is a well-recognized fact that the English modal verbs have two distinct sets of uses: a root or deontic reading which expresses such concepts as permission, obligation, and ability; and an epistemic sense which expresses possibility, certainty, or conceivability in the domain of reasoning. I have argued (Sweetser 1982, 1984) that these two senses are indeed related - that the epistemic may of (29) should be taken as a metaphorical extension of the root sense of may in (28).

(28) John may come. ("It is permitted.")
(29) John may have come. ("It’s possible but not certain.")

Adopting Talmy’s (1985) concept of force dynamics, let us assume that the basic meaning of may is that of a potentially present barrier which is not actually present. In (28) the possible barrier would be a real-world obstacle to the actual event of John’s arrival, while in (29) it would be a logical obstacle to a reasoner’s arriving at the conclusion that John will come.

In Sweetser (1984) I discussed a third usage of the modals which is almost undocumented in the literature, but is clearly distinct from the root and epistemic uses. Consider the contrast between the epistemic may of (30) and the non-root, non-epistemic may of (31)-(32):

(30) He may be a university professor, but I doubt it cuz he’s so dumb.
(31) He may be a university professor, but he sure is dumb.
(32) You may be winning, but we go to Harvard.

(said by losing Harvard team)

Although (30) indicates that there is no known obstacle to concluding that "he is a professor," (31) has another reading wherein it is assumed that the person in question is a professor. What is may doing here? Similarly, in (32), neither permission (absence of a real-world barrier) nor epistemic possibility (absence of a logical barrier) is involved. My claim is that in these cases, may expresses modality towards the speech act itself: "There’s no social or discourse barrier to admitting into the universe of discourse the claim that he is a university professor - but I refuse to admit the normal conversational implicature of this claim (i.e., that he is intelligent)." Or, for (32), "Nothing bars you from claiming or stating that you are winning; but we don’t admit the normal implicature of the winner’s being superior."

Now for the question: does may have a single over-arching force-dynamic sense, or three different related senses? In favor of an abstractionist position we could make the following observations: (1) modals really do seem to have fairly abstract meanings - as opposed, for example, to the concrete spatial senses which are the basic senses of many prepositions; (2) this looks suspiciously like the case of and or if, which arguably have very abstract senses and can be pragmatically applied to either the content, the epistemic structure, or the speech-act force of an utterance. Perhaps modals are like negation and conjunction, semantically monosemous, but pragmatically ambiguous. To add to the persuasiveness of this argument, the root/epistemic ambiguity at least is not specific to English (the speech-
act use of modals is not well enough documented for me to know how widespread it is). Many unrelated languages, including members of the Philippine and Semitic and Finno-Ugric families as well as the familiar Indo-European languages, show morphemes which are ambiguous between root and epistemic modal senses. Perhaps, as with and, universal pragmatic principles account for the different uses of the modals.

However, there are important differences, as well as important similarities, between the behavior of the conjunctions and the behavior of the modals. First and most importantly, there is a clear directionality to the relationship between root and non-root modal senses. Not only are the epistemic modal senses known to be later developments of words which had only root modal meanings in earlier English (cf. Shepherd 1981, Traugott 1982), but the root modal senses also precede the epistemic senses in children’s acquisition of language (Kuczaj and Daly 1979, Shepherd 1981) and there is some evidence that creoles develop overt expression of root modality before going on to extend root modal expressions to epistemic senses (Shepherd 1981). No such directional development is evident between the "senses" of and or of not. Under an abstractionist hypothesis, we would have to assume that there was some (objective) isomorphism between the root and epistemic modal domains, or the same abstract sense could not cover both sets of denotata. There would then be no explanation for why the historical and developmental direction should be as it is, rather than from epistemic to root: if a meaning becomes more abstract, it could do so equally well starting from either of two more specific meanings.

Second, in the case of the English modals we have an extensive and productive synchronic metaphorical system which motivates the connection between root and epistemic senses. Phrases such as "a strong premise," "a weak conclusion," "I am forced to conclude" all indicate the extent to which we metaphorically model our reasoning processes in terms of the more concrete forces and barriers of the social and physical world around us. This metaphor is unidirectional, and seems to be the motivation for the English modals' historical development of non-root senses. We cannot express the directional, metaphorical nature of the relationship between the modals' senses by proposing a single abstract sense for may: it seems clear that the root sense is synchronically basic.

Third, unlike the iconic uses of conjunction or the metalinguistic uses of negation, the non-root senses of modal expressions are not universals. We cannot predict that all root modal verbs will automatically also express corresponding epistemic modal meanings. Many languages do show this ambiguity, which is probably attributable to a universal tendency to describe the abstract epistemic and speech-act worlds in terms borrowed from more concrete domains. But we have seen that English modals were once restricted to the root domain; and plenty of languages have vocabulary which is specially dedicated to the expression of root or of epistemic modality, to the exclusion of the other. We are forced to conclude that it is a fact about the English semantic system that English modals regularly
metaphorically extend from the root (content) domain to the epistemic and speech-act domains. This conclusion seems comforting, since we also notice some irregularities in the extension - can is epistemic only in negatives and interrogatives, for example, and may is far more productively used in the speech act domain than the other modals. It is unclear how an abstractionist analysis would account for these irregularities, since whatever isomorphism accounted for the multiple uses of the modals would also predict these non-occurring uses. But polysemy, since it actually deals with all the separate, related meanings of a word, can more readily coexist with occasional non-connections between such meanings, while allowing for a regular motivation of existing connections.

It therefore seems as if the modals are polyseemous, rather than just highly abstract in meaning. Not only are their different senses directionally and metaphorically connected, but their polysemy is contingent rather than being automatic and inevitable (given universal pragmatic principles) like the ambiguity of not. Further, the metaphorical link between epistemic and root modality is supported by a lively synchronic metaphor-system.

Conclusions.

In conclusion, let us review the criteria we have used to distinguish between abstract and polyseemously structured lexical meanings. First comes the question of directionality: does one use show regular historical, acquisitional, or other priority? Second, and perhaps even more crucial, is the question of whether the directionality (if any) is metaphorical: evidence of a productive metaphor at some stage of the language's history seems fairly conclusive evidence for polysemy rather than abstraction at that historical period. Third, how abstract are the surface senses? Without laying down a rigid rule, we can say that it seems more appropriate to suggest a highly abstract underlying meaning for an obviously abstract word like and than for fairly specific, concrete words like cardinal.

The final question which we have seen to be relevant is: how predictable is the grouping of uses crosslinguistically? If it is completely universally predictable that any word used for X will also be used for Y (as in the case of linguistic and metalinguistic negation), then we may well want to postulate an abstract meaning applicable to cases X and Y. If there is no crosslinguistic predictability at all (if this polysemy structure exists only in one language, like cardinal), then we may generally conclude that the two senses are separate and that their relationship is one of polysemy - assuming that there is some connection available to current speakers, so that the word is not (like cardinal) synchronically actually a case of homonymy. And if there is correlation, but not complete predictability, fix between the two senses, then we may wish to postulate separate meanings rather than a single abstract one, but nonetheless be on the lookout for possible universal factors which might motivate a link between these two disparate senses. Polysemy, as we have seen in the cases of the modals and prepositions, may have very specific or very general motivation: the more general the
motivation, the more common a polysemy structure is likely to be across languages.

It is particularly instructive to note that we have been forced to treat the conjunction cases as abstract, while the modals seem clearly polysemous. The pragmatic structure of speech acts as propositional content, epistemic structure, and speech act force is a probable universal. Conjunctions and modals both regularly apply to all three aspects of this universal structure. But conjunctions simply are abstract enough to apply to speech acts as well as to propositional content, while modals have a more concrete basic meaning and are metaphorically extended to the epistemic and speech act domains. It is important to distinguish between these two kinds of semantic "metastructure" -- and the two metastructures are highly probable linguistic universals.

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Notes

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FROM POLYSEMY TO INTERNAL SEMANTIC RECONSTRUCTION

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Introduction
In the last few years a number of linguists have argued that polysemy should be accounted for in a theory of the lexicon (e.g. Lindner 1981, Lakoff 1982, Brugman 1983, Sweetser 1984), and should not necessarily be forced into categoriality, whether it is the macro-categoriality of the Gesamtbedeutung type that obscures necessary distinctions, or the micro-categoriality that treats most meaning differences as cases of homonymy and thereby obscures obvious similarities. When admitted in semantic theory, polysemy has traditionally been argued for only where distinct but related senses are associated with a lexical item that belongs to one syntactic category, but Brugman (1983) has argued convincingly in connection with the senses of prepositional, adverbal, and derivational over that polysemy pertains to conceptual structures that override syntactic categorization.

Most earlier work on polysemy viewed it as the result of historical changes (e.g. Breal 1964 [1897], Ullmann 1964). Recently it has been viewed largely from the synchronic perspective, though Brugman has suggested in her studies of over (1983) and of very (1984) that the synchronic processes leading to polysemy (e.g. chaining of image-schemata leading from prototypical to more marginal senses) may shed light on the historical processes. And Sweetser has suggested that metaphorical extensions in synchrony should be viewed side by side with those occurring in diachrony.

In this paper, I will assume that a semantic theory must allow for polysemy because polysemy accounts for important aspects of cognitive process. Furthermore, I assume that polysemy is not restricted to lexical items belonging to single syntactic categories. My purpose is to show that admitting polysemy in semantic theory has the added methodological advantage of allowing us to do extensive internal semantic reconstruction. By internal semantic reconstruction, I mean hypothesizing on the basis of the synchronic senses of a lexical item the historical order in which those senses arose. Just as in phonology a theory of synchronic phonological relatedness, together with a theory of possible sound change, can be used (with well-known constraints) to do internal
phonological reconstruction, so, I will argue, a theory of synchronic semantic relatedness, i.e. polysemy, together with a theory of possible semantic change, can be used to do internal semantic reconstruction. Gesamtbegriff would be too abstract and global to allow this—one must have difference to reconstruct—and homonymy would forbid it, since one must have relatedness as well as difference to reconstruct.

Until recently, there has been insufficient evidence for unidirectionality in processes of semantic change to permit attempts to project semantic change backwards. Such well-known types of semantic change as 'amelioration' and 'pejoration', 'specification' and 'generalization' are too contradictory to encourage such an exercise. However, there is coming to be overwhelming evidence for one type of unidirectionality in semantic change, and it turns out to be a very effective predictor of the historical order in which synchronically polysemous meanings arose. It is a change that I identified in broad outlines a few years ago (Traugott 1982) and have come to refine slightly. In essence the process is one of 'subjectification':

Over time, meanings tend to come to refer less to objective situations and more to subjective ones (including speaker point of view), less to the described situation and more to the discourse situation.

This hypothesis encompasses Langacker's concept of subjectification, developed to account for synchronic semantic extension:

Expressions describing physical motion by an objectively-construed mover (typically the subject) come to describe static situations construed in terms of abstract and subjective motion by the conceptualizer (Langacker 1986) but is not limited to the extension of expressions of motion into static expressions. It also encompasses Sweetser's hypothesis that there is a tendency to use vocabulary from the external (sociophysical) domain in speaking of the internal (emotional and psychological) domain (Sweetser 1984:56).

However, the subjectification process, as I define it, is broader, in that it focuses on a very general tendency toward greater pragmatisation of meaning. As will be discussed below, in certain areas such as mental vs. speech act verb meanings, discourse meanings appear to override the distinction Sweetser makes between external and internal domains.

The claim that meanings become increasingly
discourse-based, indeed increasingly speaker-based, is a large generalization that covers a number of different phenomena. It includes the well-known development of affective meanings from referentially more neutral meanings as illustrated by boor < 'ill-bred fellow' < 'peasant', in other words, most of the traditional examples of pejoration and amelioration. It also includes the development of causal from temporal meanings as illustrated by since 'because' < 'after' (causal relations in natural language are more 'person-based', more 'speaker-attributed' than temporal ones). Another well-known example is the shift of spatial prepositions and postpositions to markers of grammatical relations; e.g. Old Eng. of meant 'from' and came to mark the possessive relation only in Middle English. One of the clearest examples of the change is Old Eng. hwile 'at that time' > Middle Eng. 'during' > Mod. Eng. 'although'. Here an adverb referencing a time in the described situation comes to be a conjunction expressing not only temporality in the described situation but also textual cohesion, and then comes to express the speaker's own view of the relation between two situations.

This semantic shift from less to more discourse-based (and therefore speaker-based) meanings is interesting in several respects. For one, it might seem counter-intuitive on first thought, given what we know about small children's cognitive development and the shift from more subjective to more objective understanding, and given notions about the objectivizing force of literacy. Nevertheless, on further thought it makes sense, since at the same time as children are learning to think objectively they are using language to achieve more and more strategically planned interaction. Furthermore, there is massive evidence of the type of metaphorical interpretation Sweetser talks about, whereby abstract domains are conceptualized in terms of more concrete ones. Secondly, the change may at first appear to provide a potential counterargument against those who claim that the origins of syntax lie in discourse (e.g. Sankoff and Brown 1976). However, it does not represent a counterargument provided we distinguish the motivating factor (development of cohesive discourse) from the lexical items used to achieve that end. Sankoff and Brown discuss the use of Tok Pisin ia 'here' to identify a referent and eventually to express the relationship known as relativization. This shift exactly matches the semantic change I have outlined: a word referencing a space identifiable in the described situation becomes a
marker of discourse-meanings (a marker of a space identifiable in the proposition, in other words, of an NP). In this case there is a 'speaker-meaning' all the way along, since ia is a deictic to start with; however, the speaker based meanings shift from referencing the situation outside the discourse to referencing the situation inside the discourse. Much the same is true of the development in English of the spatial adverb there into the existential there as in There was a power-failure on Friday. A third point to be made is that, except where a form becomes purely syntacticized, and thereby loses much of its meaning, the process of pragmaticization of meaning involves shifts of meaning from the semantic into the pragmatic domain. There has been a tendency to use the term 'bleaching' both for pragmaticization of meaning and for the syntacticization that leads to dummy markers. Though the first process may give rise to the second, they are not the same process, and have probably been treated as one only because of the uncertainty until recently about the role of pragmatics in a grammar.

Armed with the generalization about subjectification in semantic change, we can look at synchronically-defined dictionary entries in a language for any period of that language with new eyes. In many (but certainly not all) cases, hypotheses about the order of development can readily be made, at least for the more general classes of meaning differences. Just as in the case of internal phonological reconstruction, loss or merger may obscure some actual paths of change. But the project can be quite successful nonetheless. I will devote the rest of this paper to illustrating some examples of backward-projecting hypotheses that can be made from the meanings of words in two lexical fields in English: 'presuppositional' terms like just, and speech act verbs like insist.

Presuppositional terms

The first study I did of the feasibility of doing internal semantic reconstruction was a micro-analysis of the polysemy of just (Traugott Forthcoming). I wanted to see whether it was possible to hypothesize the correct order of the development of the various senses of this word, and whether the adjectival and adverbial meanings could be related. Among adjectival meanings are 'honorable', 'righteous', 'well-founded', 'properly due', 'fitting' and 'exact' (cf. just measure). Among adverbial meanings are 'precisely', 'simply', 'in the immediate future or past', 'merely', 'barely'. Given the change to more discourse-based and
speaker-based meanings, one can readily hypothesize that the meanings that have to do with justice and honor are relatively early, since, although evaluative, they refer to norms that have some external verification; meanings relating to exactness are more abstract and could be expected to be later; the deictic temporal meaning and the negative 'merely' meanings, being dependent on speaker judgement, can be presumed to be the latest meanings. And indeed meanings related to 'precise' date back to the fifteenth century, the temporal deictic and 'merely' meanings to the seventeenth century. One can, of course, be bold and guess that evaluative as the 'judicial' meanings 'honorable' etc. are, they may have once been less so, but this we cannot tell from Modern English. If we go back to Indo-European, we find that IE *yous, according to Benveniste (1973) meant 'state of regularity, normality required by the rules of ritual'. He emphasizes that we may think of Latin jurare 'to pronounce the law' as primarily judgemental and therefore evaluative, but in fact it meant 'to repeat a formula', and was hardly evaluative at all.

Just is, of course, only one of a whole class of so-called 'presuppositional' terms that presuppose, entail, or implicate relations to a scale. Other such terms include mere, even, utter, and very. All of them, at least in some of their meanings, express speaker attitudes. Given the process of subjectification, we can hypothesize that all these words once had meanings that referred primarily to described situations. Mere meant 'undiluted' (as of wine), even meant 'horizontal, equal', utter comes from 'outer' (later in the sense of 'outermost'), and very from 'true'.

But this is not all that there is to say. Let us look in a little more detail at one of the words, very, for which Brugman (1983) has given a detailed synchronic analysis. She identifies two major classes of meanings: i) those that involve the extreme end of a scale, as in the very pinnacle of her career, the very back of the room, the very best croissants, or the extreme end of an implicational scale, as in the very thought of writing a dissertation puts me into a cold sweat; and ii) those that mean something like 'precise', 'identical', as in the very person I have been waiting to see, Chomsky's very words. Note that very can be substituted by mere in the very thought of writing a dissertation (cf. also even the thought...), and (with word order change) by just in the very person I wanted to see.

Granted that all these meanings of adjectival very
are discourse-based, can one hypothesize in what order they developed? What seems precise to me may not always seem precise to you; nevertheless, there are often external means of verification: for example, you and I have external means of judging whether some string was or was not actually Chomsky's words. Therefore, very in its meaning 'precise' has some reference to the described situation. But we'd have a harder time verifying the very back of the room. Verification is hardly the issue when we talk of the very pinnacle of someone's career. And it is not an issue at all in the implicational use of very as in the very thought of writing a dissertation. Here the meaning is entirely speaker-based. In other words, the meanings typified by Chomsky's very words, the very back of the room, the very thought are on a scale of less to more indicative of speaker attitude. We might conjecture that the meanings came in in this order. And a look at the OED confirms that they did, though the gap in time between the first two is rather small to be strong evidence for the ordering between them: 'precise' (the very center) in 1338, 'extreme' (the very end) in 1386, and 'implicational extreme' (the very mountains, the very mention) in 1550.

We have noted that both just and very have meanings related to 'precision' and 'truth' and that these preceded more 'up-toning' and 'down-toning' meanings. Up-toning meanings focus on the high end of a scale, down-toning meanings on the low end. Very is mostly an up-toner in the 'extreme' meanings, but serves as a down-toner in the very (= mere) thought of writing a dissertation, i.e. something as low on the probability scale as the thought of writing a dissertation. Since up-toning and down-toning meanings identify points at the extremes of a scale, they imply asymmetric relations (less, more, not equal). The shift from meanings referring to preciseness, sameness, parallelism, simultaneity, and so forth to asymmetric meanings is in fact quite frequent. As I pointed out at the beginning while, meaning 'during', and therefore involving at least partial simultaneity of events, came to mean 'although' (or 'contrary to what might be expected', that is, non-parallelism with expectation). Presently used to mean 'at the very time' but came to mean 'soon after, in a while'. Besides, which used to mean 'at the sides of', i.e. symmetrically on both sides, came to mean in addition. We may, then, be fairly confident in hypothesizing that a word like mere, which is only a down-toner in contemporary English, may once have meant something like 'true' or
'precise'. And indeed it did. As we saw, the original Latin merus meant 'undiluted'; in French it was used as a legal term to mean 'true, absolute'. The first uses in English are in the Latin and French senses. An interesting example from the mid-sixteenth century, which also includes very in the sense of 'precise' is: 1559-60 That your Majestie...is, and in verie deed, and of most meere right ought to be...our most rightful...soveraigne From 'true' mere came to mean 'not more than specified': 1581 If I speeke rather lyke a meere Citizen, than a Philosopher This brings us to even. The adjectival senses listed by the American Heritage Dictionary are: 'having a horizontal surface', 'parallel', 'regular', 'equal', 'having equal probability' (an even chance); the adverbial ones are: 'to a higher extent' (even more), 'in spite of' (even with his head start). We hardly need the extra item 'arch. identical with: It is I, even I', to guess the relation between the adjective and the adverb, or to reconstruct the main outlines of the meaning change. For the adverb we find in Old Eng. the meanings 'regularly', 'in equal parts', 'exactly', 'precisely'. 'In spite of' is a late sixteenth century meaning, and 'even more' a mid-eighteenth century one. Speech act verbs So far I have focussed on 'presuppositional' words. They belong to a small lexical set which is rather special type, and might be considered inadequate evidence for the large-scale claim that it is possible to do semantic internal reconstruction. I turn now to a brief summary of evidence from a rather different kind of lexical domain: that of speech act verbs. Many speech act verbs have several meanings. Thus to assume can mean to 'put on' (as of clothes), 'take for granted', or to 'claim', 'pretend that something is the case'. To observe can be to 'adhere to a rule or custom' (cf. observe Christmas), to 'watch attentively', or 'say that something is the case'. To commit can be to 'do' (commit a murder), 'place in trust', 'confine' (in prison), or to 'pledge oneself to do something'. To insist can either be to 'demand something' or to 'assert something vehemently' (cf. I insist that he not smoke vs. I insist that he didn't smoke). Given the claim that meanings come to refer less to the described situation, and more to the discourse situation, it follows that a reasonable hypothesis should be that where both non-speech act verb and
speech act verb meanings coexist, the former precede the latter in time, because the speech act meaning is a metalinguistic one that at least refers to the described situation as a discourse situation, and in some cases (those called performative uses) is actually constitutive of the discourse situation. And indeed this is the case. Thus *assume* originally meant first to 'take on', 'adopt' (cf. Lat. *ad-sumere* 'to take on'); it was borrowed into English in the sixteenth century with both meanings 'put on' and 'suppose'; the first entry in the OED with a speech act meaning dates from 1714. Similarly, *observe* meant to 'pay practical attention to a rule' in Middle English; the OED gives the meaning 'perceive by the senses' in 1559 (a mental verb meaning), and attributes the speech act verb meaning to Bacon in 1605. *Commit* appears first in the fourteenth century and in the meaning of 'give in trust'; in the fifteenth it means 'put' (in prison), 'do' (something bad, e.g. murder), and it is not till the eighteenth century that it acquires the speech act meaning of pledging. It is with verbs of this sort that the shift Sweetser notes from sociophysical to emotional and psychological turns out not to be sufficiently all-encompassing. The mental verb meanings of *assume* and *observe* are internal, whereas the speech act verb meanings are partly sociophysical (though of course they are psychological and sometimes emotional as well). Strict application of Sweetser's hypothesis of the shift from external > internal meanings would seem to predict the wrong result: that speech act verbs precede mental verbs meanings, but no examples of such a shift have been found in English or in Japanese (Traugott and Dasher 1985).

What can we say about the two meanings of *insist*? The directive meaning (insist that someone do something) is in a general sense deontic. The assertive meaning (insist that something is the case) is in a general sense epistemic. Some time back I hypothesized that the deontic meanings would precede the epistemic meanings on the grounds that this is generally true of modal verbs in English (cf. Traugott 1985). Thus the *may* of permission precedes the *may* of probability, and the *must* of obligation precedes the *must* of likelihood. Logicians and some semanticists (cf. Lyons 1982) argue that both the deontic and the epistemic meanings are ambiguous between objective and subjective meanings. Thus *He must be married* can be argued to be four ways ambiguous:

a) He is required to marry (deontic, objective)
b) I require him to marry (deontic, subjective)
c) It is obvious from evidence that he is married (epistemic, objective)
d) I conclude that he is married (epistemic, subjective)

Given the theory of semantic change I have outlined, we could expect the objective meanings to precede the subjective; we could also expect the subjective deontic to precede the subjective epistemic on the grounds that the tendency is for meaning-changes to become more and more speaker-based (Sweetser treats this shift in modal verbs as a metaphorical mapping from sociophysical to emotional and psychological domains, and here her hypothesis serves her very well). Both the subjective deontic and the subjective epistemic meanings are speaker-based, but the latter are more so since they do not involve the hearer directly, and are entirely focussed on the speaker's sense of what is possible. But where does c), the objective epistemic meaning fit? I submit that the logician's objective meaning is precisely that, a logical meaning. In language use, It is obvious that he is married implies obviousness to at least some one person, and this some one person must be the speaker unless otherwise specified (cf. the incoherence of It is obvious that he is married, but not to me). So c) can be ruled out in its strictly objective meaning as far as natural language change is concerned (of course, this is a testable hypothesis, and needs to be fully tested).

To return to my hypothesis about speech act verbs, indeed it does turn out that those which have both deontic and epistemic meanings, or more generally non-epistemic and epistemic meanings, acquire the epistemic meanings later. Thus insist is attested in the sense of 'demand' in 1676, and in the sense of 'maintain that something is the case' in 1768. Similarly, postulate in the sense of 'ask an ecclesiatical authority to admit a nominee (or postulant)' occurs in 1533, in the sense of 'demand' in 1593, in the sense of 'claim the existence of truth' in 1646, and 'claim that something is the case' in 1855. Investigation of commit shows that a now-lost meaning was available in the late fifteenth century along with 'put in prison', and 'do'. It was 'charge with office', and as such was a contractual term with affect on the hearer. It conforms to the general expected shift: first 'give in trust' (non-speech act verb) in 1386, then 'put', 'do', and 'charge with office', all in the late fifteenth century, followed by 'pledge (oneself)' in 1799.
Conclusion

It has been my purpose in this paper to focus on the successes of projecting semantic change backward from polysemies. There are, of course, limitations, and not only limitations of the kind that are well known for internal phonological reconstruction. One is that although much of semantic change is unidirectional, some is not. Thus there does not seem to be any way to predict whether up-toning will precede down-toning or vice versa. Another limitation is that, even when semantic change is unidirectional, it very rarely applies to items of the same lexical field at the same time. Thus while we know that words for smell are likely to become pejorative (as witness Old Eng. *stincan* 'smell' > *stink*, and *smell* itself), that spatial terms are likely to acquire temporal meanings, that words for 'precise' are likely to become up-toners and down-toners, and that mental verbs are likely to become speech act verbs, we cannot begin to date the changes. Usually they occur successively through the lexicon, not at the same time. Furthermore, the only rule of semantic change that is claimed to have gone to completion that I know of is Stern's much-cited rule (1968[1931]:189): 'rapidly' > 'immediately' before 1400, but not after. However, since this change is actually yet another example involving greater to less verifiability in the external world, and increasing subjectivity of evaluation, there is no principled reason why it should have come to completion, and may be new instances will occur.

The limitations should not concern us. No one aspect of linguistic analysis can tell us everything. What is important to recognize is that semantic change, an area of language often thought to be rather random, does in fact turn out to be subject to linguistic analysis, and to have predictive power. I have shown that what we know about prospective change from stage A to Stage B can be used to predict change retrospectively. I have also shown that the general processes of meaning extension over time seem to be the same as, or at least a subset of, the meaning relationships posited in theories of polysemy from a synchronic point of view, something totally obscured by appeal to strategies like 'pejoration', 'amelioration', 'specification' and 'generalization', and only partially accounted for by a theory of metaphorical extension of meanings from external to internal domains. Without a synchronic theory of polysemy, we could not do internal reconstruction, because we would have no reason to assume relatedness. Since a theory
that allows an account of two things at the same time is valued more highly than a theory that accounts for only one thing at a time, I have provided further evidence that a synchronic theory of semantics that admits of polysemy is preferable to one that does not.

NOTES

1 The germ of this idea is also to be found in Sweetser 1984.

2 One problem is can—the permission sense of can developed later than the possibility sense; it should be noted, however, that the epistemic meaning is later than the ability meaning, which is clearly more referential to the described situation. The permission meaning may have been introduced to establish semantic similarity with may and must, which had both deontic and epistemic meanings by the time can developed a deontic meaning (the late eighteenth century).

REFERENCES


Is the Compositionality Principle a Semantic Universal?*
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1. Introduction

A passage from the gospel of semantics (if such a thing existed) might read:

The meaning of the sentence must be such that it is a function of the meaning of its component parts and the way in which they are combined. This is the principle of compositionality, and it is a fundamental constraint on semantic theories. And I say unto you, whatsoever is not compatible with this principle, is not within the domain of semantics.

This is the gospel according to Frege.

While putting it this way might seem a little silly (we are, after all, empirical investigators, not religious fanatics), the fact is that compositionality (CP), or the Fregean principle is often adhered to and defended with a faith and fervor quite like that exhibited by "believers" defending religious doctrine. Why is this?

On the one hand, there are good reasons to maintain the CP as a constraint on semantic theory. First, the empirical evidence for so constraining a semantic theory is based on the fact that speakers can figure out the meaning of a complex expression they've never before encountered based solely on the meanings of the constituent expressions and the mode of syntactic combination. This evidence seems to indicate that compositionality is a universal of natural language semantics, and therefore justifies such a constraint. Second, there is the sort of what-else position - if semantic analysis isn't compositional then what else can it be. Compositionality, from this point of view, is simply what we mean by semantic analysis. Therefore the CP is true by definition, so to speak. The CP, from either point of view, appears to be a well-motivated universal constraint on NL semantics.

On the other hand, dogmatic defense of the compositionality principle, especially under the interpretation that CP-Montague's theory of grammar, has led to a lot of confusion. Recently in the literature, for instance, psychologically plausible alternatives to the classical theory of lexical semantic representation, such as certain instantiations of prototype theory, are deemed inadequate because
they are not (and cannot be) compositional (see for instance, Osherson and Smith, 1981; Armstrong, Gleitman and Gleitman, 1982). The general argument for this point of view can be summarized as in (1):

(1) a. An adequate semantic theory must be compositional.
b. The only possible combinatorics for prototype theories is some version of fuzzy-set theory.
c. Fuzzy-set theory yields the wrong results for conjunctive concepts, inclusions and related matters.
d. Therefore, prototype theory is not (and, some would argue, cannot be) compositional.
e. Therefore prototype theory is inadequate as a semantic theory.

There are some flaws and unsupported assumptions in this argument which I won’t go into here. What I am most concerned with is the range of responses that have been made to this argument. One counter to this argument develops an alternative version of fuzzy-set theory, which is claimed to be compositional under a broader construal of the notion of compositionality. For instance, Zadeh (1983) claims:

In its traditional interpretation, Frege's principle of compositionality is not sufficiently flexible to have a wide applicability to natural languages. In a fuzzy-set-theoretic setting which is outlined in this paper, Frege's principle is modified and broadened by allowing the meaning of a proposition P to be composed not from the meaning of the constituents of P, but more generally, from the meaning of a collection of fuzzy relations which form a so-called explanatory database that is associated with P.

Another response is to develop a model of prototype representations which are modified by principles of conceptual combination to generate complex representations which yield the correct typicality results, and are therefore claimed to obey compositionality. Smith and Osherson (ms) use this tactic. Finally, others have denied that our complex representations obey compositionality, thereby denying that the principle characterizes a semantic universal. Cohen and Murphy (1984) take this position. The question I am here to address is whether compositionality is a semantic universal, and why, when addressing the same empirical evidence, are modern theoreticians led to such divergent claims regarding the status of compositionality.
2. Versions of Compositionality

I contend that the problem stems from a confusion about what "version" of the compositionality principle is under discussion. We all seem to assume there is simply one unified notion of the compositionality principle. The use of the common appellation across theories and the general lack of detail about what the principle entails, seems to justify the validity of such an assumption. On closer review, it becomes apparent that compositionality principles range from strong versions, such as that employed in Montague's *Universal Grammar*, to versions so vague it is difficult to see how they would impose any constraint at all on semantic theory. In its most general form the principle can be stated as in (2):

(2) The meaning of a complex expression is a function of the meaning of its parts and the way in which they are syntactically combined.

Much more needs to be specified for this general form of the principle to bear any weight - for example we need to specify what meanings and functions are and what can count as the relevant component parts. It becomes apparent when considering these questions that the principle, theory-independently, has little empirical content. It is only with the support of frequently tacit, theory-relative assumptions that the principle has any teeth. There are (at least) four supporting assumptions which characterize the strictest version of compositionality a la Montague, (1970). Simplifying considerably, and avoiding technicalities, these assumptions can be characterized as in (3) - (6):  

(3) **homomorphism** - requires that there is a parallelism between the syntax and semantics, such that for each syntactic entity there is a corresponding semantic entity. More specifically, if any expression of syntactic category \( s \) corresponds to the semantic type \( X \), then all expressions of category \( s \) must correspond to semantic type \( X \).  
(4) **locality** - requires that interpretations are built bottom-up and prohibits global properties of the complex expression from affecting the semantic value of constituents.  
(5) **meaning invariability** - requires that there is one and only one contribution made by an expression \( e \) to the meaning of any complex expression \( E \) in which \( e \) occurs. This contribution cannot vary from context to context.  
(6) **determinacy** - requires that the meaning of a complex expression \( E \) must be completely determined by the constituent expressions \( e_1, \ldots, e_i \ldots, e_n \) of which it is composed. That is, any aspect of meaning with
which the complex expression is endowed, must be traceable to one of
the constituent elements, or to the construction itself.

While these assumptions are clearly interrelated and seem to
form a coherent package, one can adhere to or abandon one or
another of these assumptions without committing oneself to buying or
abandoning the whole package. Even abandoning all of the
assumptions in (3) - (6) does not necessarily commit one to
abandoning the spirit of the compositionality principle: that the
assignment of meanings to complex expressions is a *systematic* (i.e.
predictable or recursive) function based on the meaning of the parts.

I shall have little more to say directly about assumptions (4)
and (6). Assumption (5) seems untenable within a prototype-like
theory, because we would presumably want to say that contributions
can vary without having to posit ambiguity. In fact, I think it is the
desire to maintain assumption (5) that has led some theorists to posit
hybrid theories of "core + other" criticized by Lakoff (1982 ms).

In the balance of this paper I will provide evidence that
assumption (3) is too strong a constraint for natural language
semantics. Finally, I will show how a prototype-like theory can
conform to a modified compositionality constraint, which abandons
assumptions (3) and (5).

3. Challenges to Homomorphism

The assumption of *homomorphism* is a cornerstone of Montague
semantics and is often simply identified with the compositionality
principle. One interesting consequence of assuming homomorphism,
noted by Partee (1984), and Landman and Moerdijk (1983), is that it
makes an intermediate level (such as the logical language of
translation, or discourse representations a la Kamp) dispensable in
principle. Since the compositionality principle requires that for any
translation rule:

\[
F_i (a, b) \text{ translates as } G_j (a'b')
\]

the operation \(G_j\) must be such that for semantically equivalent input it
yields the same results. The only properties which can play a role at
the intermediate level are properties which are already reflected at
the syntactic and/or semantic levels, since under a strict
interpretation of (3), one level simply recapitulates the other. Thus, in principle, an intermediate level must be dispensable.

One sort of challenge to a strict homomorphic constraint, comes from arguments and analyses which require an indispensable level of representation not homomorphically related to the syntactic and semantic levels. An example of this sort of broad challenge to (3) is exhibited recently by the work of Kamp (1981) and Heim (1982). These theories, using an indispensable level of representation, provide a type of solution to the puzzle of donkey-sentences superior to other analyses. One can argue on the basis of examples like these, that since positing an indispensable level of representation allows for an elegant analysis of some natural language phenomena not heretofore adequately treated, then the homomorphic constraint, which disallows such a level, must be too strong.

Another sort of challenge concerns the correspondence required between syntactic and semantic categories. Williams (1983) presents evidence that logical distinctions do not always correspond to syntactic distinctions in his discussion of predicate and referential nominals. He argues that since both types of nominals have the same internal syntax - that is both conform to the PS rule (8):

\[(8) \quad \text{NP} \rightarrow \text{det AP N PP S}\]

and both allow free relatives, then both types of nominals should be assigned to the same syntactic category. But, in spite of their belonging to the same syntactic category, he contends they differ in logical type. Predicate nominals, unlike referential nominals translate into one-place predicates, as is illustrated by (9) - (11):

\[(9) \quad \text{John became a doctor.}\]
\[(10) \quad * \text{A doctor was become by John.}\]
\[(11) \quad \text{A doctor was seen by John.}\]

Predicative nominal phrases, like one-place predicates, must have a subject. In (9) 'John' is the subject of 'a doctor'. (10) is unacceptable because the predicate nominal is not c-commanded by its subject. Referential NP's, on the other hand, do not have subjects - they are not functors which require arguments and therefore (11) is acceptable. The explanation of the difference between (10) and (11), Williams argues, rests on positing a distinction in logical type. Since
this logical distinction is not matched by a syntactic distinction, this is a violation of assumption (3).

Another important example that challenges assumption (3), discussed most recently by Higginbotham (1985), concerns the interpretation of non-well-formed-formulas. Consider (12):

(12) * The child seems sleeping.

(12) can only be understood in the same way as "the child seems to be sleeping"; the grammar somehow disallows the interpretation of the gerund "sleeping" as an adjective as in "The child seems sleepy."

However, since (12) is ill-formed, presumably there would be no syntactic rule to generate it. Given the strict homomorphic assumption in which syntactic entities are paralleled by semantic entities, it seems, then, that there will be no corresponding semantic rule to interpret it, let alone predict its definite interpretation.

As a final challenge, consider what one must commit to if one assumes both (3) and (6) when analyzing constructions with apparent extra meanings or "missing" but understood elements. Consider (13):

(13) Being a master of disguise, Bill would fool anyone.

Stump's (1985) analysis of these sorts of constructions involves the introduction of a free variable which ranges over propositional relations. If one is firmly committed to assumptions (3) and (6) together, one is led to analyses of these sorts of constructions that enrich, or "build in" elements at the syntactic and/or semantic levels so that (3) and (6) can be upheld. This is one option in the analysis of the above, and this strategy has often been adopted for constructions which have "missing" (syntactically) but understood arguments. This strategy for maintaining assumptions - the brute force strategy - seems particularly unappealing and counterintuitive. This is especially so when one considers that there is a plausible alternative: to abandon homomorphism. This alternative allows you to maintain determinacy, which is then defined over the intermediate level of representation, and obviates the need to build-in things that don't seem to be there syntactically - things to which the syntax appears to be indifferent.

On the basis of this type of evidence, I contend that the homomorphism constraint is too strong for natural language. One
could of course, do patch-work repairs to save the assumption but
this seems rather unintuitive and doesn't seem to buy you anything.

Abandoning assumptions (3) and (5) allows us to maintain a
modified version of the CP which can be characterized as follows:

First, interpretations are built up locally, therefore meeting the
locality requirement. 2 Second, by abandoning (3) we are able to
introduce an intermediate level of representation. It is at this
intermediate level that the relevant parts are found, and therefore it
is to this level that CP applies. Further, the combinatorial operations
are over structured representations at this intermediate level. The
operations are not restricted to the basic operations on sets. Rather
representations can be altered in various ways in the combinatoric
process, as will be shown in § 4 and § 5 below.

4. The representations

To represent the core of a lexical item, I will adopt Moravcsik’s
(1981) aitiational frame format. The aitiational frame is construed as
an explanatory schema, which consists of four meaning parameters
and a conceptual type. 3 The four meaning parameters can roughly be
categorized as in (14):

(14) m-parameter: the kind, the stuff it’s made of, its essential parts
s-parameter: principles of individuation distinguishing it within
the kind.
f-parameter: the characteristic associated function
a-parameter: the characteristic causal or interactional properties.

What Rosch’s results have taught us is that there are no necessary and
sufficient conditions for most of our vocabulary. Rather, there are
many cases in which a single lexical item seems not to correspond to a
single, well-defined or bounded concept, but seems rather to be
related to systematically connected families of concepts. The lexical
specifications provided in the aitiational frame form a core around
which an interrelated family of concepts are generated. Each family
‘member’ may, under appropriate interpretational circumstances,
contribute to or become the interpretation, in accord with general
combinatoric principles.

The specifications provided by the aitiational frame are not
necessary and sufficient conditions, nor does the frame provide more
than partial specifications. Rather, the frames are to be construed as
providing minimal "default" specifications. That is, these are the feature
specifications incorporated in the interpretation of a lexical item unless explicitly defeated, or unless some conflicting alternative specification is provided. As an example consider the specification of lemon in (15):

(15) lemon (CN)

<table>
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<tr>
<th>type</th>
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<th>a-factor</th>
<th>f-factor</th>
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<tr>
<td>Nk</td>
<td>fruit</td>
<td>yellow</td>
<td>edible</td>
<td></td>
</tr>
<tr>
<td>object</td>
<td>round</td>
<td></td>
<td></td>
<td>sour</td>
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</table>

The m-factor specifies the basic domain: 'fruit', with the s-factor specifications distinguishing it from other objects falling in the same domain; e.g. the specification 'yellow' distinguishes lemons from limes, the specifications 'round' and 'sour' distinguish it from bananas and yellow apples. Our typical interpretation of 'lemon' incorporates these 'default' features, as in (16), but we certainly understand (17), even though one of the default values has been defeated.

(16) I bought a lemon yesterday.
(17) I bought a green lemon yesterday.

We would not want to say that the typical occurrence of 'lemon' (as in (16)) and its occurrence in (17) mean different things. Rather, one of the default values has been defeated in (17) by the specification of a conflicting alternative: 'green'.

An alternative to the default value replaces the default value, it is not simply added to it as illustrated in (18):

(18) green lemon (CNP)

- m-factor . s-factor . f-factor
  fruit    green    edible
  round    sour     
  color

Another feature of these representations is that the type and the m-factor determine the dominant (or important) parameter(s) creating
a hierarchical structure for lexical representations. Artifact terms, are generally dominant along the f-factor, followed by their related causal roles. Natural kind terms, on the other hand, are dominant along the structure parameter. As an illustration of this thesis, consider phrases like 'fake CN':

Intuitively we interpret this type of construction to mean something that resembles the CN in appearance, but lacks certain other features characteristic of the real CN. What these characteristics are, is determined by the dominant parameter of the CN. Consider the phrases "fake fur" and "fake gun" in (19) and (20):4

(19) fake fur (CNP)
    [looks like (fur) & lacks (s- and m- factors)]
    m-factor s-factor f-factor
    (NK) looks like hair; warmth
          hair; deceptive

fake (CNP/CN)
    type m-factor s-factor
    property like X lacks Y; part;
          deceptive

fur (CN)
    type m-factor s-factor f-factor
    NK animal hair warmth

(20) fake gun (CNP)
    [looks like (gun) & lacks (f-factor)]
    m-factor s-factor f-factor
    metal barrel -(shoot bullets)
    weapon trigger

fake (CNP/CN)
    type m-factor s-factor
    property like X lacks Y; deceptive

gun (CN)
    type m-factor s-factor f-factor
    artifact metal barrel shoots bullets
    weapon trigger

Fake is a function which takes a CN as an argument, and defeats the dominant parameter determined by the conceptual type of the CN. The value of the resultant complex expression is a representation that consists of all but the features of the dominant parameter of the argument. Applying this function to 'fur' and 'gun' as arguments, we find intuitively, that a fake fur must share the features which serve to define a real fur, save its structure. It must look like a fur and provide
warmth, but it would lack the characteristic structure (including origin) of real furs. A fake gun, on the other hand, must share the features which define a real gun, save its function and related causal power. A fake gun looks like a gun but it doesn’t shoot bullets.

The hierarchy of parameters gives us a way to capture these intuitions. The difference between ’fake’ when applied to ’gun’ and when applied to ’fur’ can be attributed to the difference in the type and m-factor in the two terms, which determine the dominant parameters. ’Fake’ functions to defeat just these dominant parameters.

5. The Combinatorics

In addition to the notion of defeat introduced above and the standard combinatoric principles of conjunction, disjunction and negation, operational in the traditional semantic theory, I claim there are (at least) two other combinatoric principles operational in the interpretation of complex expressions. Consider the differing interpretations of “letter” in (21)-(24) (examples from Bierwisch 1982):

(21) I put the letter on your desk.
(22) The letter has been distributed to the whole faculty.
(23) The letter finally led to a political crisis.
(24) For many poets, the letter is a genuine literary genre.

The basic specification for letter would be as in (25):

```
(25) letter (CN)
    type  m-factor  s-factor  f-factor  a-factor
    object  written  y address  x information  ... to z
```

In (21) the most natural interpretation of Letter, is as a physical object of a certain kind. This interpretation is in line with the basic frame in (25). In (22) the interpretation has shifted types, from basic object, to a set of those objects. In (23) the type has shifted to the informational content, and finally (24) has shifted to the type of informational structure.

In these examples, our interpretation has shifted from the basic concept to focus on one of the related members of the complex concept. Following Bierwisch, I will call the principle governing this sort of shift in interpretation "conceptual shift".

Another sort of principle involved in alternative interpretations is "conceptual specification". Consider the situational specification for 'lose' in (26):

(26) lose (TV)  
<table>
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<td>event</td>
<td>cause to not have y</td>
<td>x have y at t &amp; not have at t &gt; t</td>
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Now consider the different ways of losing involved in (27) - (31):

(27) John lost his money, as he had a hole in his pocket.
(28) John lost his money by speculating at the stock market.
(29) John lost his friend in the crowded train station.
(30) John lost his friend in a tragic car accident.
(31) John lost his friend, as he always told bad jokes about him.

In (27) the event is further specified as a change in location of a concrete object 'money'. In (28) the event is specified as a change in possession of an abstract exchange value. In (29) the event is a loss of knowledge of location of a person. (30) seems to refer to an event of loss of possession of a relation to a person (as a result of a change in that person's state). And (31) it is the loss of abstract possession of a 'friendship'. Each of these differing interpretations are the result of specifications of values of the event variable induced by the context.

Conceptual specification is different from conceptual shift. Conceptual shift involves the shift from categories of concepts of one type, to concepts of another related type. Conceptual specification, on the other hand, provides different specifications of variables, resulting in different concepts within one and the same conceptual type. I contend that you need at least these two combinatoric principles, in addition to the traditional operations of conjunction, disjunction and negation, in order to account for complex categorization.

6. Conclusion

What I have attempted to illustrate in this paper is that prototype-like representations can be incorporated in a compositional semantics. I have argued that there is good reason to abandon the homomorphic assumption, and that doing so allows an intermediate level of representation to which the compositionality principle can apply. These representations need to be structured and the combinatoric operations which operate on these representations must be able to "look inside" the representations, and modify them in accord
with the principles of defeat, shift and specification, when they occur as part of a complex expression. Finally, this way of construing prototype representations and compositionality does not violate the spirit of compositionality, even though it does abandon some of the typical supporting assumptions. The complex representations are constructed in a predictable and rule governed way from the constituent representations. I believe it is this systematicity which is at the heart of the compositionality principle taken as a semantic universal.

NOTES

* My thanks to those at BLS and in Chicago who have commented on various stages of this work. Special thanks go to R. Chalmers, D. Dowty, G. Lakoff, J. McCawley, R. McCharmock, J. Moravcsik, J. Richardson, J. Sadock, M. Silverstein and J. Stern, whose discussions, comments, and criticisms have helped me to correct errors and clarify my thinking. Remaining mistakes, of course, are my own.

1. Hintikka (1981) discusses some of these assumptions in a different context and uses slightly different terminology. I find my terminology more perspicuous.

2. Under the outline of a theory developed below, this might not always be the case, since representations can be altered and I have assumed nothing which would close representations to modifications "higher" up in the derivation. For the purposes of this paper, however, I will simply assume locality.

3. I believe this representational format has advantages over other options. First, it allows one to represent the grouping or constituency of values, rather than simply presenting unordered and unprincipled lists. Second, it allows one to characterize the dominance of certain types of values, giving a hierarchical structure to the representations. The conceptual type is my own innovation adapted from Bierwisch (1982). I'm not sure that either Moravcsik or Bierwisch would approve of my construal. Also, the representations provided below are rough characterizations for illustrative purposes only. I'm not religious about the details.

4. David Dowty pointed out to me, during the discussion period, that these particular examples could be handled within a framework that assumed homomorphism. I am grateful to him for pointing out that the point of these examples wasn't clear in the presentation. I am using these examples here only to illustrate the hierarchical character of the representations. Where I think this framework excels with respect to this data is first, it predicts what properties a "Fake CN" will and won't have, based on the frame for the CN, rather than just saying what they are not (that is, mapping them into some unspecified subset of the complement of CN). Second, since these are only partial representations, it is predicted that the fake CN will lack whatever values the dominant parameter contains, even if we have no specific information represented under that parameter. For example, we know that fake furs will lack the essential structural properties (and, perhaps causal history) of real furs, even though most of us are ignorant as to what these properties are or how to identify them. This seems just the right prediction. George Lakoff pointed out that hedges like "strictly speaking" and "technically" are better examples of expressions that can't be
handled within a homomorphic system. The examples provided under section 5.
below, are examples of things that can't be handled within theories which
assume homomorphism and which restrict themselves to the basic set operations.

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