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*Proceedings of the  
Eleventh Annual Meeting of the  
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Proceedings of the  
Eleventh Annual Meeting  
of the Berkeley  
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February 16-18, 1985

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All papers

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John Gumperz, "Contextualizing Verbal Performances"; Richard Janda, "An Autosegmental-Morphological Solution to the Problem of Phonemes and Blends"; Paul Kiparsky, "The Role of Quantity in Finnish and English Meters"; Donca Steriade, "Syllabicity: Feature or Structure".





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Navajo

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Lakhota

Frajzyngier

Tanoan

Southern Tiwa

Frajzyngier

Chukotko-Kamchatkan  
(Chukchee-Kamchatkan)

Frajzyngier



## Preface

The Berkeley Linguistics Society begins its second decade in 1985. Inspired by the success of last years' conference, and in particular by the popularity of its parasession, the Berkeley linguistics students agreed to hold another parasession this year on the topic of metrics, prosody, and poetics. This volume includes the submitted and invited papers from both the general session and the parasession.

We would like to take this opportunity to recognize the many people who helped make both the conference and this publication possible. First, we thank all those who submitted abstracts, as well as the authors who presented their papers at the conference and submitted them to this volume.

We would also like to thank the students and staff of the Berkeley Linguistics Department, who helped us immeasurably. All those who read abstracts, chaired sessions at the conference, helped with registration, book sales and publicity, contributed to the editing process, and simply provided encouragement receive our gratitude.

In particular, we offer heartfelt thanks to Claudia Brugman, Amy Dahlstrom and Monica Macaulay for their advice, aid and encouragement at every stage. Without them we might never have survived.

We hope that the linguistics community finds this volume valuable and derives as much pleasure from reading it as we do from presenting it.

Mary Niepokuj  
 Mary VanClay  
 Vassiliki Nikiforidou  
 Deborah Feder





## THE DEVELOPMENT OF NARRATIVE BY WARLPIRI CHILDREN

Edith L. Bavin, LaTrobe University  
Tim Shopen, Australian National University

**1. INTRODUCTION.** As children grow older and mature linguistically, we assume they will show increased sophistication in grammatical structures as well as vocabulary. In addition, the relationships between propositions in a narrative are likely to be expressed more clearly by such means as foregrounding and backgrounding. However, as Karmiloff-Smith (1981) has pointed out, a child will not be able to organize events into a structured narrative until the necessary cognitive capacities for organization have developed.

Peterson and McCabe (1983) discuss three approaches to analyzing children's narrative. The high point analysis focuses on the build-up of events to a high point, after which there is some resolution. The episode analysis concentrates on the problem-solving nature of narrative: a problem is established, goals are set, the protagonist attempts to achieve these goals, and there is some resolution. We have found this analysis to be useful in describing the stories we have collected. Finally, the syntactic dependency approach concentrates on the syntactic relationships among propositions, rather than their context.

These three approaches have been used generally in describing children's recapitulations of past experience, or their retelling of stories. The narratives<sup>1</sup> we collected from 30 Warlpiri children are not retellings of familiar stories nor recapitulations of past experience. They were elicited using picture prompts, and since the children had not seen the pictures before and only saw one at a time, they could not plan ahead for the stories they told. We expected, therefore, that the narratives would not necessarily reflect the most cohesive structures. We did, however, expect to find out at what age the children started to relate events, and which linguistic means they used to show these relationships. We deliberately did not ask the children to tell a story since the emphasis was on when the children would relate the events in the pictures, organize the information, and relate this organization to the linking and focussing morphology available in Warlpiri.

**2. ADULT DISCOURSE.** Before discussing the study in detail, we will briefly describe some of the discourse features of standard Warlpiri. It is basically a free word order language. Although it is difficult to make any predictions about when adult speakers use one word

order over another, adult speakers do sometimes use word order for stylistic reasons. For example, both initial and final position may provide a focussing effect. An example from Laughren (1984) is given in (1). Note that wararrji is both in initial and final position.

- 1) Wararrji, ngula -ji watiya ka warirni manu creeper, that -TOP plant IMPF wrap around and wari-yani yukuri-yukuri-nyayirni wararrji -ji. climb green -green -very creeper -TOP  
'Wararrji, it wraps around and climbs upon trees and is very green wararrji is.'

A restriction on word order is the position of the cross reference markers which indicate the person and number of core arguments. These cross reference markers appear in second position; they are attached to an auxiliary base<sup>2</sup> when there is one, as in (2); otherwise, they are attached to the first element of the clause, as in (3):

- 2) a. Luwarni ka -rna marlu (ngajulu-rlu).  
shoot IMPF -1SGSU kangaroo I-ERG  
'I am shooting the kangaroo.'
- 3) a. Luwarnu -rna marlu.  
shoot(PAST) -1SGSU kangaroo  
'I shot the kangaroo.'
- b. Marlu-rna luwarnu.  
'I shot the kangaroo.'
- c. Luwarnu.  
shoot(PAST)  
'He/She/It shot him/her/it.'

Note that the third person singular subject and object cross reference markers are  $\emptyset$ , as illustrated above in (3c).

An argument may be topicalized into clause initial position as in (4b). Here karnta 'woman' is topicalized (as indicated by the position of -lu, '3rd plural subject') and so the ergative case marking is optional (Hale p.c.)

- 4) a. Ngarrurnu -lu karnta -ngku kulu -ngku.  
tell(PAST) -PLSU woman -ERG anger -ERG  
'The women told him off.'
- b. Karnta ngarrurnu -lu kulu -ngku.  
woman tell(PAST) -PLSU anger -ERG  
'As for the women, they told him off.'

Morphemes that may be used for focussing include the following:

- |                      |   |
|----------------------|---|
| -ju/-ji <sup>3</sup> | -assumed by the speaker to be known by the hearer |
| -jala                | -emphasis/contradiction                           |
| -nya                 | -presentative                                     |

Those that may be used for linking include:  
manu 'and'

<b>ngula</b>	'then'
<b>kala</b>	'but'
<b>kuja</b>	'thus'
<b>ngula jangka</b>	'after that'
<b>-lku/-lki</b>	'now, then' (used mainly on predicates)

Warlpiri has a series of independent pronouns although for third person the definite determiners are used as pronouns. For example:

<b>nyanangu</b>	-'the aforementioned'
<b>ngula</b>	-antecedent appears in previous clause
<b>yangka</b>	-antecedent is more distant (='The one you know about')

Other properties of Warlpiri that are relevant to discourse organization include the following:

- subordination: information may be backgrounded in subordinate structures
- aspect: a distinction may be made between completed and on-going action
- particles: the speaker's attitude may be signalled with the use of a number of propositional particles, e.g., nganta 'it seems'
- zero anaphora: core arguments do not have to be overt in the clause (the cross-reference system provides information on person and number).

So the language provides a number of means for linking clauses and propositions into a narrative and/or focussing upon specific elements in a clause.

In our study, we hypothesized that the narratives from the older children would display more of the morphological properties discussed above; we made no predictions about word order. We hoped, in fact, to find some revealing trends in the use of word order to organize narrative.

3. **METHOD.** Following the methodology described in Karmiloff-Smith (1981), we collected narratives from 30 Warlpiri children in the Yuendumu community. We presented each child with pictures bound into book form. The first 'book' contained 6 pictures depicting the following:

1. Man with rifle; tracks on ground.
2. Kangaroo by rocks.
3. Man sees kangaroo.
4. Kangaroo sees man moving with his rifle.
5. Man stops and shoots as kangaroo runs.
6. Kangaroo lies on ground as man approaches.

The second 'book' also contained 6 pictures depicting the following:

1. Boy walking.

2. Boy approaches old man with bird.
3. Exchange of bird.
4. Boy walks away with bird.
5. Bird is flying away.
6. Boy walks on alone.

The subjects ranged in age from 4:10 years to 12:4 years. Fifteen children were under 9, and 15 were older, as indicated in Table 1:

TABLE 1: Subjects

Age	N	Sex
4:10	1	F=1
5	4	F=3, M=1
6	3	F=1, M=2
7	4	F=1, M=3
8	3	F=2, M=1
9	5	F=3, M=2
10	3	F=2, M=1
11	5	F=3, M=2
12	2	F=1, M=1

Each child was shown the first picture of Book 1 and was asked, 'Nyarrpa-jarri ka?' (What is happening?). After the child responded, the page was turned; no other prompt was given. The pages were turned at the end of each utterance. When Book 1 had been completed, the child was praised and the second book was started. The third story followed. Two subjects (15 and 17) were not asked to respond to Book 3.

The third 'book' contained 12 pictures; these were taken from a published book and they depicted part of a traditional aboriginal story (although not traditional to the Warlpiri tribe). These 12 pictures were more detailed than those for the earlier stories. They show a giant dingo chasing two men; the men then chase and spear the dingo; other people come up to see the dead animal.

**4. RESULTS.** For the youngest subjects, short descriptive utterances were generally given in response to the pictures. For example, the responses from subject 1 (4:10 years, female) consisted of just 4 verbs and 2 nouns. The responses from subject 2 (5:3 years, male) are similar and are given below. In contrast, subject 3, also 5:3 years, (female), included more orientation and evaluation material; she used the past continuous verb form to provide background information and the future tense to make predictions. The last utterance for story 2 included an inference (=He is going along for the bird). Her story 3 contained details about the setting, and the utterances averaged more than 9 morphemes for

## SAMPLE TEXTS

Subject 2, Story 1  
(5:3 years):

1. **Marlu -ku.**  
kangaroo -DAT  
'For kangaroo.'
2. **Kani ka, yani ka.**  
? IMPF go IMPF  
'It is going.'
3. **Luwarni ka.**  
shoot IMPF  
'He is shooting it.'
4. **Nyangu.**  
see(PAST)  
'It saw him.'
5. **Parnkami ka.**  
run IMP  
'It is running.'
6. **Luwarnu.**  
shoot(PAST)  
'He shot it.'

Subject 2, Story 2  
(5:3 years):

1. **Yani ka.**  
go IMPF  
'He is going.'
2. **Wangkami ka -rla.**  
talk IMPF-DAT  
'He is talking to him.'
3. **Yinyi ka -rla.**  
give IMPF-DAT  
'He is giving it to him.'
4. **Kanyi ka.**  
carry IMPF  
'He is carrying it.'
5. **Parrparija.**  
fly(PAST)  
'It flew.'
6. **Yani ka.**  
go IMPF  
'He is going.'

Subject 2, Story 3 (5:3 years):

1. **Yani-rni ka -pala.**  
go -DIR IMP-DUSU  
'The two are coming.'
2. **Nyanyi ka.**  
see IMPF  
'She is looking at it/  
It is looking at her.'
3. **Parnkam(i) ka -pala.**  
run IMPF-DUSU  
'The two are running.'
4. **Yani ka.**  
go IMPF  
'It is going.'
5. **Parnkami-rni ka.**  
run -DIR IMPF  
'It's running this way.'
6. **Parnkam(i) ka -pala.**  
run IMPF-DUSU  
'The two are running.'
7. **Luwarn(i) ka -pala.**  
shoot IMPF-DUSU  
'The two are shooting it.'
8. **Luwarn(i) ka -pala.**  
shoot IMPF-DUSU  
'The two are shooting it.'
9. **Luwarni ka.**  
shoot IMPF  
'He is shooting it.'
10. **Luwarni.**  
shoot  
'Shooting.'
11. **Luwarnu -lu.**  
shoot(PAST) -PLSU  
'They shot it.'
12. **Luwarni ka -lu.**  
shoot IMPF-PLSU  
'They are shooting it.'

(Note: the parts of Warlpiri words in parenthesis were not articulated.)

## SAMPLE TEXTS

### Subject 3, Story 1 (5:3 years):

1. **Panyu -lpa.**  
come(PAST) -CONT  
'He was coming.'
2. **Pankanjanu -lp(a) kangkaru.**  
run along(PAST) -CONT kangaroo  
'The kangaroo was running along.'
3. **Kangkaru kapu luwa(rni) rayipul-kurlu \_\_.**  
kangaroo FUT shoot rifle -with  
'He will shoot the kangaroo with a rifle.'
4. **Kangkaru kapu rayipul-kurlu luwarni.**  
kangaroo FUT rifle -with shoot  
'He will shoot the kangaroo with a rifle.'
5. **Kangkaru \_\_ ka -rla yani-rni.**  
kangaroo IMPF-DAT go -DIR  
**Kapu miji -(lu)warni.**  
FUT miss -shoot  
'He is coming towards the kangaroo.  
He will miss it.'
6. **Kap(u) kangkaru luwarni.**  
FUT kangaroo shoot  
'He will shoot the kangaroo.'

### Subject 7, Story 2 (6:6 years):

1. **Wati ka yani.**  
man IMPF go  
'The/A man is going.'
2. **Wati ka payirni purlka.**  
man IMPF ask old man  
'He is asking the man, the old man.'
3. **Jurlpu ka -rla yinyi wati-ng(ki)**  
bird IMPF-DAT give man -ERG  
**purlka -ng(ki).**  
old man -ERG  
'The old man is giving him a bird.'
4. **Jurlpu ka -rla kanyi wati-ng(ki).**  
bird IMP-DAT carry man -ERG  
'The man is carrying the bird.'
5. **Jurlpu ka yilyam(i) wati-ng(ki).**  
bird IMPF send man -ERG  
'The man is sending/letting go of the bird.'
6. **Yani ka jurlpu -wangu wati.**  
go IMPF bird -without man  
'The man is going without the bird.'

(Note: \_\_ means missing case marker.)

each picture. However, subjects 4, 5, and 6 used short content utterances for the stories. Below 6-1/2 years, the children generally did not use clauses with overt arguments. After that age, the children were much more likely to name the participants in the clause. Subject 7 (6:6 years, male) not only named the participants in the clause, but also showed some attempts to organize the discourse. If a sequence of clauses had the same subject, this boy named the subject argument at the end of the clause once it had been established as the theme. His story 2 is given as an example, but the same pattern is also used in his other stories.

Focussing. For the 15 children under 9 years, there was very little use of focussing or linking morphology. There were no instances of -ju/-ji for the under 6-1/2 year olds. Subjects 8 (6:10 years, female), 9 (7:6 years, female) and 13 (8:1 years, female) all used -ju/-ji but never before the third utterance. For the over 9 year olds, 6 children used the focus marker, but never in utterance 1. The focus marker was not limited to one per clause: for some subjects any overt nominal was marked, and not just those previously mentioned in the discourse. In other words, it seemed as if -ju/-ji was being used as a definitive marker by some of the speakers. As well as being used with nouns, -ju may be used on anaphoric pronouns and temporal linking morphemes (e.g., ngula jangk 'after that'). In this respect, subject 25 (11:2 years, male) followed the adult pattern, using -ju on both pronominal forms and temporal linking morphemes.

In story 2, only subjects 8 and 13 used -ju/-ji in the under 9 years group. Of the 15 children over 9, 10 used this morpheme. It seems, then, that as the children grow older, they are more likely to use -ju/-ji. This undoubtedly is linked to the fact that as the children grow older, they are more likely to use overt nominals in the clause. However, not all children will use the focus marker, and those who do may use it on any nominal for which the speaker assumes the hearer knows the specific referent, either from the non-linguistic content or from previous mention. Because -ju/-ji was not used generally in the first two utterances for each story, it seems as if some discourse principles governed its use: the child recognized that a participant had been previously introduced, although not necessarily linguistically.

For story 3, there were over 90 instances of -ju/-ji from the 14 speakers over 9 years. This number is partly due to the longer utterances produced for the story 3 pictures. Overall, these pictures provided



more opportunity for the children to elaborate. We believe that the details in the pictures encouraged the children to become more involved in the story. In addition, there were 12 pictures (not 6 as in the first two stories), so the children were given more opportunity to establish protagonists and goals, and to describe the resolving of conflict. This hypothesis is supported by the fact that although some children did make evaluations and draw inferences in story 1 and story 2, more children produced utterances with evaluations and inference in story 3. Also the children generally gave more details about the setting, and a number of children included direct quotation (e.g., the two men talking to each other about how and when to spear the dingo). In addition, syntactic constructions in story 3 were more complex: embedded sentences and complex verb constructions were frequent in the stories from some of the older children.

Linking Morphology. Linking morphology was rarely used in story 1. Only subjects 8, 9 and 13 used any in the under 9 years group, and only 5 of the over 9 year olds used any. Most instances were for the last picture (=Then he went along). For story 2, only subjects 9 and 13 used linking morphology, and only 7 of the over 9 year olds. For this group, subjects 20 (9:9 years, male), 25 (11:2 years, male) and 30 (12:4 years, male) were the most prolific users.

SAMPLE TEXT                      Subject 20, Story 1 (9-9 years):

1. **Wati ka      yani wirlinyi.**  
man IMPF go hunt  
'The/A man is going hunting.'
2. **Ngula janka marlu,      pirli -wana -lpa nyinaja**  
that after kangaroo, rocks -by -CONT sit(PAST)  
**kalku -rnu -purda.**  
facing -DIR -towards  
'After a kangaroo was by the rocks facing this way.'
3. **Ngula wati -ji yurakangu      -rla pulya -ngku**  
then man -FOC creep up(PAST) -DAT slow -ERG  
**marlu -ku -ju pirli -wana.**  
kangaroo -DAT -FOC rocks -by  
'Then the man stalked the kangaroo by the rocks.'
4. **Ngula wati -ngki -ji luwarni marlu -ju.**  
then man -ERG -FOC shoot kangaroo -FOC  
'Now the man may shoot the kangaroo.'
5. **Ngula marlu -ju luwarnu      tarnga -kurra.**  
then kangaroo -FOC shoot(PAST) for good -to  
'Then he shot the kangaroo for good.'
6. **Wati -ji ngula      nyanu wardinyi -jarrija**  
man -FOC that are self happy -INCO(PAST)  
**nyanungu -lku.**  
he -then/now                      'That man became happy.'

However, while only 5 of the under 9 year olds used any linking morphology in story 3, for the over 9 group only 1 subject did not. The number of morphemes used varied from speaker to speaker but some children used them in every clause other than the first two.

Clearly, the child will only use linking morphemes when the forms have been acquired, but the forms will only be used when the speaker is able to relate the events.

Anaphora. We found very few instances of pronominal forms; subjects 20, 24 and 25 were the only users. Subject 25 used nyanangu frequently as in:

**nyanangu-jarra-palangu lanī -manu**

DEM -DU -DUOB fear -have(PAST)

'Those two were frightened.'

Subject 24 was the only one to use yangka (once). Note that ngula is ambiguous in initial position: it can mean 'then' or 'that one'; but for most of the instances of ngula in initial position, our Warlpiri consultants gave the temporal interpretation.

There is a relationship between word order and ellipsis. For example, if a subject argument is not overt, it cannot be clause initial. Generally, we found the youngest children did not name participants, so ellipsis was deictic not anaphoric. For the older children, participants were generally named. Whether there was then anaphoric ellipsis depended on the individual speaker but, more particularly, the story. While a few children did use anaphoric ellipsis in stories 1 and 2, more used ellipsis of named participants in story 3. Our finding is that if the children were able to organize the events into a structured narrative with a thematic subject, there would be more subject ellipsis. Because the children were able to establish a thematic subject in story 3, there was more ellipsis. Table 2 indicates that for subjects 18-28 (with some exceptions) most of the utterances for stories 1 and 2 are subject initial. This contrasts with the younger children who produced more verb initial utterances. However, for story 3, subjects 18-28 (9:4-11:11 years) used variation in word order and many of the utterances for pictures 7-12 had no overt subject. Note that before picture 6 the dingo had been chasing the men, and in picture 6, one man falls down. This event was both a high-point in the story and a turning point. After this, the two men become the chasers; they plan to capture the dingo and finally succeed in their goal. So after picture 6, the two men could be clearly established as the protagonists, and for many of the older children the two men then became the subject of most of the

remaining clauses.

We should note, however, that although wati-jarra '2 men' was frequently not overt, there was overt marking for the subject in the form of the cross-reference marker -pala. Because this marking clearly identified the subject, it may have influenced the amount of ellipsis. Note that in story 1 and story 2 there was potential ambiguity as to the identity of the subject since, in story 1, man and kangaroo are both singular and, in story 2, man, boy and bird are all singular.

A number of children used anaphoric ellipsis for the subject in clauses describing story 3 picture 12; but the cross-reference marker -lu clearly established a plural subject (the people who came to look at the dingo).

TABLE 2: Word Order for Subj. 16-30 in the 3 Stories

Subject	Story 1	Story 2
16	<u>6 clauses</u> 1=subject initial (3 have overt subject)	<u>6 clauses</u> all=verb initial (1 has overt subject)
17	<u>4 clauses</u> all=verb initial (no overt subjects)	<u>6 clauses</u> all=verb initial
18	<u>6 clauses</u> 5=subject initial	<u>6 clauses</u> all=subject initial
19	<u>6 clauses</u> 5=subject initial (1=no overt subject)	<u>6 clauses</u> all=subject initial
20	<u>6 clauses</u> 5=subject initial (1=no overt subject)	<u>6 clauses</u> 4=subject initial (1=no overt subject)
21	<u>6 clauses</u> all=subject initial	<u>6 clauses</u> 5=subject initial
22	<u>6 clauses</u> all=subject initial	<u>6 clauses</u> all=subject initial
23	<u>6 clauses</u> all=subject initial	<u>6 clauses</u> all=subject initial
24	<u>6 clauses</u> 5=subject initial (1=no overt subject)	<u>6 clauses</u> 5=subject initial
25	<u>12 clauses</u> 5=subject initial (7=no overt subject)	<u>9 clauses</u> 1=subject initial (7=no overt subject)
26	<u>6 clauses</u> 2=subject initial (2=no overt subject)	<u>6 clauses</u> all=subject initial
27	<u>6 clauses</u> 5=subject initial (1=no overt subject)	<u>6 clauses</u> 5=subject initial (1=no overt subject)

28	<u>6 clauses</u> all=subject initial	<u>6 clauses</u> all=subject initial
29	<u>11 clauses</u> 7=subject initial (4=no overt subject)	<u>6 clauses</u> 2=subject initial (3=no overt subject)
30	<u>9 clauses</u> 3=subject initial (4=no overt subject)	<u>10 clauses</u> 5=subject initial (4=no overt subject)

		<u>Story 3</u>	
<u>Subj.</u>			
16	14 clauses :	6 no overt subj.;	3=subj. initial
18	12 clauses :	8 no overt subj.;	1=subj. initial
19	13 clauses :	6 no overt subj.;	7=subj. initial
20	32 clauses :	14 no overt subj.;	13=subj. initial
21	20 clauses :	6 no overt subj.;	14=subj. initial
22	15 clauses :	6 no overt subj.;	8=subj. initial
23	13 clauses :	1 no overt subj.;	10=subj. initial
24	15 clauses :	5 no overt subj.;	7=subj. initial
25	27 clauses :	13 no overt subj.;	12=subj. initial
26	18 clauses :	2 no overt subj.;	14=subj. initial
27	22 clauses :	9 no overt subj.;	10=subj. initial
28	15 clauses :	2 no overt subj.;	11=subj. initial
29	20 clauses :	5 no overt subj.;	11=subj. initial
30	26 clauses :	8 no overt subj.;	12=subj. initial

Note: Subject initial clauses include those which have a linking word. So, technically, the clauses are either subject-initial or the subject is the first core argument.

Aspect. Because the prompt was given in the non-perfective verb form, the children generally responded with that form for their first utterances. However, the switches to perfective verb form were not totally idiosyncratic: some story events seemed to condition a switch. For example, in story 1, 25 children used the perfective verb form in utterance 6, indicating they perceived the man had achieved his goal of shooting the kangaroo. In story 2, 20 children used the perfective verb form in utterance 5, when the bird had flown away or been released. Then for the last utterance of the story the non-perfective form was used in the coda (=The boy is going along). For story 3, utterance 6 elicited perfective responses from 21 children. This is the picture in which one man fell; possibly the children perceived this as the end of an episode, thinking the dingo would capture the men. In story 3 the perfective form was also used by 21 children in utterance 9, 23 in utterance 10, and 20 in utterance 11. In all these pictures, the men were spearing the dingo; the children perceived the

spearing as the achievement of a goal and so the end of an episode.

**5. CONCLUSION.** The children in the study did not generally use temporal links or focussing morphology until they were 9. However, some children seem to be better story tellers than others in that given restricted information they will link events and use the linguistic means available for linking and focussing. Others will only use their narrative skills when they are given more details and so become more involved. Possibly in this type of task 6 events is not enough to illustrate organizing skills. When the children do become involved, the older ones will organize events into a coherent narrative.

The youngest children in the study used ellipsis deictically; they stressed actions, not participants. They also missed out necessary content details to show how the events were related. At a later stage the children did name participants, and attempted to organize the narrative. When a clear thematic subject could be established, more anaphoric (subject) ellipsis was used. We found a correlation among varied word order, the use of focussing and linking morphology, and syntactic complexity. All of these properties are cues to the child's linguistic maturity.

We have argued elsewhere (1985a) that some of the Warlpiri children's use of subject initial clauses results from contact with English. While this is undoubtedly true for some of the children, it also seems that the use of subject initial clauses may reflect a development stage, a stage at which the child is attempting to structure discourse.

Karmiloff-Smith (1981) found that the youngest French children she worked with used pronouns deictically, but older children used pronominal forms only after establishing the referents linguistically. The older children focussed more on organizing the utterances into a cohesive narrative, and tried to establish a thematic subject. Evidence from self-correctives supports this claim: some of the children reordered utterances to maintain the same subject. When the same subject could not be retained, the children were careful to use the noun, not pronoun. Although Warlpiri is quite different structurally, we also found the older children (10 and 11 years) attempted to organize story 3 around a protagonist. Because the dual subject marker -pala uniquely identified the dual subject in story 3, more ellipsis was found than in stories 1 and 2 when ambiguity might

have arisen if the third singular subject had not been overt in the clause.

#### FOOTNOTES

1. The data was collected as part of a long-term study of the children's acquisition of Warlpiri. We are grateful to the Yuendumu community for their support. We are particularly grateful to Jeanie Nungarayi Egan. The study is funded by the Australian Institute for Aboriginal Studies and the Australian Research Grants Scheme.

2. See Hale (1982) for details of which arguments are cross-referenced.

3. The alternation is conditioned by vowel harmony rules.

#### REFERENCES

- Bavin, E.L. & T. Shopen, 1985a, 'Warlpiri Children's Comprehension of Transitive Sentences,' (to appear) Journal of Child Language, Vol. 12.
- Bavin, E.L. & T. Shopen, 1985b, 'Warlpiri and English: Languages in Contact' to appear in M.Clyne (ed.) Australia: Meeting Place of Languages, Pacific Linguistics.
- Chafe, W., 1979, 'The Flow of Thought and the Flow of Language' in T. Givon (ed.) Discourse and Syntax, Syntax and Semantics, Vol. 12, Academic Press.
- Hale, K., 1982, 'Some Essential Features of Warlpiri Verbal Clauses' in S. Swartz (ed.) Papers in Warlpiri Grammar, Work Papers of SIL-AAB, Series A, Vol. 6, Darwin.
- Karmiloff-Smith, A., 1981, 'The Grammatical Marking of Thematic Structure in the Development of Language Production' in W. Deutsch (ed.) The Child's Construction of Language, Academic Press.
- Karmiloff-Smith, A., 1983, 'Language Development as a Problem-Solving Process' PRCLD, Vol. 22, pp. 1-22.
- Laughren, M., 1984, Handout from Australian Linguistics Meeting, Alice Springs.
- Ochs, E., 1979, 'Planned and Unplanned Discourse' in T. Givon (ed.) Discourse and Syntax, Syntax and Semantics, Vol. 12, Academic Press.
- Peterson, C. & A. McCabe, 1983, Developmental Psycholinguistics: Three Ways of Looking at Children's Narrative, Plenum Press.
- Romaine, S., 1984, The Language of Children and Adolescents, Blackwell.
- Schiffrin, D., 1981, 'Tense Variation in Narrative' Language, Vol. 57, No. 1, pp. 45-62.
- Tannen, D., 1982, 'Oral and Literate Strategies in Spoken and Written Narratives,' Language, Vol. 58, No. 1, pp. 1-21.

Information Flow in Seneca and English  
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This paper is about some differences between English and Seneca, an Iroquoian language spoken by about 500 people in western New York State. Specifically, it is about differences in how the flow of information through time is handled in the two languages. When I say "flow of information" I have in mind the stream of consciousness of the speaker and hearer, as ideas enter the speaker's mind and are subsequently communicated in some form to the hearer's mind, but I also have in mind the process by which those ideas are converted into language in order to accomplish the communication, the process of on-line verbalization. It is of some interest to compare Seneca and English because they are, in a variety of ways, as unlike each other as two languages can be. Their handling of information flow is one of the most conspicuous ways in which they differ.

In order to understand what I am talking about, you will have to join me in imagining that while a person is talking, first one piece of information and then another is activated in his or her mind. You will have to suppose, furthermore, that the amount of information that can be activated at one time is very small, relative to the total amount that is stored in the speaker's mind. And you will also have to suppose that one piece of active information is replaced by another at fairly regular intervals, it would seem about every two seconds (Chafe 1980:14). Finally, you will have to suppose that each piece of active information is verbalized in what I will call an intonation unit. A typical intonation unit is characterized by an initial pause, a coherent intonation contour ending in a clause-final cadence, and the possession of at least one word that is intonationally prominent. Schematically we can represent an intonation unit as follows, where the three dots indicate the initial pause, the x's indicate words, the accent mark shows that at least one of the words has primary stress, and the comma indicates any one of a set of clause-final intonations:

... x x x *x* x,

The following is a sample of a brief sequence of intonation units in English:

1. ... and then another day,
2. ... it was really *hót*,
3. ... it was in the *súmm*er.
4. ... and ... my *róom* was *smáll*.
5. ... it was like ... nine by *twélve* or something.
6. ... it seemed *spácious* at the *tíme*.

One of the things we can notice about these intonation units is that the limited amount of information verbalized in each of them is reflected in the limited number of words each contains. In a sample of about 2,000 English intonation units from casual conversation (see Chafe and Danielewicz, in press), I have found the modal number of words per intonation unit to be five. I interpret this strong preference for very short intonation units as reflecting a strong limitation on the amount of information that can be active in a speaker's mind at one time.

One of the ways the Seneca language differs from English is in being a classic polysynthetic language, which is to say that many of its words have quite a bit more information packed into them than do the words of English. If the just mentioned limitation on the amount of information that can be active in a speaker's mind at one time reflects a universal cognitive constraint, we might then expect that the intonation units of Seneca would be significantly shorter than those of English. That appears to be the case. In a sample of 830 Seneca intonation units in an informal conversation, I found the modal length to be two words rather than five. The following excerpt from this conversation (between two speakers labeled A and B) may provide some idea of what Seneca intonation units are like. Speaker A has been looking at the front page of a newspaper:

7. A. ... tho:há kyq?qh,  
almost they say

8. A. ... wá:ti?skót                      nẹ:kẹ:h,  
they came to be in water these

9. A. ... honq:wé                      nẹ:kẹ:h,  
it belongs to them this

10. A. ... ka:yátqshə?  
paper

"It says here the owners of this paper,  
they almost drowned."

11. B. ... ó:.  
oh

12. B. ... kwe?thá? aotí?sko?qh.  
almost they might have come to be in water

"They might have drowned."

13. A. ... Uh huh.  
uh huh



14. B. ... ó:.  
oh

15. A. ... ka:q̣ẉ? ne:? o?wátka:ho?  
boat it turned over

"Their boat turned over."

It appears, then, that languages may differ in the modal length of their intonation units when measured in terms of words, and that this difference is correlated, as we might expect, with their degree of synthesis, or roughly speaking the amount of information which their words contain (Sapir 1921:127-128).

It is natural to think of degree of synthesis in terms of morphemes per word (Greenberg 1960:185). In this case, the words of Seneca tend to contain relatively large numbers of morphemes, those of English relatively few. One might then suppose that a count of morphemes, rather than words per intonation unit might yield a more stable figure across languages. A preliminary count of small samples of English and Seneca suggests that this may be true, and that both languages tend to show something on the order of eight morphemes per intonation unit. Typical is intonation unit 6 from the English excerpt above:

6. .. it seemed spácious at the time.

Here there are six words but eight morphemes, if seemed and spacious are regarded as containing two morphemes each. Typical also is intonation unit 8 from the Seneca excerpt:

8. A. ... wá:ti?skó?t ne:ké:h,  
they came to be in water these

where the first word contains seven morphemes and the second, one. Although further work is called for, it is at the moment a plausible guess that the number of morphemes per intonation unit is a more stable figure across languages than the number of words.

For several reasons, however, it is problematic to assume that morphemes are units of information. For one thing, it is obvious that some morphemes convey quite a bit of information, while others convey little, or even none. To put it in terms of old-fashioned information theory (Shannon and Weaver 1949), the predictability of different morphemes varies greatly. In the Seneca example just quoted, the morpheme represented as -q- near the end of the first word is high in information content, with the meaning "be in water," whereas the sequence -?sk- which immediately precedes it can be considered an "empty morph," present in this word only because the verb root -q- requires an incorporated noun root of some kind. When there is no other noun root, the slot must be filled by this empty one. A little more subtle is the fact that

the "factual" morpheme, represented by the wa- at the beginning of this word, requires the presence of the "punctual" aspect morpheme, represented by the -t at the end. In other words, given that the word began with wa- we can predict that it will end with -t, so that the -t conveys a minimum of new information in the sense that it is maximally predictable.

Another kind of problem is represented by intonation unit 11:

11. A. ... ka:yátqshə?  
paper

This word might be said to contain four morphemes, but it has a unitary meaning for a speaker of Seneca, just as the two-morpheme word "newspaper" has for us. In other words, the division of ka:yátqshə? into four morphemes may have some etymological validity, but it can hardly be said to reflect any psychological segmentation into smaller meaningful units on the part of a speaker (or hearer).

Despite these problems, we may nevertheless be able to salvage some significance from the provisional finding that both an analytic language like English and a polysynthetic language like Seneca tend to have a similar number of morphemes per intonation unit. For it may well be the case that the relative distribution of the more informative and less informative morphemes in the two languages is the same. Although further research is clearly necessary, it would certainly be of some interest to discover that the number of morphemes per intonation unit is relatively stable across languages.

There is, however, another approach one can take to this question of how much information can be expressed in intonation units. I can sketch it only briefly here; a fuller discussion, limited to English, is available in Chafe (in press). It depends on the notion that a piece of information in a speaker or hearer's mind may be in any one of three different states of activation, which I will call "active," "inactive," and "semi-active." The distinction between active and inactive information may be clear enough already. Active information is that which a person is focusing on, which is in the center of a person's attention at the moment, whereas inactive information is that which is completely out of a person's immediate awareness. For reasons that will appear, however, it is useful to recognize a third, or intermediate, degree of activation, involving information that is in a person's consciousness to a peripheral degree. Information may be in this "semi-active" state for either of two different reasons. It may have been fully active at some earlier point in the discourse, and then have receded for a time into this state. Or it may be semi-active because it is inferrable from some other, related information that has already been activated.

Imagine now, again, a speaker who is activating successive chunks of information. Probably the process of changing a piece of information from the inactive to the active state uses up a

certain amount of mental energy, and the expenditure of that energy takes a certain amount of time. The process itself is what might traditionally be viewed as "recall," or retrieval from long-term memory. Probably at least one of the major reasons for the pause that typically begins an intonation unit is this process of activating previously inactive information. Thus, given our schematic representation of an intonation unit:

$$\begin{array}{c} \dots \quad x \ x \ x \ x \ x, \\ / \qquad \quad / \\ X \qquad \quad Y \end{array}$$

we can suppose that the activation process begins at point X (the beginning of the initial pause) and is complete at point Y (the end of the initial pause).

It is usually the case that, while some of the information that will be expressed in the upcoming intonation unit will have to be activated in this way, there will also be some information that is already either active or semi-active at point X. In other words there is usually some active, and perhaps some semi-active information that is carried over from one intonation unit to the next. I want now to suggest the hypothesis that during the period between X and Y no more than one concept can be changed from the inactive to the active state. When I say "concept" here, I mean either a referent, such as is conveyed by my room in intonation unit 4, or an event or state in which a referent participates, such as is conveyed by was small. We can call this the "one recall at a time" hypothesis. Its implication is that a particular intonation unit is able to express only one "brand new" concept, or only one concept activated from the inactive state, all others being concepts that were already active or semi-active at point X.

Let us review the English example with this hypothesis in mind. I will indicate in boldface the verbalizations of those concepts which, during the period just prior to the intonation unit in which they appear, were activated from the inactive state:

1. ... and then **another** day,
2. ... it **was** really **hot**,
3. ... it **was** in the **summer**.
4. ... and ... my **room** **was** **small**.
5. ... it **was** like ... **nine** by **twelve** or something.
6. ... it **seemed** **spacious** at the time.

That is, another day, be hot, be in the summer, be small, be nine by twelve, and seem spacious verbalized concepts that were previously inactive. The stressable syllable of each such item is given intonational prominence. It happens that the one intonationally prominent phrase in this example that does not express previously inactive information is my room. The speaker had been talking about her room shortly before, and it was a concept that

was semi-active at the beginning of the initial pause in 4. This example thus fits the one recall at a time hypothesis. Preliminary investigations of other English material suggest that the hypothesis is a fruitful one.

We can now look at the Seneca example from the same point of view. I will again give in boldface the words that express information recalled from the inactive state:

7. A. ... tho:há kyq?qh,  
almost they say

8. A. ... wá:ti?skó?t                      nẹ:kẹ:h,  
they came to be in water these

9. A. ... honq:wé                      nẹ:kẹ:h,  
it belongs to them this

10. A. ... ka:yátqshə?  
paper

"It says here the owners of this paper,  
they almost drowned."

11. B. ... ó:.  
oh

12. B. ... kwe?thá? aotí?sko?qh.  
almost they might have come to be in water

"They might have drowned."

13. A. ... Uh huh.  
uh huh

14. B. ... ó:.  
oh

15. A. ... ka:q̣wq? ne:? o?wátkaha:tho?  
boat it turned over

"Their boat turned over."

I assume that the particles and responses that constitute 7, 11, 13, and 14 do not express recalled information, and are thus irrelevant to the present discussion. It is only 15 that might seem to contradict the one recall at a time hypothesis, since it contains both the referent expressed as ka:q̣wq? "boat" and the event expressed as o?wátkaha:tho? "turned over." Are these in fact two separate concepts that were recalled during the initial pause of 15? I suggest that the speaker was conceptualizing here a unitary "capsizing" event, as in fact is signaled by the stress on

bóat and not on turned over in the English equivalent the bóat turned over (Chafe 1974:115-116). This boat-turning-over concept was in fact a good candidate for noun incorporation, the ultimate way of expressing conceptual unity in Seneca. The speaker might, that is, have said o?wathowókaha:tho?, combining the boat and the turning over within a single word. It is a symptom of the moribundity of Seneca that incorporation is a less and less frequently used device. The inclusion of the noun and verb in a single intonation unit such as 15 might, in fact, be regarded as a kind of poor man's incorporation, easier to accomplish and with similar effect.

Let us return now to intonation units 7-10, and take note of a discrepancy between the original Seneca and the invented, but I think quite reasonable English translation. In the Seneca there are four separate intonation units, whereas the translation (given just below 10) contains only two. It would be awkward in several ways to translate more literally:

"It says here,  
they drowned,  
it belongs to them,  
the paper."

Just now I am concerned with what appears to us to be the excessive fragmentation here. Later we can return to the unusual (for English) order in which the concepts are presented.

There are two reasons why Seneca has more intonation units in 7-10. One is that Seneca is a language in which it is more common than in English to present an evidential or epistemological orientation in a separate intonation unit, as in 7. We actually find a similar phenomenon in written English, where words or phrases like however or in any case are often set off by commas, but spoken English does this less often. Seneca speakers, on the other hand, frequently devote a separate intonation unit to a string of particles. The following example is more extreme than 7:

16. ... ne:?      nǎ:      shɔ:    kho    ni:?    ne  
         assert   contrast   just   also   I       the

hoqwé:kwa:    kwe?tha?  
over there    almost

"And I almost just the one from over there."

This intonation unit fails to contain a single spelled out noun or verb, but from it the hearer understood that the speaker was inclined to subscribe only to the Jamestown newspaper. Perhaps this way of speaking is especially characteristic of small speech communities in which there is a great deal of shared knowledge.

The other device that distinguishes 7-10 from its idiomatic English translation is the expression of "the owners of this paper"

as a single concept in English, but as two in Seneca: essentially hono:wə "they own it" and ka:yátəshə? "paper." It appears that the concept of newspaper owners is a unified concept in English, but one that Seneca speakers must create synthetically. And it must be presented in Seneca in two separate stages: first the idea of ownership, then the idea of the paper. I am suggesting here a kind of Whorfian difference between the two languages, with English expressing the idea of newspaper owners with a minimum of effort, Seneca expressing it with more difficulty. (It is interesting to contrast the effortful expression of this concept with the unified idea of the boat turning over in 15, as discussed above.)

So far I have dealt with various limits on the amount of information that can be included in a single intonation unit in English and Seneca. I have shown that the two languages differ in number of words per intonation unit, but that they appear to be similar in the number of morphemes. I have suggested that both languages are subject to the one recall at a time hypothesis, to the effect that an intonation unit can contain no more than one concept that has been recalled from the inactive state. And I have shown that what is treated or is treatable as a single concept may differ between the two languages. Now I would like to turn from the amount of information expressed in an intonation unit to the order in which the information is presented, both within and across such units. Again we will find interesting differences.

I will begin by assuming that all languages share the strategy of presenting information by bringing up some concept and adding it to some other concept that functions as a starting point. In other words, information is not verbalized in a vacuum, but is attached to other information. The starting point appears as what we generally know as the subject of a clause, the added information as the predicate.

English, as we know, typically expresses the starting point, the subject, at or near the beginning of a clause, and then goes on to add the predicate. Seneca does it differently. The typical Seneca strategy is to begin with an epistemological orientation expressed through one or more particles, sometimes as a separate intonation unit as in 7, sometimes in the same intonation unit as what follows, as in 12. What then follows these particles may be either a subject or a predicate. In a general way the choice seems to depend on which of the two is the most "newsworthy" (Mithun, in press). The following example may give some idea of how this kind of choice operates. The speaker was talking about trains:

17. ... ne:ʔ      o:nə    oʔgáʔse:ʔ,  
      assert    now    it pulled

18. ... okwe:nyó:      ne    ʔ:kwe    ɛyʔteʔnóhtə:h.  
      it's possible    the    people    they will get in

"Then they pulled, and people were able to get in."

19. ... ta: ne:? ti nɛ:kɛ: ae? niyáwɛ?ɔh,  
so assert switch this again what happened

20. ... ne:ne:? twɛ:níshɛtɛ:nyɔk,  
those in those days

21. ... ne:? nɛ:kɛ: ne yatátehso:t,  
assert this the he and his grandmother

22. ... wa:yate?nɔhtɛ:h.  
they got in

"So what happened in those days was that a boy and his grandmother got in.

23. ... nɛ: ka?sehtowáne:neh.  
this in the big car

"In this big car."

24. ... ka?sehtiyánowé?keh.  
in the fast car

"In the train."

25. ... wa:yate?nɔhtɛ: yatátehso:t.  
they got in he and his grandmother

"The boy and his grandmother got in."

Intonation units 21 and 22 together express a clause in which the concept of the boy and his grandmother was the subject, that of "getting in" the predicate. The concept of the boy and his grandmother was brand new, previously inactive information, and when such information is presented as a subject it is necessarily allotted its own separate intonation unit. The concept of getting in was at this point semi-active information because it picked up on something already stated in 18. It was less newsworthy than the subject, and thus appeared second.

In 25 the situation was reversed. Here both concepts were semi-active, having both been verbalized before, but having both lapsed into the semi-active state while the speaker focused on the car and the train in 23 and 24. The degree of activation of these two concepts was equal, and was thus irrelevant to determining the order between them.

It is probably the case that when a subject and predicate share the same degree of activation, as in 25, Seneca speakers generally treat the predicate as more newsworthy, expressing it before the subject. This hypothesis also explains the ordering of 8-10, where all the concepts involved were previously inactive, and where there were in fact two cases of predicate preceding subject:





When both the subject and predicate are equivalent in their degree of activation (either both previously inactive as in 8-10 or both previously semi-active as in 25), the issue is decided by a default preference for the predicate as the more newsworthy of the two. However, when a subject and predicate together constitute a single unitary concept, as in 15, there is an arbitrary imposition of a frozen subject-predicate order.

These seem to me to be at least some of the principles that govern the flow of information in this language. The principles cover quite a bit of the data I am familiar with, though doubtless they will need to be modified and extended before they will account for all the relevant facets of Seneca discourse. In the meantime, I hope they may extend somewhat our arsenal of discourse facts and explanations.

### References

- Chafe, Wallace. 1974. Language and consciousness. *Language* 50:111-133.
- . 1980. The deployment of consciousness in the production of a narrative. In Wallace Chafe (Ed.), *The pear stories: cognitive, cultural, and linguistic aspects of narrative production*. Norwood, NJ: Ablex.
- . In press. Cognitive constraints on information flow. In Russell Tomlin (Ed.), *Coherence and grounding in discourse*. Amsterdam: John Benjamins.
- Chafe, Wallace, and Jane Danielewicz. In press. Properties of spoken and written language. In Rosalind Horowitz and S. J. Samuels (Eds.), *Comprehending oral and written language*. New York: Academic Press.
- Greenberg, Joseph. 1960. A quantitative approach to the morphological typology of language. *International Journal of American Linguistics* 26:178-194.
- Mithun, Marianne. In press. Is basic word order a universal? In Russell Tomlin (Ed.), *Coherence and grounding in discourse*. Amsterdam: John Benjamins.
- Sapir, Edward. 1921. *Language: an introduction to the study of speech*. New York: Harcourt, Brace.
- Shannon, Claude E., and Warren Weaver. 1949. *The mathematical theory of communication*. Urbana: The University of Illinois Press.

ON EXPLAINING THE PHONEME: WHY (SOME OF) PHONOLOGY IS NATURAL

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One of the most important discoveries in the history of phonological theory is the construct that has been called the "phoneme."<sup>1</sup> In the early work in which the phoneme plays a prominent role, there are basically two positions concerning the nature of this construct. The first position, that the phoneme is a psychological or mental entity, was held by, among others, Baudouin de Courtenay (1895), Sapir (1925, 1933), and the early Prague school. Thus, Sapir (1925), for example, states that "...the objective relations between sounds are only a first approximation to the psychological relations which constitute the true phonetic pattern." The second position, taken by such investigators as Bloomfield (1933), is that the phoneme is some kind of physical entity (either a characteristic of all and only the allophones of a given phoneme, or the sum of the allophones). Twaddell (1935) challenged both of these positions, arguing that "...it is inexpedient and probably impossible (at present) to associate the term [phoneme] with a reality...because the purposes to which the term may be put in our discipline are served equally well by regarding the phoneme as an abstractional, fictitious unit." That is, the phoneme, though convenient for making statements that we would like to make about the phonological structure of various languages, has neither psychological nor physical reality. Halle (1959), in his celebrated argument from Russian voicing assimilation, takes Twaddell a step further, arguing that one aspect of phonemic theory (that which requires that it be possible to determine a phonemic representation from a given phonetic representation) "involves a significant increase in the complexity of representation." I.e., the phoneme is an inconvenient "fictitious unit," and should be banished forever from the realm of phonological theory. In this paper, I will argue that not only should the concept "phoneme" play a role in phonological theory, but it does in fact have reality of the psychological sort. After establishing this point, I will then turn to an attempt to explain why such a psychological construct should exist.

The basis for all of my arguments in favor of a psychologically real phoneme is establishing a set of psychological facts that require an explanation, and for which the existence of phonemes seems the only likely candidate. No fictitious unit, no matter how convenient, can play a role in a real explanation of real facts. Furthermore, if the facts in question are psychological in nature, then we will require constructs which are also of a psychological nature in order to explain them; one cannot explain psychological facts by appealing to, say, physical forces (aside from, perhaps, those ultimately responsible for the psychological constructs in question) any more than gravity can be explained on the basis of the shape or size of the earth.

The first kind of fact is the following often-noted phenomenon: "Although the speakers produce and the hearers experience objectively different sounds, they are not aware of that difference" (Twaddell 1935). Twaddell is referring here only to differences within a given allophone, which could presumably be explained on the basis that the differences involved are too small to be perceived (aside from cases involving free variation). But other similar facts cannot be explained on this basis, since the differences in question can be phonemic differences in languages other than in question. As Sapir (1925) puts it: "In most languages, what is felt by the speakers to be the 'same' sound has perceptibly different forms as [phonetic] conditions vary." Thus, for example, English [p] and [p<sup>h</sup>] are not perceived as being "different" sounds by native speakers, despite the fact that they are perceived as being different by speakers of languages such as Thai and Hindi--and in fact may function to signal meaning differences in these languages. The fact that speakers of these languages (and speakers bilingual in these languages and English) can routinely perceive the differences in question shows clearly that what is involved is not the physiology of the human perceptual system, but rather the neurolinguistic processing of these auditorily different sounds.<sup>2</sup>

The example under discussion is particularly instructive in that it shows that physical phonetic similarity is not always of primary importance in determining which phones are considered psychologically the "same sound." The standard textbook accounts of the articulation of these sounds describe [p] as being voiceless and unaspirated, while [p<sup>h</sup>] is said to be voiceless and aspirated; [b], on the other hand, is voiced and unaspirated. In these terms, [p] shares with [p<sup>h</sup>] the property of being voiceless, and with [b] that of being unaspirated (all three being, of course, bilabial). That is, unless there is some way of ranking these properties in such a way that a higher-ranked property counts more for determining phonetic similarity, [p] is no more different from [b] than it is from [p<sup>h</sup>]. Furthermore, as Swadesh (1934) has pointed out, there is another property that is relevant: both [p] and [b] are relatively lenis, while [p<sup>h</sup>] is fortis. Note further that if the s in an sp-initial word is removed, say by splicing it out of a taped utterance, the result is invariably perceived as having initial /b/ (cf. Ladefoged 1975). Thus, if anything, [p] is more similar phonetically to [b] than it is to [p<sup>h</sup>].<sup>3</sup> Despite this fact, I know of no researcher who has claimed that [p] and [b] are allophones of the same phoneme in English.<sup>4</sup> This represents a significant amount of agreement on this point, especially given the fact that with respect to other issues, linguists show a penchant for taking all possible positions that are even remotely plausible.

All of the above discussion is based on more or less impressionistic observations on the part of me and other linguists. One might well question these claims on the basis of a lack of any hard "scientific" evidence. Even without this type of evidence,

the arguments seem to me to be sufficiently compelling that the burden of proof would rest on those who might want to deny the existence of the putative facts in question. However, Jaeger (1980) reports on psycholinguistic research which appears to support strongly Sapir's position. I will summarize here only one of her two experiments which appear to support this position, the one which involved classical conditioning of subjects to respond to words containing [k<sup>h</sup>] (so chosen because of the large number of ways of spelling this sound). Of the four naive subjects who were eventually conditioned to respond to this sound, all four also responded to words containing [sk] in subsequent testing, while failing to respond to words with [g] and words without velar stops, at a statistically significant rate. Interestingly, two of these subjects did not notice that it was words containing [k<sup>h</sup>] that correlated with the mild shock that was being used for conditioning purposes ("galvanic skin response" was used to determine whether subjects responded even without the shock), thus providing further evidence that conscious attention to, say, spelling was not responsible for the results. Thus, there is good experimental evidence that [k] and [k<sup>h</sup>] are psychologically the same for these speakers.

Let us now turn to the second kind of fact, which, once again, Sapir (1925:25) has emphasized: "...people find it difficult to pronounce certain foreign sounds which they possess [in restricted phonological contexts--DGC] in their own language." For example, English contains nasalized vowels (before nasal consonants), but most speakers have considerable difficulty in coping with French nasal vowels, as any French teacher can attest. Similarly, Sapir points out, Nootka speakers invariably substitute n for l, which occurs in Nootka, but only in song. It might be objected that this phenomenon is not psychological, but physiological, in nature, in that the vocal tract has been trained to be able to produce such sounds only in the environments that are appropriate for the language in question. While there seems to be at least some truth to this, it clearly cannot be the entire explanation. English has nasal vowels not only before nasal consonants, but also before voiceless consonants (cf. Malecot 1960), at least for some speakers. In fact, this can be demonstrated even without acoustic study for such speakers who can optionally pronounce pre-consonantal t as glottal stop. In sequences such as can't go, the glottal pronunciation contains no alveolar articulation at all, and thus, obviously, no [n]. What we have here is a sequence of a nasalized vowel plus glottal stop (however much it may "feel" to speakers, including the present author, that there is an n present). Similarly, most speakers of English find syllable-initial pt clusters utterly unpronounceable, with the result that loans like pterodactyl which contain such a cluster are simplified so as to begin with t. However, such clusters do occur in casual speech, as in potato ([p<sup>h</sup>edə]), so we clearly are able to articulate such a sequence. It is only when we are trying to say them that they are a problem. It is neither our ears nor

our vocal tracts that are responsible for our phonological inabilities. It is the brain, apparently, that is responsible, as a result of trying to send the vocal tract instructions that are within its capabilities (although it sometimes crosses itself up, as in the case of what we might call the "potato phenomenon") or to design a system that allows for efficient phonological storage.

Finally, slips of the tongue and the adaptation of loan words provide evidence in favor of the psychological reality of phonemes. Fromkin (1971, 1980) reports that the output of slips of the tongue is invariably in accord with the allophonic rules of the language in question. Since, as was seen above, this kind of thing cannot be due solely to vocal tract physiology, there must be something of a mental nature involved here as well. Similarly, loan words are "fixed up" so that they obey the phonological structure of the borrowing language (cf. Ohso 1973, Lovins 1973, 1974, Bjarkman 1976, and below), as our treatment of words such as pterodactyl illustrates. This phonological structure must be of a rather abstract, psychological, sort, since the offending sequences are readily pronounceable (as long as we don't try to pronounce them!), as was demonstrated above.

We would like to be able to explain these facts, of course-- and the only serious candidate appears to be notions such as "phoneme" and "allophonic rule." Again, since the facts in question are psychological facts, the concepts used will have to have psychological content. Thus, it seems clear that Sapir was quite correct when he stated (1925:25) that "...phonetic phenomena are not physical phenomena per se..." Both phonemes and allophonic rules are psychologically real entities, although the latter, as alluded to above, have a physiological motivation.<sup>5</sup>

We are now faced with a fact that seems as puzzling as those for which we have just provided an explanation. Why do phonemes exist? I.e., what is it about the acquisition process that causes adults (and older children) to have such abstract concepts? This is a question which most linguists and psychologists have simply failed to ask, and it is easy to understand why. For those who take the "fictitious unit" position seriously (including, presumably, most behavioristically-oriented psychologists, as well as the American structuralist linguists who were heavily influenced by behaviorism), this question is utterly nonsensical. And for generative phonologists and generative grammar-oriented psychologists, who reject the distinction between phonemes and morphophonemes, it is equally impossible to ask such a question. But it is an important question to ask, if phonemes are psychologically real entities and significantly different from morphophonemes. Is there a significant difference between these two kinds of constructs? It seems clear that there is, since, for one thing, the facts discussed above do not hold for morphophonemes. No one feels that the c in electric and that in electricity are the "same sound," and no one would have any difficulty pronouncing the latter with a [k] rather than an [s] or vice versa. Some morphophonemic rules do apply to the output of slips of the tongue (such

as that responsible for the allomorphy in the English indefinite article), and play a role in nativization (at least in the later stages), but many do not, while all allophonic rules are applicable in such cases. There is also an extremely important difference from the standpoint of acquisition: there are no alternations in the case of allophonic variation to give the child any reason to go deeper than the surface form. Note that doing so would violate the Strong Alternation Condition of Kiparsky (1968) if we take this condition literally (although it seems clear that Kiparsky did not intend it to apply in the case of allophonic variation). That is, there is no evidence from the morphophonemic alternations that figure so prominently in generative phonology to suggest to the child that he or she should do anything other than take the allophones at face value. Thus, the standard generative approach to language acquisition--that the child is a "little linguist" who discovers alternations, posits abstract underlying forms and corresponding rules, and chooses the simplest system on the basis of some kind of evaluation measure--is irrelevant in this area.

Suppose, then, that the child is not only a "little generative phonologist," but also a "little classical phonemicist," in the sense that children have the ability to do the equivalent of minimal pair tests, to discover complementary distributions, etc. Is this a realistic picture of phonemic acquisition? There are a number of reasons to think that it is not. First of all, as Patricia Donegan has argued in unpublished work, what is known about the nature of memory makes it extremely implausible that something like this could be going on. But suppose, for the sake of argument, that it is physiologically possible for a child to do something like this. Is there any evidence that children do do this? If, in particular, they were actually seeking out (maximally general) allophonic rules, then we would expect them to at least occasionally overgeneralize, as they clearly do in the case of other kinds of rules. But, to the best of my knowledge, no child has ever been reported to, say, aspirate all syllable-initial stops, rather than only voiceless ones. Overgeneralization of allophonic rules never seems to occur; moreover, it is only allophonic rules which are not subject to such overgeneralization. Thus, it would appear, children are not actively seeking out allophonic rules. But if they are not, how can they end up having them?

The position that we appear to be driven to is that such constructs are in some sense innate, since we "know" (in the funny Chomskyan sense) things that we have not learned. This is the position taken on at least partially independent grounds in the theory of "natural phonology" (cf. especially Stampe 1973, Donegan and Stampe 1979): children don't actively acquire phonemes or allophonic rules at all. Rather, these mental-but-physiologically-motivated rules (=Stampe's "natural processes") are built in (innate), and if we are not forced by the language we are acquiring to unlearn them, they survive to adulthood. Thus,



why acquirers of English invariably end up with this rule, rather than some other rule which accounts equally well for the data and appears to be just as phonetically plausible. (The phonetic motivation for this rule appears to be an assimilation with respect to point of articulation, at least for my articulation of /r/. But note that (1b') would be an assimilation of exactly the same type.)

Even in the face of this and the other evidence adduced in favor of natural phonology, one might still feel somewhat uncomfortable positing innate constructs, especially ones as specific as rule (1b). Derwing (1977), in fact, questions "the value of any linguistic theory that attempts to invoke 'innateness' as an explanatory vehicle" on the basis that doing so "does not provide any positive insight into either its nature or development, but is rather tantamount to an admission of failure to explain it." (He is referring here specifically to natural phonology.) To be sure, one must be careful about abusing this notion, but it seems to me equally undesirable to go too far in the opposite direction. Surely no one would question the value of a biological theory that proposed that the reason why birds have wings is that this is part of their genetic makeup. The reason why such a theory is acceptable is that there are good reasons for believing it to be true, and we should clearly evaluate linguistic theories on the same basis: does the evidence support the claim about innateness or does it not? It would be just as wrong to claim that something that is innate is not, as to claim that something that is not innate is. There is, of course, nothing to prevent the biologist from asking further why wingedness is innate to birds, and indeed one might well propose an explanation based on such concepts as evolutionary advantage--nor is there anything to stop the biologically oriented linguist from asking an analogous question.

Let us look, then, somewhat more carefully at the argument. It is worth pointing out that the argument given above appears to have another strike against it: since most of data discussed come from English, we are essentially positing a universal on the basis of data from a single language. In fact, however, there is nothing wrong in principle with such an argument, as I will now attempt to demonstrate. I give in (2) an outline of the single language/universal argument:

- (2) a. If a set of speakers S "know" X, but can't have learned X, then X is innate to S.
- b. All of the English-learning children studied to date seem not to have learned phonemes and allophonic rules, and all English-speaking adults (and older children) seem to "know" these things.
- c. Therefore, these things are innate to the children studied.
- d. If X is innate to S, then X is innate to all humans.

(2c) follows from (2a) and (2b) by modus ponens, and the



conclusion that "these things are innate to all humans" would follow from (2c) and (2d), again by *modus ponens*. There is thus nothing at all suspect about the form of such an argument; we have here an impeccable double application of *modus ponens*. If it fails, then, it must be because one of the premises is false. (2a) seems to me to be thoroughly plausible, and establishing the truth of (2b) has been the focus of this paper up until now. If we accept these premises, then we are bound by simple logic to accept the conclusion (2c). Before turning to (2d), I would like to compare briefly this argument with a typical Chomskyan argument for innateness of some syntactic principle. From the standpoint of form, there would be no difference between the two kinds of arguments, the Chomskyan argument again depending on a double application of *modus ponens*. Premise (2a) would also remain unchanged, but (2b) would replace "seem not to have learned" by "cannot have learned." This is an important difference, especially since this claim is typically made without any reference to the actual facts about acquisition. The second conjunct of (2b) would also presumably be more problematic in the Chomskyan argument, since many researchers would not accept the claim that adults "know" what they are claimed to "know." Thus, not accepting the Chomskyan conclusion need not entail rejecting the conclusion of the present argument.

But (2d) must also be true in order for the argument to go through, and it seems clear that it is not. Musical ability, for example, is not the kind of "X" that we would like to generalize about on the basis of a small number of individuals. We can't all be Beethovens, and many of us can't even carry a tune, but if we examined a statistically freaky group of individuals and found that they all had substantial musical talent, (2d) would enjoin us to conclude that all humans do. Unless there is a crucial difference between language abilities and musical abilities, then, the argument is in trouble. But there does in fact seem to be such a difference: it is a truism that all normal individuals end up by acquiring remarkably similar grammars of the language(s) they are exposed to. Furthermore, the unanimity concerning the phonetically counterintuitive grouping of [p] and [p<sup>h</sup>], without regard to the language spoken by ancestors, provides strong evidence that there are no relevant genetic differences with respect to the acquisition of this aspect of language. That is, it seems that a weaker version of (2d) is likely to be true:

- (3) If X' is innate to S, then X' is innate to all humans.

If "X'" is taken to be "phonemic acquisition ability," this is an extremely plausible hypothesis, and the desired conclusion is correspondingly likely. Note that showing that one of the premises on which this argument rests would seriously weaken the conclusion (though it would not, strictly speaking, falsify it), since it is hard to see what other kind of evidence could be provided for it. Note further that extending the range of linguistic

phenomena to include other abilities such as syntactic ones (and I find such an extension quite plausible, although I will not press the case here) would render a Chomskyan argument legitimate--as long as premise (2b) (the problematic one) can be shown to be true.

Some apparent substantive problems have also been brought up in the literature. First of all, different languages have different rules which act to remove the same phonetic difficulty (Dinnsen 1980), and show what we might call "suballophonic" differences (i.e., different languages have phonetically different vowels that we would write as /u/, etc.--cf. Ladefoged 1983). This creates the problem of explaining why, if the processes in question are innate, speakers of one language choose one in order to alleviate the phonetic difficulty in question, while speakers of other languages choose different ones, in the first kind of case, and why different languages have different "suballophonic" rules in the second. A related objection has been raised by Manaster-Ramer (1982), who points out that different languages may treat the sound in different ways when nativizing it. Thus, for example, German invariably converts English interdental stops to the corresponding dental stop, while in French the alveolar fricatives are substituted. (In fact, if my informal observations are to be trusted, even dialects of the same language may differ in this way, since Canadian French speakers show the dental stops.) Again, we would like to know why German speakers apply their innate despirantization rule, while French speakers "prefer" to use their backing rule, despite the fact that both rules are innate to both sets of speakers.

The facts in question appear to me to be quite genuine, but not, at least in principle, unexplainable in terms of the theory of natural phonology. Before turning to an examination of possible explanations, I would like to give some attention to Dinnsen's discussion, which is marred by an apparent failure to distinguish between explanation and prediction. He maintains that in order to qualify as an explanation, a phonetic account must explain why one change occurs to the exclusion of others. It is not enough, for Dinnsen, to show that the process in question serves to remove a phonetic difficulty, as long as there is another way of removing that difficulty.<sup>6</sup> For me, this is all that is necessary--if we understand why something occurs, then we have explained it. We can't predict when or if another language will respond to this same difficulty in the same way, but prediction is not explanation. If we required that all explanatory accounts make predictions, then we could never explain a past event (which would make the practice of conducting autopsies in order to determine the cause of death a prime candidate for the Golden Fleece Award!). We may not be certain that we have the correct account, but neither can we be certain that our predictions will be borne out. This kind of uncertainty is simply a fact of life for all of science.

However, some of the uncertainty about which phonetic process

will occur in which language will quite possibly be removed by future advances in our understanding. I will mention two areas in which such an advance seems likely. The first is the traditional notion of the "basis of articulation" (which Ladefoged in fact mentions in a pair of sentences but otherwise ignores). It has often been maintained, for example, that the French basis is relatively far forward in the mouth and with significant lip rounding (cf. Schourup 1983 for a survey and some extremely interesting and promising discussion of this notion). This could be taken as a valid explanation for why French has as many front rounded vowels as it does--including, perhaps significantly, the hesitation vowel. For the present, this is really no more than a promissory note, but I find Schourup's arguments concerning the relevance of the basis to natural phonology in particular quite suggestive. This could also obviously play a role in explaining the cross-linguistic differences discussed by Ladefoged, so it is difficult to understand why Ladefoged did not discuss it any more than he did. Similarly, the borrowing differences may also yield to explanation in such terms.

To Schourup's discussion I would like to add one observation which, like so much of the evidence for the basis, is anecdotal in character. It has often been maintained that when one speaks a second language with a reasonably accurate pronunciation, it is necessary to "warm up" after not having spoken this language for some time before the limits of accuracy can be attained. My own experience confirms this contention, and it seems that the basis of articulation could provide an explanation for why this is so. If we suppose that it is necessary when changing from one language to another to also change bases, and that this latter task is relatively more difficult as the length of time during which a basis has not been used increases, then this phenomenon is just what we would expect.

The other area, in which some progress is now being made, is the difference in prosodic structure that is found from language to language (cf. especially Donegan and Stampe 1983, Selkirk 1984). That is, it may be that the processes that are innate vary not only with respect to the basis of articulation, but also with respect to what kind of prosodic system is present. Alternatively, it may be the case that all processes are innate, but each requires a "trigger" in the basis and/or the prosodic system in order to be activated. This approach bears obvious similarities to the parametric approaches advocated in various other contemporary theories, in which the parameters, like the basis of articulation and the prosodic structure of the language being acquired, must be learned, but most of the rest of the linguistic system is built in. In sum, it seems likely that phonology is not quite as simple as most current theories make it out to be.

One final apparent objection will be considered here, that of Anderson (1981). Anderson begins and ends his article with quotations from Donegan and Stampe (1979); a passage from the conclusion is given below (the passages in single quotes are taken from

Donegan and Stampe):

"Language is not 'governed by forces implicit in human vocalization and perception.' Language is not simply a 'reflection of the needs, capacities, and world of its users'... In this sense, phonology is clearly not 'natural.'" (Anderson 1981:535).

Given this, one might expect that the body of the paper would contain, at least in part, a critique of Donegan and Stampe's position. Aside perhaps from the claim (p. 512) that "if we were to attempt to impose phonetic naturalness as a defining condition on the class of objects we study in phonology, we would not be left with very much" (made without discussion of or even reference to the claim to the contrary made by Donegan and Stampe 1979:128 that "this includes far more than it excludes"--a sentence which immediately follows one of those quoted by Anderson), however, it does not. What Anderson has actually done is argue (and demonstrate, I feel) that what Donegan and Stampe would call morphonology is not natural. I do not see why Anderson felt compelled to demonstrate this, since no one, to my knowledge, has ever denied it, certainly not Donegan and Stampe. One could conceivably construe the body of Anderson's paper as a critique of the "Natural Generative Phonology" of Theo Vennemann and his students (though not a very good one, I would maintain), but since he does not refer to any of their work, this seems unlikely. Anderson has succeeded in demolishing his straw man, but the non-effigy is still very much alive; at least in the area of allophonics (and probably in all of automatic phonology), phonology, contrary to Anderson, is natural. Moreover, if we accept the distinction between phonology and morphonology, we can maintain that all of phonology is natural.

#### NOTES

1. The "phoneme" I am referring to here is the classical one of the American structuralists which is a unit of surface contrast. This is the same phoneme which Halle (1959), and Chomsky in later work, have attacked. Lest it be thought that I am being inconsistent (or have changed my mind!), I still feel that Halle's argument was successful to a limited extent (cf. Churma 1983). In particular, his argument appears to legitimately refute theories which require a rigid prohibition against "mixing of levels," such as the structuralists he was criticizing. But it did not show that the phoneme has no role to play whatsoever in linguistic theory, only that it does not exist as some identifiable level in a generative derivation (cf., for example, Schane 1971).
2. There are two different senses of "perceive" that the English language does not allow us to readily distinguish. In one sense of this word, speakers do in fact perceive such differences,

since, as Sapir has pointed out, they can notice foreign accents that make use of the "wrong" allophones. Nevertheless, they are not consciously aware of them, will deny that they exist, and fail to make use of them when performing such tasks as designing orthographies. It is in this sense that they cannot perceive these differences.

3. Swadesh (1935), in his critique of Twaddell's monograph, argues that [p] is slightly less lenis than [b], and that this is why the former is grouped with [p<sup>h</sup>]. Even so, as Twaddell (1936) points out in his reply to Swadesh, [p] is phonetically more similar to [b] than it is to [p<sup>h</sup>], if we accept Swadesh's account of the facts.

4. Some, such as Twaddell and the Praguians would set up a third phoneme or "archiphoneme." Ladefoged (1975) seems to be suggesting that the orthography is responsible for our perception that [p] and [p<sup>h</sup>] aren't really different (and cf. Ladefoged 1983 for further argument along these lines). This position is extremely implausible on several counts. First of all, the orthography does not cause us to feel that other sounds that have the same spelling, but are phonemically distinct, are not different (see below for further discussion). Secondly, preliterate children who invent orthographic systems after having learned only the names of the letters and how to make them invariably use the symbol for the voiceless sounds to represent post-s stops (cf. Read 1971). Finally, the experimental evidence discussed by Jaeger (1980) indicates that spelling cannot explain this phenomenon (see below).

5. It is worth pointing out that, while phonemes are relatively accessible to consciousness, allophonic rules, like other linguistic rules, are not.

6. Dinnsen does not go into much detail about what would replace phonetics as an explanatory device, giving only a sketchy account of his theory of "atomic phonology" which is apparently intended to give a vague idea of what would be involved in a true explanation. What is more, he says nothing about the severe problems faced by the theory that Donegan and Stampe (1977) have pointed out.

#### REFERENCES

- Anderson, S.R. 1981. Why phonology isn't natural. LI 12:493-539.
- Baudouin de Courtenay, J. 1895. An attempt at a theory of phonetic alternations. In E. Stankiewicz (ed.), A Baudouin de Courtenay anthology. Bloomington, IN: Indiana University Press.
- Bjorkman, P. 1976. Natural phonology and loanword phonology (with selected examples from Miami Cuban Spanish). University of Florida dissertation.
- Bloomfield, L. 1933. Language. New York: Holt, Rinehart and Winston.

- Churma, D. 1983. A further remark on the 'Halleian Syllogism.' *Lingua* 59:345-54.
- Churma, D. 1984. Impossible nativizations as phonological evidence and the explanation of constraints on phonological structure. *JL* 20:223-7.
- Derwing, B. 1977. Is the child really a 'little linguist'? In J. Macnamara (ed.), *Language learning and thought*. New York: Academic Press.
- Dinnsen, D. 1980. Phonological rules and phonetic explanation. *JL* 16:171-91.
- Donegan, P. and D. Stampe. 1977. On the description of phonological hierarchies. In S. Fox, et al. (eds.), *CLS book of squibs*. Chicago: Chicago Linguistic Society.
- Donegan, P. and D. Stampe. 1979. The study of natural phonology. In D. Dinnsen (ed.), *Current approaches to phonological theory*. Bloomington, IN: Indiana University Press.
- Donegan, P. and D. Stampe. 1983. Rhythm and the holistic organization of language structure. In J. Richardson, et al. (eds.), *Papers from the parasession on the interplay of phonology, morphology, and syntax*. Chicago: Chicago Linguistic Society.
- Fromkin, V. 1971. The non-anomalous nature of anomalous utterances. *Lg*. 47:27-52.
- Fromkin, V. 1980. *Errors in linguistic performance*. New York: Academic Press.
- Halle, M. 1959. *The sound pattern of Russian*. The Hague: Mouton.
- Jaeger, J. 1980. *Categorization in phonology*. University of California (Berkeley) dissertation.
- Kiparsky, P. 1968. How abstract is phonology? In O. Fujimura (ed.), *Three dimensions of linguistic theory*. Tokyo: TEC Company.
- Ladefoged, P. 1975. *A course in linguistic phonetics*. New York: Harcourt Brace Jovanovich.
- Ladefoged, P. 1983. The limits of biological explanation in phonetics. *UCLA Working Papers in Phonetics* 57:1-10.
- Lovins, J. 1973. *Loanwords and the phonological structure of Japanese*. University of Chicago dissertation.
- Lovins, J. 1974. Why loan phonology is natural phonology. *Natural phonology parasession*, 240-50. Chicago: Chicago Linguistic Society.
- Malecot, A. 1960. Vowel nasality as a distinctive feature in American English. *Lg*. 36:222-9.
- Manaster-Ramer, A. 1982. *How abstruse is phonology?* University of Chicago dissertation.
- Ohso, M. 1973. *A phonological study of some English loan words in Japanese*. Ohio State University Working Papers in Linguistics 14:1-26.
- Read, C. 1971. Pre-school children's knowledge of English spelling. *Harvard Educational Review* 41:1-34.
- Sapir, E. 1925. Sound patterns in language. *Lg*. 1:37-51.

- Sapir, E. 1933. The psychological reality of phonemes. In D. Mandelbaum (ed.), *Selected writings of Edward Sapir*. Berkeley, CA: University of California Press.
- Schane, S. 1971. The phoneme revisited. *Lg.* 47:503-21.
- Schourup, L. 1983. The basis of articulation. *Ohio State University Working Papers in Linguistics* 25:1-13.
- Selkirk, E. 1984. *Phonology and syntax: the relation between sound and structure*. Cambridge, MA: MIT Press.
- Stampe, D. 1973. A dissertation on natural phonology. University of Chicago dissertation. [Published in 1979 by Garland Publishing.]
- Stanley, R. 1967. Redundancy rules in phonology. *Lg.* 43:393-436.
- Swadesh, M. 1934. The phonemic principle. *Lg.* 10:117-29.
- Swadesh, M. 1935. Twaddell on defining the phoneme. *Lg.* 11:244-50.
- Twaddell, W.F. 1935. On defining the phoneme. *Language Monograph* No. 16.
- Twaddell, W.F. 1936. On various phonemes. *Lg.* 12:53-9.

# Indirect Object "Lowering"

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## 1. Introduction: Types of Linguistic Explanations

This paper will be another one of those papers demonstrating that a semantic account of a particular grammatical phenomenon, in this case the relationship between possessors and indirect objects, is superior to a syntactic one. However, in addition to proposing the semantic analysis of possessor ascension and indirect object "lowering", I wish to compare the two types of linguistic explanation in order to see how they are related to each other.

The labels 'syntactic' and 'semantic' are both misleading when applied to types of explanation. In the case of the phenomena which I am about to discuss, it has become more popular to propose lexical rules rather than syntactic ones, although syntactic rules are still used by theories such as relational grammar. The term 'formal' has been used to describe syntactic/lexical types of explanations (e.g., Comrie 1983), but that too is partly a misnomer: semantics can be formal too, in the sense of being made precise and axiomatizable. Syntactic or lexical rules as explanations of grammatical phenomena are formal in the sense of mentioning only properties of the form of an utterance in their definition. Since the term 'formal' in this sense has an unfortunate homonymy with 'formal' meaning 'precise or axiomatizable,' I would prefer not to use it but instead use the synonymous term 'structural.'

The term 'semantic,' like the term 'syntactic,' is not broad enough: in addition to explaining grammatical phenomena in terms of the structure of the real-world situations language describes, linguists also talk in terms of the structuring imposed by speaker's cognitive apparatus and by the nature of discourse. These latter two factors have generally been called 'pragmatic' or 'functional,' with 'functional' sometimes covering semantic explanations as well (Comrie 1983), but both of those terms have many other meanings not relevant to the point at hand. Hyman (1983) has proposed the term 'external' explanations, contrasting with 'internal,' that is, structural, explanations. I will, however, stick to the terms 'structural' and 'semantic,' with the caveat that in the latter case I really mean 'semantic-pragmatic.' This terminological discussion has highlighted the differences between structural and semantic explanations; after presenting the evidence and the analysis, I will examine their similarities.

## 2. Possessor Ascension

The phenomenon I wish to analyze is the relationship between possession, generally manifested in one or more of a structurally diverse set of genitive relations,

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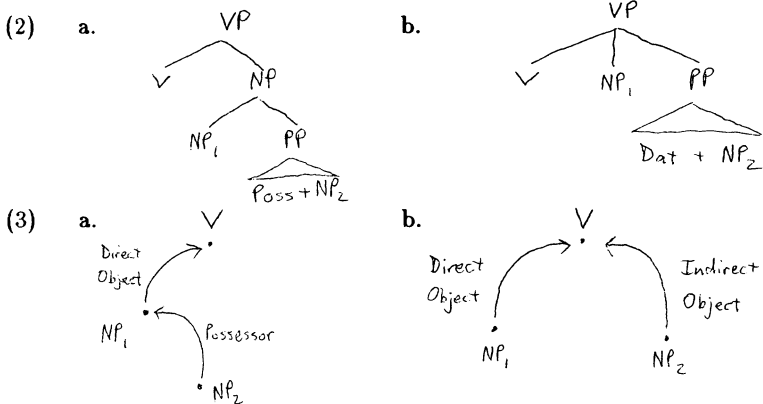
I would like to thank Keith Denning for his comments on this paper, and Carol Toffaleti for the French data.



including genitive case-marking, adpositions, possessor adjectivalization, simple word order, or cross-referencing affixes, and indirect objects, a structurally-defined class which generally includes the thematic roles of recipient, benefactor and sometimes malefactor. The most well-known relation between possession and indirect objects is "possessor ascension," so christened by relational grammarians, where the possessor of the direct object and sometimes the subject is realized as a surface indirect object:

- (1) Je lui ai cassé le bras.  
'I broke his arm.'

This phenomenon has not been discussed extensively in the literature. It has been described syntactically as a movement process, which would operate on phrase structures or dependency structures as in the (a) forms in the two diagrams, and yield surface structures as in the (b) forms (**Poss** and **Dat** representing whatever language-specific structure is used):



I have not seen lexical analyses of possessor ascension, so the following examples are hypothetical. A lexical rule for possessor ascension is not entirely straightforward, since it would have to refer to the internal structure of subcategorized phrases, but in a dependency-oriented notation, this is not particularly unusual:

- (4)  $break [- [NP_1 [Poss NP_2]_{PP}]_{NP}] \Rightarrow$   
 $break [- NP_1 [Dat NP_2]]$
- (5)  $\langle newpred\ indobj \rangle = \langle oldpred\ obj\ possessor \rangle$

While there are important issues involved in deciding whether to do it in the syntax or do it in the lexicon, and whether to do it with phrase structure or do it with dependency (functional) structures, all of these analyses have in common that they relate two structures, one a basic, underlying or abstract structure and the other a surface structure, and the relation is determined by structural properties. This makes all of these analyses structural.

All of these structural analyses have in common the property that they relate an underlying structure in which there is an NP dependent on the direct object NP to a surface structure in which the "former possessor" NP is dependent on the verb or VP as an indirect object. Possessor ascension thus resembles what has traditionally been called Raising in that an NP which "belongs" in a lower syntactic unit is realized in a higher syntactic unit, the main clause VP. This resemblance to another well-known and widely-attested phenomenon has perhaps allowed it to be accepted as relatively unproblematic, since it has not generated a great deal of controversy and the structural accounts available handle it decently enough. However, allowing the structural rules to raise NP's out of other NP's as well as out of lower clauses is a further generalization of Raising (however it is to be analyzed) which requires constraining to disallow sentences like 6, in which the possessor of the instrument ascends to indirect object—not to mention raising other kinds of dependent NP's than possessors, or raising NP's out of other kinds of syntactic structures, or even raising other kinds of syntactic units.

- (6) \*Il m'a brûlé le tableau avec le chalumeau.  
'He burned the painting with my blowtorch.'

### 3. Indirect Object "Lowering"

While possessor ascension does have resemblances to other well-known structural processes, namely, those having to do with Raising, there is one major structural fact about the relationship between possession and indirect objects which does not fit into this schema at all. That fact is that the inverse of possessor ascension is also attested. The inverse of possessor ascension I will call "indirect object lowering," in keeping with the traditional movement metaphor used for naming such phenomena but not implying a movement analysis. I have encountered instances of indirect object lowering in the following languages: Tlapanec (Otomanguan; Suárez 1983:123), Quiché (Mayan),<sup>1</sup> Hixkaryana (Carib; Derbyshire 1979:94), Kobon (Indo-Pacific; Davies 1981:112), Buin (Indo-Pacific; D. C. Laycock, p.c.), and Mokilese (Micronesian; Harrison 1976:133).

Indirect object lowering is the realization of a recipient or benefactive argument as the possessor of the direct object NP. The first two examples show the lowering of a recipient to the possessor of the direct object, and the next three examples show the lowering of a benefactor to the possessor of the direct object.

Quiché (Mondloch 1981:200)

- (7) k-Ø-(i)-yā xun nu-kěx  
IMPF-3sgABS-2plERG-give one 1sgPOSS-deer  
'Give me a deer.'

Mokilese (Harrison 1976:263, 133)

<sup>1</sup>Quiché evidence has been culled from my own notes from a course offered by Norman McQuown at the University of Chicago in 1976-1977, and in various texts; it has not been discussed in any of the linguistic literature on Quiché to my knowledge.

- (8) Ngoah rapah-ki ih pwa ngoa-n kioang nah mwani-ho  
 1sg look=for-COMP him COMP 1sg=MODAL give CLASS=3sgPOSS  
 money-that  
 'I looked for him to give him the money.'
- (9) Ngoah insigeh-di kijinlikkoan-oaw nih-mw  
 1sg write-ASP letter-one CLASS-2sgPOSS  
 'I wrote a letter to/for you.'

Kobon (Davies 1981:112)

- (10) Nipe win yad g-ab  
 3sg bow 1sgPOSS do-3sgPRES  
 'He is making a bow for me.'

Hixkaryana (Derbyshire 1979:94)

- (11) rokrahani yonyhoryeye Waraka  
 my-bow he-made-it Waraka  
 'Waraka made a bow for me.'

All four of these languages use cross-reference markers on the NP to indicate the possessor. This is the reason that we may safely say that the possessor is a surface syntactic dependent on the direct object NP. In those languages where case marking is used to indicate genitive relations, and the case markers for genitive and dative and/or benefactive are identical, one cannot determine by inspection whether or not indirect object lowering is present; one can do so only by using constituency tests. For example, in Guugu Yimidhirr, an Australian language, there is an unusual syncretism between the dative and just those genitives which can be lowered indirect objects in other languages. In Guugu Yimidhirr, case-marked nominals dependent on NP's agree with the NP in case, so there is double case-marking. Although the genitive marker is generally the same as the ablative, the double case marking Gen + Abs, i.e., the possessors of direct objects,<sup>2</sup> is identical to the dative (indirect object). Thus we find the following:

Guugu Yimidhirr (Haviland 1979:117, 148-149)

- (12) ngadhu gaarga(-Ø)  
 1sg=DAT(GEN+ABS) younger=brother(-ABS)  
 'my brother'
- (13) Nyulu ngadhu mangal-Ø wagi  
 3sg=NOM 1sg=DAT(GEN+ABS) hand-ABS cut-PAST  
 'He cut me in the hand/He cut my hand.'
- (14) Nyulu ngadhu galga-Ø maandiidi  
 3sg=NOM 1sg=DAT(GEN+ABS) spear-ABS take=REDUP=NONPAST  
 'He brought me a spear.'

<sup>2</sup>And intransitive subjects, many of which fit the semantic account to be given; see 31-33 below.

However, in the absence of any evidence concerning constituency, we cannot infer that Guugu Yimidhirr has indirect object lowering.

A more unusual example of indirect object lowering is found in Mokilese. Mokilese has possessive classifiers, and one can lower the indirect object without a direct object being present by having the possessive classifier alone (Harrison 1976:133):

- (15) Li-ho doa-doa ah  
 woman-that sew-sew CLASS=3sgPOSS  
 'That woman sews for him.'

Finally, one can find evidence of indirect object lowering in even such a pedestrian language as English. The following is an attested utterance, in which the speaker was asking the hearer to go out and buy a beret, which I find only marginally acceptable out of context:

- (16) Let's go get your beret.

This sentence was not uttered with a specific beret in mind and of course without the hearer having acquired any beret at the time of utterance, so the possessive modifier cannot be considered to be merely a dependent denoting the possessor of the beret.

A structural analysis of indirect object lowering would presumably be the inverse of proposals for possessor ascension. The syntactic rules would take the 2b and 3b forms as basic and the 2a and 3a forms as derived, while the lexical rules would look like the following:

- (17) *give* [— NP<sub>1</sub> [Dat NP<sub>2</sub>]]  $\Rightarrow$  *give* [— [NP<sub>1</sub> [Poss NP<sub>2</sub>]<sub>PP</sub>]<sub>NP</sub>]  
 (18) <newpred obj possessor> = <oldpred indobj>

The structural analysis of indirect object lowering suffers from all of the defects of the structural analysis of possessor ascension and more. Just as there was no principled way of constraining what structures an NP could ascend from, there is no principled way to constrain what structures an NP can be lowered into, disallowing constructions like 19, where the instrument is lowered into the direct object, not mention lowering NP's into other dependent NP's than the direct object, lowering NP's into other syntactic structures, or even lowering other kinds of syntactic units:

- (19) \*Harry cut the knife's bread.  
 (= Harry cut the bread with the knife.)

Even worse, though, is that indirect object lowering is unique from a structural point of view. While there are a variety of raising rules, and these bear a distant similarity to promotional rules (see Langacker 1974 for a proposed explanation of this fact), there are no other lowering rules. The only similar rules are Quantifier Lowering, which is no longer generally accepted, reflects a semantic analysis of quantification rather than a syntactic one, and is radically different from indirect object lowering in its structural particulars; and various demotion rules, which

normally are either optional or are obligatory consequences of a promotional rule. Thus, permitting a structural lowering rule opens a Pandora's box of necessary constraints on lowering rules, since one cannot prohibit them altogether.

#### 4. Semantic Explanation

In this section I will propose a semantically-based analysis of the phenomena discussed which not only gets the gross facts right—the interchangeability of possessors only with indirect objects only, and the bidirectionality of the phenomenon—but will also account for some of the more subtle constraints which have been observed.

One of the constraints on indirect object lowering provides the key to the problem. Indirect object lowering is attested almost exclusively in cases where the individual denoted by the indirect object ends up possessing the item denoted by the direct object. Thus, the crucial semantic fact is that some sort of possession relation is involved. In the case of ordinary verbal constructions, any possession relations present are not altered by the event. However, in the cases where indirect object lowering is attested, the possession relations which hold are affected by the event itself. Generally, the benefactor (indirect object) comes into possession of the direct object by virtue of the event described by the main verb; thus, the possessive construction has generalized its use to include possessors-to-be.<sup>3</sup> The verb types fall into four classes, which seem to fit in a hierarchy of susceptibility to indirect object lowering: in a given language, the presence of indirect object lowering in types 1 and 2 implies the presence of indirect object lowering in types 3 and 4.

**1. Predication of possession.** This is the only case of indirect object lowering into subject position;<sup>4</sup> it occurs only in Quiché and Mokilese in our sample:

Quiché (course notes)

- (20) ?eh xumpa? ?i-čix ?iš ?e-ńolik  
 PRT how=many 2plPOSS-sheep 2pl 3plABS-be  
 'How many sheep do you have?'

Mokilese (Harrison 1976:211)

- (21) Mine woaroa-n woal-o war  
 exist CLASS-3sgPOSS man-that canoe  
 'That man has a canoe.'

<sup>3</sup>These verbs are also the ones which license dative shift in English, an interesting functional parallel, though for opposite reasons: dative shifted indirect objects become direct objects since they are more intimately affected by the action denoted by the main verb, by virtue of their coming to possess the former direct object.

<sup>4</sup>except, of course, for passivized direct objects, as in the following from Quiché; they of course still come to be possessed by the lowered indirect object:

- a. ya sukumam čik le r-acyäq le ?al mate?y  
 already made then the 3sgPOSS-clothes the girl Matea  
 'Someone has already made the [wedding] clothes for Matea.'

A lowering analysis is proposed for semantic reasons: the relation is a two-place predicate  $\text{Possess}(x, y)$ , and yet in the surface structure the possessor argument is a dependent of the possessed. The only reason that an *indirect object* lowering analysis can be proposed is that in many languages predication of possession is done by making the possessed thing the subject and making the possessor the indirect object, e.g. Latin *Mihi liber est*. This is also the case in Guugu Yimidhirr (Haviland 1979:58), where the dative and genitive are identical:

- (22) Yarrga-wi galga- $\emptyset$  wu-naa  
 'boy-DAT(GEN=ABS) spear-ABS exist(lie)-NONPAST  
 'The boy has/owns a spear.'

This construction asserts the presence of a possession relation rather than a transfer of possession relation, and so differs from the other verb types.

**2. Transfer of Possession.** These are the standard verbs like *give* or *send*, where the agent carrying out the transfer is also the former owner of the thing transferred (the source). There are examples of type 2 from Quiché and Mokilese, and Suárez cites Tlapanec without providing any examples. They do not occur in Hixkaryana or Kobon.

**3. Verbs of Creation.** These are verbs of creation such as *make*, *bake*, *write*, *sew*, in which the subject creates the object, and at the same time gives it to the possessor. These differ from the verbs of type 2 in that there really is no former possessor: the creator does not intend to keep the created thing but instead it becomes the recipient's possession upon creation. At most, one could argue that the creator is a temporary possessor. Verbs of type 3 are attested in all of the languages cited.

**4. Verbs of Obtaining.** That is, the agent of the transfer is not the former possessor or source.<sup>5</sup> Type 4 includes verbs such as *buy*, *get*, and *bring*. This type is attested in the English innovation 16 as well as in the languages with more general indirect object lowering.

English examples of type 4 verbs sound much better in the past tense:

- (23) She got my beret at Macy's.  
 (24) She got me a beret at Macy's.

However, the reason for this greater acceptability is not because tense is another interacting factor with possession relations, but that in these sentences the normal function of *attributive* possession, modification of the head noun, is actually what renders these utterances acceptable. Unlike types 1-4, all of which have the pragmatic (discourse) function of defining two participants in an event in terms of their relationship to each other with respect to the action described by the main verb, attributive possession has the pragmatic function of modification of the referent, usually in order to assist in identifying the referent (restrictive modification) or to

<sup>5</sup>The agent may also be the recipient, in which case the verb may be a middle form or a simple active form without a benefactor or even possessor relation explicitly represented; see the discussion of the Tzotzil constraints in footnote 8.

make a secondary comment on it (nonrestrictive modification; see Croft 1984 and below for discussion of the basic pragmatic functions of clause structure). This sets it apart from types 1-4 and is responsible for the syntactic structures usually associated with it.

The reason that type 3 and type 4 verbs are more likely to undergo indirect object lowering than type 1 and type 2 verbs is that their semantics is more conducive to the pragmatic function of modification. Type 3 and 4 verbs primarily denote the actions of creation and obtaining respectively, and only secondarily denote the transfer of possession to the benefactor. In fact, the benefactor may be absent, in which case they denote only the actions of creation and obtaining, as in *I baked a cake* or *I got a beret*. As a less central part of the verbal semantics, the transfer of possession is more suitable to representation as modification as secondary comment. Type 1 and 2 verbs, on the other hand, primarily denote the possession or transfer of possession event respectively, and so it is much more likely that cross-linguistically the benefactor will remain a primary participant of the main verb in surface structure.

From this one would expect that indirect object lowering with both type 3 and type 4 verbs in English is also relatively acceptable under those circumstances most conducive to perceiving the possessor as a true NP constituent in its discourse function. For a possessor to assist in successfully identifying the referent of the head NP to the hearer, the type of entity denoted must be preferably unique (or uniquely salient) in its relation to the possessor. Hence, an already-owned item (past) is better than an unknown, to-be-owned one (future); and a unique or uniquely salient item is better than an ordinary one:

(25) (?)Marian will make her wedding dress.

(26) \*?Jane is going to make my yogurt.

In these sentences, it is extremely difficult if not outright impossible to separate the attributive-possessor from benefactive functions; the clearest examples of indirect object lowering are those where the attributive-possession function is impossible or very unlikely.

The reason for this is the primary semantic fact which licenses possessor ascension as well as indirect object lowering: something can be beneficially/adversely affected by an action by virtue of being the possessor of the entity which is directly affected by the action. In the examples of possessor ascension given above, the benefactor relation realized in the surface morphosyntax is semantically implied, or at least pragmatically implicated, by the possession relation. Actually, from the point of view of languages with extensive indirect object lowering, English and other languages with little or no indirect object lowering actually exhibit extensive "possessor ascension," realizing directly the dative/benefactive relation only implied in the Quiché and Mokilese constructions. This fact also accounts for the widespread syncretism among genitive, dative and benefactive cases. In a study of synchronic syncretism (formal identity) of case-markings in a forty language sample (Croft 1985), there were 24 independent instances of syncretism of at least two of these three cases.

If the analysis proposed here is correct, then one should be able to account for some of the constraints on possessor ascension. First, the more intimate the possession relation, the more likely one will find possessor ascension. In French, (inalienable) body part possessors can ascend. However, 28 is marginally acceptable if the painting was actually created as opposed to owned by the possessor. With an owned object which is unimportant, such as the pencil in 29, the possessor can hardly ascend.

- (27) Il m'a cassé le bras.  
'He broke my arm.'
- (28) ??Il m'a brûlé le tableau.  
'He burned my painting.'
- (29) \*?Il m'a cassé le crayon.  
'He broke my pencil.'

Also, if possessor ascension represents an implied benefactive/malefactive relationship between the action and the possessor, then one will find only direct objects and nonagentive subjects which are directly affected by the event with possessors that can ascend. 30 is bad because the object of a perception verb is not directly affected by the action, while the Spanish examples 31-33 contrast nonagentive and agentive subjects.

- (30) \*Il m'a écouté la chanson.  
'He listened to my song.'
- (31) Se me quebró el brazo.  
'I broke my arm.'
- (32) Se me olvidó/perdió el libro.  
'I forgot/lost my book.'
- (33) \*El perro me comió las tortillas.  
'My dog ate the tortillas.'

While this is not an exhaustive list of the kinds of constraints on possessor ascension, it suggests that the semantic explanation I have proposed here will bear fruit in a more detailed examination of possessor ascension.

## 5. Conclusion: Structural and Semantic Explanations Compared

Although I have argued that in the case of the relationship between possession and indirect objects a semantic analysis is superior to a structural one, and the way I have presented the two makes them look radically different, it is worth investigating the similarities between the two approaches.

Why does a syntactician propose the constituent structures and rules that he does? Because he can demonstrate that other rules must also refer to that constituent unit, and that that rule allows other rules to be written in a perspicuous form. Why does a semanticist propose the kinds of semantic relations and



pragmatic functions holding between them, such as those enumerated in Section 4? Because he has a model, intuitive or formalized, of the real world relations they denote, and because he can demonstrate that altering the semantic parameters will alter the interpretations, making the utterance more or less acceptable in predictable ways. These are very different forms of argumentation, and yet they usually yield surprisingly similar results.

The reason underlying abstract syntactic structures such as in 2 and 3 or basic lexical forms such as 4-5 and 17-18 is that they allow for a relatively uniform isomorphism to semantic or pragmatic structure, cutting across variations in surface form in a single language or variation across languages. Semantic arguments to a predicate are realized syntactically as dependents on the verb (or, dominated by VP). Pragmatic modifiers of a referring expression are realized syntactically as dependents of a head noun (or, dominated by NP). These intuitive matches are the cause, not the symptom, of the syntactic arguments proposed for the underlying forms. Thus, there is a great deal of similarity, i.e., redundancy, between abstract syntactic representations and semantic-pragmatic representations, while it is the surface structure which is periodically aberrant. Syntacticians explain the aberrance of surface structures by the application of syntactic rules, syntactic not only in the way they are stated but also because they are presumably sensitive to structural rather than semantic constraints.<sup>6</sup> Many linguists have argued, as I have here, that these rules are actually sensitive to semantic and pragmatic constraints. It now remains to describe the semantic alternative to a syntactic *rule* for realizing the surface structures themselves.

If we want a semantic-pragmatic analysis which is truly nontransformational, that is, describes utterances in terms of their own semantic and pragmatic structure rather than in terms of a derivation from a related structure or an abstract structure, then we must have a model of the interaction between the various semantic and pragmatic properties of the described situation and the utterance context that produces the desired surface structures. The following is a fragment of such a model. In most cases, semantic and pragmatic structure tend to align neatly with each other. The alignments, or natural correlations, are displayed in the following table, from Croft 1984:57:

<i>Syntactic Category</i>	noun	adjective	verb
<i>Semantic Class</i>	object	property	action
<i>Pragmatic Function</i>	reference (topic)	modification	predication (comment)

**Table 1.** Natural correlations of syntactic categories

<sup>6</sup>These arguments apply *mutatis mutandis* to lexical rules, since lexical rules are essentially transformations applied to subcategorizations, which are partially specified trees or dependency structures.

When this is the case, semantic and pragmatic structure can be read directly from surface structure. When conflicts in semantic and/or pragmatic structures arise, surface structures have to resolve that conflict in some way. The same is true when a single entity plays a double role in either semantic or pragmatic structure. This creates a conflict with principles of the linearization of dependencies, since linearization optimally keeps dependents contiguous with their heads. A constituent with two heads is a suboptimal situation: either only one dependency will be realized, or there will be doubling of the constituent unit.

This model predicts that cross-linguistic variation will be found where such conflicts take place, since arbitrary choices must be made to resolve the conflict. This is certainly true in the case of the relationship between possession and indirect objects. The type 1-4 verbs where indirect object lowering is found are examples of a double-role conflict: a semantic participant in the event denoted by the main verb ends up entering into a possession relation with another semantic participant by virtue of the action or state denoted by the main verb. There is also a pragmatic conflict, especially for type 3 and 4 verbs, between reference to a participant in the action denoted by the main verb and modification of the possessed item. Most languages conventionally resolve the conflicts by making the possessor-to-be a surface-syntactic dependent of the main verb, which also fits the referential pragmatic function it plays. But a small number of languages conventionally resolve the conflict the other way, realizing the possessor-to-be as an actual possessor and thus a modifier of the direct object; this is indirect object lowering.

In the case of possessor ascension, the situation is similar but slightly different. The possessor again plays a double role in the semantic structure: it is both the possessor of the direct object and a beneficiary (or "maleficiary") of the action by virtue of being the possessor of the direct object, and as such the modifier is derivatively a participant in the action. Some languages conventionally resolve this conflict by realizing the possessor as possessor only, the "normal" case. Others realize the possessor as benefactor only, i.e., the derived meaning and function; this is possessor ascension.

More rarely, languages will realize both functions in possessor ascension or indirect object lowering. In English, which has historically tended to realize dative experiencers as subjects, one finds the following nonagentive constructions where the possessor both has ascended to subject and is the possessor:

(34) I broke my arm.

(35) I lost/forgot/remembered my book.

In the following example, there is double marking where the lowered indirect object is realized as surface recipient and as possessor; the acceptability of the example is improved, of course, by the past tense:<sup>7</sup>

(36) I gave him his first book.

<sup>7</sup>This example was pointed out to me by Jane Robinson.

The best example of the bidirectional relation between possession and indirect objects can be found in Tzotzil, a Mayan language (Aissen 1980). Tzotzil represents both the situations which give rise to indirect object lowering and the situations which give rise to possessor ascension with double marking: possessors ascend to indirect object (which is then promoted to direct object, triggering verb agreement and the applicative suffix *-be*), while the (former) direct object still retains a possessive cross-reference prefix (37; possessive forms are identical to the ergative forms). On the other hand, benefactors and recipients can be represented also as cross-referenced possessors not just under the conditions licensed by the type 2-4 constructions (e.g., 38-40) but also in other benefactive constructions where the benefactor does not come to possess the direct object (41):<sup>8</sup>

- (37) ?i-s-tz'is-be la s-nukulal ti pukuj-e.  
PF-3ERG-set-APPL PRT 3ERG-skin the devil-ENC  
'He sewed up the devil's skin.'
- (38) ta x-a-k-ak'-be s-kolesob-il l-a-vokol.  
IMPF -2ABS-1ERG-give-APPL 3ERG-help-SUFF the-2ERG-hardship  
'I will give you something to relieve your hardship (lit. hardship's help).'
- (39) ?i-j-meltzan-be y-ot li Romin-e.  
PF-1ERG-make-APPL 3ERG-tortilla the Romin-ENC  
'I made Romin's tortillas/I made tortillas for Romin.'
- (40) Ch-i-na?-be tal j-nichim-al.  
IMPF-3ABS-1ERG-remember-APPL coming 1ERG-flower-SUFF  
'They remember to bring me flowers.'
- (41) Tz-jok'-be-ik x-ch'en-al.  
IMP=3ERG-dig-APPL-3pl 3ERG-hole-SUFF  
'They dig a hole for them [the bones].'

If, as this analysis as well as others suggest, much of syntax can be analyzed as semantics and pragmatics in disguise, that is, structural phenomena give rise

<sup>8</sup>It is no accident that the non-possessor benefactives in the Tzotzil examples in Aissen's paper are or can be translated using the English benefactive preposition *for*.

I should point out that Aissen provides a structural (relational grammar) analysis of Tzotzil, and does not describe the phenomena in 38-41 as indirect object lowering. Tzotzil also exhibits two constraints on this construction, only one of which is easily explainable. The relatively explainable one is that possessor ascension is disallowed (i.e., only the possessor is present in the surface) when the possessor/benefactor is coreferential with the subject; this is presumably because the possessor/benefactor is also agent and thus does not allow representation as an oblique form (see Croft 1985 for more discussion). The inexplicable one is that the double representation is obligatory for third persons but optional for first and second persons, where only the possessor is acceptable. This goes contrary to predictions by the animacy hierarchy, since this means the first and second person may optionally be left in a more embedded structure and thus will not trigger verb agreement. On the other hand, type 2-4 verbs can be realized with the recipient/benefactor as a surface argument of the verb only as well (Aissen 1983); more evidence concerning distribution of possessor-only, benefactor-only, and double marking in Tzotzil is necessary to sort out the conditioning factors.

to semantic-pragmatic explanations, the distinction between syntax and semantics as different levels in the grammar is misplaced. Instead, form and meaning can be quite directly connected in the way I have demonstrated here. The genuinely relevant distinction for linguistics is between what is motivated, and thus can be explained directly in terms of semantic and pragmatic structures, and what is arbitrary, and thus must be explained in terms of the conventional resolution of conflicts in semantic and pragmatic structure by particular languages.

### Bibliography

- Aissen, Judith. 1980. Possessor ascension in Tzotzil. *Papers in Mayan Linguistics*, ed. by Laura Martin. Columbia, Mo.: Lucas Publishers.
- . 1983. Indirect object advancement in Tzotzil. *Studies in Relational Grammar 1*, ed. by David Perlmutter, 272-302. Chicago: University of Chicago Press.
- Butterworth, Brian, Bernard Comrie, and Östen Dahl (ed.). 1983. *Explanations for Language Universals*. (*Linguistics*, Vol. 21, No. 1.)
- Comrie, Bernard. 1983. Form and function in explaining language universals. Butterworth, Comrie and Dahl 1983, 87-103.
- Croft, William. 1984. Semantic and pragmatic correlates to syntactic categories. *Papers from the Parasession on Lexical Semantics*, ed. by D. Testen, V. Mishra and J. Drogo. Chicago: Chicago Linguistic Society.
- . 1985. Oblique grammatical relations and the causal structure of events. Paper presented in the Ferguson/Greenberg Lecture Series on Language Universals and Sociolinguistics.
- Davies, Peter. 1981. *Kobon*. (Lingua Descriptive Series, 3.) Amsterdam: North-Holland.
- Derbyshire, Desmond. 1979. *Hizkaryana*. (Lingua Descriptive Series, 1.) Amsterdam: North-Holland.
- Harrison, Sheldon P. 1976. *Mokilese Reference Grammar*. Honolulu: University Press of Hawaii.
- Haviland, John. 1979. Guugu Yimidhirr. *Handbook of Australian Languages*, Vol. 1, ed. by R. M. W. Dixon and Barry J. Blake, 27-182. Canberra: Australian National University Press.
- Hyman, Larry M. 1983. Form and substance in language universals. Butterworth, Comrie and Dahl 1983, 67-85.
- Langacker, Ronald. 1974. Movement rules in functional perspective. *Language* 50:630-664.
- Mondloch, James. 1978. *Basic Quiché Grammar*. (Institute for Mesoamerican Studies Publication No. 2.) Albany: Institute for Mesoamerican Studies.
- Suárez, Jorge. 1983. *The Mesoamerican Indian Languages*. Cambridge: Cambridge University Press.

Why All Languages Aren't SOV or VOS, or  
How Competing Motivations Lead to Natural Inconsistency  
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1. The Background: Consistency, Inconsistency, & Change.

Since Greenberg's seminal article (1963) on grammatical universals a great deal of work has been done on word order correlates and cross-language generalizations (see references and bibliographies in Comrie 1981 and Mallison & Blake 1981).

Lehmann and Vennemann have concentrated on defining the so-called consistent types of languages, which are consistent in that they either position modifying elements before governing elements (e.g. consistent 'OV' languages like Hindi, Japanese, and Turkish), or they position modifying elements after governing elements (e.g. consistent 'VO' languages like Arabic, Gaelic, and Spanish). Lehmann sees consistency resulting from a fundamental organizing principle in language having to do with the positioning of the (direct) object in relation to the verb such that nominal modifiers are positioned on the side of the object noun opposite the verb and its modifiers. Thus, in a consistent OV language noun modifiers should precede head nouns and verb modifiers should follow verbs; in a consistent VO language noun modifiers should follow head nouns and verb modifiers should precede verbs (Lehmann 1972:983 & 1973:48). Positioning nominal and verbal modifiers on opposite sides of each other has the value of keeping them from being confused.

Vennemann sees consistency stemming from the 'principle of natural serialization' whereby 'operators either all follow or all precede operands, in the natural case' (1974a:347). Semantically, operators are specifying (modifying) elements and operands are specified (governing) elements. Syntactically, operands govern the constituent category of operator-operand constructions (Vennemann 1974a:347 & 1973:49ff). Thus, objects are operators on verbs and adpositions (as operands), so, if objects precede them, noun modifiers should precede head nouns, and if objects follow them, noun modifiers should follow head nouns. Vennemann explains natural serialization as a result of analogical processing of operands and operators in noun phrases, adpositional phrases, and predicate constructions (Vennemann 1974b).

Even though they differ somewhat in approach, both Lehmann and Vennemann view word order consistency to be the most fundamental and natural state in language and inconsistency to be somewhat deviant. They see languages changing in cyclic patterns from one consistent type through a period of inconsistency to another consistent type with inconsistent languages always drifting towards consistency.

As Mallinson and Blake (1981:406) state, 'the consistent type is a real phenomenon.' It is a linguistic reality that needs to be explained. Natural serialization may be due to human psychological processing based on generalizing -- treating like elements

alike. But, it is not clear how (nonlinguist) speakers make rather abstract analogical deductions across major linguistic categories such that they recognize in a similar way objects as operators on verbs, nouns as operators on adpositions, and noun modifiers as operators on head nouns. That speakers may recognize abstract operator-operand relations on some psychological level is of course possible, but we do not understand the process yet. Apart from analogy, it is clear that consistency is also a result of 'recurrent diachronic developments' (see Mallinson & Blake 1981:383-94 for discussion; for specific examples see Andersen 1979:35, Craig 1977:117, Givón 1975:78, 86 & 100, and Vennemann 1973:31ff). Thus, for example, nouns and verbs may develop (or 'grammaticalize') into adpositions from genitive constructions and from deverbal participial and nominal constructions (e.g. in a VO language:  $N + \text{gen} > \text{prep} + N$  and  $V + O > \text{prep} + N$ ; in an OV language:  $\text{gen} + N > N + \text{postp}$  and  $O + V > N + \text{postp}$ ). In any event, no matter what the ultimate causes of natural serialization, typological consistency is a very important aspect of language.

Despite the fact that many of the world's languages display typological consistency, typological inconsistency is also very much a linguistic phenomenon. As Hawkins (1979:198) has pointed out, a majority of the world's languages are, in fact, inconsistent to one degree or another (e.g. Aztec, English, Finnish, Persian), and many of them have been inconsistent for centuries.<sup>1</sup> Since inconsistent languages are at least as normal as consistent languages, they can hardly be viewed as deviant or any less natural than consistent languages -- anyway, all languages are 'natural'.

Hawkins (1979 & 1980) attempts to deal with the discrepancy between inconsistent and consistent languages. First, he notes that the position of modifying adjectives before or after head nouns is rather unstable and not as reliable as other factors (such as the position of genitives, adpositions, and direct objects); therefore, adjective position should not be viewed as crucial in defining the types. If adjective position is not taken as diagnostic of the types, then many more languages display typological consistency. Hawkins also questions Lehmann and Vennemann's lumping SVO languages with VSO languages into a VO supertype. He points out that although many SVO languages (e.g. Spanish) have word order correlates like VSO languages, many other SVO languages (e.g. Finnish) have correlates like (S)OV languages, while still others are a typological mixture (e.g. Aztec & English). SVO languages, taken as a group, then, are not a consistent type with unique correlates of their own, nor do they fit well with other types. As a group they are ambivalent. Since SVO languages are generally ambivalent, Hawkins concludes that the position of the subject is influential in determining typology and should not be ignored as Lehmann and Vennemann have done.

To account for inconsistent languages, Hawkins proposes the 'principle of cross-category harmony' (CCH), which basically says

that languages do not have to be consistent across the board, only that there is a preference for generalizing operator-operand positions, and that languages only need to maintain a balance in position of operands relative to operators across operand categories. By implication, CCH predicts that the less consistent, i.e. the more out of balance, a language is, the less frequent its type will be among the world's languages. CCH is basically a modified version of natural serialization, and it, like the latter, rests on the assumption of analogy as a motivating force. CCH makes inconsistent languages seem plausible, but it does not account for how languages become inconsistent or why most languages are inconsistent even if in some sort of balance, nor does it account for minority consistent languages like most VSO, VOS, and OSV languages.

Languages are always in a state of transition, and, as in other areas, they change their syntactic patterns through time, whether consistent or inconsistent. A number of factors effecting word order changes have been discussed in the literature:

Contact -- A language may change type under the prolonged influence from a language of another type (see Givón 1979:276ff, Hyman 1975:115, Lehmann 1972:989ff & 1973:201ff, Mallinson & Blake 1981:398ff).

Ambiguity Avoidance -- An SOV language dependent on case marking for distinguishing agent and patient may change to SVO if its case markers are worn away by sound change or phonological reduction (see Givón 1975:70ff, Vennemann 1973:25ff & 1974a).

Grammaticalization -- A language may grammaticalize verbs making adpositions of them and thus effecting word order; for example an SVO language with a serial verb construction of the form S+V+O+V may become S + acc. prep. + O + V, i.e. SOV (see Givón 1975, Hyman 1975:118ff, 124, Li & Thompson 1974).

Afterthought -- Additional information expressed after the main proposition may effect rigid verb-final languages by setting up a pattern for postverbal constituents, eventually leading to SVO order by analogy (see below and Hyman 1975:124ff).

Drift -- Languages may drift towards consistency from inconsistent states due to pull from natural serialization (see Vennemann 1974b).

2. Relative Frequency of Basic Word Orders & Their General Degree of Consistency.<sup>2</sup> Despite all the work that has been done on word order (correlates, consistency, and change), there has been little discussion on the relative frequency of basic word orders found among the world's languages, on minor word order types (e.g. VOS, OVS, OSV), or on inconsistent types.<sup>3</sup> In this section I make some brief but interesting observations with regard to these things.

SOV is the most common basic order in the world; roughly 40-45% of the world's languages are SOV. And, the vast majority of them are consistent typologically, forming the basis for the classical OV type. Basic SVO order is the second most common among the world's languages (ca. 35%). But, SVO languages are a mixed bunch typolo-

gically, many having VO characteristics, others having OV correlates, and still others displaying inconsistency or a mixture of VO and OV characteristics. Languages with basic VSO order comprise about 10-15% of the world's languages, running a distant third behind SOV and SVO languages, despite the fact that they are generally quite consistent. The vast majority of VSO languages have the word order correlates on which the classical VO type is based. Languages with basic VOS order form a small minority comprising perhaps 3-5% of the world's languages. Many of them come from the Malayo-Polynesian family, and over half of the 30 Mayan languages are VOS; others are scattered in various other families. VOS languages are consistently of the classical VO type, and most come from families where other languages are VSO (see Keenan 1978a:285-6).<sup>4</sup> It is noteworthy that VOS languages are usually the exact mirror-image of SOV languages displaying one-for-one obverse word order correlates. Languages with basic OVS and OSV order have only recently become known (see references to Derbyshire and Pullum). Only ten OVS and five OSV languages have been documented; this makes them the rarest in the world. Pullum, assuming 4400 languages in the world, figures OVS languages comprise 0.227% and OSV 0.113% of all the world's languages (see Mallinson & Blake 1981:181 ft.6). All OVS and OSV languages are found in the Amazon Basin in South America. From examples in the literature, they all seem to have consistent OV correlates, and they all apparently come from language families like Carib and Arawakan in which other languages are SOV. Finally, a small percentage (ca. 4%) of languages do not seem to have any basic order, i.e. they are Free Order languages, although there are preferential orders, and different orders may have different pragmatic functions (e.g. Latin, Old English, Wiyot, Sahaptin).

3. The Problem. From the short discussion above, it seems clear that typological consistency alone is absolutely not correlatable with a high frequency of occurrence among the world's languages. Some languages which are generally quite consistent have a high frequency (e.g. SOV), while others have a low frequency (e.g. VSO, VOS, OVS, OSV), while some languages generally displaying a good deal of inconsistency are quite common (e.g. SVO). The conclusion from this is that natural serialization (whatever its ultimate causes) is not the only factor, or even the most important factor, making a language type highly favored. If natural serialization were the only factor involved, we would expect the world's languages to be divided evenly between the most consistent types, SOV and VOS, which are the exact mirror-image of each other.

Thus, a number of questions come to mind that have not been adequately addressed in the literature:

- (1) Why are SOV languages the most common type?
- (2) Why are VOS languages among the most uncommon types even though they are as consistent as SOV languages and the mirror-image of them?
- (3) Why are SVO languages nearly as common as SOV languages



even though as a group they are relatively inconsistent and rather heterogeneous in typological characteristics.

(4) Why are VSO languages rather uncommon (i.e. much less common than SOV and SVO languages), and why are they more common than VOS languages?

(5) Why are OVS and OSV the rarest of all languages even though OSV languages are as consistent as SOV languages, and OVS languages are generally more consistent than SVO languages?

(6) Why are Free Order languages also uncommon?

4. Competing Motivations: The Principles. The main thesis of this paper is that there are a number of powerful forces that are always at work in (any) language. These forces have a number of different sources or motivations: pragmatic, semantic, syntactic, and phonological. So, even though they often work together, they also often conflict and compete with each other. And, since, taken together, their ultimate motivation is communication, the end result is not necessarily consistency in terms of word order typology. One end result is, I believe, the diversity of language types found in the world as well as their relative frequency of occurrence. The forces, or competing motivations, are stated informally below as basic language principles.<sup>5</sup>

- I. The Pragmatic Principle of Forward Themmatization
- II. The Syntactic Principle of Natural Serialization
- III. The Semantic Principle of Ambiguity Avoidance
- IV. The Phonological Principle of Reduction
- V. The Pragmatic Principle of Afterthought
- VI. The Pragmatic Principle of Focus Fronting

The Pragmatic Principle of Forward Themmatization says that topical material has a strong tendency to come at the beginning of a sentence. As Hockett (1958:201) stated, 'the speaker announces a topic and then says something about it'. Since subjects are usually topics or themes, they usually come first (see Givón 1979:303, Greenberg 1963: Universal 1, Keenan 1976 & 1978:188ff, Lyons 1977:501ff, Vennemann 1974a:340 & 1975:288; Vennemann attributes the principle to 'Berhaghel's Second Law'). The motivating force behind the principle probably has to do with psychological processing: other things being equal, it is easier to present a topic and then comment on it than to present a comment, holding it in mind, and then present the topic of the comment ('ease' here is probably more hearer ease than speaker ease). As Mallinson & Blake (1981:148) note, 85% of the languages in their sample have subject before object (i.e. SOV, SVO, VSO). And more importantly, since SOV and SVO languages account for over 75% of the world's languages, there is clearly a strong motivation for making subjects (= topics) precede all other constituents in the sentence. Even in those languages which are not basically subject-initial, sentences with initial subjects are almost always alternative orders (see Greenberg 1963: Universal 6, Keenan 1978a:

generalization G-3). Very often subject-initial order is used in these languages when the subject is the general discourse topic. For example, all 30 Mayan languages (except Chortí) have basic VOS or VSO orders (or both), but they all tend to have SVO order when the subject is discourse topic. Chortí is basically SVO and seems to have grammaticalized this tendency, perhaps under the influence of Spanish.

The Syntactic Principle of Natural Serialization, as discussed above, says that there is a strong tendency for operator-operand constituents to serialize unidirectionally with modifying elements or operators either all before or all after governing elements or operands (see Vennemann 1973:41ff & 1974:347). There is controversy about the ultimate motivating force behind this principle, namely, whether it is due to psychological propensities to generalize i.e. analogy, or recurrent historical developments, or both (see Mallinson & Blake 1981:385ff). But no matter what its ultimate causes, the fact remains that nearly half of the world's languages are consistent in operator-operand positioning, and many others are nearly consistent.

The position of the subject has generally been ignored in discussions of consistency, especially by Lehmann and Vennemann (e.g. see Vennemann 1973:41 ft. 22). This is because they want to collapse VSO and SVO languages into one VO supertype, and because the subject has a strong tendency to be sentence-initial under the force of Forward Thematization. But, as Hawkins (1979 & 1981) has argued, the position of the subject does have an effect on consistency as is seen with SVO languages, which tend to be not very consistent, generally. Hawkins says this is due to the subject pulling in one direction and the object in the other. However, following Hawkins' reasoning, we would expect OVS languages to be as inconsistent (or consistent) as SVO languages. But this does not seem to be the case. From what little evidence there is, OVS language like Hixkaryana seem to be consistently of the OV type, which indicates that the subject has little or no effect on serialization.

That the subject is problematic may have to do with the criteria defining operator-operand relations (as discussed by Vennemann). The subject can be interpreted in two different ways depending on how it is viewed. From a semantic-pragmatic point of view, the subject could be taken as an operand: since subjects are usually topics, they are governors with comments specifying something about them. On the other hand, syntactically, they are operators specifying arguments of verbs as predicates in predication. It may be that, if Natural Serialization actually exists as a psychological phenomenon, speakers are ambivalent about how to interpret subjects.

The Semantic Principle of Ambiguity Avoidance says that languages must distinguish between agent and patient (as well as other arguments) for communication to take place, and so languages will not tolerate systematic ambiguity (see Vennemann 1973:26ff). Agent and patient may be distinguished in a number of ways: directly by case marking with affixes, clitics, or adpositions, or indirectly by word

order, cross-referencing, or semantic factors (e.g. the animacy hierarchy, definiteness, specificity, etc.), or any combination of these. The implication is that languages which do not allow any ambiguity will be favored, and those which allow some ambiguity will be disfavored accordingly. And, if for some reason, the possibility of systematic ambiguity begins to develop, a language will make adjustments to disambiguate.

The Phonological Principle of Reduction says that sound changes in general are largely reductive, 'words become shorter by phonological change, not longer' (Vennemann 1974a:389). The principle is a consequence of what the Neogrammarians said was the primary motivating force behind sound change, namely, making articulation easier. Speakers generally minimize effort in production. Thus, phonological change tends to grind off unstressed affixes and clitics (among other things). Phonological reductions will have an effect especially on SOV languages, particularly those which have alternative OSV order (as most SOV languages do; see Steele 1978:601), and which distinguish agent and patient with case marking suffixes or enclitics (as most SOV languages do; see Greenberg 1963: Universals 27 & 41). If case marking is lost in these languages, then in order to avoid ambiguity (as in 4.3.), adjustments will have to be made such as shifting to SVO (Vennemann 1974a), developing new case markers (Givón 1975:71), or developing a more rigid word order (without alternative OSV).

The Pragmatic Principle of Afterthought says that speakers often have to add material after the basic proposition in a sentence has been uttered. There is often a strong pragmatic need for speakers to give additional information to clarify in order to help hearers understand, or to say something that was forgotten (see Hyman 1975:119-21 & 124ff). Usually, the material tacked on after the main proposition is new information: adverbs, adverbial phrases and clauses, adpositional phrases, oblique cases, relative clauses, and conjunct noun phrases. But, sometimes afterthought material is old or given information tacked on to avoid ambiguity (e.g. 'she chased me...Mary that is/I mean').

This principle is compatible with all language types except for rigid verb-final SOV languages. In other words, afterthoughts may be readily added in over half the world's languages. Although rigid verb-final languages have problems with afterthought, as Hyman (1975: 124) points out, even they must allow for violations of verb-final syntax so that afterthought material can be tacked on after the verb. Hyman argues that afterthought has been an important factor contributing to the change from SOV to SVO in many West African languages: SOV + afterthought > SOV + everything else > SVO + everything else.

Afterthought may also be the seed for the development of basic OVS order in languages like Hixkaryana, which otherwise have SOV characteristics. For example, Panamint Shoshone is a consistent SOV language, but OVS order is not uncommon. At the beginning of a discourse, the normal order is SOV. But, after the first sentence, if the same subject remains topic, the subject is either pronomi-

nalized or omitted giving sequences like: SOV, (pronoun) OV... However, if the discourse contains a number of different nominal references or complex embeddings, then very often an atonic subject is attached after the verb: OVS. This OVS order, with old topic subject attached at the end appears to be obligatory in some cases.

The Pragmatic Principle of Focus Fronting says that emphatic or contrastive material (i.e. material in focus) tends to be fronted to sentence-initial position, for much the same reasons that topics usually occur initially. Very often what goes under the guise of 'topicalization' in the literature is in fact fronting of emphatic or contrastive material (see Chafe 1976:49ff). Languages may also indicate contrast by emphatic particles or stress, but most, if not all, allow fronting (see Mallinson & Blake 1981:152). Focus Fronting may have been the main impetus for the development of basic OSV order in those few South American languages that have it. That is, the order for objects in focus (i.e. OSV) may have been grammaticalized, probably from earlier SOV since these languages have OV characteristics and are in families where the other languages are SOV.

It should be noted that there are potential conflicts between Focus Fronting of objects and Forward Themmatization of subjects since the force of both of them is for two different NPs to occur towards the beginning of the sentence. For example, most SOV languages have alternative OSV order when objects are in focus. But, if case marking has been worn away by Phonological Reduction, then the resulting string, NP(=O)+NP(=S)+V, is potentially ambiguous. Potential conflicts can also arise in verb-initial languages. Most VSO and VOS languages have alternative SVO order when subjects are discourse topics under the force of Forward Themmatization. However, many of them also allow objects (as well as subjects) to be fronted when in focus. In either case, the resulting string, NP+V+NP, is potentially ambiguous, especially since verb-initial languages rarely have direct case marking.

5. Speculations on the Causes of the Relative Frequency of Basic Word Orders. Most of the competing motivations discussed in the previous section are well-known to linguists. But, how they work together and in competition to favor some basic word order types and disfavor others has not really been discussed. In the next few paragraphs I make some speculations in this regard.

SOV languages are the most common type because they are at once completely in harmony with both Forward Themmatization and Natural Serialization. This is apparently why Vennemann (1973:28) claims that SOV order 'is the most natural serialization of S, O, and V', and why Givón (1979:303ff) claims that SOV languages are evolutionarily the most basic. However, rigid verb-final SOV languages are not compatible with Afterthought. And, some SOV languages may have problems with Ambiguity Avoidance because of Focus Fronting combined with the results of Phonological Reduction. I believe this indicates that there is always some potential and motivation for SOV languages to develop SVO order.

SVO languages are also highly favored because they are completely in harmony with all of the principles, except Natural Serialization. And, many SVO languages, whether displaying VO characteristics like Spanish or OV characteristics like Finnish, are largely compatible with Natural Serialization, even though they can never be completely compatible since S and O are on opposite sides of the verb. I believe these factors make SVO languages rather stable in general, even if somewhat inconsistent.

Another Factor which makes SVO languages common is that other language types tend to develop SVO order. VSO and VOS languages often develop SVO order because of pull from Forward Themmatization (e.g. see Givón 1977). SOV languages often develop SVO order because SVO is more compatible with Afterthought, and because SVO order can never be ambiguous with respect to agent and patient marking.

VSO languages are only marginally favored because they are only partially in harmony with Forward Themmatization in that S does not precede the entire comment, being sandwiched between V and O. They also have a potential problem with Ambiguity Avoidance because of the conflicting consequences of Forward Themmatization and Focus Fronting. On the other hand, VSO languages are consistent in Serialization harmonious with Afterthought, and have no problem with Phonological Reduction.

VOS, OVS, and OSV languages are all disfavored because they are not harmonious with Forward Themmatization. VOS (like VSO) languages also have potential problems with Focus Fronting and Ambiguity Avoidance. However, they are compatible with Natural Serialization, Phonological Reduction, and Afterthought.

OVS languages are disfavored because they are not only incompatible with Forward Themmatization but they are also not completely compatible with Natural Serialization since S and O are on opposite sides of the verb. They are harmonious with the other principles.

OSV languages are disfavored because they are incompatible with Afterthought as well as Forward Themmatization, and they have potential problems with Phonological Reduction, Ambiguity Avoidance, and Focus Fronting (like SOV languages). They are in harmony with Natural Serialization.

Free Order languages are harmonious with Forward Themmatization, Afterthought, and Focus Fronting. But Free Order languages by definition are not harmonious with Natural Serialization since, if they are free, there is no basis on which to serialize. And, they need a good deal of morphological apparatus, case marking and cross-referencing, to maintain Ambiguity Avoidance. I believe the reason that they are so uncommon is that they are too fragile. If through Phonological Reduction morphological marking begins to break down, the whole system falls apart.

6. Relative Priority of the Competing Motivations. What is clear from the preceding discussion is that the six principles or competing motivations are not equally powerful in effecting word order types.

Forward Themmatization is by far the most powerful motivation since over 3/4 of the world's languages are subject-initial (i.e. SOV and SVO combined). Also, where other things are equal, languages with subjects more forward outnumber those with subjects more rearward (i.e. SOV > OSV, SVO > OVS, VSO > VOS).

Natural Serialization is also very powerful since about half the world's languages are typologically consistent (i.e. most SOV, VSO, VOS, and some SVO). However, it is not as powerful as Forward Themmatization since SVO languages, not necessarily consistent, far outnumber types like VSO and VOS, not harmonious with Forward Themmatization. Natural Serialization is apparently stronger than both Ambiguity Avoidance and Afterthought since SOV languages, potentially having problems with ambiguity and afterthought, outnumber SVO (or OVS) languages even though SVO (or OVS) is a completely unambiguous order and harmonious with Afterthought.

Ambiguity Avoidance is also powerful since it seems to be the prime motivation for completely unambiguous orders like SVO and OVS even though these orders can never be completely harmonious with Natural Serialization. If the two basic semantic roles of NPs, agent and patient, are determined by their respective positions relative to the verb (and not each other), then other forces like Phonological Reduction, Afterthought, and Forward Focus cannot be disruptive.<sup>6</sup>

Afterthought and Focus Fronting, unlike the motivations just discussed, are not primary forces motivating basic word orders. They are mainly forces motivating word order variations within a particular language. However, Afterthought is one factor motivating basic SVO order from earlier SOV and perhaps also basic OVS from earlier SOV. Focus Fronting is probably the main motivation behind basic OSV order, i.e. SOV > OSV via the pattern set up by object fronting. And, it is a contributing factor in the development of SOV to SVO because of Phonological Reduction and Ambiguity Avoidance.

Phonological Reduction, of course, is not a direct motivation for any word order, but it combined with Ambiguity Avoidance can affect the word order change from SOV to SVO.

7. Conclusion. I have made some observations about several 'principles' which are at work in all languages and which seem to be fundamental in motivating different basic word orders and their relative frequencies among the world's languages. I would like to point out that, even though the principles conflict and compete with each other in terms of structural ordering, sometimes disrupting typological 'consistency', they all work together enhancing the main function of language, i.e. communication. We should remember that consistency is neither a goal nor a function of language, rather only a result of some language processes. Consistency may be nice for linguists and grammarians, and it may have value in terms of certain psychological processes at work in encoding and decoding. But, there are clearly other factors, pragmatic, semantic, and phonological, that are also very important in language.

## Notes

1. Of Greenberg's sample of 142 languages (1963: Appendix II), only 68 (47.89%) are consistent while 74 (52.11%) are inconsistent (Hawkins 1979:198).
2. The relative frequencies of the different basic word order types are based on samples found in Mallinson & Blake (1981:134-48), Steele (1978:590), and Greenberg (1963: Appendix II):

	<u>Mallinson &amp; Blake</u>	<u>Steele</u>	<u>Greenberg</u>
SOV	41	30 = 47%	64 = 45%
SVO	35	20 = 32%	52 = 37%
VSO	9 (- Quiché = 8)	10 = 16%	26 = 18%
VOS	2 (+ Quiché = 3)	3 = 5%	--
OVS	1	--	--
OSV	1	--	--
Free Order	4	--	--
other	7	--	--
Total entries	<u>100</u>	<u>63</u>	<u>142</u>

There is (at least) one mistake in Mallinson & Blake's figures: Quiché is listed as VSO when it is VOS (actually, VSO is the only alternative order that is always ungrammatical in Quiché). Greenberg's sample is not very reliable in terms of percentage frequencies because the entries are a mixture of individual languages, subgroups, families, and phylum (e.g. Type 1 contains among other things: 'Celtic languages; Hebrew,... Polynesian languages and probably other Austronesian languages;... Oto-Mangue languages'). There are also a number of errors, some of which Hawkins (1979:194-5) has pointed out; also Maya is listed as SVO in Type 10, when in fact it is VOS, SVO being a common alternative order; and a number of Polynesian languages are VOS, not VSO Type 1 (these errors have not been corrected in the table above). Despite the errors and different methods of sampling, the figures are close enough that I think they give us a rough estimate of relative frequencies of basic orders.

3. Notable exceptions are Hawkins (1979, 1980) on inconsistent languages and speculations on their likely frequencies of occurrence; Dayley (1983), Keenan (1978a), and Steele (1978) on VOS languages; and Derbyshire (1977), Derbyshire & Pullum (1981), and Pullum (1981) on OVS, OSV, and VOS languages.

4. Two Mayan languages, Huastec and Tenejapa Tzeltal, are both basically VSO and VOS with the order depending on the animacy hierarchy (see Dayley 1983).

5. Of course there certainly are other basic principles in language, but these seem to me to be the most important for understanding the motivations for word order consistency and inconsistency and the relative frequency of the types.

6. For example, in an SVO language, if the object is fronted under focus, then since it does not occur after the verb, it must be the NP in focus, not the subject. Likewise, if the subject occurs as an afterthought, since it does not occur before the verb, it must be the afterthought not the object. In languages with agent and patient

NPs on the same side of the verb in basic order, there is always potential ambiguity (i.e. if there is no direct case marking).

#### References

- Andersen, P.K. 1979. Word order typology and prepositions in Old Indic. In: *Studies in Diachronic, Synchronic and Typological Linguistics* 2, pt. 1, 23-34, ed. B. Brogyanyi. Amsterdam: John Benjamins.
- Chafe, W.L. 1976. Givenness, contrastiveness, definiteness, subjects, topics, and point of view. In: *Subject and Topic*, 25-55, ed. C.M. Li. New York: Academic Press.
- Comrie, B. 1981. *Language Universals and Linguistic Typology*. Chicago: University of Chicago Press.
- Craig, C.G. 1977. *The Structure of Jacaltec*. Austin: University of Texas Press.
- Dayley, J.P. 1983. Voice and ergativity in Mayan languages. In: *Studies in Mesoamerican Linguistics, Report #4, Survey of California and Other Indian Languages*, 5-119, ed. A. Schlichter et al. Also in: *Journal of Mayan Linguistics* 2:2, 3-82 (1981).
- Derbyshire, D.C. 1977. Word order universals and the existence of OVS languages. *Linguistic Inquiry* 8, 590-99.
- Derbyshire, D.C. & G.K. Pullum. 1981. Object initial languages. *IJAL* 47, 192-214.
- Givón, T. 1975. Serial verbs and syntactic change: Niger-Congo. In: Li ed., 47-111.
- \_\_\_\_\_. 1977. The drift from VSO to SVO in Biblical Hebrew: The pragmatics of tense-aspect. In: *Mechanisms of Syntactic Change*, 181-254, ed. C.N. Li. Austin: University of Texas Press.
- \_\_\_\_\_. 1979. *On Understanding Grammar*. New York: Academic Press.
- Greenberg, J.H. 1963. Some universals of grammar with particular reference to the order of meaningful elements. In: *Universals of Language*, 73-113, ed. J.H. Greenberg. Cambridge, Mass.: M.I.T. Press.
- Hawkins, J.A. 1979. Implicational universals as predictors of word order change. *Language* 55, 618-48.
- \_\_\_\_\_. 1980. On implicational and distributional universals of word order. *Journal of Linguistics* 16, 193-235.
- Hockett, C.F. 1958. *A Course in Modern Linguistics*. New York: The MacMillan Co.
- Hyman, L.M. 1975. On the change from SOV to SVO: evidence from Niger-Congo. In: Li ed., 113-47.
- Keenan, E.L. 1976. Towards a universal definition of 'subject'. In: *Subject and Topic*, 303-34, ed. C.N. Li. New York: Academic Press.
- \_\_\_\_\_. 1978a. The syntax of subject-final languages. In: Lehmann ed., 267-327.
- \_\_\_\_\_. 1978b. On surface form and logical form. In: *Linguistics in the Seventies: Directions and Prospects*, ed. B.B. Kachru, 163-204. Special Issue of *Studies in the Linguistic Sciences*.



- Lehmann, W.P. 1972. Contemporary linguistics and Indo-European studies. Publications of the Modern Language Association 87, 976-93.
- \_\_\_\_\_. 1973. A structural principle of language and its implications. *Language* 49, 47-66.
- \_\_\_\_\_. 1978. *Syntactic Typology: Studies in the Phenomenology of Language*. Austin: University of Texas Press.
- Li, C.N. ed. 1975. *Word Order and Word Order Change*. Austin: University of Texas Press.
- Li, C.N. & S.A. Thompson. 1974. Historical change of word order: a case study in Chinese and its implications. In: *Historical Linguistics I*, 199-217, ed. J.M. Anderson & C. Jones. Amsterdam: North-Holland Press.
- Lyons, J. 1977. *Semantics 2*. New York: Cambridge University Press.
- Mallinson G. & B.J. Blake. 1981. *Language Typology: Cross-linguistic Studies in Syntax*. Amsterdam: North-Holland Press.
- Pullum, G.K. 1981. Languages with object before subject: a comment and a catalogue. *Linguistics* 19, 147-55.
- Steele, S. 1978. Word order variation: a typological study. In: *Universals of Human Language 4: Syntax*, 585-624, ed. J.H. Greenberg et al. Stanford: Stanford University Press.
- Vennemann, T. 1973. Explanation in syntax. In: *Syntax and Semantics 2*, 1-50, ed. J.P. Kimball. New York: Seminar Press.
- \_\_\_\_\_. 1974a. Topics, subjects and word order: from SXV to SVX via TVX. *Historical Linguistics I*, 339-76, ed. J.M. Anderson & C. Jones. Amsterdam: North-Holland Press.
- \_\_\_\_\_. 1974b. Analogy in generative grammar: the origin of word order. In: *Proceedings of the Eleventh International Congress of Linguists II*, 79-83, ed. L. Heilmann. Bologna: Il Mulino.
- \_\_\_\_\_. 1975. An explanation of drift. In: Li ed., 269-305.

Lhasa Tibetan Evidentials and the  
Semantics of Causation\*

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Lhasa Tibetan,<sup>1</sup> like many languages, obligatorily marks an evidential distinction in non-future, non-first person sentences, as exemplified in exx. 1-4:<sup>2</sup>

- 1) Sonam-gyis thaŋ=kha bkal-soŋ  
Sonam-ERG thangka<sup>3</sup> hang-PERF/DIRECT  
'Sonam hung up a thangka.' (based on direct perception).
- 2) Sonam-gyis thaŋ=kha bkal-ba-red  
  -  
  -PERF/INDIRECT  
'Sonam hung up a thangka.' (based on report or inference).
- 3) Sonam-gyis thaŋ=kha 'gel-gyi (-'dug)<sup>4</sup>  
  hang-IMPF/DIRECT  
'Sonam is hanging a thangka/thangkas.' (direct perception)
- 4) Sonam-gyis thaŋ=kha 'gel-gyi-yod-pa-red  
  hang-IMPF/INDIRECT  
'Sonam is hanging thangkas.' (report or inference).

The glosses roughly but accurately define the appropriate set of contexts for each verb form: the sentences with the DIRECT gloss report information which the speaker has obtained through direct sensory perception (through any sense channel), while those glossed as INDIRECT represent knowledge which the speaker has obtained indirectly, as by report from a third party, or which is inferred on the basis of other knowledge (e.g. the speaker may know that Sonam has been intending to hang up some thangkas, and that he recently went into the room where they are to be hung carrying appropriate tools).

However, a more detailed examination of these and related verb forms shows that the distinction encoded is more complex than a simple binary source-of-evidence distinction, and a fuller explication of the evidential system sheds considerable light both on the rest of the Lhasa verb system and on the structure of the underlying cognitive model of event causation which informs the semantic structure of the Lhasa clause. (Needless to add, there is good reason to consider this model relevant to the semantics and syntax of other languages as well). To begin with, note that with first-person actor in a volitional clause, neither the DIRECT nor the INDIRECT forms can be used; instead a third set of forms occurs:

- 5a) ŋa-s thaŋ=kha bkal-ba-yin  
I-ERG thangka hang-PERF/VOLITIONAL  
'I hung up a thangka.'
- b) \*ŋa-s thaŋ=kha bkal-ba-red
- c) \*ŋa-s thaŋ=kha bkal-soŋ

- 6a) ṇa-s thaṇ=kha 'gel-gyi-yod  
I-ERG thangka hang-IMPF/VOLITIONAL  
'I am hanging thangkas.'
- b) \*ṇa-s thaṇ=kha 'gel-gyi(-'dug)
- c) \*ṇa-s thaṇ=kha 'gel-gyi-yod-pa-red

However, the -pa-yin and -gyi-yod forms are not simply indices of first person, for they occur only with volitional predicates:<sup>5</sup>

- 7a) ṇa na-gi(-'dug)  
I sick-IMPF/NON-VOLITIONAL  
'I'm sick.'
- b) \*ṇa na-gi-yod
- 8) ṇa-s dkaryol bcag-soṇ  
I-ERG cup break-PERF/NON-VOLITIONAL  
'I broke the cup (accidentally).'
- 9) ṇa-s dkaryol bcag-pa-yin  
PERF/VOLITIONAL  
'I broke the cup (deliberately).'

Thus we find the same pair of forms, perfective -soṇ and imperfective -gi-'dug, used with first person actors to code the non-volitional value for a volitional/non-volitional contrast, and with non-first person actors to code the direct perception value for an evidential contrast. The morphosyntactic interaction of these two semantic categories is not entirely surprising in the light of the semantic connections between the two categories which I have noted elsewhere (DeLancey 1981. to appear a), but clearly the nature of these connections will be further illuminated if we can construct a single semantic analysis for these forms which will accomodate both the volitional and the evidential values.

We can complicate matters further -- while taking a step toward a better understanding of the semantic distinctions involved -- by considering another perfective form, bṣag,<sup>6</sup> which contrasts with both -soṇ and -pa-red, as illustrated in ex. 10 (compare exx. 1-2):

- 10) sonam-gyi thaṇ=kha bkal-bṣag  
Sonam-ERG thangka hang-PERF/INFERENTIAL  
'Sonam hung up a thangka.' (inferred from direct perception of the hanging thangka).

While ex. 1, with -soṇ, reports an event which the speaker directly witnessed, and ex. 2, with -pa-red, reports an event which the speaker knows of only by report or indirect inference, ex. 10 reports inference from directly perceived evidence: the speaker did not witness the hanging of the thangka, but has seen the thangka hanging on the wall. A similar set of examples is 11-13:

- 11) Sonam gñid sad-soṅ 'Sonam woke up.'  
Sonam awaken-PERF/DIRECT
- 12) Sonam gñid sad-bzáḡ 'idem.'  
PERF/INFERENTIAL
- 13) Sonam gñid sad-pa-red 'idem.'  
PERF/INDIRECT

Ex. 11 can be used only if the speaker actually watched the subject awaken; 12 indicates that the speaker has seen the subject up and about, but didn't watch him wake up; while 13 represents hearsay, or inference from indirect evidence such as an empty bed.

A comparison of the two sets of examples (1-2,10) and (11-13) demonstrates the inadequacy of a simple notion of direct evidence here, for there are clearly two distinct types of direct perception which can be distinguished: direct perception of the actual event being reported, and direct perception of the subsequent state which directly resulted from that event. This distinction can be further illustrated by a number of interesting examples along the lines of 14:

- 14a) kho-s ḡa-'i deb brkus-bzáḡ  
he-ERG I-GEN book steal-PERF/INFERENTIAL  
'He stole my book.'
- b) \*kho-s ḡa-'i deb brkus-soṅ  
PERF/DIRECT

Since brkus 'steal' refers only to secretive theft, it could not ordinarily be used to describe an event witnessed by the victim, so that (14b) in any ordinary context would be impossible; the speaker in this case can know of the event only by discovering its effect, i.e. the absence of the stolen article.

In some more widely-known evidential systems the category marked in Lhasa by -bzag is conflated with the indirect evidence category marked by -pa-red. Not surprisingly, the line which separates these two categories in Lhasa is not absolutely clear. An instructive pair of examples is 15-16:

- 15) Sonam-gyis ku=sú zas-bzáḡ  
Sonam-ERG apple eat-PERF/INFERENTIAL  
'Sonam ate the apple.'
- 16) Sonam-gyis ku=sú zas-pa-red  
PERF/INDIRECT  
'idem.'

Both could be used in a context where the speaker sees that an apple which used to be there now exists only as a gnawed core. However, if the speaker and Sonam were alone together in the house at the time that the eating must have occurred, only 15, not 16, is a possible report, for the eaten state of the apple and the speaker's knowledge that he himself was not responsible for that state necessarily identify

Sonam as the eater, and thus the event of eating as one which is reliably described in (15). On the other hand, if more than one possible suspect was in the house at the relevant time, then (16) is much more natural than (15); for, although the evidence is incontrovertible that someone ate the apple, it is not absolutely clear that it was Sonam.

The -soŋ/-bʒag evidential distinction with non-first person actors can be neatly described in terms of a simple cause-effect schema, in which events are seen as effecting resultant states. -soŋ then codes direct knowledge of the causal event, and -bʒag direct knowledge of the resulting state, from which the occurrence of the event can be reliably inferred. An extension of this schema will also accommodate the -soŋ/-pa-yin volitionality contrast with first person, thus taking a step toward a coherent account of the Lhasa verb system and toward an understanding of the semantics of event causation. We should first note the unsurprising fact that the indirect evidential -pa-red perfective does not normally occur with first person actors, since a conscious participant in any event normally has direct sensory evidence for the occurrence of the event.<sup>7</sup> The same argument predicts the non-occurrence of the inferential -bʒag with first person actor. To this prediction there are in fact a handful of counterexamples, but an examination of these serves to confirm the analysis which I am suggesting. A clear example is the occurrence of -bʒag with the verb 'forget':

- 17) ŋa-s brjed-bʒag 'I've forgotten.'  
I-ERG forget-PERF/INFERENTIAL

Although 'forget', in both English and Tibetan, has the syntax of a transitive event verb, unlike most such verbs it does not actually denote an observable event; the hypothetical event of forgetting can only be inferred from the consequent state of having forgotten. Thus 'forget', like 'lose' (which also takes -bʒag with first person), differs from most inadvertent events (e.g. 'trip', 'fall', 'sneeze') which are experienced by the actor as they unfold even though they were unintended; the event of forgetting cannot be experienced even by the forgetter, so that even with first person the -bʒag perfective makes sense.<sup>8</sup>

The -pa-yin form, in the examples we have seen reflects volitionality on the part of first person (see Jin 1979; DeLancey 1984a,b, to appear a,b, for further discussion) and can thus be assumed to automatically have the direct knowledge value for evidentiality. However, we need to explain the non-occurrence of this form with non-first person actors, even with clearly volitional predicates. The explanation (for which further argumentation and evidence is presented in DeLancey to appear a) is that, like other tense/aspect forms, the volitional form is in fact part of the evidentiality paradigm, and encodes not simply the presence in the clause of a semantically volitional predicate, but the speaker's first-hand knowledge of the actor's volitional participation in the event. Obviously such first-hand knowledge is possible only when the speaker is also the actor. Thus the overall perfective system marks the

nature (direct or indirect) of the speaker's knowledge of three separate points in a causal chain in which an act of volition<sup>9</sup> causes an overt act, which in turn causes a resulting state:



Direct knowledge of the initiating cause, i.e. the act of volition, is indicated by the -pa-yin form; -soŋ indicates direct knowledge of the actual event but not of its ultimate cause, and -bʒag direct knowledge of the resultant state, but not of any prior link in the causal chain. The indirect -pa-red form reflects no direct knowledge of any aspect of the causal chain.

We can now see that what at first appeared to be distinct senses of -soŋ -- non-volitional with first person actor and direct knowledge with non-first persons -- actually have in common the speaker's direct experience of the event, but not of its antecedent cause. (There is some oversimplification involved here in discussing only volition as ultimate cause, although the problem does not affect the data discussed here. For more detailed discussion of allied problems see DeLancey 1981, 1984c).

This analysis can be extended in a straightforward manner to the imperfective forms -gyi-yod, -gyi(-'dug), and -gyi-yod-pa-red, whose volitionality/evidentiality values parallel those of the perfective forms -pa-yin, -soŋ, and -pa-red. As with -soŋ, so with -gyi(-'dug) the apparently distinct senses have in common that the speaker has first-hand knowledge of the event or state being reported, but not of its ultimate cause. Missing from the imperfective paradigm is a form paralleling -bʒag, a gap which follows logically from our analysis and the meaning of imperfectivity: since an imperfective clause by definition makes no reference to a resulting state, there can be no evidential value for the speaker's knowledge of such a resulting state.

In the future paradigm we lose one more category; there is only a two-way volitionality distinction.<sup>10</sup> As in the other aspects, volition can be indicated only for first person actors:

- 18) ɳa    thaŋ=kha    'gel-gyi-yin  
     I    thangka    hang-FUT/VOLITIONAL  
     'I will hang up a thangka.'
- 19) ɳa    na-gyi-red  
     I sick-FUT/NCN-VOLITIONAL  
     'I'll get sick.'
- 20a) kho    thaŋ=kha    'gel-gyi-red  
     he    thangka    hang-FUT/NON-VOLITIONAL  
     'He'll hang up a thangka.'
- b) \*kho    thaŋ=kha    'gel-gyi-yin  
                 Fut/VOLITIONAL

Since, in a future predication, there can be no evidential value for the actual event, the future paradigm lacks an equivalent to the perfective -soŋ and imperfective -gyi(-'dug). The restriction of the expression of volitionality to first person actor demonstrates that in the future also the category of volitionality is fundamentally evidential: the -gyi-yin form represents direct knowledge of the intention to perform an action, and the -gyi-red form no direct knowledge of any aspect of the causal chain which it is assumed will lead to the event described in the clause.

The forms which we have discussed can now be directly related to one another as follows:

	Direct knowledge of			No direct knowledge
	Act of volition	Event	Resultant State	
Perfective	-pa-yin	-soŋ	-b'zag	-pa-red
Imperfective	-gyi-yod	-gyi(-'dug)		-gyi-yod-pa-red
Future	-gyi-yin			-gyi-red

#### Lhasa Tibetan tense/aspect/evidentiality forms

Thus arranged, the hyphenated forms cry out for further morphological and semantic analysis, which we do not have time for here; the yin, red, yod and 'dug morphemes and their place in the evidentiality system are discussed at some length (though for a slightly different dialect, the Lhasa-based koiné rather than Lhasa proper) in DeLancey to appear a.

I have presented elsewhere (DeLancey 1984a, b, to appear a,b) discussion of other Tibetan evidence for the causal chain interpretation of agentivity (and see DeLancey 1984c for discussion of related data from other languages). This analysis is of considerable importance to current debate concerning the extent to which morphosyntactic structure is directly informed by semantics. It is frequently argued, for example, that case roles cannot be taken as the determinants of syntactic structure -- e.g. as directly determining surface case marking or verb morphology, or what some refer to as "underlying grammatical relations" -- because what seem by current definitions of case roles to be identical roles may in different languages (or, for that matter, in different constructions within the same language) be represented differently. An argument along these lines to which the claim developed here is directly relevant is that put forward by Rosen (1984), who argues that casemarking in active-stative languages cannot reflect underlying case roles, because there are predicates -- typically involuntary bodily activities such as 'snore', 'sweat', etc. -- which take a

morphosyntactically agentive subject in some languages, and a morphosyntactically non-agent argument in others. The assumption underlying this and similar arguments is that the participant in such an event must be, unequivocally and universally, either an agent or not, and that therefore cross-linguistical variation in the marking of such clauses vitiates the notion that agentivity is a determinant for case marking or grammatical relations. But if agentivity is a more complicated notion -- in particular, if it universally involves a multi-stage chain of causation such as we have documented for Lhasa Tibetan -- then there are more precisely definable subcategories of agentivity which languages may choose to code morphosyntactically. In events such as snoring and sweating, the subject is the directly perceived cause of the event, but the causation cannot be traced back all the way along a causal chain to an original act of volition. On this analysis then it is precisely such predicates which should manifest cross-linguistic variation in their case marking and grammatical relations structure if these are ultimately determined by semantic role.

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- 1) The language described here is the dialect of Lhasa proper, which is not identical to the Lhasa-based koine taught as standard in Tibetan refugee communities in India, although the latter is sometimes referred to by some Tibetans, and by some linguists (including myself in some earlier papers, including DeLancey to appear a,b) as "Lhasa".
- 2) All exx. are given in a transliteration of standard orthography.
- 3) A *thangka* is a type of scroll painting.
- 4) Prescriptive grammar requires the *-'dug*, but it is normally omitted in affirmative declarative sentences in colloquial Lhasa.
- 5) Very similar patterns occur in some other Tibetan dialects (though very possibly not all) and in Newari, which is probably a fairly close relative of Tibetan (Hale 1980, SchötteIndreyer 1980).
- 6) Goldstein and Nornang (1970) label this as a perfect rather than a perfective, for reasons which will be clear from our examples and discussion. There is, however, a true perfect construction, using the verb *tshar* 'finish' as an auxiliary, for which the term is best reserved.
- 7) For exceptional events involving drunkenness, etc., my informant will (often reluctantly) accept *-bzag* with first person, but not *-pa-red*. However, the *-pa-red* form does occasionally occur with first person in another use which I do not entirely understand; some examples are given in Chang and Chang 1980, and briefly discussed in DeLancey to appear b.
- 8) I have conflicting data from different sessions with the same informant for whether *-son* can ever occur with 'forget'. Either can occur with 'lose', with *-bzag* the appropriate form when the speaker has just discovered the loss, and *-son* preferred once the loss is an established fact. These facts bear on another aspect of the semantics of evidentiality, which is discussed (although without these data) in DeLancey to appear a.



9) The philosophical problems associated with the notion "act of volition" (see for example numerous discussions in Brand 1970) are irrelevant to our present enterprise.

10) There is a third future form, the use of yon 'come' with the perfective stem of the verb, which occurs with both first and non-first persons; I do not at present understand its use well enough to be able to say how or whether it fits into the system developed here.

Brand, Myles, ed. 1970. *The Nature of Human Action*. Scott, Foresman.

Chang, Betty Shefts, and Kun Chang. 1980. Ergativity in Spoken Tibetan Bull. of the Institute of History and Philology, Academia Sinica, 51.15-32.

DeLancey, Scott. 1981. An interpretation of split ergativity and related patterns. Lg. 57.626-57.

\_\_\_\_\_. 1984a. Transitivity and ergative case in Lhasa Tibetan. BLS 10

\_\_\_\_\_. 1984b. Categories of non-volitional actor in Lhasa Tibetan.

in A. Zide, et. al., eds., Proc. of the Symposium on Participant Roles: South Asia and Adjacent Areas. IULC.

\_\_\_\_\_. 1984c. Notes on agentivity and causation. Studies in Language 8.181-213.

\_\_\_\_\_. to appear a. Evidentiality and volitionality in Tibetan. in W. Chafe and J. Nichols, eds., *Evidentiality: The Linguistic Coding of Epistemology*. Ablex.

\_\_\_\_\_. to appear b. On active typology and the nature of agentivity. in F. Plank, ed., *Relational Typology*. Mouton.

Goldstein, Melvyn, and N. Nornang. 1970. *Modern Spoken Tibetan: Lhasa Dialect*. U. of Washington Press.

Hale, Austin. 1980. Person markers: Finite conjunct and disjunct verb forms in Newari. in Trail, ed.

Jin, Peng. 1979. Lun Zang-yu Lasa-ko dungci-de tedian yu yufa jiegou-d guanxi. ('On the relations between the characteristics of the verb and syntactic structure in spoken Lhasa Tibetan'). Minzu Yuwen 3.173-81.

Rosen, Carol. 1984. The interface between semantic roles and initial grammatical relations. in D. Perlmutter and C. Rosen, eds., *Studies in Relational Grammar 2*. U. of Chicago Press.

Schöttelndreyer, Burkhard. 1980. Person markers in Sherpa. in Trail, ed.

Trail, Ronald, ed. 1980. *Papers in South-east Asian Linguistics No. 7*. Pacific Linguistics Ser. A - No. 53. Australian National University.

## Syntactic Intrusions and The Notion of Grammatical Construction<sup>1</sup>

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### Introduction

It has always been assumed in the generativist tradition that **phrasal constituents** can be introduced into a sentence only by means of proper phrase structure rules (or their equivalents), and hence only at the initial level of a sentence's derivation. In the past two decades, in fact, it has seemed important to limit the introduction of individual **lexical elements**, even of the "syntactic trappings" sort, to phrase structural means<sup>2</sup>. The phenomena that I'll be considering here, under the somewhat unhappy label of **syntactic intrusions**, will support the suggestion that the grammatical apparatus for introducing lexical and phrasal elements into a sentence sometimes require a kind of context-sensitivity best expressed by reference to **host constructions** of a particular sort, such constructions often endowed with properties which are not independently determined by facts about their constituency or their derivation.

The phenomena to which I wish to direct your attention are, in both cases, instances of disapproved linguistic usages in English. I take the social status of my phenomena as a guarantee of the importance of what I have to say about them, rather than as evidence for its triviality. Whenever we find impressive regularities in language that we know we didn't learn either at mother's knee or in Miss Fidditch's classroom, we can be sure that we are in touch with structures seated deep in the language, and not inventions externally imposed upon it.

In defending a "constructionist" point of view, I will need to point to situations in which semantic or pragmatic properties of linguistic structures can be seen as determinants of certain otherwise unexplained possibilities for introducing elements. And since some of the constructions which serve as hosts for phrase insertion have to be seen at what is, from a

transformationalist point of view, a "non-initial" stage of a derivation, I will also need to argue in favor of a single-level representation of complex syntactic objects, as opposed to multi-level or derivational representations. (I claim originality for neither of these inclinations.)

### The Notation

In representing constituent structure I use **container diagrams**, as in Figure 1: constituents are portions of text shown as contained in ovals or rectangles bearing category labels. Transparently, container diagrams have the same properties as **branching tree diagrams** or **bracketing representations** of constituent structures - the "containers" constructed by closing off the brackets above and below. But since I intend to use lines and arrows for superimposing on pure constituent structure representations other sorts of information, the **branches** of branching tree diagrams would get in the way.

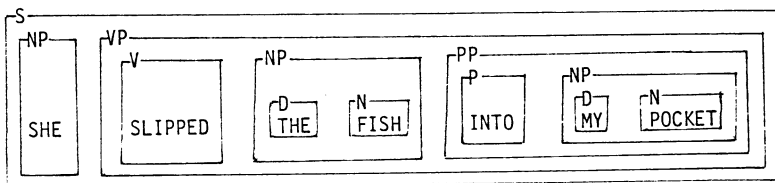


Figure 1

### Syntactic Intrusion Type I

Consider, first, the mysterious extra syllable that occurs, in certain **past counterfactual** clauses, after the word HAD or HADN'T. It can be heard in the second of the following two examples.

- (1) IF YOU HAD EATEN IT, YOU WOULD HAVE DIED.
- (2) IF YOU HAD 've EATEN IT, YOU WOULD HAVE DIED.

Although there was a brief time when I thought this syllable was akin to the interloper syllable in expressions like "HOW BIG OF A BOX", it appears quite clearly to be a contracted form of HAVE, sometimes given full pronunciation, but most typically realized as [ ] before a consonant and [ v ] before a vowel. Using the name given it by the Oxford English Dictionary, I'll refer to the phenomenon as **redundant HAVE**. The form is disapproved by normative grammarians, but it appears not to be subject to social class variation (Lambert 1983). As Lambert's research shows, speakers are not easily made aware of it.

It may be necessary to point out immediately that **redundant HAVE** is not merely a colloquial variant of the pluperfect. That is, we do not find, at any level of informality, sentence (4) as a way of saying (3).

(3) AT THAT TIME I HADN'T OPENED YOUR LETTER.

a "redundant have" version

(4) \*AT THAT TIME I HADN'T 've OPENED YOUR LETTER.

The principal generalization to make about **redundant HAVE** is that it occurs in past counterfactual clauses, that is in clauses pluperfect in form and with a polarity-reversing presupposition. We note that:

1. It occurs in the IF-clause of a counterfactual conditional sentence:

(5) IF I HADN'T 've SEEN IT, I WOULD HAVE STEPPED IN IT.

2. It occurs as the counterfactual complement of WISH:

(6) I WISH I HADN'T 've SAID THAT.

3. It occurs in exclamatory sentences beginning with WHAT IF or IF ONLY.

(7) WHAT IF I'D 've OPENED IT?<sup>3</sup>

(8) IF ONLY I HADN'T 've SAID THOSE THINGS.

4. It occurs in certain expressions which invite the addressee to imagine a non-actual situation:

(9) SUPPOSING YOU HADN'T 've CAUGHT THE TRAIN.

5. It occurs in certain contexts in which the non-actuality

or counterfactuality of the proposition is already assumed.

(10) BY THE TIME YOU'D 've NOTICED IT, IT'D'VE BEEN TOO LATE.

The reason redundant HAVE is a problem is that its occurrence in these contexts is not supported by anything else we know about English. There is no other situation in English calling for an infinitive form to occur after the perfect auxiliary, certainly none that could be limited to the past tense of that auxiliary. It is limited, we have said, to clauses construed **counterfactually**, and these can occur in a wide variety of syntactic environments.

Occasionally you hear speculation on the origin of the phenomenon in terms of an analogically introduced rhythmic pattern which allows protasis and apodosis of a counterfactual conditional sentence to achieve a kind of metric balance, as in (11),

(11) IF HARRY HAD'VE OPENED IT, LUCY WOULD'VE LEFT.

where HAD'VE and WOULD'VE are rhythmically paired. Such explanations are unsatisfying, not only because our HAVE syllable occurs in counterfactual contexts not supported by a following clause - such as as a complement of WISH - but also because its earliest appearances seem to be, not in the IF-form of a past counterfactual conditional sentence, but in the FRONTED HAD-form. In the O E D's section on **redundant "have"**, there are two early citations. The first is from Sir Thomas Malory, fifteenth century,

(12) HAD NOT HE HAVE BE, WE SHOLD NEVER HAVE RETORNE.

and the second from Owen Feltham, seventeenth century:

(13) CLEANTHES MIGHT WELL HAVE FAILED, HAD NOT ACCIDENT HAVE HELPED HIM.

Interestingly, the only instances of redundant HAVE I find in Fowler (*Modern English Usage*), where he describes the phenomenon as "illiterate blundering," are of the FRONTED-HAD form, that is, without IF:

(14) HAD I HAVE BEEN IN ENGLAND ON MONDAY, I SHOULD CERTAINLY HAVE BEEN PRESENT AT THE FIRST PERFORMANCE.

It is obvious from these examples that the intruded form is not simply cliticized onto HAD, since the word HAD can move away

from it in IF-less conditionals, as in (15).

(15) HAD I 've OPENED IT.

Nor does it appear likely that it is cliticized to the following participle, as shown by examples such as (16).

(16) WHAT IF I HADN'T 've EVER SAID THAT?

### On the Non-Existence of Counterfactual Conditionals

Now since I have made such a point about the **redundant HAVE** being limited to counterfactually understood clauses, and since the most common occurrences of it are in counterfactual conditional sentences, I am obviously obliged to say something about recent claims that conditional sentences with counterfactive presuppositions do not exist. Reinhart (1976) has suggested that conditional sentences said to introduce counterfactive presuppositions really only implicate the falsity of their propositional content. She describes two interestingly different possible contexts for the following sentence:

(17) IF THE DEAN HADN'T ANSWERED MY LETTER, I WOULD HAVE RESIGNED.

In one context we can imagine the speaker as someone who wrote to the dean, and who received an answer to her letter. The clause IF THE DEAN HADN'T ANSWERED MY LETTER is construed counterfactually by implication: the Dean did answer the letter, and the speaker proposes that any world, distinct from the actual one, in which the Dean fails to answer the letter, is a world in which the speaker resigns. We know that this is a matter of implicature only, says Reinhart, from the fact that there are contexts in which a sentence with exactly the same lexicosyntactic form can be spoken with such an implicature absent. In this second context, the addressee, not the speaker, has written to the dean, and the dean did not answer the letter. The speaker, putting himself in the addressee's place, says

(18) IF THE DEAN HADN'T ANSWERED MY LETTER I WOULD HAVE RESIGNED.

This time there is no suggestion that the Dean answered the speaker's letter, or that the speaker ever wrote to the dean in the first place.

While it may be the case that the sentential form of a pluperfect clause in a conditional sentence does not always require a counterfactual interpretation, it happens that **redundant HAVE** can appear only when such an interpretation is present. Thus, the person who stayed on the job as a result of the Dean's correspondence could say

(19) IF THE DEAN HADN'T 've ANSWERED MY LETTER, I WOULD HAVE RESIGNED.

In the non-counterfactual context, however, you would not find anybody saying

(20) \*IF THE DEAN HADN'T 've ANSWERED MY LETTER, I WOULD HAVE RESIGNED.

The "construction" at hand is a clause having the **pluperfect** form and understood as counterfactual; and the permitted intrusion is the intrusion of HAVE, in unstressed and hence contractable form, after the word HAD. See Figure 2.

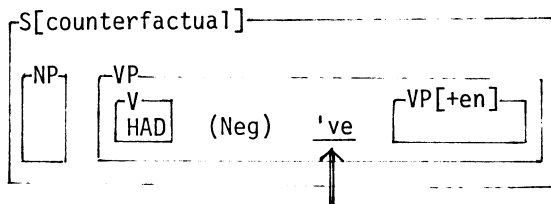


Figure 2

The very argument which I have just presented in favor of a view which recognizes grammatical constructions could, in an older framework, have been given in favor of a particular formulation of an insertion transformation, like **D0-Support**. If there is a difference, it is in my intuition that the phenomenon in question relates in a quite specific way to a structure which must be simultaneously formally and notionally defined, and my suspicion that grammatical theory will eventually provide the means of recognizing such structures. In the next example the inserted material is a class of phrases rather than a single morphological element, and so the feasibility of treating the phenomenon in terms of an insertion transformation is reduced.

## Interlude on Displacement Structures

Since my second example involves **initial WH-phrases**, I need to digress on the "constructional" nature of **displacement** structures, structures in which a constituent is **presented** for some grammatical or rhetorical purpose in one part of the sentence but **interpreted** in another. The constituent in question, **displaced** to the front of its clause, is **linked** to a **gap** at a specific site elsewhere in the clause, in such a way that at the place of the **gap** it satisfies the requirements of some **predicational** structure or provides some sort of adverbial modification of the clause.

In the exclamatory sentence represented by Figure 3,

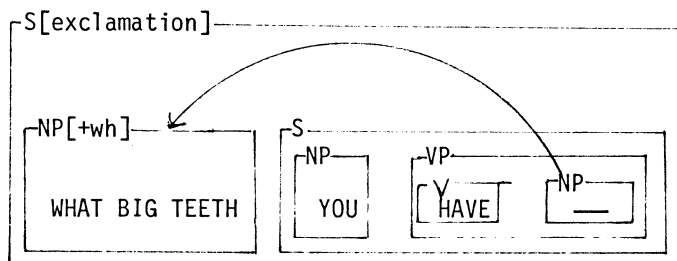


Figure 3

the phrase WHAT BIG TEETH, found at the sentence's beginning, is interpreted as the object of the verb HAVE. To say that, of course, is not yet to have given the sentence an analysis. We could view a **displacement structure** of the sort just noticed simply and only as a **grammatical construction** of a particular kind: a **WH-word phrase** is in construction with a clause containing a **gap**, bearing with that gap the kind of interpretive link just described. Alternatively, we could say that the initial WH-phrase has been moved to the sentence's front by a transformation of WH-Movement, and regard the diagram showing the gap and the link as a record of the **derivational history** of the sentence's development from an abstract **deep structure** to the observed **surface structure**. As a kind of abbreviated "T-Marker", in an older idiom.

The best sort of argument in favor of the "constructionist" view is the inverse of the kind of argument we all learned in



defending the transformationalist view. The standard case for the correctness of the movement treatment is a demonstration of the numerous ways in which "fronted constituents" fit their assigned gap, in respect to phrasal category membership, case assignment, selection restriction, potential for theta-role bearing, and all the rest. If in their form they satisfied expectations contracted at the site of the gap perfectly, we had reason to believe they were generated there, suited the requirements of their environment at that site and must therefore have ended up where we see them by way of a movement rule. Arguments for a constructionist or non-movement position, therefore, should concentrate on properties of initial constituents which do not agree with what is permitted or required at the site of the linked gap.

One such argument has been pointed out to me recently by Paul Kay, involving nominal constituents fronted before THAT and THOUGH, as in

- (21) FOOLISH CHILD THAT HE WAS, ...
- (22) STRONG TEAM MEMBER THOUGH SHE IS, ...
- (23) RIDICULOUS SUGGESTION THAT IT AT FIRST SEEMED, ...

Said in X' jargon, the nominal phrase in these expressions is an N' rather than an N"; that is, it is something which could not be found, just like that, in the position from which it is alleged to have "moved." Semantically there is no doubt the fronted constituent fits and needs to be interpreted at the gap to which it is linked, but it couldn't have been generated at that place in that form. That is, we don't say

- (24) \*HE WAS FOOLISH CHILD.
- (25) \*SHE WAS STRONG TEAM MEMBER.
- (26) \*IT WAS RIDICULOUS SUGGESTION.

## Syntactic Intrusion II

But the phenomena that interest me just now are not things which are left out in particular positions in a construction but things which are introduced into a construction.

A favorite exercise in middle level syntax classes is to explore the conditions under which in English it's possible to pepper up one's speech with certain intruding interjections. I have in mind mainly THE-phrases like THE HELL, THE DEVIL, THE HECK, THE DEUCE, etc. (there may be others), but also certain

formulaic prepositional phrases, usually with IN or ON, such as ON EARTH, IN THE WORLD, IN TARNATION, IN HEAVEN'S NAME, etc. (The two types have slightly different distributional possibilities, but I will ignore those here.) A generalization that can be made about these phrases is that they can occur immediately after any clause-initial interrogative WH-word, except WHICH.

1. The initial position requirement for our phrases predicts correctly that they do not occur in **echo questions**. Thus we get such judgments as the following:

- (27) WHAT DID YOU SEE?
- (28) WHAT THE HECK DID YOU SEE?
- (29) YOU SAW WHAT?
- (30) \*YOU SAW WHAT THE HECK?

2. The requirement that the WH-word welcoming our phrases be clause-initial predicts that insertion of THE HECK, etc., is only possible when all preceding parts of a WH-phrase are left stranded. Thus we get the following judgments:

- (31) WHAT DID YOU FIX IT WITH?
- (32) WHAT THE DEVIL DID YOU FIX IT WITH?
- (33) WITH WHAT DID YOU FIX IT?
- (34) \*WITH WHAT THE DEVIL DID YOU FIX IT?

3. The phenomenon occurs only in interrogative clauses, not in homophonous **free relatives**. In (35),

(35) I CAN'T IMAGINE WHAT SHE COOKED.

WHAT SHE COOKED is an interrogative clause. In (36),

(36) I COULDN'T EAT WHAT SHE COOKED.

it is a free relative, meaning something like "that which she cooked." Notice that it is possible to say (37) but not (38).

(37) I CAN'T IMAGINE WHAT IN HEAVEN'S NAME SHE COOKED.

(38) \*I COULDN'T EAT WHAT IN HEAVEN'S NAME SHE COOKED.

4. The phenomenon in question occurs only with **displaced WH-words**, hence not with the word **WHETHER** in a

subordinated interrogative clause. Thus we don't get

(39) \*I DON'T KNOW WHETHER THE HECK THEY'RE  
COMING.

5. It doesn't occur with the word WHICH, either as a determiner, as in (40),

(40) \*WHICH THE HECK BOOKS DO THEY RECOMMEND?

or as a full NP, as in (41).

(41) \*WHICH THE HECK DID YOU CHOOSE?

WHAT, as well as WHICH, can be used in "determiner" position in interrogated noun phrases, but a number of informants who reject WHICH THE HECK find (42) acceptable.

(42) WHAT THE HECK BOOK DID THEY READ?

6. Bolinger (1976) has suggested that the word ELSE that occurs after indefinite pro-words, plain and interrogative, really functions as a **suffix** rather than as a separate word. We can now see, however, that the mechanism that allows us to introduce THE HECK and its kin shows that to be not quite true. Notice examples (43) and (44):

(43) WHO THE HELL ELSE DID YOU INVITE?

(44) WHERE THE HELL ELSE DO YOU WANT ME TO TAKE  
YOU?

7. We are accustomed to thinking of the word WHOSE as a single tightly bound word, but we are also aware of the modern English S-genitive as being sometimes called a **phrasal genitive**, as illustrated in such expressions as (45).

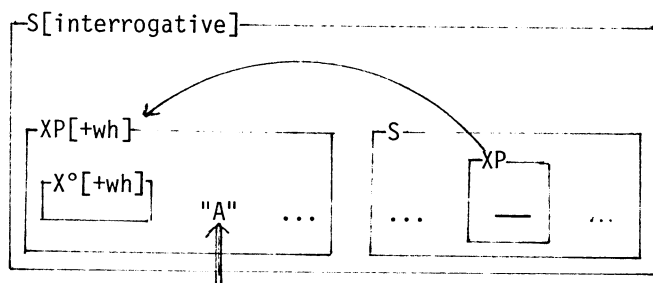
(45) THE KING OF ENGLAND'S HAT

Perhaps the suffix we see in WHOSE is not as tightly associated with the WHO as the spelling would suggest, since we can, after all, say (46).

(46) WHO THE HECK'S FAULT DO YOU THINK IT IS?

The observation that THE HECK follows the "first word" exposes the true structure of the word WHOSE.

It seems to me that the only way to account for the phenomenon of the **intrusion** of THE HECK into a question is to recognize a construction (see Figure 4) in which a WH-word, not WHICH, is in initial position in a fronted WH-word phrase, and to introduce into the position after that word a special category - possibly unique to this construction - capable of being realized as one of our peppery interjections. It is not easy to imagine this category introduced merely parasitically on some constituent participating in **WH-Movement**: the clause in which it occurs has to be an interrogative clause, the WH-word has to be destined to become the first word in the sentence, and it can't be the word WHICH<sup>4</sup>.



"A" = the heck, the hell, the devil, etc.  
 X° ≠ which

Figure 4

### Grammatical Constructions

It has been common, in recent work within the Transformationalist tradition (Chomsky 1981, Stowell 1981) to abandon the use of the phrase structural apparatus for providing the subcategorizational environment for lexical items, calling instead on structures linked to particular lexical items capable of serving as some such category as VP. The rejected batteries of phrase structure rules stand instead as a set of generalizations over the contents of subcategorization frames. Typically the pretense is maintained that such structures are shallow, consisting solely of the lexical item in question and its co-constituents - its structural sisters. This pretense requires various technical tricks to take care of the instances

in which a prepositional complement requires a particular preposition or a clausal complement requires a particular complementizer or a particular mood.

If new-style lexical entries for content words were to be seen instead as **constructions** capable of occupying particular higher-phrase positions in sentences and included both the needed semantic role and the needed specification of structural requirements (where sometimes nieces and grand-nieces are as important as sisters), we could see such structures as providing expansions of their containing categories. Structures of this sort with multiple occurrences of content-words would be the language's idioms. Structures of this sort lacking content words would be the language's major and minor grammatical constructions. Thus, it is possible to see Figure 2 as not merely the construction within which **redundant HAVE** is introduced, but as the construction which provides the form of a past counterfactual clause in the first place, the "intrusion" taken as optional. Figure 4, however, cannot be seen as the structure for WH-Movement, or for WH-Moved Questions, but only as the construction within which our family of interjections can be inserted.

The people who decide on such things would surely declare that the phenomena I have been describing belong to the "periphery" of grammar and not its "core", and they might be quick to tell us that within the "core," displacement structures are equivalently described constructionally or transformationally, the two being "mere notational variants" of each other. I would like to suggest that since in the "peripheral" cases the "constructional" account has, as I see it, a number of advantages, perhaps a constructional treatment should be preferred throughout. This would at least make it less necessary to believe that there is a major discontinuity between Core Grammar and The Periphery.

## NOTES

1. The author is grateful to Farrell Ackerman, Amy Dahlstrom, Georgia Green, Paul Kay, Tom Larsen, Mary Catherine O'Connor, and Peter Trudgill for comments on an earlier version of this paper. I first learned about Valerie Lambert's thesis from Peter Trudgill.
2. Here I have in mind the lexical redundancy rule treatment of passivization, the phrase-structural introduction of COMP and

its fillers, etc.

3. Many American observers see examples like (7) and (10) as abbreviations of WOULD, not HAD. The examples are drawn from or modeled after BrE attestations, where interpretation as WOULD is ruled out. My assumption about the Americanism "If she would have come" is that it is a reconstruction (or "disabbreviation") of contracted "had have." Trudgill and Hannah speak of it as "relatively recent" (1982, p. 47) and limited to AmE. Victoria Liptack (U.C. Santa Cruz) has suggested in conversation that in **redundant HAVE** it is not the HAVE about which something special needs to be said, but the HAD: that, in fact, the word HAD comes to function, in past hypothetical clauses, as a modal. Looked at this way, the American "disabbreviation" of 'd as WOULD would seem quite natural. I am not able to evaluate this proposal.
4. The full story has not been told. Our phrases may follow some instances of the -EVER versions of free relatives: "Do whatever the hell you want" (example from Georgia Green). Green and Morgan (1976) propose some pragmatic conditions for the choice of THE HELL, etc., and these have something to do with whether the speaker (or somebody whose interests the speaker cares about) is "ignorant of" (to which one might add "has no interest in") "the answer to the question that corresponds to the WH-the-hell clause." (Green and Morgan 1976, p. 234). This explanation comes close, but counterexamples are disturbingly easy to construct.

## REFERENCES

- Bolinger, Dwight (1976), "Meaning and memory," Forum Linguisticum 1.1-14.
- Chomsky, Noam (1981), Lectures on Government and Binding, Foris.
- Fowler, H. W. (1926/1954), A Dictionary of Modern English Usage, Oxford University Press.
- Green, Georgia and Jerry L. Morgan (1976), "Notes toward an understanding of rule government," in Studies in the Linguistic Sciences 6.1.228-248. (University of Illinois Linguistics Department)
- Lambert, Valerie (1983), The Non-Standard Third Conditional in English: A Sociolinguistic Study. M.A. thesis, University of

Reading.

Reinhart, Tanya (1976), "Polarity reversal: logic or pragmatics?" Linguistic Inquiry 7.697-705.

Stowell, Timothy (1981), Origins of Phrase Structure, MIT Ph.D. Dissertation.

Trudgill, Peter and Jean Hannah (1982), International English: A Guide to Varieties of Standard English, London: Edward Arnold.

## TOWARDS A NON-PARADIGMATIC MORPHOLOGY\*

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Everybody uses the notion of paradigm. In spite of this, it is a somewhat vague notion.

It is generally used to characterize a set of interrelated forms but there are extended usages that go far beyond our present concerns -- such as those of de Saussure (1915) or Hjelmslev (1963), not to speak of Kuhn (1973). There are also restricted uses as well, the subtleties of which are not pertinent to the present discussion. For example, the structure of a paradigm is generally given in terms of the relationships between the forms, most often by defining the members of a paradigm as functions of a given basic form. The formulations in (1) make that clear:

- (1) i) "Each of these groups is called a paradigmatic group, or paradigm and each form of the group is called an inflected form or inflection."  
(Bloomfield, 1933: 210)
- ii) "For the same reasons, we are often led to construct an artificial base." (Bloomfield: 205)
- iii) For any lexeme *l*, the paradigm of *l* is the set of all the alphabets *s* etc., such that for a given *w*, *s*\**R*s and *w*\**F**l* (where \**R* = "is a realization of" and \**F* = "is a form of" in the sense specified in Matthews (1965:272-273) ).

The basic difference lies in the nature of the basic form. For Priscian, for example, the basic form is a member of the paradigm; for Bloomfield and Matthews this is not the case. For them it is an abstraction, though not of the same sort. For Bloomfield, it is a purely formal abstraction, a theme on which the forms of the paradigm are constructed. For Matthews, it is a semantic abstraction; the basic form is the nucleus of meaning which underlies the set of forms of the lexeme. This nucleus is related exponentially to the basic form. These differences, however, are not germane to the argument presented in this paper. It should be obvious that the notion is somewhat vague. There is, for example, no formal criterion that permits us to decide whether we are faced with one, two or three paradigms in any given case. The use of the term reflects this fact. The vagueness also reflects, we shall argue, the fact that the notion of paradigm is a somewhat wavering and incomplete effort to capture lexical relatedness. Although the not infrequent hand-waving is clearly an indication of the fact that there is more to lexical relatedness than paradigms, it is almost never seen as such. We shall attempt to show precisely how incomplete an effort it really is and why the hand-waving should be taken more seriously than it is.



When we refer to the verbal paradigm, we are generally referring to the set of possible forms a given verb can take. We can represent these forms in terms of abstract formulas, such as 3rd person singular present indicative. The set of these forms is what constitutes the verbal paradigm. Thus, in answer to the question of how many verbal paradigms there are, the reply should be one. But generally, we do not answer one, but two, three, five or ten, depending on the language in question. Perhaps in order to avoid this sort of problem certain grammarians have used a different term. To designate this meaning of paradigm, the term conjugation is used. In much the same fashion, the term declension was coined to designate noun case paradigms. In other cases, no special term is in use and the word paradigm must be used. For example, for number (singular, dual, plural), there is no special term, nor is there one for degrees of comparison. In case-languages, we can incorporate these distinctions into the declension and number can also be incorporated into the conjugation in the case of verbs. Aside from these contexts, the term paradigm is used.

Another example of the vague or ambivalent nature of the term paradigm is its use in referring to parts of a paradigm. For example, we have already seen that the term paradigm refers to the set of all forms of a verb, in the case of a verb, that is the set of all forms in a conjugation. But it can also refer to a set of finite verb forms for a given tense or to the set of declined forms for a given number in the case of nouns. In this way we can speak of present, past or passive verb paradigms or the plural paradigm. This use is often conditioned by the actual structure of the paradigm in question. For example, if one recognizes several paradigms within the conjugation of a given verb, it is usually because one recognizes several basic forms. In Latin, for example, we speak of the principal parts of a verb: /ago/ /agere/ /egi/ /aktum/. Any one of these forms constitutes the basic form of a different paradigm:

- (2)     ago     - present  
          agere - future  
          egi    - preterit  
          aktum - passive

There is an asymmetry with respect to the noun declension. There can be two or more principal parts of a noun, such as the nominative and the genitive, for example mos, moris, but never to our knowledge has anyone ever named the set of forms derived from mos and moris, as paradigms.

The foregoing demonstrates the imprecision associated with the term paradigm. However, in our opinion, there are many more drawbacks associated with this term. To make them explicit requires the elucidation of another example. We take the case of Latin declensions under the standard classical analysis, the one we

learned in our school primers and which is based directly on Priscian's grammar. We display it in (3):

(3)	1	2	3	4	5	6
nom	insula	mûrus	bellum	puer	pater	rex
voc	insula	mûre	bellum	puer	pater	rex
acc	insulam	mûrum	bellum	puerum	patrem	rêgem
gen	insulae	mûrî	bellî	puerî	patris	rêgis
dat	insulae	mûrô	bellô	puerô	patrî	rêgî
abl	insulâ	mûrô	bellô	puerô	patre	rêge
	7	8	9	10	11	12
nom	cîvis	nômen	tempus	mare	terror	môs
voc	cîvis	nômen	tempus	mare	terror	môs
acc	cîvem	nômen	tempus	mare	terrorem	môrem
gen	cîvis	nôminis	temporis	maris	terrôris	môris
dat	cîvî	nôminî	temporî	marî	terrorî	môrî
abl	cîve	nômine	tempore	marî	terrôre	môre
	13	14	15	16	17	18
nom	nûbês	senex	dux	pês	gens	vectîgal
voc	nûbês	senex	dux	pês	gens	vectîgal
acc	nûbem	senem	ducem	pedem	gentem	vectîgal
gen	nûbis	senis	ducis	pedis	gentis	vectîgâlis
dat	nûbî	senî	ducî	pedî	gentî	vectîgâlî
abl	nûbe	sene	duce	pede	gente	vectîgâlî
	19	20	21	22	23	
nom	casus	cornû	domus	diês	rês	
voc	casus	cornû	domus	diês	rês	
acc	casum	cornû	domum	diem	rem	
gen	casûs	cornûs	domûs	diêî	reî	
dat	casuî	cornuî	domuî	diêî	reî	
abl	casû	cornu	domô	diê	rê	

We use this model, rather than Bloomfield's or Matthews', because there is no analysis of Latin declension in the latter models and we do not want to extrapolate. However it must be clear that what we say concerning paradigms in the Priscian analysis applies equally to the other models. The analysis states, grosso modo, that there are about twenty declensions in Latin. That is to say that if we know a noun in Latin in the nominative, its other case forms would correspond to one of these twenty odd categories.

In general, we can criticize this approach for three reasons:

- i) it prevents generalizations from being formulated
- ii) it does not account for acquisition in a natural fashion
- iii) it does not seem adequate for an account of the language's evolution.

In order to see this, let us take the case of the nouns templum, nomen, tempus, mare, vectigal and cornu. For all these nouns,

the nominative, accusative and vocative forms are identical. Nonetheless, according to the paradigmatic analysis, these belong to six different classes. Even if we divide classes into five principal declensions, with all the defects mentioned, there are three of these declensions included among these words. We actually know that what is at stake is a generalization concerning neuter nouns. If there are no nouns from the first and fifth declensions, it is because these declensions do not contain any neuter nouns. Note that an analysis with paradigms must necessarily have redundancies of this nature.

A list of other generalizations of this type that can and in our opinion must be expressed for Latin are given in (4):

- (4) i) the nom. and acc. are identical for a neuter noun
- ii) if the nom. ends in -s, the acc. is formed by replacing the -s with -m
- iii) the nom. and the voc. are identical everywhere except for nouns like murus
- iv) if the acc. ends in -um, the dative is formed by replacing -um with -o
- v) if the dative ends in -o, the ablative is identical.

It is evident that if we enlarge the paradigm to plural forms, the generalizations will be all the more striking but we limit ourselves to the singular, for ease of presentation.

As far as acquisition is concerned, the paradigmatic model does not constitute a natural model in the sense that it has never, as far as we know, been demonstrated that during language acquisition paradigms are constructed and actually used. For example, it has been proposed that certain forms are acquired before others, generally according to the order presented by Jakobson's markedness theory. A partial list of some of the oft-cited generalizations from this theory is given in (5):

- |     |              |                   |
|-----|--------------|-------------------|
| (5) | Unmarked     | Marked            |
|     | present      | preterit          |
|     | 3rd pers.    | other pers.       |
|     | singular     | plural            |
|     | finite forms | participial forms |
|     | direct case  | oblique case      |
|     | masculine    | feminine          |

Some of the acquisitional counterparts of the generalizations in (5) are listed in (6):

- (6) (a) The singular is acquired before the plural (cf. Ruke-Dravina: 1973).
- (b) The present is acquired before the past (cf. Ruke-Dravina, Bates: 1976 and Simoes and Stoel-Gammon: 1979).
- (c) The indicative is acquired before the subjunctive (cf. Ruke-Dravina and Simoes and Stoel-Gammon).

- (d) The third person form of the verb is acquired before forms of other persons (cf. Ruke Dravina, Bates, and Simoes and Stoel-Gammon).

These generalizations seem to offer evidence for the classical paradigm theory, which seems to require that the unmarked form be acquired before the marked form. But note that this is no more than a tendency. As Tiersma (1982) has shown very well, it is necessary, in order for markedness to obtain, that in certain circumstances the plural rather than the singular, the oblique rather than the direct case be the unmarked form. A list of Tiersma's local principles is given in (7):

- (7) Principle 1 : When the referent of a noun naturally occurs in pairs or groups, and/or when it is generally referred to collectively, such a noun is locally unmarked in the plural.  
Principle 2 : In languages with case systems, nouns referring to places are locally unmarked in the locative (or another local) case, and nouns referring to tools or instruments are locally unmarked in the instrumental.  
Principle 3 : Verbs of perception and emotion may be locally unmarked in the 1st person.

The very existence of these principles seems to us to cast doubt on the paradigm as a model of acquisition. It seems only reasonable to suppose that a speaker can have, starting from any given form, access to all associated forms. For this reason, the paradigmatic model, which is directional, seems to us to fail (cf. Ford and Singh: 1985).

With respect to the explanation of diachronic change as well the paradigm model fails. This contention can be illustrated with Bybee (1980), which relies on the paradigm model. What she calls paradigm-internally motivated morphophonemic change is the levelling of an alternation in favour of the alternant that is basic. She cites the following change

- |     |        |           |        |        |
|-----|--------|-----------|--------|--------|
| (8) | cierro | cerramos  | cierra | cerró  |
|     |        | ↓         |        | ↓      |
|     |        | cierramos |        | cierro |

According to her the change is always in the direction of the least marked or basic form.

What she calls paradigm-externally motivated change is, grosso modo, what happens when a verb changes its paradigm. For example, the verb pensare that does not participate in the alternation illustrated in (8) above is said to undergo this type of change after the fashion of verbs like cierro:

- |     |        |          |        |        |
|-----|--------|----------|--------|--------|
| (9) | penso  | pensamos | piensa | piensó |
|     | ↓      |          | ↓      |        |
|     | pienso |          | piensa |        |

- (14) i)  $\begin{matrix} [X]_{\text{Nom}} \\ \text{Neuter} \end{matrix} \leftrightarrow \begin{matrix} [X]_{\text{Acc}} \\ \text{Neuter} \end{matrix}$   
 ii)  $\begin{matrix} [Xs]_{\text{Nom}} \\ \text{Neuter} \end{matrix} \leftrightarrow \begin{matrix} [Xm]_{\text{Acc}} \\ \text{Neuter} \end{matrix}$

Note that this analysis: i) permits the clear expression of generalizations blocked by a paradigmatic description, ii) accounts for acquisition facts and diachronic change. If we suppose with Kurylowicz that the two phenomena are linked we make strong predictions on how young Romans expressed themselves and in which direction the language should have changed. In (15) we show several changes that are documented for Vulgar Latin. They are all explainable in terms of the strategies in (12).

(15)	nom.-acc	nom.-gén.
	0-0 3,8,9,10,18,20.	us-î 2
	â-am 1	a-ae 1
	s-m 2,6,13,15,17,19,21	ês-is 13
	is-em 7	is-is 7
	0-um 4	um-î 3
	0-m 5,11.	us-ûs 19,21.
	s-rem 12	0-î 4
	ex-em 14	0-is 5,8,11,18.
	ês-edem 16	s-is 6,15,17.
		us-oris 9
		os-oris 12
		e-is 10
		ex-is 14
		ês-edis 16
		u-ûs 20
		ês-êi 22,23
	acc.-gén.	
	um-î 2,3.	
	am-ae 1	
	em-is 4,5,6,7,11,12,13,14,15,16,17.	
	0-is 8,18.	
	um-ûs 19,21.	
	em-êi 22,23.	
	us-oris 9	
	0-is 10	
	û-ûs 20	

Compare our proposal with the classical versions of the break-up of the case system in Latin in terms of a paradigmatic analysis, of which a sample is given in (16), and you can decide for yourselves which of the two analyses is more revealing.

(16)	nom.	acc.	gén.
	ager > agrus	agrum	agrî
	aedês > aedis	aedem	aedis
	faciês > facia	faciem	faciêi
	bôis > bovis	bovem	bovis
	herês > heredis	heredem	heredis
	honos > honor	honorem	honoris
	cornu	cornu > cornum	cornuî

mare	mare > marem	maris
fructus	fructum	fructûs > fructû
Sabina	Sabinam	Sabinae > Sabinaes

For those who are not familiar with the data we would like to close with an illustration of the efficiency of the model in the solution of another problem. The data is given in (17). It should be noted that with respect to other dialects, Quebec French is characterized by the development of certain new verb forms. At present, the form which interests us is the third person, present indicative plural. Some examples appear in (17):

(17)	sg.	pl. standard	pl. québécois
	ri	ri	riz
	pu	pu	puz
	zu	zu	zuz

It will be seen that a paradigmatic theory will be hard-pressed to account for this type of development. It is not what Bybee has called interparadigmatic because the new plural does not come from the singular. Neither is it extraparadigmatic because the new paradigm formed did not previously exist. The closest one would be a verb like dire or lire but if we say the verb rire has entered the dire paradigm we should have \*nous risons, \*vous rîtes but we have nous rions, vous riez. In the same fashion, if we would like to say that rire has passed over to the lire paradigm, we should have \*nous risons, \*vous risez (cf. lisez, lisons). Thus a new paradigm has been created. The same phenomenon is observed in the case of verbs such as jouer and puer. There is no verb in the standard language that has an infinitive in er which also has a third person plural in -z. Nevertheless, jouer, puer, suer and several other verbs have acquired this property.

Note that in the framework proposed here, we do not need to change paradigms in order for morphological change to occur. We can simply say that these verbs are in conformity with the strategy that says that when a third singular terminates in a vowel, we add -z to make the plural. This strategy is one amongst others that are in competition with the dominant strategy: that the first and third persons singular and plural are identical.

Our main contention is that if word-formation rules are appropriately represented by bidirectional strategies like (14) that capture lexical redundancies in the lexicon and provide, when activated, models for creating or understanding new items, the notion of paradigm is not needed for it is, at best, a partial and somewhat distorted attempt to capture what might be called lexical relatedness. Word-formation processes form a network and the paradigm gives us only a distorted picture of that network. What it really looks like is something we explore in another paper (cf. Ford and Singh: forthcoming).

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## References

- BATES, E. (1976). Language and Context: The Acquisition of Pragmatics. New York: Academic Press.
- BYBEE, J. (1980). "Morphophonemic change from inside and outside the paradigm", Lingua 50, pp. 45-49.
- BLOOMFIELD, L. (1933). Language. New York: Holt, Rinehart and Winston.
- FORD, A. and R. Singh (1985). "On the Directionality of Word-Formation Rules", ESCOL 84, ed. by Brian. Columbus: Ohio State University.
- FORD, A. and R. Singh (forthcoming). "WFR Networks".
- HJEMSLEV, L. (1963). Prolegomena to a Theory of Language. Madison: University of Wisconsin Press.
- JAKOBSON, R. (1972). Child Language, Aphasia and Phonological Universals. The Hague: Mouton.
- KUHN, T. S. (1973). The Structure of Scientific Revolutions. Chicago: University of Chicago Press.
- KURYLOWICZ, J. (1949). "La nature des procès dits analogiques", Acta Linguistica 5, pp. 121-138.
- MATTHEWS, P. H. (1965). "Some concepts in word and paradigm morphology", Foundations of Language 1, pp. 268-289.
- OROZ, R. (1966). La Lengua Castellana en Chile. Santiago: University of Chile.
- ROSENBLAT, A. (1946). Biblioteca de Dialectologia Hispano-americana II. Buenos Aires Facultad de Filosofia y Letras de la Universidad de Buenos Aires, Instituto de Filologia.
- RUKE-DRAVINA, V. (1973). "On the Emergence of Inflection in Child Language: A Contribution based on Latvian Speech Data". Studies in Child Language Development, ed. by C. A. Ferguson and D. I. Slobin. New York: Holt, Rinehart and Winston.
- SAUSSURE, F. de (1915). Cours de Linguistique Générale. English ed., A Course in General Linguistics, translated by Wade Baskin. New York, 1959.
- SIMOES, M. C. P. and C. Stoel-Gammon (1979). "The Acquisition of Inflections in Portuguese: A Study of the Development of Person Markers on Verbs", Journal of Child Language 6, pp. 53-67.
- SINGH, R. (1984). "Wellformedness Conditions and Phonological Theory." Paper presented at the 5th Phonology International, Eisenstadt.
- TIERSMA, P. M. (1982). "Local and General Markedness", Language 58, pp. 832-848.



ERGATIVITY, NUMBER, AND AGREEMENT  
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Summary: In the present paper I propose the following (1):

1. The category number may be encoded in the nominal, the verbal, in both, or in neither system.
2. If the number of the patient is encoded in the verbal system, then the subject of the intransitive will also be encoded by the same device. In addition, the number will be encoded in the adjectives, if the language has any.
3. If the verbal encoding of number includes the patient, the encoding of number in the nominal system will be severely limited, or nonexistent.
4. It is proposed to reassess number agreement, and for some languages to view it as a cooccurrence of independently encoded devices to mark plural.

1.0 IS NUMBER A NOMINAL CATEGORY ONLY?

Traditional and contemporary linguistics assumed that the locus of the category number is the noun (e.g. Hopper and Thompson 1984:718). Instances of number encoded in the verbal system or in the modifiers are usually interpreted as phenomena of agreement, essentially redundant in the sense of information theory. Although in some languages such an interpretation of agreement may be justified, there are languages in which the number encoding in the verb must be considered to have the nonredundant function of being the primary marker of this semantic category, e.g., Onondoga (Northern Iroquoian):

- 1 a. *cihá kahnyá.ha?*  
      'the dog is barking'
- b. *cihá knihnyá.ha?*  
      'the dogs (dual) are barking'
- c. *cihá kotihnyá.ha?*  
      'the dogs (plural) are barking' (Chafe 1970:31) (2).

In 1 a., b., and c. the number distinction is indicated by affixes to the verb while the noun cihá remains unmarked for number. Similarly, in Pero (West Chadic):

- 2 a. *kpéemùn lée- kò*  
      woman give birth-Compl  
      'woman gave birth'
- b. *kpéemùn léyyí- kò*  
      give birth-Pl  
      'Woman gave birth to many children'
- 3 a. *nī-díg-kò mīnà*  
      lsg -build-Compl house  
      'I built a house'
- b. *nī-dikkú-jù-kò mīnà*  
      build- Pl  
      'I built many houses'

One cannot talk about the agreement phenomena in 1-3 for the

simple reason that there is nothing in the sentence for the verb to agree with.

Since the category number may have its locus totally or partially in the verb, we should postulate at least two types of number encoding: one nominal and the other verbal. Languages may have only one or both types of encoding available.

## 2.0 TWO TYPES OF VERBAL ENCODING

From the point of view of the function of the number marking two types of encoding can be distinguished: the type in which the number marker indicates only the number of one of the arguments of the verb, and the other in which it indicates plurality both of action and of the number of one of the arguments. The first type is familiar from I.E. languages. The second type, illustrated by the Pero examples above, is also encountered in languages from other families.

### 2.1 Correlation 1

The following correlation seems to occur: When the verb encodes both plurality of action and plurality of one of its arguments by the same device, the argument so encoded is patient, and the number encoding in the verb will also include the subject of the intransitive.

Compare the following examples from Pero with the ones already given:

- 4 a. gbáali tódd-áani  
calabash break-Stat  
‘The calabash is broken’  
b. gbáali tóddô-t-áani  
PL  
‘Calabashes are broken’

The plural form of the transitive verb in Pero never indicates the number of the agent. Compare 5 with 2 and 3:

- 5 mûn-díg- kô mínà  
1pl built-Compl house  
‘We built a house’ (Frajzyngier in press.)

This pattern has been observed in other Chadic languages: in Mandara (Frajzyngier 1984a), Mopun, and it probably exists in other Chadic languages (Frajzyngier 1984b). Polish, like most I.E. languages, has the verb encoding the gender, number, and person of the surface structure subject. But it also has a prefix po-, one function of which is to indicate plurality of action, e.g.:

- 6 a. Po-stał w kolejce  
stand in line  
‘He stood in line (for quite some time)’  
b. Po-leżał w królewskim łóżu  
lie in royal bed  
‘He lay for some time in the royal bed’

Po- may also indicate plurality of an argument, and according to the hypothesis the number marking through this device will have

ergative characteristics, e.g.:

- 7 a. Po-otwierai okna  
 Pl- open-Sg window-Pl  
 'He opened [all] the windows'  
 b. \*po-otwierai okno  
 window-Sg

- 8 a. \*Po-spadał  
 fall-Sing  
 but: po-spadali  
 fall-Pl  
 'They fell down' (3)

I did not have an opportunity to check whether Correlation 1 occurs in all languages in which plurality of action and plurality of one of the arguments are marked by the same device.

## 2.2 Correlation 2

If the verb encodes the number of the patient, the number encoding will have ergative characteristics, e.g., in Shokleng:

- 9 a. tā wū ti pənū mū  
 he(A) 3-Nom he(P) shoot-Sing Active  
 'He shot him'  
 b. tā wū mē pin mū  
 he 3-Nom Distr they shoot-Pl active  
 'He shot them'  
 10 a. tā wū tē mū  
 he 3-Nom go-Sg Active  
 'He went'  
 b. ɔŋ wū mū mū  
 they 3-Nom go-Pl Active  
 'They went'

When the agent is plural and the patient is singular the verb is singular rather than plural:

11. wū ti pənū mū  
 they 3-Nom he shoot-Sing Active  
 'They shot him' (Urban in press.)

The correlation holds for most of the Caucasian, Chukotko-Kamchatkan, and Australian languages. It is also true for all languages for which Correlation 1 was true, because in those the plurality of action also encodes plurality of patient: therefore those languages meet the necessary condition of the Correlation 2. All languages that I have examined that mark the number of patient in the verb comply with Correlation 2. Nevertheless, I cannot theoretically exclude the possibility of the existence of languages in which a transitive verb will encode the number of the patient and yet have a system of number encoding exclusively nominative, i.e., one in which the number of patient is encoded by one device, and the number of agent and subject of intransitive by another device. Hence, despite the existence of considerable evidence, I propose it as a hypothesis only. This hypothesis, although based on the semantic feature number, deals essentially with the ergative phenomena. Nothing that follows

depends crucially on this hypothesis.

### 3.0 RELATIONSHIP BETWEEN VERBAL AND NOMINAL PLURAL

#### 3.1 Correlation 3

There appears to be another correlation that has not been observed previously:

If a language encodes the number of patient and of some other argument, including the number of action, then the number encoding in the nominal system will be constrained in a manner different from when the number encoding in the verb does not include the patient. In particular, the number encoding in the nominal system will be constrained to certain syntactic relations or semantic classes of nouns. Languages with number encoding in the ergative pattern constitute a subclass that will be covered by the above hypothesis.

I will offer an explanation of this phenomenon after presenting the evidence for it.

#### 3.2 Evidence

##### Pero

There are no morphological devices to mark plural in the nominal system. There are only a few nouns, predictably [+human] for which the number is indicated by suppletion.

##### Shokleng (Brazil)

It appears that there is no nominal encoding of number in this language nor in the closely related Kaingáng (Wiesemann 1972).

##### Australian languages

Number specification is optional in most Australian languages... (Dixon 1980:75). In Dyirbal the plurality of nouns may be optionally indicated by reduplication. The verbal system encodes the person and number of arguments, and moreover this encoding has ergative characteristics.

##### Penutian

With respect to number distinction in Takelma nouns, Sapir 1922:247 writes: 'As a rule it is not considered necessary in Takelma to specify the singularity or plurality of an object, the context generally serving to remove the resulting ambiguity'. The verb in this language marks plurality through reduplication. Sapir 1922:127 states: 'The frequentative idea may have reference in the repetition of the act itself or to the plurality of the transitive object or intransitive subject affected'. He gives following examples: wog 'arrive' wogowa 'many arrived'; lebe 'pick up and eat (seeds)' le<sup>e</sup>p<sup>e</sup>lap<sup>e</sup> 'pick and eat many seeds'.  
Yuma

It appears that there is no number marking in the nominal system. Halpern 1946:264 states: 'The noun theme generally may have either a singular or a plural significance: maxwá 'badger' or 'badgers'. The verbal system has a well-developed number marking system. There are two fundamental types of plural: Plural of intransitive verbs which indicates collective plural subject, and 'distributive object form indicating primarily action

performed on a number of different objects' (Halpern 1946:276). In addition, Halpern states that the verbs of transitive meaning are normally conjugated for both these plurals. The examples he gives have an indication of either the plural subject of an intransitive or the plural object of a transitive, e.g.: taspér 'to tighten' > taspí.r 'to tighten many'; ayér 'to fly' > ayá.r 'to fly (collective)'.

Basque

In Basque only nouns that are definite may have the plural marker. In Basque and in Summerian the adjective is marked for number. When a noun occurs in construction with adjectives it is not marked for number, e.g.:

12 a. soldado eta aintzindari erneak

soldier and officer brave-Pl

'brave soldiers and officers' (Basque, Lafitte 1944:121)

b. digir-gal-gal-ene 'All great gods'

god great -Pl-Pl (Summerian, Diakonoff 1967:58-60)

In Chukotko-Kamchatkan languages nouns are divided into two classes, human and nonhuman. In the human class, nouns are marked for number in all cases, but in the nonhuman class the nouns are marked for plural only in the absolutive.

#### 4.0 WHERE DO THE NOMINAL NUMBER MARKERS COME FROM?

Although it has been shown that in many languages there is no number marking in the nominal system, nevertheless some languages discussed here have such markers, and they may be considered counterevidence to the hypothesis about the correlation between plural marking in the verb and nominal number marking. In the present section I propose to examine these nominal markers with the purpose of assessing their implication for the hypothesis.

##### 4.1 Chadic

In Frajzyngier 1977 it has been shown that two of the most frequent number markers in nouns, reduplication and affixation of a, have been borrowed from the verbal system. Another type of marking plural consists of adding the morpheme identical with 3 p. pl. pronoun.

##### 4.2 Chukotko-Kamchatkan

In virtually all languages of this group the nominal plural marker is related to the 3 p.pl. object marker (see the Chart for details).

##### 4.3 Ket

In Ket the nominal plural marker is identical with the plural marker of 3 p. intransitive subject and transitive object. In Eskimo the number markers on verbs and nouns are identical.

#### 4.4 Lakhotá

There is no nominal plural in this language, except in the vocative. The plural is then formed with the suffix -pi. This marker, with a different stress, also indicates plural subject or object of the animate nouns (Davis 1964, p. 27).

#### 4.5 Australian

The occasional number marking in nouns through reduplication is related to reduplication in the verbal system where it indicates that an activity is done many times, or a reciprocal action (Dixon 1980:433).

#### 4.6 Caucasian

Most Caucasian languages have several ways to mark nominal plural.

For the Abkhaz-Adyghe family, Kumaxov 1969 states that it is not possible to reconstruct the nominal plural marker for the proto-language of the family. In at least one language of the family, Adyghe, the nominal plural marker -xe- is related to the 3 p.pl. marker on intransitive verbs -x, e.g., maklo 'he goes' maklox 'they go' (Kumaxov 1967:157). In at least one language from each of the remaining two families of Caucasian languages, the nominal plural markers are identical either with the pronominal plural markers or with the verbal plural markers. Compare the following examples from Xinalug (Desheriev 1967:671), which marks the nominal plural by suffixes -r, -n and -d:

- 13 a. kin-d-mae 'he ate'
- b. kin-dur-mae 'they ate'
- 14 a. cakku-d-mae 'he will carry him up'
- b. cakku-d-r-mae 'he will carry them up'

In Avar the plural marker for all classes is -r or -l. The latter is also the marker of plurality in pronouns, e.g., g'eb 'that' g'el 'those' (Madiéva 1967).

#### 5.0 EXPLANATION

In this section I propose a functional explanation for Correlation 3.

In a number of works Klimov (see Klimov 1977) observed that many languages have a poorly developed nominal marking of plurality. He attributed this property to active typology, without explaining, however, how this typology had been responsible for such and no other number marking. He considered presence of suppletive plural verbs in some languages to be a compensatory device to mark plurality in view of the paucity of nominal plural marking. I could not find anything in the descriptions of active typology that could be considered a cause of the lack of number marking in the nominal system. Moreover, the lack of number marking in the nominal system is characteristic of languages with no active typology features, e.g., Chadic. Since it has been shown in the present paper that the lack of number marking in the nominal system is linked with the presence

of extensive number marking in the verbal system, the two must be examined as to whether or not they are in a cause-effect relationship.

The first hypothesis one may consider is that the lack of number marking in the nominal systems triggers number encoding in the verbal system. Such a hypothesis, although theoretically plausible, must be rejected in view of the presence of languages, such as Chinese, in which there is no number encoding in either the verb or the noun. Moreover, such a hypothesis will have no way of explaining why in some languages with number encoding in the noun there is still number encoding in the verb, as in many I.E. languages.

The second hypothesis: Since there is systematic and extensive number encoding in the verb, the communicative need to encode number in the nominal system is greatly diminished. In a normal speech situation nouns very seldom occur alone. In most cases they are parts of larger constructions that often involve verbal or adjectival predicates or modifiers. In languages where number is either exclusively or predominantly encoded in verbs and adjectives, the only nouns whose number will not be specified in a sentence will represent the argument not encoded in the predicate or modifier. It is for this argument that one would expect the nominal encoding of number to emerge first. The ergative encoding of number now becomes important because in it both the number of the subject of an intransitive verb and the object of a transitive verb are marked. What remains unmarked in these languages is only the agent of the transitive. Kumaxov 1969:58 postulates that in the Abkhaz-Adyghe family, number distinction emerged first in the ergative case (the only case marked for number in contemporary Ubyx), and later it spread to other cases. In Lakhota the noun is marked for number only in the vocative, i.e., when it occurs without other constituents that might have encoded the number distinction.

In view of what has been said, the situation in Chukotko-Kamchatkan languages becomes interesting because in the nonhuman nouns it is the absolutive rather than the instrumental serving as ergative that is encoded for number. The explanation for this may lie in the fact that in these languages verbs with two arguments can occur in either an ergative or a nominative construction. In the latter there would be no way to determine the number of arguments.

## 6.0 WHERE DO THE AGREEMENT SYSTEMS COME FROM?

Agreement is usually understood as a phenomenon in which some feature of one constituent in a sentence triggers the presence of a feature in another constituent (cf. Moravcsik 1978, Plank 1984).

Tacitly, agreement is treated as adding redundancy to the grammatical system of language, whereby the information available from some other element of grammar is reinforced.

The data presented in the present paper indicate a possibility of a radically different approach to the phenomenon of agreement. Number encoding in the verb may be seen as an independent indication of this semantic category. Subsequent number encoding in the noun is also independent indication of the same semantic category. Synchronic evidence for this interpretation is provided by languages in which, even when both types of encoding are available, only one is used. Thus in Bachama (Chadic, Biu-Mandara) there is number distinction in verbs 'often correlating in intransitive clauses with a singular or plural subject, and in transitive clauses with a singular or plural object. Sometimes, however, the singular or plural forms of the verb is at variance with the number of the subject or object, and appears to be independent of such concords, and to relate directly to semantic factors in the situation' (Carnochan 1970:101). Similarly, in Old Georgian the verb agreed in number with agent when it was marked with the suffix -n but not when it was marked with the suffix -eb (Chikobava 1967:57). In many languages the noun, when modified by a numeral is not marked for number. What on the surface appears to be an agreement phenomenon may in fact represent cooccurrence of two constituents that encode independently the same semantic category. In time, such cooccurrences, if frequent, may be reinterpreted as a true agreement phenomenon, in which a feature of one constituent triggers the presence of a feature in another constituent.



## CORRELATIONS OF NUMBER FEATURES

Language	Nominal pl.		Verbal pl.			Adj pl.
	Ergat	Absol	Ag	Pat	Subj	
Basque	-k	-k		+	+	-k
Ubyx	+	-		?	+	
Avar	-r	-r	-r(Frequentative form)			
Tabasaran	-ar					-ar
Itelmen		-?n			-?n	
Kerek		-fkku			-nakku	
Alutor		-w			-wwu	
Koriak		-v'			-v'	
Chukchee		-t			-t	
Eskimo		-t			-t	
Biloxi	-	-			+	
Dakota		-pi (Voc. only)			-pi (Anim).	
Siuslaw	-	-			+	
Coos	-	-	R	+	+	(R)
(Kinship terms are marked.)						
Takelma	-	-			+	+(R)
Khoasati			R	+	+	(R)
Yuman	-	-			+	+
Mayan (Generally the same markers can mark the plural of either noun or verb.)						
Dyirbal Red.		Pl. of action	Red.	+	+	
Kaingǎng	-	-			+	+
Shokleng	-	-			+	+

## FOOTNOTES

1. The work on this paper was supported by the Center for Applied Humanities, University of Colorado. I would like to thank Robin

Quizar and David Rood for information on Mayan and Lakhota.

2. Chafe states: 'As is often the case with the semantic units of a noun, dual and plural in these sentences have been postsemantically transferred from the noun to the verb' (Chafe 1970:31). It appears that this explanation was motivated by the traditional assumptions about the locus of the category number.

3. This discussion of Polish was stimulated by an exchange many years ago with Francesco Antinucci.

#### REFERENCES

- Bokarev, E. A. and K. V. Lomtadidze, ed. 1967. Iberijsko-Kavkazskije jazyki. Moskva: Nauka.
- Carnochan, Jack. 1970. 'Categories of the verbal piece in Bachama'. African Language Studies, 11:81-112.
- Chafe, Wallace L. 1970. A semantically based sketch of Onondoga. IJAL Memoir 25.
- Chikobava, A. S. 1967. 'Gruzinskij jazyk'. in Bokarev and Lomtadidze 22-61.
- Desheriev, Y. D. 1967. 'Xinalugskij jazyk'. in Bokarev and Lomtadidze 659-675.
- Diakonoff, I. M. 1967. Jazyki drevnej perednej Azji. Moscow: Nauka.
- Dixon, Robert Malcolm Ward. 1980. The languages of Australia. Cambridge: Cambridge University Press.
- Frajzyngier, Zygmunt. 1977. 'The plural in Chadic'. Papers in Chadic Linguistics, Paul Newman and Roxana Ma Newman ed. 37-56. Leiden: Afrika-Studiecentrum.
- Frajzyngier, Zygmunt. 1984a. 'Ergative and nominative-accusative features in Mandara'. Journal of African Languages and Linguistics, 6, 35-45.
- Frajzyngier, Zygmunt. 1984b. 'On the Proto-Chadic Syntactic pattern'. Current progress in Afro-Asiatic linguistics. James Bynon, ed. 139-160. Amsterdam: Benjamins.
- Frajzyngier, Zygmunt. in press. A Grammar of Pero. Los Angeles: Undena Press.
- Halpern, A. M. 1946. 'Yuma'. Linguistic structures of native America, Cornelius Osgood, ed. 249-288. New York: Viking Fund Publications in Anthropology.
- Hopper Paul J. and Sandra A. Thompson. 1984. 'The discourse basis for lexical categories in universal grammar'. Language 60, 4, 703-752.
- Klimov, G. A. 1977. Tipologia jazykov aktivnogo stroja. Moscow: Nauka.
- Kumaxov, M. A. 1967. 'Adygejskij jazyk'. in Bokarev and Lomtadidze 145-164.
- Kumaxov, M. A. 1969. 'K istorii kategorii cisla v abkhazo-adygskix jazykax'. Materialy pervoy sessii po sravnitel'no-istoriceskomu izuceniju iberijsko-kavkazskix jazykov. G. B. Murkelinski, ed. 52-58. Maxackala: Institut istorii, jazyka i literatury, Dagestanskij filijal AN SSSR.
- Lafitte, Pierre. 1944. Grammaire basque. Bayonne: Editions des Amis du Musée Basque.

- Madieva, G. I. 1967. 'Avarskij jazyk'. in Bokarev and Lomtadidze 255-271.
- Magometov, A. A. 1965. Tabasaranskij jazyk. Tbilisi: Metsniereba.
- Moravcsik, Edith. 1978. 'Agreement'. in Universals of Human Language. Joseph Greenberg, ed. 331-374. Stanford: Stanford Univ. Press.
- Plank, Frans. 1984. 'Romance disagreements: phonology interfering with syntax'. Journal of Linguistics, 20, 329-349.
- Sapir, Edward. 1922. 'The Takelma language or southwestern Oregon'. Handbook of American Indian Languages, Franz Boas, ed. Part 2, 1-296.
- Stewart, Stephen. 1980. Grammática Kekchi. Edita: Guatemala.
- Urban, Greg. in press. 'Ergativity and accusativity in Shokleng (Gê). IJAL.
- Wiesemann, Ursula. 1972. Die phonologische und grammatische Struktur der Kaingáng-Sprache. The Hague: Mouton.

## SYNTACTIC CONSTRAINTS ON NOUN INCORPORATION IN SOUTHERN TIWA

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**0. Introduction** The existence of complex verb stems which include a noun stem is often referred to as 'noun incorporation'. Although this phenomenon is commonly spoken of as if it were a process, there is of course no reason why it must be so treated in a grammar. This paper looks at the status, within a non-constructional theory (Relational Grammar), of constraints on noun incorporation in Southern Tiwa (ST).

To describe noun incorporation as other than a process which moves a noun from a syntactic position outside of the verb to a position within the verb, constraints on this phenomenon must be of at least two types. First, there must be rules which allow noun stems to be constituents of verbs, limit this occurrence to a subclass of verbs if such a limitation is required by the language in question, state the relative order of the verb and noun stems, and determine that the appropriate allomorphs of the constituent stems are utilized. Second, the strong constraints on which syntactic or argument positions are correlated with the incorporated noun must be stated.

After brief coverage of ST verb morphology in §1, this paper focuses primarily on the aforementioned constraints on syntactic correlations. It will be demonstrated that it is to both initial and final grammatical relations, and not to argument structures or thematic/semantic roles, that these constraints on the distribution of noun-incorporated verbs must make reference.<sup>1</sup>

**1. Verb Morphology** Looking first at the morphological structure of the verb, the minimum requirements of the verb as a word are an agreement prefix, a verb stem, and a tense suffix (in that order), as exemplified in (1) and (2):<sup>2</sup>

- (1) Musa-n i-k'euwe-m.  
cat-pl B-old-pres  
'The cats are old.'  
(2) Yedi seuan-in bi-mū-ban.  
those man-pl 1s:B-see-past  
'I saw those men.'

Any additional complexity of the verb may, and evidently should, be ascribed to potential for expansion of the verb stem. (3) illustrates a verb stem made up of a transitive stem plus the passive morpheme. The complex stem in (4) includes a causative root, while those in (5) and (6)<sup>3</sup> include another verb root; the complex verb stem of (7) has an incorporated noun stem (cf. (2)):

(8) Seuan-ide-ba te-t'arata-'abe-ban.  
man-sg-instr 1s-work-cause:pass-past  
'The man made me work.'  
(lit: 'I was made to work by the man.')

(9) 'U-mnin i-p'akhu-kha-the-ban.  
child-pl B-bread-bake-want-past  
'The children wanted to bake (the) bread.'

(10) Wisi seuan-ide-ba te-p'akhu-kha-'abe-ban.  
two man-sg-instr 1s-bread-bake-cause:pass-past  
'The man made me bake (the) two (loaves of) bread.'  
(lit: 'I was made by the man to...')

(11) Bi-seuan-'u'u-miki-'am-ban.  
1s:B-man-baby-feed-cause-past  
'I made the men feed the baby.'

Bi-seuan-'u'u-miki-'am-ban.  
'1s: B-man-baby-feed-cause-past'

I have included labels for the morphological relations I think are necessary in ST verbs. And though the particular labels are tentative,<sup>4</sup> we will see later that there are morpho-syntactic<sup>5</sup> rules which make reference to the relations of verb constituents.

In summary, verb morphology may be described by the following rules; note that they refer to relations, not nodes. (Each non-terminal node involved would be a V node.)

$$(12) \quad P = \text{AGR} + H + T$$

$$(13) \quad H = (\{U, \text{INC}\}) H$$

$$(14) \quad U = (\text{INC}) H$$

Virtually all verb stems of ST may combine with noun stems to give complex stems. In all cases, the noun stem precedes the verb stem. When incorporated, nouns lack number suffixes. And of course only a relatively small subset of verbs are subcategorized to be the Head in a union construction. Only verbs head U arcs.<sup>6</sup>

**2. Syntactic Correlations of Incorporation** In this section I explicate what I meant above by correlation of incorporated noun stems and syntactic functions. Consider first examples (15)-(17):

(15) *Seuan-ide i-musa-tuwi-ban (yedi).*  
       man-sg     A:B-cat-buy-past   those  
       'The man bought (those) cats.'

(16) *U-k'uru-k'euwe-m (wisi).*  
       C-dipper-old-pres     two  
       'The (two) dippers are old.'

(17) *Bi-'u-wia-ban hliawra-de-'ay.*  
       1s:B-child-give-past   lady-sg-to  
       'I gave the children to the lady.'

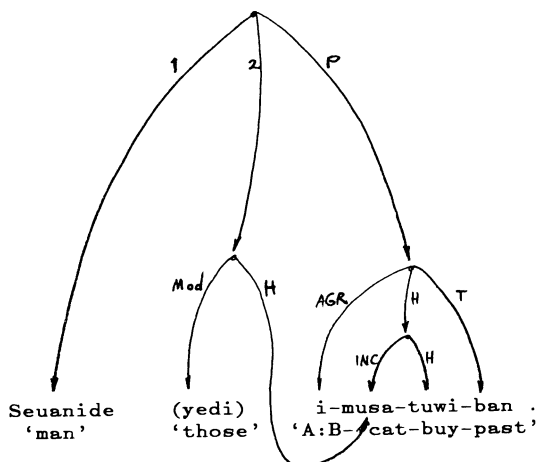
These examples illustrate that the incorporated noun always corresponds to the Head of a noun phrase bearing a grammatical relation to the verb. In (15) *musa* 'cat' corresponds to the Head of the 2, while in (16) *k'uru* 'dipper' corresponds to the Head of the (final) 1. If the noun phrase has no constituents, such as a numeral or demonstrative, other than its Head, then there will be no surface (ie overt) noun phrase if the Head is incorporated.<sup>7</sup>

Consider the relational network for (15) given as (15') [next page]; note that the noun stem *musa* bears the relation of Head of the noun phrase as 2 as well as bearing a relation within the verb stem.

Given that morphology takes precedence over syntax in determining the linear positioning of morphemes, as proposed by Sadock (ms), the noun which bears competing relations occurs within the verb; consequently, only if the noun phrase with the incorporated Head noun has some other constituent will there be a surface nominal. The nominal still counts as a final 2, however;<sup>8</sup> this latter fact accounts for the agreement of the verb prefix with the nominal, for verb prefixes of ST always agree with their final 1s and final 2s.

Relational constraints on the correlation of incorporated noun to Head of a nominal bearing a grammatical relation are repeated here from Allen, Gardiner and Frantz (1984).

(15')



- (i) Only nouns as Head of initial 1s and 2s may be incorporated.
- (ii) Heads of inanimate gender absolutes must be incorporated.
- (iii) Heads of animate gender final 1s are never incorporated.
- (iv) Heads of absolutive chomeurs must be incorporated.
- (v) Heads of 2s in a clause with an advanceable 3 must be incorporated.

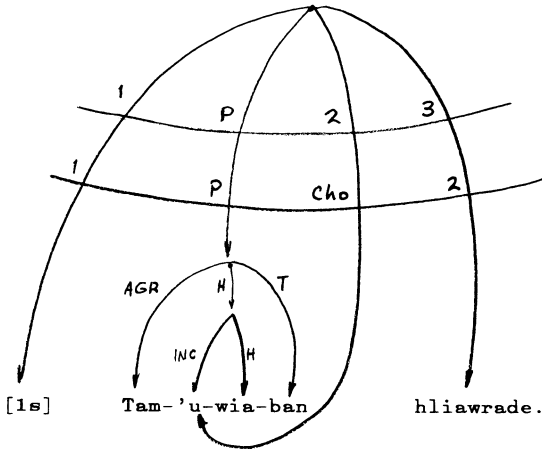
**3. Necessity For Syntactic Levels** Constraints (ii), (iii), and possibly (v), could be stated in monostratal theories, but (i) and (iv) are clearly multilevel rules. I will repeat some of the evidence for (i) and (iv) in this section, and consider the difficulties these facts offer to some other approaches in §6.

Consider (18) - (20):<sup>9</sup>

- (18) Tam-'u-wia-ban hliawra-de.  
1s:A\B-child-give-past lady-sg  
'I gave the lady the children.'
- (19) \* Tam-wia-ban hliawrade 'umnin.  
1s:3s\3p-give-past lady children
- (20) \* Tam-hliawra-('u-)wia-ban.  
1s:A\B-lady-(child-)give-past  
('I gave them(children) to the lady.')

As demonstrated in Allen and Frantz (1978), (18) differs from (17) in that (18) has one more level of relations such that it exhibits the phenomenon called 3 to 2 advancement in RG, as shown in (18'): That is, the initial 3 of (18) is the final 2; consequently the initial 2 is a final chomeur and, by (iv), must be incorporated, as can be seen in (19). And even though *hliawrade* 'lady' in (18) has all other final 2 properties (see Allen and Frantz, 1978), it may not be incorporated, as shown in (20). The incorporation is disallowed even when the initial 2 lacks a noun to be incorporated, i.e. when it is a

(18')



pronoun, as the parentheses in (20) are intended to show.

Constraint (iv) also comes into play in examples involving advancement of a destinal Goal to 1 (Allen, 1978). The Goal of (21) corresponds to the final 1 in (22). (23) is bad because it violates (iv).

- (21) Seuanide  $\phi$ -wan-ban 'i-'ay.  
 man A-man-come-past 2s-to  
 'The man came to you.'  
 (22) Ka-seuan-wan-ban.  
 2s\A-man-come-past  
 'The man came to you.'  
 (23) \* Seuanide ka-wan-ban.  
 man 2s\A-come past

Similarly, the chomeur of possessor ascension constructions must be incorporated, as shown in (24) and (25).

- (24) In-musa-teurawe-we.  
 1s\A-cat-run-pres  
 'My cat is running'  
 (25) \* Musade in-teurawe-we.  
 cat 1s\A-run-pres

**4. Inadequacy of Semantic/Thematic Role Constraints** In this section I consider whether the facts accounted for by (i) might be captured in monostratal theories by reference to semantic or thematic roles. Granted, the incorporee in most cases can be characterized as a patient or theme, though not without the usual difficulties which attend all such characterizations; e.g. is 'man' in (22) an agent or a theme? But even granting the theme role to the incorporee of such examples, the possessor ascension cases such as (24) demonstrate the failure of such role characterizations, for the incorporated noun in that example is surely an agent. Another case where an agent may be incorporated is provided by passives. Compare (26)-(28):



If we attempt to apply this model to ST, we find that it makes entirely the wrong predictions about noun-incorporated verbs. First of all, the incorporated noun is never understood as an oblique argument.<sup>10</sup> Second, a subset of internal arguments may be incorporated (2s but not 3s; see (20)). And third, 'external' arguments often are incorporated; see (16), (22), and (24).<sup>11</sup>

Furthermore, incorporation never satisfies the syntactic argument structure of verbs, as evidenced by verb agreement and presence of the remainder of complex noun phrases ((15) and (16)).<sup>12</sup>

In a very interesting and provocative discussion, Jerry Sadock (ms.) interprets morphology:syntax discrepancies such as ST incorporation as evidence for the need for departure from the strict submodularity of standard views of morphology, and proposes an "autolexical" theory of syntax which gives morphology an independence from syntax that is clearly not present in most other current models. Syntactic rules are distinct from rules of word structure, and consequently a given string may be given a particular bracketing by the syntactic rules and a different bracketing by the morphological rules. For those of us who have had extensive experience with a polysynthetic language, this has a ring of truth, for this is essentially how we have been forced by the languages to view our analyses. Sadock goes beyond this by beginning to consider what kinds of constraints can be placed on the mapping between the two representations.

Because a noun may be the head of a NP in the syntax but a subconstituent of a complex verb in the morphology, Sadock is proposing what I have described above in RG as multiattachment, except that in the RG account no separate dimension is posited for morphology, since the same apparatus and the same types of constraints on well-formedness of networks account for both morphological and syntactic relations. Thus I view Sadock's conclusion of the need for an autolexical approach as a direct consequence of his choosing a model (GPSG) which does not sanction multiattachment.

## Notes

<sup>1</sup>All of the data and most of the analysis presented here are the work of Barbara Jane Allen and Donna Gardiner, both of the Summer Institute of Linguistics. See Allen, Gardiner, and Frantz (1984) for a more complete coverage of ST noun incorporation.

<sup>2</sup>The agreement prefix on the verb reflects features of the final 1, final 2, and if different from these, the initial absolutive. The features of these nominals are represented in the prefix gloss as follows: final 1:final 2\absolutive. In glosses only, 1, 2, and 3 abbreviate first, second, and third person, respectively. *s* and *p* abbreviate singular and plural. E.g., '1s:A' indicates first person singular final subject, with A as final direct object. A is one of three third person inflectional categories of Tanoan languages formed by reducing to three the six possible combinations of two numbers (singular and plural) and three gender classes (i, ii, iii), as follows: A = is or iis; B = ip or iis; C = iip or iiip. Gender class i may be characterized as the class of animate nouns, though it includes a few non-living objects such as *karude* 'car' and *barkun* 'boat'. The other two gender classes consist of inanimate nouns. (In two cases the agreement is prefix is null: 'A' as final 1 of an intransitive verb, and 'A:A' as final 1:final 2 on a transitive verb.)

<sup>3</sup>The apparently empty prefix *na-*, glossed 'q' and seen in (6), is required on any verb stem of which certain roots are Head.

<sup>4</sup>AGR=agreement, H=head, T=tense, U=union, INC=incorpoatee. I distinguish **Head** of, a relation to a node, from **head** of, a relation to an arc.

<sup>5</sup>I use the term 'morpho-syntactic', not to refer to the syntax of words, but to rules which make reference to both morphological and syntactic relations.

<sup>6</sup>Since there is good reason to treat the passive suffix as the Head of passive verbs. I am tentatively assigning the union relation to the verb to which it is attached; this presupposes that the passive morpheme Heads the P of a syntactic union construction of the type that has been called Equi-subject union (Frantz, 1976). Alternatively, (14) must be revised to allow a third possibility within the brackets, say 'DR' for root of a derived stem.

<sup>7</sup>It may seem that I am beginning to speak about deriving noun-incorporation examples from corresponding clauses without noun incorporation. But as will be clarified in §5, the constraints on incorporation to be listed below are well-formedness constraints on networks.

<sup>8</sup>ST differs in this regard from most other languages for which noun incorporation has been reported. See Mardirussian (1975) and Mithun (1984).

<sup>9</sup>The morphological category of the initial absolutive is indicated to the right of a slash in the verb prefix gloss, as stated in note 2.

<sup>10</sup>Unless the passive chomeur is viewed as such, as it would have to be in mono-stratal theories. But note that it would be unique among obliques in this regard, for no others are incorporated, not even instrument, even though the latter, when unincorporated, is marked by the same flag as the passive chomeur:

(a) Te-hwiete-ban      keuap-ba.      'I was hit with a shoe.'  
1s-hit:pass-past   shoe-instr

(b)\* Te-keuap-hwiete-ban.      ('I was hit with a shoe.')

<sup>11</sup>Williams 1984.653, says that external arguments are excluded from compounding. Consequently, he would have to say that the 'comer' and 'runner' in (22) and (24), and the 'dipper' in (16), are not external arguments in these sentences. This certainly would require unusual argument structures in ST, including the requirement that inanimate gender nouns never be external arguments - see (ii).

<sup>12</sup>Herein may lie the grounds for distinguishing compounding from incorporation within Williams' model: incorporation, unlike compounding, does not satisfy argument structure and consequently is not subject to the constraints on argument satisfaction.

## References

- Allen, Barbara Jane. 1978. Goal advancement in Southern Tiwa. Work Papers, volume XXII, Summer Institute of Linguistics. Univ. No. Dakota.  
Allen, Barbara and D. Frantz. 1978. Verb agreement in Southern Tiwa. BLS 4.  
(Revised version 'Advancements and verb agreement ...' in Perlmutter (ed.))  
Allen, B., Donna Gardiner, and D. Frantz. 1984. Noun incorporation in Southern Tiwa. IJAL 50.3  
Frantz, D. 1976. Equi-subject union. BLS 2.  
Johnson, David and Paul Postal. 1980. Arc Pair Grammar. Princeton Univ. Press.  
Lieber, Rochelle. 1983. Argument linking and compounds in English. LI 14.2.  
Mardirussian, Galust. 1975. Noun-incorporation in universal grammar. Papers from the Eleventh Regional Meeting of the Chicago Linguistic Society.  
Mithun, Marianne. 1984. The evolution of noun incorporation. Language 60.4.  
Perlmutter, David (ed.). 1983. Studies in Relational Grammar 1. U. Chic. Press.  
Perlmutter, D. and Paul Postal. 1977. Toward a universal characterization of passivization. BLS 3. (Reprinted in Perlmutter (ed.))  
Sadock, J. ms. Autolexical syntax: a theory of noun incorporation and similar phenomena.  
Selkirk, Elisabeth. 1982. The syntax of words. MIT Press.  
Williams, Edwin. 1981. On the notions "Lexically Related" and "Head of a Word". Linguistic Inquiry 12.2.  
Williams, E. 1984. Grammatical relations. Linguistic Inquiry 15.4.

THE DESCRIPTION OF INVERSIONS  
IN GENERALIZED PHRASE STRUCTURE GRAMMAR

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O. Classes of Inversions

As indicated in (1) and (2), there exist on the order of 20 to 40 types of inverted sentences in English.

1. INVERSIONS OVER "V"

- A. Loc. PP: At the table sat the Jackson Five.
- B. Dir. PP: Onto the rug scurried a little gray mouse.
- C. Loc. Adv: Here/Yonder had been the only building in Zweibruecken to escape Patton's rage.
- D. Dir. Adv: Here comes Lee.
- E. Abstract PP: To every VP rule with certain properties corresponds an S rule with related properties.
- F. Temporal: First would apply a fronting rule, perhaps Topicalization.
- G. Pres. Prt.: Crawling into the room came the messenger from Sparta.
- H. Past Prt. : Stacked in the corner were/stood bundles of magazines from the 1960s.
- I. AP: Increasingly vocal about the amount of mercury in the Bay are the residents of Marin County.
- J. Quotation "But..." stuttered/said/objected Kim.

2. INVERSIONS OVER FIRST AUXILIARY V

- K. Exclamations: (Boy) Do Kim and Leslie (ever) like historical linguistics!
- L. Conditionals: Had we been there, it wouldn't have been so easy for them.
- M. Neg. decl.: Can't nobody read that. [= 'Nobody can read that']
- N. Neg. Adv, Conj, PP: Never/Nor/Under no circumstances will this company accede to such absurd demands.
- O. Neg. NP: Not a bite did he eat.
- P. Neg. correl.: No sooner had they settled themselves than the phone began to ring again.
- Q. Pos. Adv: Often did the inhabitants of that village come to me to learn the ways of my people.
- R. Extent-  
-result: So carefully did the Indian detective plan his move (that Hoskins never suspected he was being led into a trap).
- S. Deictic 2R: Thus did the hen reward Beecher.
- T. SO 'too': So did Kim. So's your old man.

It is the aim of this paper to discuss the form that a successful analysis of these constructions might take, and some of its implications for the theory of generalized phrase structure grammar. I will show that the constructions within each class are different from each other in ways that prevent the formulation of a wholly general account, even within the two major classes, and

this conclusion probably holds across grammatical theories. The accounts I suggest within GPSG represent the similarities across constructions by taking advantage of independently necessary rules where possible. In some cases, however, they appear to require extension of the theoretical devices currently available within GPSG.

On syntactic grounds, there are two major classes of inversions, V-inversions, which have a NP representing the logical subject after the first non-auxiliary verb, and auxiliary inversions, which have the NP representing the logical subject appearing just after the first auxiliary verb. The examples in (1) exemplify the first class, while those in (2) exemplify the second class.

Subject-verb inversions like (3) have been described by Sag and Klein (1982) and Gazdar, Klein, Pullum and Sag (henceforth GKPS) (1982), as admitted by the topicalization-like rule in (4), which says that a sentence can consist of a PP and a VP of the sort that takes there as a subject, with a PP gap in it.

3. In the garden was a unicorn.

4. S --> P2, V1[INFORM there]/P2

The [INFORM there] on the V1 guarantees that the V1 is sanctioned by the rule in (5), which provides an "extra" NP which will be interpreted (Sag and Klein 1982) as the logical subject of the verb.<sup>1</sup>

5. V1[INFORM there] --> V, NP, X2[+PRD]

The subject-auxiliary inversion (SAI) found in yes-no questions like (6) has been described in Gazdar, Pullum, and Sag (1982), and in GKPS (1984) as being sanctioned by a metarule of the form (7a) or (7b), which in effect admits an inverted clause corresponding to every VP headed by a finite auxiliary.

6. Has Kathy locked the door?

7a. V1[AUX, FIN] --> H, V1[0] ==> S[INV,AUX,FIN] --> H, S[0]

7b. V1[AUX, FIN] --> W ==> S[INV, AUX, FIN] --> W, NP.

As the Feature Cooccurrence Restriction in (7c) will stipulate that inverted clauses must have finite auxiliaries, it will not be necessary to specify [AUX, FIN] in this and similar rules.

7c. INV ) [AUX, FIN]

The formulations in (7a) and (7b) are not quite equivalent; among other things, they impose different constituent structures, and thus, potentially, different constituent orders. I return to this in Sec. 2.2, to show that the necessity of analyzing most non-question inversions as involving unbounded dependencies excludes metarules like (7b) as candidates.

The (now implicit) specification [AUX, FIN] in the metarule guarantees that yes-no questions will begin with finite auxiliaries. The variable set of features [Ø] guarantees that only those VIs that are syntactically well-formed as sisters of a finite auxiliary can occur as the main V1 in an inverted S headed by that finite auxiliary. Allowing the S in (7a) to consist of [V S] allows the constituent after the V to be anything that could begin a S. Thus:

- 8a. Has Holly left?
- 8b. Would under the rug be the best place to hide the journal? (GPS 51a)
- 8c. Is easy to please how one would describe him? (GPS 51b)
- 8d. Does that she is here surprise you? (GPS 51c)
- 8e. Will whether she arrives determine whether we stay? (GPS 51d)

The feature [INV] serves to mark the sentence as inverted, and on the V, by the Head Feature Convention (HFC), distinguishes verb forms that occur in inverted questions from corresponding ones that don't, as GPS mention (1982:613-14).

## 1.0 Properties of V-inversions and Aux-inversions

As background for the analyses to be given below, I want to focus briefly on the properties that both families of inversions share, and on those that distinguish them from each other. Then I will sketch what a comprehensive description of V-inversions will have to account for. I will show that to a limited extent, this can be done by extending the account given by GKPS (1982), but a full account will require additional rules, and additional kinds of rules. After that, I will sketch a treatment of Aux-inversions which exploits the independently necessary SAI metarule, but in different ways for different constructions.

### 1.1 Grammatical relations

The grammatical relation borne by the post-verbal NP has been discussed by Green (1977) and Postal (1977). This NP unquestionably controls agreement in both V-inversions, and Aux-inversions, as shown in (9).

- 9a. Near the fountains was/\*were a unicorn.
- 9b. Near the fountain \*was/were two unicorns.
- 9c. Never \*have/has he laughed so much.
- 9d. Never have/\*has they laughed so much.

Whether the control of agreement entails that this NP is, or ever "was" a subject is relevant only to the extent that the grammatical theory requires reference to grammatical relations.

### 1.2 Alternative constructions

Most V-inversions which involve an initial non-subject, like those in (1), are more or less obligatorily triggered by the

initial non-subject. This is a complex matter, however, and is affected (differentially from construction to construction) by the definiteness and pronominality of the logical subject (10a,d-g) and the by the specificity of the verb (10b,k). To the extent that the unacceptability of the uninverted main verb types is due to pragmatic factors (Green ms.), it is unnecessary to exclude them on syntactic grounds; it is not clear that similar explanations are available for the absence of uninverted auxiliaries in examples like (11d-f). Inversion in conditionals is obligatory (11b), given the absence of the conditional marker if.

- 10a. In the garden \*a/the unicorn was. (Maybe: In the garden he was.)
- 10b. In the garden a unicorn ??stood/slept.
- 10c. Into the garden a unicorn ran.
- 10d. \*Into the game Jenkins is.
- 10e. \*Here a bust of Lenin is. (But: Here it is.)
- 10f. \*Here the bus comes. (But: Here it comes.)
- 10g. Off Sandy ran.
- 10h. \*At issue an important principle is.
- 10i. ??To every VP rule, an S rule corresponds.
- 10j. Leaning against the wall an old man \*was/slouched.
- 10k. Buried in Arlington National Cemetery a great leader \*is/??lies.
- 10l. \*Increasingly appalled at the amount of mercury in the Bay the residents of Palo Alto are.
- 10m. "Off with his head," the Queen muttered.
- 11a. You have a lot of nerve!
- 11b. \*We had been there, we would have spoken up.
- 11c. Nobody don't mess around with me.
- 11d. \*Never I had been so high.
- 11e. \*Not a bite Chris ate.
- 11f. \*No sooner we had left than our dilatory guest arrived.
- 11g. Often the inhabitants of that village came to us for advice.
- 11h. ??So aghast they were that they failed to notice that he was soaking wet.
- 11i. ??Into such a metaphorical corner they had backed themselves.
- 11j. In this way the children let slip their true feeling about their leader.
- 11k. \*So Sandy did.<sup>2</sup>

### 1.3 Selectional restrictions, subcategorization, and long-distance dependency

The verb inversions in (1) all involve restrictions on the verbs. At first this appears to be a (relatively) simple case of subcategorization, but certain systematic dependencies between the verb and the lexical head of the initial phrase suggest that this is semantic or pragmatic in nature, rather than (syntactically) arbitrary. For example, adverbs and prepositional phrases which

DENOTE or IMPLY a location require a verb which denotes (e.g. 12a), entails (e.g. 12b), or implies (e.g. 12c) being at a location.

12a. In the garden had been a bust of Lenin.

12b. On the beach lay/slept/??dreamed a malnourished vagrant.

12c. In the room paced/\*dashed three angry officers.

Likewise, adverbs and prepositional phrases which denote or imply a goal or direction of action require a verb which denotes motion from one point to another (e.g. 13).

13. Onto the rug scurried/\*stood a little gray mouse.

(For discussion of how the selectional restrictions governing these co-occurrences are best stated, see Green (1984b)).

The fact that the subject inverts past any auxiliary verbs, to the right of the main verb suggests (especially when auxiliaries are treated as a subclass of verb) that this is an unbounded dependency, and indeed this is the case.<sup>3</sup> All of the inversions in (1) occur in long distance dependencies of the sort illustrated in (14a,b). In general, these sound much better when the main verb is be than when it is a more descriptive word (14c), and the colloquiality of certain constructions (e.g. (1C)) clashes with the relative formality of many "Raising" predicates (14d).

14a. In the garden appeared to be a unicorn.

14b. To each VP rule continues to appear to correspond an S rule with exactly the same right-hand side, plus an extra NP.

14c. Leaning against the wall seemed to be/?slouch an old man in ragged and dirty clothes.

14d. ??Up/??Away seemed to float the giant, tomato-shaped balloon.

By way of contrast, the auxiliary inversions in no way select for particular classes of verbs; the choice of main verb is entirely free. In addition, but not surprisingly, there is no long-distance dependency involving the subject: the subject goes after exactly the first auxiliary verb, and it must be do if no other is provided. This is illustrated in (15).

15a. \*Thus would have been leaving two of the stickiest thorns in the side of the director.

15b. Under no circumstances do you seem to be eligible.

15c. \*Under no circumstances (do) seem to be you eligible.

15d. \*Under no circumstances (do) seem you to be eligible.

#### 1.4 Correlation with there-insertion

For the most part, V-inversions correspond to there-constructions, with or without an initial non-subject phrase. That is, for almost every inversion sentence of the form of (16a),



there is a there- sentence of the form of (16b) or (16c), or both, where C is in {A, P, V}.

- 16a. CP ... V NP W
- 16b. CP there ... V NP W
- 16c. There ... V NP CP W

For quotation inversion, where C is (if anything) N, there are no corresponding there- constructions. We do not find sentences like (17).

- 17a. \*There said Kim, "Yecch!"
- 17b. \*"Yecch," there said Kim.

I do not believe that there are any there- constructions corresponding to any of the auxiliary constructions, i.e. examples like (18).

- 18a. \*Never there had the fiddler been so happy.
- 18b. \*Never there had been the fiddler so happy.
- 18c. \*There had the fiddler in no place been so happy.
- 18d. \*There had been the fiddler in no place so happy.

## 2.0 Extending existent analyses

### 2.1 Extending the slash-category analysis to cover all V-inversions

As is perhaps clear by now, the V-inversions in (1) have almost nothing in common beyond the relative order of subject and first V, with the auxiliary inversions in (2). V-inversions are lexically governed (cf. Green 1984b), while auxiliary inversions are ungoverned. V-inversions involve a dependency between the trigger phrase and the governing verb, while auxiliary inversions have no such dependency. V-inversions are unbounded in that a potentially indefinitely long string may appear between the trigger phrase and the governing verb, which immediately precedes the subject, while in auxiliary-inversions, the subject NP immediately follows the first auxiliary verb, which immediately follows the triggering phrase (if any). In auxiliary inversions, any triggering phrase is not dependent on the auxiliary inverted over, and in some cases, may come from several clauses down, as in Not a bite did Kim imagine that Sandy would eat. Finally, some auxiliary-inversions occur in the absence of a triggering constituent, while productive V-inversions seem to always have a syntactically realized triggering phrase. (When syntactic triggers are present, they are initial constituents for both types.) As the inversions that (4) appears to have been intended to account for seem to be (a subset of) the V-inversions, I will discuss in this section what it would take to extend the analysis they sketch in such a way as to treat all of them in roughly the same fashion. In Sec. 2.2 I discuss how the various auxiliary-inversions might be treated.

### 2.1.1 Correlation with there- constructions

The analysis sketched in GKPS (1982) and Sag and Klein (1982) exploits the rule which generates VPs for there- subjects, cited above as (5), to guarantee the presence of an NP directly after the verb. This rule actually must be formulated as (19) to guarantee correct agreement (Green 1984a).

19. VP[there] --> H0[SUBCAT 12, NUM \$], NP[NUM\$], X2[+PRD]<sup>4</sup>

This rule sanctions such VPs as those in (20).

20a. be a man in the garden

20b. is a unicorn standing over there

20c. are some people taller than me

Now, improved as this formulation is, it still only generates inversions over be; it will not sanction such sentences as (21), despite the implication in GKPS (1982) that it will, for the simple reason that V[SUBCAT 12] is limited to be.

21. In the garden sat a unicorn.

If we just let the membership of V[SUBCAT 12] be a larger set, containing, e.g., sit, run, stand, lay, crawl, etc., then the rule in (19) will sanction the sentences that rule 5 was apparently intended for, and in addition, quite a few more, including (1B) and (1E). We would need to include so-called verbs of saying in this class to generate Quotation inversions like (1J), and generalize the rule in (4) to cover initial NPs<sup>5</sup> (if that is what quoted speech is, syntactically), but this is surely ill-advised. First of all, including these verbs in V[SUBCAT 12] incorrectly predicts the existence of sentences like (17a). Second, using syntactic means to ensure that the semantic object of the verb of saying is an NP which represents speech, to prevent sentences like (22a,b) or even (22c), requires the syntax to duplicate independently necessary semantic or pragmatic principles.

22a. \*There said Leslie a unicorn.

22b. \*Some unicorns says Leslie.

22c. \*Some questions asked Leslie.

Since quotation inversions are significantly different from other V-inversions in other ways (they allow no preverbal auxiliaries, for instance), I will assume that they are described by a different set of rules, perhaps something on the order of (23), where  $p^+$  is a regular expression over the set of discriminable phonetic segments, or something like that.

23a. VP --> H,  $p^+$

23b. S -->  $p^+$ , S/ $p^+$

This claims, contra Partee (1973), that the quoted material has no

part of speech, which may be correct, but it would seem to pose problems for LP rules and probably for the semantics to "mix levels" in this way. Possibly one could get around this by replacing  $p^+$  with NP and a feature [PHONETIC], though this seems ad hoc. This sort of treatment also poses problems for guaranteeing linear order, as we can get the forms in (24a-d), but not those in (24e-f).

24a. NP V  $p^+$

24b.  $p^+$  V NP

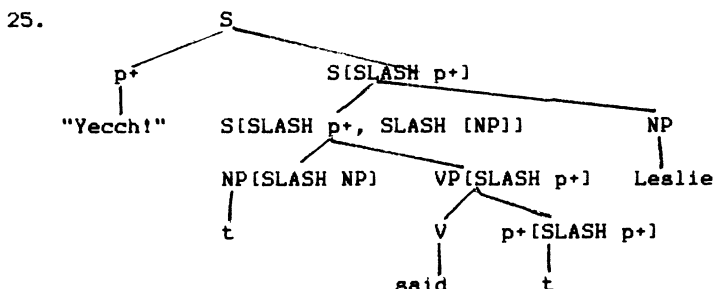
24c.  $p^+$  NP V

24d. V NP  $p^+$

24e. \*V  $p^+$  NP

24f. \*NP  $p^+$  V

Even with the rules in (23) and an LP rule requiring NPs to precede "phonetic material", we will still fail to get (24b), because of the English LP rule that says that lexical items precede phrasal sisters. Indeed, the only analysis I can imagine that is consistent with these rules is the one sketched in (25), and it contains two dubious novelties: rightward topicalization,<sup>6</sup> and doubly-slashed categories. While there are reasons to suppose that multiply-slashed categories need to be available as a theoretical option (Maling and Zaenen 1982), there are problems with the sort of rightward dependency rule one would need to generate a tree like (25).



Among them are the fact that it requires postposing subjects, though subjects ordinarily cannot postpose. It will not do to say that NPs follow slashed sisters, because this is not generally true--just the opposite is true of ordinary topicalization. In addition, it would predict such sentences as What did you [promise [that you would bring back t from the library] Bill]? I will not attempt to resolve these issues here, and suppose merely that some satisfactory treatment of this common but entirely literary construction can be found.

In fact, we can generate even more of the V-inversions if we can revise the inversion rule in (4) a bit more, to something like (26), generalizing from PP-initial sentences to V2-initial and

AP-initial as well.

26. S --> X2[+PRD], VP[there]/X2<sup>7</sup>

The category V2[+PRD] will have to be restricted to a participial form, or sentences like (27) will be sanctioned as well.

27. \*Stack in the corner lay 12 issues of Playboy.

When V[SUBCAT 12] was just (be), this was not too much of a problem, because rules already stipulated (Gazdar, Pullum, and Sag 1982:608) that when be was generated as head of a VP consisting of H and VP, the VP daughter was [PRP] or [PAS]. However, that still wouldn't get even the participial inversions with be correctly, because a VP[PAS] will optionally have an agent phrase, and these inversions are unacceptable with agent phrases, as in (28).

28a. \*Stacked in the corner by Sandy were 12 issues of Playboy.

28b. \*Hidden amongst the ferns by some means was Garfield.

A possible solution to both problems is to say that the participial phrases in (1G,H) are not merely VP, but also AP, but it is not clear what would motivate a rule like (29).

29. AP --> VP[@] where @ ( [[PRP], [PSP]] )

In any case, it is reasonable to ask at this juncture if there are any untoward consequences to tying inversion to there-constructions as this analysis does. It has been suggested (Postal (1977), Hankamer (1977)) that there is a one-to-one correspondence between inversion and there-insertion, and many accounts seem to assume that this is the case. In fact, however, the full paradigm of there-initial sentences, there-second sentences, and there-less inversions, as described above, has a number of gaps. The there-second constructions like (16b) and (30) would be sanctioned by the topicalization rule schema in (31) instantiated on a S with a there subject, and should occur for every there-initial sort of sentence, as should the inversions sanctioned by rules in (19) and (26).

30. Into the garden there (may have) galloped a silver unicorn.

31. S --> CP, S/CP (Topicalization rule schema)

The worst problem for the there/ Inversion connection is cases like (32a). These have no there counterparts whatever.

32a. Into the game now is the fullback Jenkins.

32b. \*There is the fullback Jenkins/a halfback I don't recognize into the game.

32c. \*There is into the game the fullback Jenkins.

- 32d. \*Into the game there is the fullback Jenkins.  
 32e. \*Into the game is there the fullback Jenkins.

If (26) can be generalized to include initial adverbs as well as PPs, the problem arises again: the directional adverb inversions have a paradigm similar to (32): none of the there construction sounds at all acceptable.

- 33a. Here comes the bus.  
 33b. \*There comes the bus here.  
 33c. \*There comes here the bus (to Santa Monica Beach).  
 33d. \*Here there comes the bus (to Santa Monica Beach).  
 34a. Up went the balloon.  
 34b. \*There went the balloon up.  
 34c. \*There went up the balloon (that we spent all our money on).  
 34d. \*Up there went the balloon (that we spent all our money on).

Since trying to use a there-VP rule to generate these inversions would predict such ungrammatical sentences as (33b-d, 34b-d), one might try to account for the constructions in (32a, 33a, 34a) with an independent S-level rule like (35) (since with a lexical S-rule one could never get the PP to precede the verb--besides the "verb" is really an intransitive VP with all of its auxiliaries and non-preposed complements, as indicated in (1C, 1F, 30)). Not only would this grossly overgenerate, yielding such lovelies as (36), it would provide no way of ensuring that the VP consist of V, NP, and an optional predicative phrase; one would also get sentences like (37).

35. S --> XP[+PRD], VP  
 36a. \*Proud of her father ran Kim.  
 36b. \*Up kicked Sandy into the pool.  
 37a. \*Into the garden arrived.  
 37b. \*Here ran into the room.

In other words, it would exponentially compound the subcategorization problem (not discussed here, cf. Green (1984b)) that arises when (5) is generalized to include verbs other than be.

Other directional constructions, like (38a), with different main verbs occur with there second (38d), but not with there initial, unless the PP adjunct precedes the NP (38b,c).

- 38a. Into the garden ran Kim/the cat/an orange cat.  
 38b. \*There ran Kim/the cat/an orange cat into the garden.  
 38c. There ran into the garden \*Kim/\*the cat/??the orange cat/an orange cat.  
 38d. Into the garden there ran \*Kim/\*the cat/??the orange cat/an orange cat.

If it is some correlate of the heavy NP shift phenomenon that accounts for this distribution, indefiniteness counts as very heavy. Since in better-established cases of that phenomenon, indefiniteness is not particularly important (38e), it seems unlikely that the distribution in (38) involves the "Heavy NP Shift" phenomenon.

38e. They attributed to arson ?\*a fire/?\*the fire/a fire which destroyed 20,000 acres of timber yesterday/the fire which destroyed 20,000 acres of timber yesterday.

There are even fewer there counterparts to AP inversions like (39a):

39a. Extremely angry about the increase are the/some residents of Marin County.

39b. There are ?some/\*the residents extremely angry about the increase.

39c. \*There are extremely angry about the increase some/the residents of Marin County.

39d. \*Extremely angry about the increase there are some/the residents of Marin County.

The participle inversions with main verbs other than be are like the inversions in (38) in sounding better with the NP in final position, as if it were "heavy", but again, indefiniteness seems to count more than length in constituting "heaviness".

40a. Leaning against the wall stood the/a raggedy old man.

40b. Leaning against the wall stood Sandy.

40c. There stood \*the/???a raggedy old man leaning against the wall.

40d. There stood leaning against the wall ?\*the/a raggedy old man.

40e. Leaning against the wall there stood \*Sandy/the raggedy old man/a raggedy old man.

41a. Galloping down the street came Trigger.

41b. Galloping down the street came the/a riderless horse.

41c. There came \*the/???a riderless horse galloping down the street.

41d. There came galloping down the street \*Trigger/???the riderless horse/a riderless horse.

41e. Galloping down the street there came \*Trigger/???the riderless horse/a riderless horse.

42a. Stacked against the wall stood the/a pile (of old comic books).

42b. There stood \*the/???a pile (of old comic books) stacked against the wall.

42c. There stood stacked against the wall \*a pile/???the pile of old comic books/a pile of old comic books.

42d. Stacked against the wall there stood \*a pile/???the pile of old comic books/a pile of old comic books.

In all of these cases indefiniteness makes a difference only in cases where there shows up. Where there is no there, it makes no difference. This suggests that the there-connection is spurious. Although Aissen (1975) shows that a "presentational" there construction admits definite post-posed subjects with a wide range of verbs (just like inversions), those definites do seem to have to be genuinely heavy, as shown in (43).

43. There hung on the wall ?\*the picture/the picture of Marx that Lenin had commissioned from Cezanne.

What the examples in (32-43) show, then, is that exploiting there-VPs to generate (certain) V-inversions entails either overgenerating there-sentences, or failing to generate large classes of V-inversions, namely those with a definite NP immediately after the verb, and maybe all of those with main verbs other than be.

There is one thing that tying inversions to (19) and (26) buys, though, if the instantiations of X2 exclude NP, and that is that it automatically excludes transitive constructions such as (44).

44a. \*A race ran Kim and Sandy.

44b. \*Into the garden ran a race Kim and Sandy.

44c. \*Into the garden ran Kim and Sandy a race.

The inversion verb will have only one NP sister if it is sanctioned by (19). However, if V[SUBCAT 12] includes crawl, sleep etc., as it would have to, under this analysis, to get inversions like (1A, B), and the topicalized X2 can be NP, we will get word salad like (45) in addition to unacceptable VPs like \*be a man a lawyer, and the semantic account of the unacceptability of \*be a man a lawyer does not generalize in any obvious way to examples like (45).

45a. \*sleep Lee a backpack.

45b. \*crawl a toddler the worm.

Thus it seems that little is gained by deriving V-inversions by means of the rule that admits VPs for there-subjects.

## 2.2. Extending the metarule analysis to all aux-inversions

The metarule in (7), intended to describe English yes-no questions, allows auxiliary-initial inversions. If one overlooks a few differences in pre-(main)verbal adverbials,<sup>8</sup> this metarule could do double duty for exclamatory inversions like Is that easy! Negative inversions. Negative inversions like (2M) could be derived by a similar metarule along the lines of (46)

46. V1 --> W ==> S[INV, NEG] --> W, NP[INDEF ...]

If such constructions require the inverted subject to be some kind

of quantified indefinite (as an acceptability pattern like that in (47) suggests), then formulating the metarule along the lines of (7b), as in (46), would seem to be necessary, as a formulation like (7a) would not allow reference to the subject.

- 47a. Don't no dude mess with Monty.
  - 47b. \*Don't that dude mess with Monty.
  - 47c. Can't many dudes ride that horse.
  - 47d. \*Can't some dudes ride that horse.
  - 47e. Can't three dudes in the entire state of Texas ride that horse.
  - 47f. Can't three dudes ride that horse.
- [\* if three = 'exactly 3']  
[OK if three = 'even 3']

A metarule-induced rule sanctioning V and S as sisters under S (as in (7a)) would not allow specification of the features of the subject of the embedded S. On the other hand, if, as seems likely, sentences that are unacceptable are excluded on the semantic (or pragmatic) grounds that the negative-polarity subject NPs are existentials with narrow scope with respect to negation (cf. Ladusaw 1979), then either sort of metarule would do. As I am unfamiliar with the details of the syntax of this construction I won't explore it further.

Conditional inversions. It might seem that the simplest way to account for the cross-clause modal verb dependencies in conditional inversions (exemplified in (48-49)) would be by a metarule from uninverted if...then constructions.

- 48a. Were we in Boston, we could go to Fenway Park.
- 48b. Had I been in Boston, I would have visited them.
- 48c. Should he leave, you can have his room.
- 48d. You can have his room, should he leave.
- 49a. \*Had he left, you can have his room.
- 49b. \*Should he leave, you could have replaced him.

Although I have no idea how the latter might be derived, we may suppose that it is by a rule something like (50). If so, the metarule in (51) might be a candidate.<sup>9</sup>

50. S --> S[if, @], S[\$]  
 where either @ ( {had, could, would}, and \$ ( {would, could, should}  
 or @ ( {could, were} and \$ ( {would, could, should, might}  
 or @ ( {should, did} and \$ ( {will, may, can, could, must}

51. S --> S[if, @], S[\$] ==> S --> S[INV, @], S[\$]

However, there are some problems. The inverted clause cannot begin with a (contracted) negative auxiliary. Specifying the S[INV] as [-NEG] will correctly predict the unacceptability of (52a) and the acceptability of (52b), since the Head Feature Convention will project it onto the head V, not the complement VP.



52a. \*Hadrn't we been there, it would have been difficult for them.

52b. Had we not been there, it would have been difficult for them.

Since not all uninverted conditionals correspond to inverted conditionals, some auxiliaries would have to be excluded entirely. For example, will, was, can do not occur in the inverted conditional antecedent, even though there are non-counterfactual conditionals (e.g. (48c,d)). Finally, since the sets of auxiliaries involved in the dependencies ({had, could, were}, {would, could, might}; {should}, {will, may, can}) do not appear to be specifiable in a natural way, it is not clear how  $\emptyset$  and  $\$$  in (50) and (51) could be specified. Something closer to the yes-no question metarule in (7a), along the lines of (53), runs into the same problems in excluding negatives, and accounting for the modal-modal dependencies, and furthermore entails a rather unlikely constituent structure.

53.  $V1[AUX, FIN] \rightarrow W \Rightarrow S[INV] \rightarrow H[\emptyset], S, S[\$]$

In addition, while (51) correctly predicts that the order of clauses in conditional inversions is free (cf. 48d), getting the linear order of clauses right with LP rules would seem to require ad hoc diacritics if these inversions are induced by a rules like (53). Thus, the metarule in (51), which is impossible according to the current theory, is empirically superior to that in (53), the most likely candidate allowed by the theory. Nonetheless, I should point out that the metarule in (51) is prohibited by the constraint that metarules only refer to rules which specify lexical heads.

Negative phrase-initial inversions. We might try to add an initial "trigger" phrase to the yes-no question rule (7a), to account for the inversions with initial negative phrases like (2N), but in fact, all we really need is an ID-rule like the scheme in (54), which like the output of the metarule in (51), EXPLOITS the fact that the SAI metarule defines a category  $S[INV]$ , which, it turns out, can dominate an auxiliary verb and its complement.

54.  $S \rightarrow C[NEG], S[INV]/C[NEG]$

Having this rule be a slash-introducing rule like the topicalization rule is necessary to get the semantics correct--most obviously where the initial phrase is an argument, as in (55).

55a. Not a bite did Sandy eat.

55b. To no one did Lee give any books.

It also correctly predicts that the trigger-gap relationship is an unbounded dependency, as shown by examples like (56).

56. Not a word did Kim imagine Sandy would say [t].

Notice that since such inversions must involve slashed categories, we could not generate sentences like (55) with a metarule like (7b); given an input and an output with VARIABLES OVER SETS of categories, it is not determined where the slash would go, or even if you could specify a slash at all. Supposing that one could write a metarule of the form (54'), where W/C would be interpreted as 'a collection of categories such that one of them has the value C as a coefficient of [SLASH],' this would not allow all of the necessary Cs to be specified.

54'. V1 --> W ==> S[INV] --> C, W/C, NP

The reason is that the formulation in (7b), from which (54') is derived, takes advantage of the fact that, if we follow the analysis in Gazdar, Pullum, and Sag (1982)<sup>10</sup>, all of the auxiliary verbs are generated as the head of a rule of the form V1 --> V, V1. This means that W in (7b) or (54') is an abbreviation for sets of sets of the form {V[Ø], V1[S]}. Since lexical categories cannot usefully have the feature [SLASH], this leaves V1 as the only category which could carry the [SLASH]. However, the most characteristic value of C in these constructions is PP or Adv, and most of these attach to V2[-SUBJ] (predicate phrases), not V1 (verb phrases); since V1 does not have V2 as a daughter, there would be no place to get PP or Adv gaps from in this analysis. Under the analysis in (54), where it is S (equivalently, V2[-SUBJ]) that is specified as having the feature [SLASH], or where adjuncts of this sort are all daughters of V1, this is not a problem.

However, the formulation in (54) raises a number of issues. First of all, there is the problem of specifying the range of C. It includes NP as in (55a), PP as in (55b), lexical adverbs as in (57a), phrasal adverbs as in (57b), clausal adverbs as in (58), conjunctions as in (59a), and AP if sentences like (59b) are acceptable.

57a. Never/Rarely/Seldom have I seen so many kinds of tofu in one place.

57b. Hardly ever did Lee and Hilary speak of their college days.

58a. Hardly had the man come in when the woman left again.

58b. No sooner had they settled themselves than the phone began to ring again.

58c. Not until Kim had finished did Leslie begin to object.

59a. Nor/Neither do we charge three and sixpence for it.

59b. Unafraid to ski had Kim been, but the opportunity never arose.

This is not an easily specified class, but then it is not obvious that all of these inversions should be sanctioned by a single principle.

Second, if the initial "trigger" is to be characterized as

[+NEG], [NEG] will have to be a foot feature: it is manifested morphologically on the NP in a PP, not on the preposition (as in (55b)), so the HFC will not suffice to guarantee its presence in the correct place. Presumably, a rule such as (60) would suffice to allow such phrases as those in (61) to initiate these inversions as well, while such adverbs as seldom, rarely would just have to be marked lexically with [NEG].

60. X2[+NEG] --> not X2[-NEG]11,12

61a. Not under any circumstances

61b. Not a page/bite/word/drink etc.

Further specifications are probably necessary to limit NPs in this construction to indefinites, unless semantic or pragmatic principles will exclude examples like (62a). Definites are (possibly) acceptable only with a following explicitly contrastive phrase (cf. Horn 1985).

62a. \*Not the page did he read.

62b. ?Not the play did he see, but the movie.

62c. \*The play did he see, but not the movie.

There are alternative analyses of these "negative" inversion triggers, which treat the inversion-licensing negatives as identical to the set of polarity-licensing negatives. But these fail to explain why inversions are not licensed in some contexts where negative polarity items are, and why inversions and negative polarity items embed under different conditions. The inversion licenses are a subset of the negative polarity licenses: constituents containing not, no, never, rarely, seldom, hardly, barely, and only license both kinds of construction. These inversion licenses might in fact be characterizable by a real morpho-syntactic feature, in a way that the larger class of negative polarity licenses is not.

Positive frequency and degree adverbials. Presumably the rule for inversions such as those in (20) would be very similar to that for Negative-phrase inversion, as in (54), except that there would be no [NEG] and C would range over just adverbs and adverbial phrases--cf. (63).

63. Many a moonlight night have I murmured it to the nightingales which haunt the gardens of St. Johns.

Whether C would have to be specified to include only frequency adverbials is not clear. This is a very infrequent construction to begin with, and if sentences like (64), with manner and degree adverbs, are only more infrequent, and thus pragmatically disfavored, rather than being really ungrammatical, we do not want the grammar to exclude them.

64a. Wistfully did she commend to us those little Italian places...

64b. Enough had she listened to warped and scratched monaural discs from the 1960s.

Of course we do want the grammar to exclude sentence adverbs like obviously, perhaps, unfortunately (65), and adjective- and adverb-modifying adverbs like very, extremely, too, but distinguishing among adverbs in this way is one more thing the grammar will have to do anyway.

65. \*(Un)fortunately did the committee reject our offer.

Comparative extent-result inversions. I turn now to inversions like (2R). Here again a topicalization-like rule will be necessary to get the grammatical relations correct in the semantics. Given that the monoclausal inversions are interpreted as anaphoric versions of the cataphoric biclausal inversions like (2S), it is quite appropriate to describe them by means of an optional clausal constituent, as in (66).

66. S --> XP[S], S[INV]/XP[S], (S[COMP that])

Here XP must range over NP, PP, AP, Adv of whatever level phrases like so carefully are, and whatever category such belongs to in sentences like (67) (probably NP).

67. Such is the impact of work on some people.

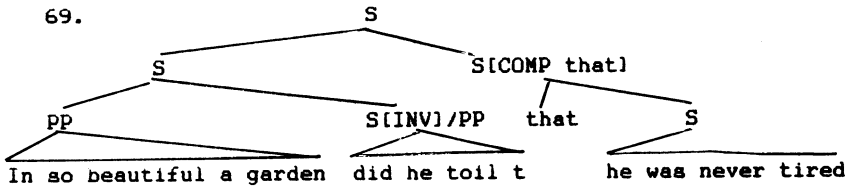
Of course, not all topicalized NPs, PPs etc. co-occur with inverted clauses, only negative ones and ones with so or such. This means that XP must be further specified, in a foot-featurish manner similar to that seen to be necessary for negative-phrase-initial inversions--again the "so"-morphology shows up on the NP in a PP, not on the preposition.

68a. In such peaceful circumstances did he labor that ...

68b. In so beautiful a garden did he toil that he never was tired.

It would seem that the fact that the that-clause is a result clause would have to be stipulated, or made to follow from some sort of meaning postulate dependent on the semantics of the "so"-constituent.

The constituent structure implied in (66) is almost certainly not correct; the that-clause, though logically connected with the so-phrase, appears to be a sister of the rest of the sentence, as in (69).



Furthermore, neither (66), nor the rules implied in (69) correctly predicts the phrase order; (66) allows (70a), and (69) allows (70b), as well as the correct (68b).

70a. \*In so beautiful a garden that he was never tired did he toil.

70b. \*That he was never tired in so beautiful a garden did he toil.

The deictic constructions like (2S) are quite similar, but do not have a second clause, so substituting DEM(onstrative) for SO in (66) would predict impossible sentences like (71).

71. \*Thus does he introduce her anecdotes that she bores everyone unmercifully.

An ID-rule like (72) would probably suffice.

72. S --> XP[DEM], S[INV]/XP[DEM]

The feature [DEM], to be realized in thus, this, that, etc., would have to be, like ["SO"] and [NEG], and for the same reasons, a foot feature.

Additive inversions. The last inversion whose analysis I will discuss here is that exemplified by such sentences as (2T). One could do their syntax simply enough, treating so as a syncategorematic element with a rule like (73), if the semantics didn't have to be predicted from the syntax.

73. S --> so, H2[INV]/V2[@] where @ is not [VFORM FIN]

However, although the [SLASH V2[@]] will ultimately beget a V2[+NULL], from which an interpretation of this constituent as VP-elliptical can be derived (cf. Klein 1984), such a rule will generate what amounts to an unbound trace. This could be remedied if the constituent which leaves out as so could be justifiably characterized as a V2[@], perhaps with some diacritic such as [+PRO], which would have this effect, as in (74).<sup>13</sup>

74. S --> V2[@ +PRO], H2[INV]/V2[@] where @ is not [VFORM FIN]

It is not obvious how the additive meaning of such sentences

could be predicted within the Klein and Sag (1982) theory of rule translation, but it could be stipulated, or, as it is not truth-conditional, dealt with in a linguistic pragmatics (cf. Green 1982).<sup>14</sup>

Insofar as both [V2 S] and [S V2] are allowable orders, both sentences like (75a) and (75b) will be derived.

75a. So [is Kim].

75b. \*[Is Kim] so.

I know of no other cases where V2 and S are sisters, so perhaps an LP rule that says that V2s precede their S sisters will suffice.

### 2.3 Linear order

The LP rules in (76) (cf. Gazdar and Pullum (1982)) go a good part of the way towards correctly specifying the order of elements in English phrases. However, since V1 isn't ordered with respect to PP, V2, AP, or Adv with any number of bars, they allow the constituents in the V-inversions, as analyzed above, to show up in more than one order, as listed in (76).

76a. lexical category < NP < PP < S

76b. NP < V1

77a. V2 V1 [V NP] Slouching in the corner was/stood a young man.

77b. [V NP] V1 V2 \*Stood a young man slouching in the corner.

77c. PP V1 [V NP] Into the room ran a young man.

77d. [V NP] V1 PP \*Ran a young man into the room.

77e. AP V1 [V NP] More significant is what you don't say.

77f. [V NP] V1 AP \*Is what you don't say more significant.

77g. Adv V1 [V NP] Here comes the bus.

77h. [V NP] V1 Adv \*Comes the bus here.

The (b,d,f,h) examples are clearly incorrect as inversions. (It is also worth noting that unacceptable examples (77b,d,f) are predicted to be the only correct forms by theories which treat the postcopular material in constructions like (20) as a single NP constituent (e.g. Williams 1984, GKPS 1984).) Thus, the rules in (76) fail to guarantee that the inversion "trigger" be initial in inversions. We cannot add the LP rules in (78), because within V2s, V1s ordinarily precede PPs and VP adverbials, as shown in (79).

78a. V2 < V1

78b. P2 < V1

78c. A2 < V1

78d. Adv < V1

79a. The bottom fell out of the stock market in 1929.

79b. \*The bottom in 1929 fell out of the stock market.

79c. \*The bottom because everybody was buying on margin fell out of the stock market.

Furthermore, liberating the contents of VP/XP into S (cf.

Pullum 1982) is no solution, as XP, whatever its instantiation, would have to follow V, and thus could not be initial.<sup>15</sup> It is possible to engineer a solution without abandoning the claims of ID/LP format, but it involves taking advantage of the absence of limitations on possible features, and admitting such a solution does gut the ID/LP claims of empirical content. One could postulate a feature--call it [FIRST] so as to have no illusions about its ad hoc nature--that the inversion rules (e.g. (26)) assign to the trigger XP. Then an LP rule like (80) will guarantee that the XP will precede its V1/XP sister.

80. [FIRST] < V1

Assuming that [FIRST] is a head feature, it will be harmlessly passed down by the Head Feature Convention (harmlessly since XP will never have any V1 daughters that Head daughters would incorrectly have to precede).

What about the auxiliary inversions? The ID-rules sketched as candidates for the inversions in (2K, 2M-T) are rules which license S<sub>a</sub> consisting of a predicative phrase and an inverted sentence with a predicative phrase gap. This retains the slash (topicalization) analysis of the trigger phrase, and so preserves the prediction that the trigger-gap relation is an unbounded dependency, as shown in examples like (56) above, and (81) here.

81. So calmly did we believe that they would take the news [t] (that ...).

Having the mother unmarked for inversion will allow these to be embedded freely (cf. Green 1976), and require them to be rated unacceptable in some environments on pragmatic grounds rather than ruled ungrammatical. Marking the daughter S/C as bearing [INV] allows the output of the yes-no metarule itself to do the work of inversion in expanding S[INV]/C. That same marking will not generate incorrect contracted auxiliaries in sentences like (82) if [-NEG] or a FCR will suffice to ensure that the head of S/@ will get the negative value for [NEG].

82. Thus \*aren't I/am I not absolved from responsibility for such events.

If the trigger is a PP or NP, it will now only precede the S/@, as desired, according to (76). However, if @ is some kind of adverb or adverbial, no order can be specified by an LP rule, because adverbial sisters of S must be free with respect to S, in light of sentences like (83).

83a. Slowly Lee walked home.

83b. Lee walked home slowly.

83c. Unfortunately, Lee is absent.

83d. Lee is absent, unfortunately.

The only way out of this that I can see involves saying 1) that adverbs like never, thus, in no way, rarely, barely belong to a different category, say QAdv, from sentence adverbs like unfortunately, maybe, perhaps, no doubt, slowly, and 2) that QAdv is free with respect to its sister VP, and Adv is free with respect to its sister S, but QAdv precedes S. Maybe this will work.

Additional problems remain for the additive so inversions, even if the analysis in (74) derives the correct linear order. The problem is that the scheme in (74) indicates an unbounded dependency, which is correct for subject-auxiliary inversions of the other seven triggered types, but which is not correct for this so. While we find such sentences as (56), we do not find such sentences as (85).

56. Not a word did Kim imagine Sandy would say  $t_i$ .

85a. \*So does Kim think Dana (did).

85b. \*(Sandy likes apples, and) so does Kim think that Jo may.

Actually, there is a further complication here. The examples which best show the unbounded nature of the dependency between the initial XP and the post-auxiliary S involve intervening main verbs of the class involved in the negative-raising phenomenon (cf. Green 1974). Thus, the examples of (56), (81), and (86) are better than those of (87).

86. Thus<sub>j</sub> did we want the boys to confound their leader's plans  $t_i$ .

87a. ?Not a word did Kim regret that Sandy said  $t_{i16}$

87b. ?So calmly<sub>j</sub> did we announce that they would take the news  $t_i$  (that Kim was utterly unprepared for the joyous scene that followed).

87c. ?Thus<sub>j</sub> did we force the boys to confound their leader's plans  $t_i$ .

Interestingly, it is possible for the negative in negative-NP-initial inversions to be semantically local to the embedding verb, while the rest of the NP is embedded below it, as in examples like (88).<sup>17</sup>

88a. Not a bite did Kim ONEG admit/record that Sandy ate [ $t_i$ ]NP.

88b. Not a bite did Kim ONEG order/observe them to eat [ $t_i$ ]NP.

This poses an interesting challenge for the semantic analysis of these constructions.

### 3.0 Conclusions

I have showed that while it is possible to generalize the



rules in (4) and (5) to one like (26), and so describe all of the V-inversions in (1A-11), to do so predicts the existence of there-initial sentences which do not occur, such as those in (32-34, 38-42). Some of the unacceptability seems to hinge on referential properties, e.g. definiteness, and perhaps a pragmatic rule for the use of these constructions could allow us to say that unacceptable examples like those in (38-42) are grammatical but pragmatically contradictory or pointless. Other examples, like those in (32-34) are ungrammatical for all sorts of NPs. The proper analysis of these constructions in GPSG (in any theory, probably) remains very unclear. It should be noted that two of them (those in (33) and (34)) are constructions which occur frequently in natural speech, and the other (in (32)) is one that most of us don't use, but which sportscasters couldn't do without.

Because the quotation inversion in (1J) has markedly different properties, and no correlation at all with there-constructions, it is more appropriately described with a separate rule, or set of rules. In either case, the account may well involve constituents of a novel sort.

With respect to auxiliary inversions, I have shown that the gross properties of exclamations like (2K), and negative sentences like (2M) are already accounted for by the SAI metarule, while conditional inversions like (2L) appear to require a new metarule, and the inversions with overt initial "triggers" (2N-2T) can be accounted for with topicalization-like ID-rules which exploit the output of the SAI metarule.

I have sketched a number of obstacles to generalizing proposed treatments of inversions (chief among them: imperfect correspondences between inversions and their uninverted counterparts, and the description of the linear order of phrases). I have suggested possible directions for the resolution of some issues. The proposals have been of several sorts: additional features, additional metarules, construction-specific ID-rules, and pragmatic acceptability-demotion in lieu of syntactic expulsion. But even these proposals are not entirely unproblematical. For example, two of the proposals require current constraints on possible grammars to be relaxed--constraints on the domain of metarules, and constraints on multiple values for [SLASH]. Furthermore, in several cases, allowed constituent orders pose problems for the ECPO condition implicit in ID-LP grammars.

But if I have failed to provide a completely adequate description of inversions within the constraints of GPSG, I expect that by sketching some of the systematic properties of inversions, I have made clear the danger inherent in building elegant, explanatory theories on the foundation of a few facts about a common construction, without attempting to see if those theories are consistent with facts about systematically similar (and less mundane, but hardly exotic) constructions. I have in mind the fact that linguists have been willing to devise theories of grammar--frameworks for description--which boast of having as natural consequences the (counterfactual) claims that inversion and topicalization do not co-occur (Safir 1982:438), that

inversions never embed (Emonds 1976; Safir 1982:451,460), and that negative NPs occur only in initial position (Williams 1984). In fact, some topicalizations (e.g. 2N, 20, 2P, 2T) require inversion (as Safir's own examples indicate (Safir 1982:459). Most inversions embed in at least some contexts; a smattering of collected examples is given in (89).

- 89a. I'm always afraid that out of the blue is gonna come a bolt of lightning. (TV program, Rhoda)
- 89b. I have found out, from its pages, that never once have I been right. (Dorothy Parker)
- 89c. So he was settin' there, tellin' this bartender how heartbreakin' it was to be a manager of circus clowns, when up pops this Pearl du Monville outa nowheres. (S. J. Perelman)
- 89d. ...while on the window-silla of the houses stood wooden boxes containing moss-rose plants and terra cotta pots in which grew a breed of geranium whose spread of intensely red blossoms accented the prevailing pink tint of the rose-clad house-front like an explosion of flame. (Mark Twain)
- 89e. Miss Estelle Winwood, as Tweeny, gave a performance such as would cause your fourteen-year-old sister to be blackballed from the high school dramatic club, did she attempt to emulate it. (Dorothy Parker)

And negative NPs occur in object position as well as topicalized and in subject position, as in the verse in (90) from "The Night Before Christmas".

90. He spoke not a word, but went straight to his work...

At the very least, the data sketched here (and elaborated in Green (ms.)), represent large, systematic sets of constructions which any respectable theory of syntax must be able to account for in some way more satisfactory than dismissing them as marginal or stylistic (cf. Safir 1982:459) when exemplars are noted which contradict the theory.

#### Footnotes

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1. GKPS (1984) assumes a different analysis, in which the NP and its XP complement form a single syntactic constituent (a NP).

2. Example (11k) is perfectly acceptable where so means 'therefore' or 'likewise', but not where it means 'also'.
3. In the analysis of GKPS (1984), where the XP is a part of the NP, not a sister to it, an analysis as an unbounded dependency construction is unavoidable.
4. The symbols @ and s represent lower case alpha and beta respectively. Evidence that would motivate person agreement in there-insertion constructions and corresponding V-inversions is murky, largely because of the (probably grammatical and not phonological (cf. Green 1980)) infelicity of the pronoun-final inversions that show whether person-agreement occurs.

- ia. ?\*In the garden am I.
- ib. In the garden is me.

However, other be inversions do require person agreement:

- ii. Able am/\*is I to go, and willing.

5. Thus adopting the analysis of Partee (1973). I am in basic agreement with her general conclusion, though some of the arguments are flawed.
6. There is a treatment of rightward dependencies as extraction in Gazdar (1981). However, it is phrased in terms of CF-PSG rules, not ID-rules, getting the rightward extraposition "for free". This is not possible with ID-rules and LP statements, and would require an ad hoc feature (e.g. [TOP]) to distinguish between phrases from which a constituent is topicalized (to the left), and phrases from which a constituent is extraposed (to the right). It seems to me that features of this sort make a mockery of the restrictive claims of ID/LP grammars.
7. Making the topicalized constituent the vague category X2 correctly predicts that predicative phrases can be conjoined in this position (cf. Sag, Wasow, Gazdar, and Weisler 1985):

- i. On top of the world, and feeling fine, but angry about public apathy is Lewisville disc jockey, Kim Stacee.

8. Indeed, ever seems to be a positional variant of intensifiers like sure, really which never occur in inverted exclamations:

- i. He sure/really/\*ever can swim fast!
- ii. Can he ever/\*sure/\*really swim fast!

Some of the strings that are asterisked in (ii) are acceptable, and can even be interpreted as being intended to convey assertions, but they have the intonation of echo-questions, and the declarative "force" is an implicature from questioning the act of questioning (cf. Sadock 1969).

9. The pattern in metarule (51) doesn't meet the restriction proposed in GKPS (1984) that the right-hand of the input rule consist of the variable W (a variable over multisets of

categories) and at most one additional category. Even if there were independent motivation for a feature [SFORM CONDL], allowing the pattern to be S[CONDL] --> W, this still wouldn't be a lexical rule, and there would be no way to incorporate a pattern of this form into a metarule like (S1), which needs to refer to the constituents of S[CONDL] to make the if-clause inverted and if-less.

10. The analysis in Sag and Klein (1982) seems to differ in treating there-insertion be as being the sister not of a V1[PRED], but of an N2 and an X2[PRED]. However, this would only help for there-insertion sentences, and leave no analysis for such sentences as (1).

1. Under no circumstances would he leave.

11. If (1) is OK (which I doubt), then the C2 in (60) should be an X2.

1. Not a bite, and not under any circumstances, would he eat.

12. Ladusaw (1982:18-19; cf. also Ladusaw 1979) assumes (following Klima (1964:313)) that the inversion-licensing NEG is not a syntactic feature, but the same polarity-licensing semantico-pragmatic feature as Klima's (1964) [Affect], and that inversion is predictable from the semantics. Observations about the structure of adverbial phrases like hardly ever, almost never would seem to support this. It is not at all clear to me what their syntactic structure is, and, for example, whether either has a head, and if so, whether the head stands in a constant precedence relation to its sister, but in any case, it seems to be the first adverb in the first phrase, and the second adverb in the other which bears the feature [NEG], whatever it turns out to be. How a generalization of the sort Ladusaw makes can be expressed in a GPSG where the semantics of a construction is not stipulated, but follows largely from general principles and type assignments is not clear either. However, perhaps one could do it through a special combinator f-INV. This would amount to saying that sentences like (1) were syntactically well-formed, but semantically incoherent, which is perhaps correct-- as Chomsky says, we have no privileged intuitions of grammaticality.

1. The bite did John eat.

On the other hand, the correlation between licensing negative-polarity items and licensing inversion in Klima's system was in some measure dependent on the particulars of that system, specifically, on ordered transformational rules, which have no counterpart in GPSG. Klima's inversion rule is triggered by an [Affect]-containing neg or wh constituent "in their original pre-sentential position" (1964:321), "where the constituent containing the feature Affect may have other constituents incorporated into it" (1964: 313). (This implies prior rules

incorporating constituents into neg and wh.) In any case, many [Affect]-containing constituents, which do license negative polarity items, do not license inversion:

11a. I doubt that anyone ever said that.

11b. I am surprised that anyone ever said that.

11ia. \*I doubt that did he (ever) say that.

11ib. \*I am surprised that did he (ever) say that.

Such non-correlations do not falsify Klima's claim of correlation because his was relativized to include only [Affect]-containing constituents in their original presentential position; in (ii) and (iii) the [Affect]-containing doubt and surprised are not in presentential position. Not surprisingly, moving them there does not help, as the [Affect]-containing items in (iv) do not c-command, or have in their (translations') scope, the inverted clauses.

11va. \*Doubting anyone would challenge the speaker did I leave.

11vb. \*Surprised that anyone would leave was Kim insulted.

In fact, even plausibly originally initial [Affect]-containing items do not license inversion:

11va. \*Doubt (that) did anyone leave (if you're serious about being a detective).

11vb. \*Doubt (that) did anyone leave, don't you. [With any stress or intonation]

In general, though, inversion is neither licensed (ii-iii) nor distributed like negative polarity items. Inversions do embed (vi), but in pragmatically more-or-less transparent clauses (cf. Green 1976), not neg or [Affect]-containing ones (vii).

11vi. I think that never has he really cleaned this room.

11via. \*It's not true that has he picked up any of his toys.

11vib. It's not true that he has picked up any of his toys.

Furthermore, it is well-known that negative polarity items may be licensed pragmatically (R. Lakoff 1969, Green 1981).

11viiia. Do you want some/any spinach?

11viiib. If you eat any candy, I'll spank/\*kiss you. [assuming spanking is undesirable but kissing and candy are desirable]

But inversion requires an overt license; a sentence like (ix) is not an exclamation that the speaker has never been embarrassed to some implied degree.

ix. \*Have I ever been so embarrassed.

Thus, the parallelism between so-called negative inversion and negative polarity items is only apparent.

I had thought that the inversion license had to be "local" to the inversion, and that sentences like (x) and (xi) were impossible.

x. I don't think that ever has he cleaned his room by himself.

xi. I don't think that anywhere is there a book as maddening as that one.

But I found they sort of grew on me, and in fact, one of the few inversions I have been able to collect from spontaneous speech in my presence reads as in (xii).

xii. I don't think that at any time did we get permission from the executive officer before the appellant's case was heard.

Another collected example:

xiii. Riley doubts that even then will the faculty favor bargaining unless faculty attitudes take a drastic turn.  
(Champaign-Urbana Courier 3-20-77)

13. If sentences like (i) are examples of this construction, then this inversion isn't an auxiliary-inversion like the others, because it allows more than one auxiliary verb before the subject NP, but not real main verbs (ii), and it will require another rule altogether.

i. So may have Sandy.

ii. \*So slept Sandy.

14. This is on the assumption that the semantics to be provided is strictly a truth-conditional semantics.

15. Another possibility that won't work is to abandon the there-connection and generate V-inversions with a rule like (i).

i. S ---> X2, S[INV]/X2

The reason this won't work is that S[INV] induces inverted Ss, but only auxiliary inversions. Thus (i) would induce sentences like (ii), not sentences like (iii).

ii. \*In the garden had a bust of Homer stood.

iii. In the garden had stood a bust of Homer.

16. There is an acceptable interpretation of this sentence, which construes the not with regret, and that Sandy said t as an

extraposed relative clause modifying word. I am concerned with the interpretation of (87a) which takes that Sandy said t as an object complement of regret.

17. This does not occur with other negative phrases. Never did I say that Kim had insulted Tracy does not mean 'I did not say that Kim had ever insulted Tracy,' and it is difficult, if not impossible, to get a sensible interpretation for sentences like With no pie do I want Kim to assault Dana.

#### References

- Aissen, J. 1975. Presentational-There insertion; a cyclic root transformation. Papers from the 11th regional meeting, Chicago Linguistic Society, ed. by R. Grossman, L.J. San, and T. J. Vance, 1-14. Chicago: Chicago Linguistic Society.
- Emonds, J. 1976. A transformational approach to English syntax. New York: Academic Press.
- Gazdar, G. 1981. Unbounded dependencies and coordinate structure. *Ling. Inq.* 12:155-184.
- Gazdar, G., and G. Pullum. 1982. Generalized phrase structure grammar; a theoretical synopsis. Indiana University Linguistics Club. Bloomington, Ind.
- Gazdar, G., G. Pullum, and I. Sag. 1982. Auxiliaries and related phenomena in a restrictive theory of grammar. *Language* 58: 591-638.
- Gazdar, G., E. Klein, G. Pullum, and I. Sag. 1982. Coordinate structures and unbounded dependencies. *Developments in generalized phrase structure grammar*, ed. by M. Barlow, D. Flickinger, and I. Sag, 38-71. Bloomington, Ind.: Indiana University Linguistics Club.
- Gazdar, G., E. Klein, G. Pullum, and I. Sag. 1984. Generalized phrase structure grammar. (In press) Cambridge, Ma.: Harvard U. Press.
- Green, G. 1974. *Semantics and syntactic regularity*. Bloomington, Ind.: Indiana U. Press.
- Green, G. 1976. Main clause phenomena in subordinate clauses. *Lg.* 52: 382-397.
- Green, G. 1977. Do inversions change grammatical relations? *Studies in the Linguistic Sciences* 7,1: 157-181. Urbana, Department of Linguistics, University of Illinois.
- Green, G. 1980. Some wherefores of English inversions. *Lg.* 56: 582-601.
- Green, G. 1981. Pragmatics and syntactic description. *Studies in the Linguistic Sciences* 11,1: 27-37. Urbana, Department of Linguistics, University of Illinois.
- Green, G. 1982. Linguistics and the pragmatics of language use. *Poetics* 11: 45-76.
- Green, G. 1984a. Why agreement must be stipulated for There-insertion. *Proceedings of Second Eastern States Conference on Linguistics*.
- Green, G. 1984b. Subcategorization and the account of inversions. *Proceedings of the Second Eastern States Conference on Linguistics*.

- Green, G. ms. Syntax and pragmatics of English inversions.
- Hankamer, J. 1977. Multiple analyses. Mechanisms of syntactic change, ed. by C. Li, 583-607. Austin: University of Texas Press.
- Horn, L. 1985. Metalinguistic negation and pragmatic ambiguity. *Lg.* 61: 121-174
- Klein, E. 1984. VP ellipsis in DR theory. Ms.
- Klein, E., and I. Sag. 1982. Semantic type and control. Developments in generalized phrase structure grammar, ed. by M. Barlow, D. Flickinger, and I. Sag, 1-25. Bloomington, Ind.: Indiana University Linguistics Club.
- Kiama, E. 1964. Negation in English. The structure of language, ed. by J. Fodor and J. Katz, 246-323. Englewood Cliffs, N.J.: Prentice-Hall.
- Ladusaw, W. 1979. Polarity sensitivity as inherent scope relations. University of Texas diss.
- Ladusaw, W. 1982. Logical form and conditions on grammaticality. ms.
- Lakoff, R. 1969. Some reasons why there can't be any some-any rule. *Language* 45: 608-615.
- Maling, J., and A. Zaenen. 1982. A phrase-structure grammar account of Scandinavian extraction phenomena. Nature of syntactic representation, ed. by P. Jacobson and G. Pullum, 229-282. Dordrecht, D. Reidel.
- Partee, B. 1973. The syntax and semantics of quotation. Festschrift for Morris Halle, ed. by S. Anderson and P. Kiparsky, 410-418. New York: Holt, Rinehart and Winston.
- Postal, P. 1977. About a "nonargument" for raising. *Ling. Inq.* 8: 141-154.
- Pullum, G. 1982. Free word order and phrase structure rules. Proceedings of NELS 12, ed. by James Pustejovsky and Peter Sells, 209-220. Amherst, Mass.: University of Massachusetts Graduate Linguistics Student Association.
- Sadock, J. 1969. Hypersentences. *Papers in linguistics* 1: 283-371.
- Sair, K. 1982. Inflection-government and inversion. *Linguistic review* 1: 417-467.
- Sag, I., and E. Klein. 1982. The syntax and semantics of English expletive pronoun constructions. Developments in generalized phrase structure grammar, ed. by M. Barlow, D. Flickinger, and I. Sag, 95-139. Bloomington, Ind.: Indiana University Linguistics Club.
- Sag, I., T. Wasow, G. Gazdar, and S. Weisler. 1985. Coordination and how to distinguish categories. To appear in *Natural Language and Linguistic Theory*.
- Williams, E. 1984. There-insertion. *Ling. Inq.* 15: 131-154.



Constraining the Application of Erasure Rules:  
Evidence from Conjunction Reduction\*

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In the book Arc Pair Grammar, Johnson and Postal (1980) give an analysis of verb-phrase conjoined sentences like the one in (1) which predicts that such sentences will behave syntactically as two unreduced clauses conjoined with and.

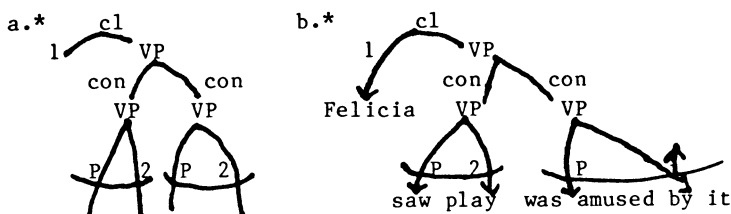
(1) Dean watched t.v. and took a nap.

I will give arguments to show that this prediction is wrong, that such conjunction reduction (CR) sentences act as if they are composed of a single clause, and that for the Johnson and Postal analysis to be able to capture this fact, rules would have to be able to make reference to information not normally available to them, hence increasing their power in an undesirable way. In addition I will argue that not only shouldn't conjunction reduction be accomplished through the type of rule that Johnson and Postal propose, but that such an analysis should be explicitly prevented as a possibility. I claim that constraining Arc Pair Grammar (APG) in such a way will allow the theory to capture generalizations that it currently cannot make.

Johnson and Postal (p. 228) say that in a sentence like (1), "the 1 arc of the [second] clause is definitely foreign erased, by the 1 arc of the main clause, and thus is a final stratum arc."<sup>2</sup> This analysis entails that each VP is in a separate clause, each of which has a 1 arc (a subject arc) (cf. figure 1). Foreign erasure is a rule which prevents an arc from being an input to the phonology without affecting its status in the syntax. So a foreign-erased arc though syntactically present is phonologically null. In figure 1, arc A erases arc B and Dean, the nominal heading both arc A and arc B, will be pronounced only once--it will occur as the subject of the clause that arc A is in. It will not be pronounced in the position that a nominal heading a 1 arc in the clause containing the arc B would normally be pronounced in.



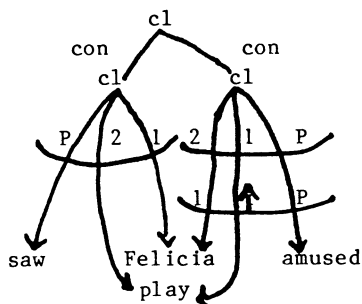
Figure 2



(2) Felicia saw the play and was amused by it.

In order for (2) to have 2-1 advancement in the second clause, there would have to be two separate clauses with different nominals heading the 1 arcs in their initial strata. The stratal diagram for (2) under the Johnson and Postal analysis would be figure 3. The 1-arc in the first clause erases the 1-arc that goes to Felicia in the second clause.

Figure 3



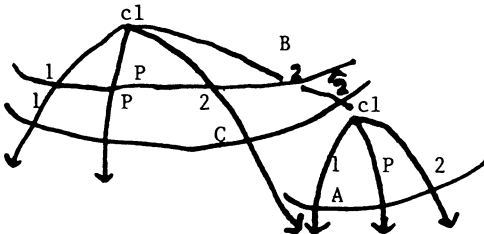
The rule of foreign erasure which gets (1) from figure 1 and (2) from figure 3, is defined to apply to arcs that are in what is called a kissing relationship. This means that the arcs share a head (are headed by the same element) but do not share a tail. Since the arcs do not share a tail it means they cannot be in the same clause since all arcs in the same clause share a common tail, namely the clause node. Given that foreign erasure does not change this structural relation, nor does it alter grammatical relations, rather, it simply makes one of the arcs unavailable to the phonology, the Johnson and Postal analysis of conjunction reduction as simply arc foreign erasure says that the final structure for verb-phrase conjoined sentences is two basic clauses conjoined with and, in no way syntactically different from two

unreduced conjoined clauses. Therefore, given this analysis, conjunction reduction sentences would be expected to behave just like unreduced conjoined sentences.

In what follows I will argue that this is not the case, that conjunction reduction sentences act as if they are composed of a single clause, and that for a conjunction reduction rule based on foreign erasure to be able to capture this fact, rules would have to be able to include reference to surface phenomena predicted by APG not to be a relevant part of determining syntactic structure. I suggest that not only shouldn't conjunction reduction be accomplished through a foreign erasure rule, but that a foreign erasure analysis should be explicitly prevented as a possibility. More precisely, I argue that a constraint should be added to universal grammar to prevent erasure from applying across conjunctions, and claim that with such a constraint the theory of APG will be able to capture generalizations that it currently cannot make both about conjunction reduction sentences and about other constructions such as Equi-structures.

One argument that CR sentences act as if they have only a single clause rather than two clauses in their final strata comes from sentences in which they are embedded under raising verbs. In APG, raising-to-object involves a lower clause arc such as A in figure 4, together with the higher clause arc B, which the embedded clause heads, sponsoring (licensing the existence of) the ascension arc C in the higher clause.

Figure 4



In English, if the embedded clause is the conjunction of two or more clauses, raising cannot occur. So in (3)(b) although it appears as if Sam might have been raised from an embedded conjoined clause in a network otherwise like the one in figure 4, the unacceptability of (3) (c) shows that this is not the case since Sam cannot advance to 1 in the higher clause in a passive construction as 2s normally do.

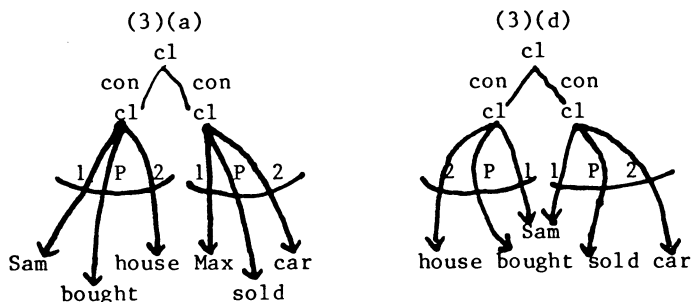
- (3) (a) Sam bought a house and Max sold his car.  
 (b) Mary believes Sam to have bought a house and Max to have sold his car.  
 (c) \*Sam is believed by Mary to have bought a house and Max to have sold his car.

If sentences with CR have two clauses in their final strata, then with respect to raising, they are predicted to behave just like (3) (a) which doesn't have reduction. In other words, the prediction is that the overt 1 in the CR sentence cannot become a 2 of the higher clause, and that it will not be able to advance to 1 in the higher clause. Yet this is not the case as can be seen by looking at (3)(e) and (f). In (3)(e) like (3)(b) it looks as if raising has applied. But we can see that in the case of (e) unlike (b) it really has applied, since the raised nominal can advance to 1 in the higher clause as seen in (3)(f). So the reduced sentence (3)(d) acts syntactically different with respect to raising than the unreduced (3)(a).

- (3) (d) Sam bought a house and sold his car.  
 (e) Mary believes Sam to have bought a house and (to have) sold his car.  
 (f) Sam is believed by Mary to have bought a house and (to have) sold his car.

By the Johnson and Postal analysis of (3)(a) and (d), the representations for these sentences differ in two ways as shown in figure 5. The network for (d) but not the one for (a) has arcs initially in a kissing relationship, and has had a rule of foreign erasure apply to erase one of the kissing arcs.

Figure 5



For their analysis to account for the difference in the behavior of these two sentences with respect to raising they will have to be able to explain it on the basis of one or both of these factors since these are the only things differentiating the two representations. I will show that making reference to the kissing relationship alone cannot explain the difference in the behavior of (3)(a) and (d), and will argue that any way in which foreign erasure could be referred to would lead to an undesirable rule form.<sup>6</sup>

One possible way of trying to account for the raising facts is to say that the rule of raising has a restriction on it specifying that an arc can only raise out of a conjoined clause if it is in an initial kissing relationship with the arc bearing the same grammatical relation in its sister clause. That this is not sufficient for explaining the differences can be seen by looking at sentences like the ones in (4) in which the kissing relationship has been resolved by anaphoric replacement (see figure 6) rather than by foreign erasure. The resulting sentences are nevertheless unacceptable unlike (3)(e) and (f) which would be claimed to have erasure.

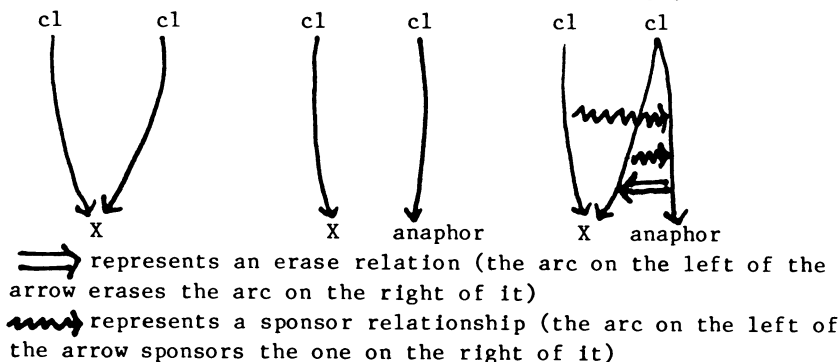
(4) (a) \*Mary believes Sam to have bought a house and he sold his car/him to have sold his car.<sup>7</sup>

(b) \*Sam was believed by Mary to have bought a house and he sold his car/him to have sold his car.

Figure 6

### Anaphoric Replacement

initial stratum      surface relations      erase and sponsor relations



So in spite of an initial kissing relationship, the unacceptability of (4) shows that the arc from the first clause can

still not be raised. This means that the only acceptable situation in which raising can occur out of a conjoined clause is when kissing has been resolved by foreign erasure (assuming the Johnson and Postal analysis). The restriction would have to specify that a network with an ascension arc sponsored by an arc in a conjoined clause was only acceptable if the arc from the lower clause that sponsored the ascension arc (the "raised" arc) had erased all arcs that it had a kissing relation with in its clause's conjoined sisters.

But a rule making reference to this type of information would be a very strange type of rule. Rather than referring to grammatical relations or even just to the structural configuration of an arc with regard to other arcs, such as whether they share a head, the rule must refer to what an arc has done, so to speak, to another arc. Since APG predicts that syntactic facts follow from grammatical relations and not from surface facts such as whether an arc is available to the phonology or not, this is not a desirable addition to possible rule forms.

But this analysis is bad for another reason as well. Since the only cases where raising occurs out of conjoined clauses are cases with conjunction reduction, hence cases where at least superficially the embedded clause looks as if it has only one 1-arc for two VPs, and since conjunction reduction by this analysis is foreign erasure, this analysis then claims that if an arc is phonologically null, it acts syntactically null, even though the rule making it phonologically null is explicitly designed to ensure that the arc is still syntactically present. A raising rule that made reference to foreign erasure would then be a rule that allowed sentences to act syntactically as if they were something different from what they really were (it would allow two sentences to act as one), as long as they looked superficially as if they were what they acted like syntactically. Without such tricks, a foreign erasure analysis of conjunction reduction incorrectly predicts that CR sentences will act syntactically as if they are two sentences.

A second case where a foreign erasure analysis incorrectly predicts that CR sentences will act as two sentences rather than one, is in predicting the occurrence and scope of time adverbs. In single nonconjoined clauses in English, time adverbs can be phrasal and occur sentence finally, or they can be sentential and occur sentence initially--(5)(a) and (b) respectively. But a sentence cannot have both a sentential and a phrasal adverb as seen in (5)(c).

- (5) (a) Ella went to a movie on Friday.
- (b) On Friday Ella went to a movie.
- (c) \*On Friday Ella went to a movie on Saturday.

In conjoined clauses without reduction, if a time adverb precedes both clauses it optionally has scope over both clauses, but this is not a necessary reading. (6)(a) could have an interpretation where Bob moved out on some day after Friday. And as seen in (6)(b), the second clause can have a phrasal time adverb in it in spite of the fact that the first clause has a sentential time adverb in it without there being a change in acceptability for the sentence as a whole.

- (6) (a) On Friday Ella bought a car and she/Bob moved out.
- (b) On Friday Ella bought a car and she/Bob moved out on Saturday.

However in a sentence with conjunction reduction, if a time adverb is sentence initial, it necessarily has scope over the entire sentence, as in (7)(a). An interpretation where Ella moved out after Friday is not available, and as with single clauses, there cannot be another time adverb following the VP as seen in (7)(b).

- (7) (a) On Friday Ella bought a car and moved out.
- (b) \*On Friday Ella bought a car and moved out on Saturday.

There is no way to account for these facts by an erasure analysis. The erasure rule for conjunction reduction would have to specify that erasure could not occur if the clause of the eraser had a sentential time adverb and the clause of the erasee had any sort of time adverb at all.<sup>8</sup> In this case a rule would have to be able to make reference to the existence or nonexistence of arcs (time adverb arcs) that were not in any special structural configuration with the arcs partaking in the rule (the nominal arcs). In addition, the erase rule would have to specify that when an arc was erased, scope relations of time adverbs changed. In particular, the scope of the adverbs would change to become what they would be if there were only one clause instead of two in the conjunction reduction sentence. So with regard to time adverbs as with raising, when there is conjunction reduction, the two clauses act as if they are a single clause with a single l-arc.

A third case in which an erasure analysis would have to make two clauses act as one is in the determination of word order in

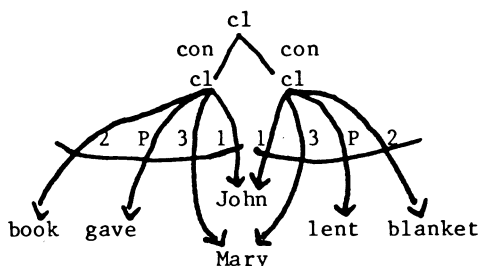


conjunction reduction sentences. If we adopt an erasure analysis, then in sentences with passive in both clauses, for example (8)(a), both *ls* and *↑s* must get erased. This can be seen in figure 7. *Mary* starts out as an initial 3 in both clauses, and John starts out as the initial 1 in both clauses as in figure 7a. The arcs to *Mary* must advance to 2 and then to 1 in both clauses, for both clauses to be passive. This corresponds to the network in 7b.

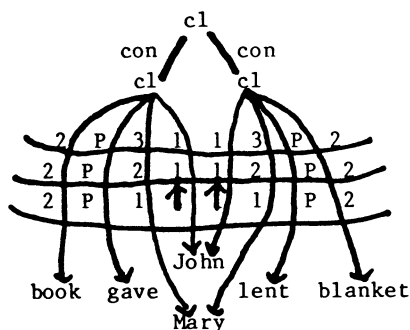
(8) (a) Mary was given a book and (was) lent a blanket by John.

Figure 7

a.



b.



As seen in figure 7b there are kissing *ls* and kissing *↑s*, but as seen in (8)(a) there is only one phonological instance of each. This means that in a sentence like (8)(a), both a *l*-arc and an *↑*-arc would have to be foreign erased. However it turns out that *ls* and *↑s* have to erase in opposite directions after linear order is determined. (9) shows that *ls* must erase from left to right since (9)(b) where erasure has gone in the other direction is unacceptable. (8) in comparison with (9) shows that *↑s* erase

right to left since (8)(b) where a ↑ has been erased on the right is unacceptable (with the same meaning as (8)(a)).

- (8) (b) \*Mary was given a book by John and (was) lent a blanket.
- (9) (a) John saw the house and decided to buy it.
- (b) \*Saw the house and John decided to buy it.

Therefore, for erasure to account for conjunction reduction, foreign erasure rules must be able to make reference to linear precedence facts. Before foreign erasure could apply, the clauses would have to be linearly ordered and the rule for English would have to specify that for *Is* the rule operated in one direction and for *↑s* it operated in another.<sup>9</sup> There are several reasons why this is not a good solution. First, allowing foreign erasure rules to make reference to these facts changes to some extent the concept of what a foreign erasure rule is. Foreign erasure is intended to be the licensing of a phonologically null element simply on the basis of another element being present. But the simple presence of the other element is not sufficient. What is necessary is the presence of another element in a particular linear relationship to the one that is phonologically null.

Another problem with having word order facts captured through directionality in the conjunction reduction foreign erasure rule is that it misses the generalization that the CR ordering facts appear to follow from other linear order facts in the language, namely that in English *Is* precede *Ps* and *↑s* follow *Ps*. But it doesn't even make sense to say this with regard to word order in CR sentences unless they are composed of a single clause, because if there are two clauses, a phonologically null element could be linearly ordered properly with respect to its own clause but still end up in the "wrong" position with regard to the conjoined clause as a whole.

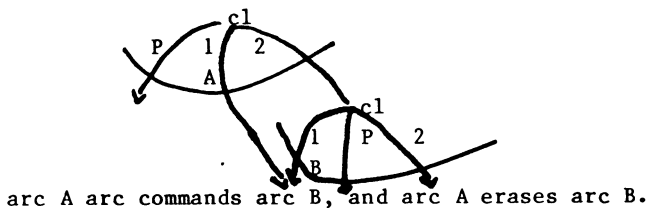
The position of phonologically null elements must be determined with respect to both clauses, and an analysis treating CR sentences as two clauses must incorporate directionality into rules of foreign erasure, and treat it as accident of the language that the word order of phonologically overt *Is* and *↑s* in CR sentences is exactly the same as if they were the only syntactic *Is* and *↑s* in the sentence as well. So by having erasure rules make reference to linear precedence, the generalizations about word order must be stated twice in the language, once in the linear precedence rules and once in the rule for conjunction reduction. And as was the case with the analyses of raising and time adverbs, foreign erasure, though not affecting syntactic

configuration or grammatical relations would make a sentence act syntactically different than its counterparts without foreign erasure.

To summarize, if conjunction reduction is simply foreign erasure of an arc, the grammar has to have built into it a number of mechanisms which ensure that a phonologically null element, although syntactically present, acts as if it is syntactically null. Hudson (1976) characterized conjunction reduction as deletion occurring when coreferential items have the same structural function. This characterization helps to explain why a foreign erasure analysis can't work for APG. An analysis which treats CR sentences as two clauses cannot capture the fact that the remaining surface element takes on the syntactic role of the erased element to its verb or verb phrase.

Not only doesn't foreign erasure capture this generalization, it in principle shouldn't. Foreign erasure is characterized as a relation between two elements such that the existence of one is sufficient for the nonexistence of the other. But this can only be the case if the elements are already in a relationship in which one has control in some sense over the syntactic role of the other. This cannot be the case in coordinate constructions. Coordinate clauses are of equal and independent status, elements in one do not control elements in another, and therefore, foreign erasure should not be expected to apply from one to the other. There are cases, however, where the proper relationship of control does seem to hold, and these are cases where the eraser arc commands the erasee. An arc A commands an arc B if the tail of B is the head of an arc sharing a tail with arc A (see appendix). In kissing structures, this happens when the erasee is in a complement or subordinate clause of the clause of the eraser. And foreign erasure does seem to get the right results in cases like these, Equi being one such example. (An Equi structure is shown in figure 8).

Figure 8



I would like to propose that foreign erasure be explicitly restricted to occur only in such cases where the erased element is

dependent on the role of the non-erased element, in other words to cases where the erased element is in a complement or subordinate clause. I suggest that a constraint such as (10) should be added to universal grammar saying that foreign erasure only occurs when the erased element is arc commanded by the arc erasing it. This means essentially that the arc that is erased is governed by the tail node of the arc erasing it.

(10) Foreign Erase (A,B)  $\rightarrow$  Arc Commands (A,B)<sup>10</sup>

Since kissing relations cannot exist between surface arcs (the arcs that are input to the phonology), ruling out foreign erasure across clauses means that CR sentences will always have to be a single clause in their final stratum because the only other way to resolve kissing relations while maintaining two clauses is through anaphoric replacement. Since this leaves a pronoun rather than a phonologically null element, this could not produce CR sentences.<sup>11, 12</sup> Therefore, this constraint ensures that conjunction reduction sentences will universally consist of only one clause in their final strata.

Placing a constraint like (10) in universal grammar allows APG to capture two generalizations that it currently cannot make. First, it universally characterizes CR sentences as having only a single clause in final structure. From this follows the generalization that CR sentences act syntactically as if they are composed of one clause, and in particular the fact that word order follows from the independently stated linear precedence rules for each language.

Secondly, if all foreign erasure occurs from higher to lower clauses universally, then the fact that this is the appropriate structure for Equi will automatically follow and will not have to be stated in the rules of Equi in each language. This type of generalization has already been made for raising structures through the Nominal Arc Successor Law which ensures that a successor governs its predecessor. So universally the ascension arc in raising structures must govern the arc in the lower clause that sponsored it. This prevents, for example, arcs being raised from one conjoined clause into another. A constraint like (10) would allow for the same sort of generalization across languages, namely, that Equi rules always apply into complement or subordinate clauses. Without this constraint every language must specify the appropriate structure in which Equi can apply within its language--specific Equi rule.

Therefore, a universal constraint that restricts foreign erasure to applying only in cases where the eraser governs the

erasure prevents the necessity of restating linear order facts in erasure rules. It allows universal grammar to capture the generalization that in CR the clauses act syntactically as if they are a single clause. And it both simplifies the statement of Equi rules and captures the generalization (which is already assumed) that Equi erasure is always from a higher to a lower clause.

## Appendix

Most of the definitions and laws in this appendix are stated informally, for formal definitions see Johnson and Postal (1980). Where page numbers are given, they refer to pages in that book.

1--subject 2--direct object 3--indirect object cl--clause  
 ↑--l-chomeur, "unemployed l", a l that has been "bumped out" by a successor.

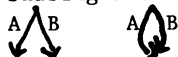
P--predicate con--label for arcs going to conjuncts

sponsor relation (informal definition, p. 61)--Sm sponsors Sn means "that the occurrence of Sn is (partially) justified by, or is dependent upon, the occurrence of Sm"

erase relation (informal definition, p. 61)--Sr erases Ss means "That the occurrence of Ss is sufficient for the nonoccurrence of Sr in the phonologically relevant 'surface aspect' of the sentence in question."

foreign (p.109)--not a neighbor; arcs not sharing a tail

neighbor (p.41-42)--Neighbor(A,B)  $\leftrightarrow$  Tail(A)=Tail(B); elements sharing a tail; there are two neighbor constructions--



tail--the end of an arc that doesn't have an arrow at it

head--the end of an arc that has an arrow at it

foreign erase--erasure by one arc of another in a kissing relation

basic clause (p.209)--the "subset of basic constituents whose points are labelled Cl"

basic constituent (p.211)--having a self sponsoring point, not dominating con arcs

(see p.47 for a definition of 'point')

final l law (p.228)--every basic clause must have a l-arc in its final stratum

P-arc tail label law (p.200)--the tail of every initial P-arc must be labeled cl (clause)

kisses (p.41-42)--when arcs share a head but not a tail; A B



motivated chomage (p.356)--an arc can only bear a chomeur relation if another arc bears the relation, in the same stratum that the chomeur is first in, of the arc that it is the successor of (eg. the 1-arc for a <sup>1</sup>-chomeur arc); for something to be a chomeur, it must have been "bumped out" of the relation it previously held

ascension arc--an arc in a higher clause sponsored by an arc in a lower clause

stratal uniqueness law (p.243-244)--there can only be one 1-arc, one 2-arc, and one 3-arc, in the same clause in the same stratum.

parallel assassin law (p.129)--if arc A is a neighbor of arc B and A erases B, then A must be the successor of B

maximal two sponsor law (p. 122)--an arc cannot have greater than two sponsors

successor (p.106)--an arc A that shares a head with an arc B that sponsors it, is the successor of arc B

predecessor (p.106)--an arc B that sponsors and shares a head with an arc A is the predecessor of arc A

overlay arcs (p.259-261)--overlay arcs are arcs outside of a clause but sponsored by arcs within it; they are used to account for "unbounded movement" phenomena

arc-commands (p.257)--arc A arc-commands arc B if the tail of A remote-governs the tail of arc B

remote-govern (p.35)--if node a governs node b, and node b governs node c, then node a remote-governs node c

govern (p.43)--a node a which is the tail of arc A governs a node b if b is the head of arc A

nominal arc successor law (p.257)--an arc A that is the successor of an arc B arc-commands arc B

#### Footnotes

\*I would like to thank Jan Jake, Michael Livnat and Sue Ann Kendall for their help in the early stages of this paper. Without them it would never have gotten off the ground. I would also like to express my appreciation to the people at the U of I and UB who listened to and commented on earlier versions of this work, and in particular would like to thank Donna Gerdtz for her comments, criticisms, time and energy which she gave so willingly in spite of such short notice from me. And finally, I'd like to thank John Richardson for helping me see what I was getting at even when he wasn't sure of what it was.

<sup>1</sup>I have tried to strike a compromise in this paper between defining terminology in the text as it is introduced, and taking long digressions from the main points to explain all of the arc-

pair terminology and laws which I use. To solve this problem, although I do define some things within the text, many of the definitions and explanations of APG laws have been put separately into an appendix. So if in reading this paper some of the terminology is unclear, please check the appendix before giving up.

<sup>2</sup> I assume that Johnson and Postal mean nothing more by the term "main clause" than "unreduced clause" since they provide no explanation for their use of this term.

<sup>3</sup> I use stratal diagrams with arc pair notions incorporated in them rather than using pair networks because I think stratal diagrams are easier to read. The diagrams should be taken as shorthand for pair networks, and I will usually refer to them as networks.

<sup>4</sup> Initial VPs are ruled out by the P-arc tail label law which specifies that every self-sponsoring P arc has a clause node as its tail. Therefore, every initial P must be an immediate constituent of a clause, and cannot be a constituent of any smaller unit. Note that this law does not rule out the possibility of VPs in final strata since the Ps in final strata do not have to be self-sponsoring. Non-self-sponsoring Ps can arise, for example, through rules like clause union.

<sup>5</sup> A network like (2)(b) is also unacceptable in APG because it violates motivated chomage.

<sup>6</sup> There are two other equally unacceptable possible ways, besides the ways discussed below in the text, to capture the raising facts. One way would be to allow both lower clause P-arcs to sponsor ascension arcs (hence the raising morphology on both verbs in (3)(b)), and have erase apply in the higher clause. This doesn't work for several reasons, one is that it violates stratal uniqueness because there would be two 2s in the higher clause. A second reason is that the arcs would not be in a kissing relationship in the higher clause (since they would share a tail), so foreign erasure could not apply. Additionally, erasure of a coreferential arc within a single clause is prohibited by the parallel assassin law. Even if we could get around these problems, this analysis would still wrongly predict that (4)(a), where replace rather than erase occurs, would be okay.

The second possibility would be to have the kissing arcs together sponsor a single ascension arc. This, however, violates the maximal two sponsor law since the embedded clause arc also sponsors the ascension arc, and since there can be more than two conjoined clauses. But even if the law were somehow modified for conjunction cases, such a construction would be simulating a collapsing of arcs and hence of clause structure as well, even

though technically there would still be two clauses in the embedded clause. If this is really what is necessary, then it seems to me that it would be better to capture this fact through a rule that actually did change clause structure rather than through a rule that just pretended to. Additionally, even though this solution would technically account for the raising facts, it would not help in the problems associated with word order discussed below in the text.

It's not at all clear why a sentence with an anaphoric replacer should act differently from two independent sentences in this case since in their final arc structures they are identical. If a sentence like (3)(b) initially has two clauses with raising in each and then some kind of gapping or identity deletion rule applies, then the latter rule will have to be blocked if there are anaphoric relations holding between the *ls* of the clauses. Alternatively, it may be that (3)(b) has a conjoined clause embedded under a single verb but that the verbs in the conjoined clauses are initially nonfinite. Then the version of (4)(a) without raising morphology in the second clause would be ruled out by a requirement that if one of the verbs in a conjoined clause is nonfinite the others must also be. And the case with the raising morphology could be ruled out by a constraint on initial strata that there not be both nonfinite verbs and a kissing relation between the *ls* of the nonfinite clauses.

I have presented the arguments here as if the difference between phrasal and sentential time adverbs is simply a matter of word order, but I suspect that a more accurate analysis is to treat sentential time adverbs as resulting from overlay relations. This analysis would be able to explain the scope facts straightforwardly. In the case of two clauses conjoined, an adverb could bear an overlay relation either to its basic clause, and have scope only over its own clause, or it could bear an overlay relation to the higher conjoined clause as a whole, and have scope over both/all of the conjuncts. If the second clause had a time adverb, the overlay arc for the sentential adverb could only bear a relation to the first conjunct since if it were an overlay arc to the whole conjoined clause, the one time adverb per VP constraint seen in (5)(c) would be violated in the second clause.

In the case of CR, if these sentences are a single clause in final structure, then any time the second VP had a time adverb in it, if another time adverb bore an overlay relation to the clause, the constraint would necessarily be violated. Also if there were only one clause, the overlay relation would necessarily be born to both VPs, explaining the scope of the adverb over both VPs, since there would only be one clause node for the overlay arc to attach



to.

<sup>9</sup> An alternative to having a conjunction reduction rule sensitive to linear precedence relations would be to have conjunction reduction apply before linear precedence is determined, and then have the linear order of the conjoined clauses with respect to each other be determined by which clause had which erased elements in it. For example, an ordering rule for English conjoined clauses could specify that clauses having foreign erased l-arcs followed clauses with l-arcs that weren't foreign erased. But this solution is not really any better. Linear precedence is predicted to follow from grammatical relations rather than surface relations, so having ordering rules make reference to foreign erase relations is undesirable. But even more importantly, such an analysis should be avoided because it still misses the generalization that CR sentences act like a single clause with respect to the determination of word order.

<sup>10</sup> This constraint also rules out a foreign erasure analysis of gapping and right node raising constructions, but it does not rule out the foreign erasure that occurs in raising and clause union. The foreign erasure that occurs in raising and clause union is from successors to predecessors, and successors always govern their predecessors (other possibilities are ruled out by the nominal arc successor law). Since (10) allows foreign erasure where the eraser governs the erasee, these rules fall into the class of examples where foreign erasure would still be licensed. Gapping and right node raising by foreign erasure would be ruled out since erasure would be across conjoined clauses. I think this is the right analysis though there would have to be some other rule of phonological deletion which could make reference to identity of elements.

<sup>11</sup> Actually (10) by itself doesn't completely guarantee that conjunction reduction sentences have to have only a single clause in their final stratum. It is possible to have one of the kissing arcs replaced by an anaphoric replacer which could then self-erase. However there independently need to be strict constraints on self-erasure, even though at this point it is not clear what they are, since not all anaphors can self-erase and still produce good sentences. In addition since I have argued that one of the reasons that foreign erasure is not a good analysis is that the CR sentences act as if they are composed of a single clause, the self-erasure analysis would be riddled with the same problems. I suspect that self-erasure of anaphors should also be constrained to cases where the kissing arc of the replaced one governs the anaphoric replacer.

<sup>12</sup>It is not clear what mechanism could resolve the kissing relation in a way that would produce only one clause either, but if a new type of rule is created to solve conjunction reduction sentences, one having an outcome of one clause rather than two would nevertheless be preferred since only a rule treating these sentences as a single clause in final structure would capture the appropriate generalizations. In addition the rule suggested by Frantz (1976) for equi-subject clause union, rather than consisting of a rule of equi followed by clause union, is a rule which allows kissing arcs to collapse simultaneously with the clause union. This type of analysis might also work for conjunction reduction. The kissing ls would collapse together creating a single clause with the remaining bits of the two original clauses getting conjoined in the process.

#### References

- Frantz, Donald. 1976. Equi-subject clause union. BLS 2, Berkeley. 179-187.
- Hudson, Richard A. 1976. Conjunction Reduction, Gapping, and Right-Node Raising. Language 52:3.535-562.
- Johnson, David E. and Paul M. Postal. 1980. Arc Pair Grammar. Princeton: Princeton University Press.

Japanese Sentence-final Particles as Commitment Markers  
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1. Introduction. Speakers of Japanese use a class of lexical items called "sentence-final particles" (SFP's) to indicate their attitudes about the content of their utterances. I list examples of typical SFP's and the meanings usually associated with them in (1).

- (1) a. yo -- I tell you, you know (strong assertion)  
 Mado ga aite imasu yo.  
 'The window is open, you know.'
- b. sa -- naturally, of course (emphasis--the information is self-evident)  
 Mado ga aite iru sa. (fn. 1)  
 'The window is open (naturally).'
- c. zo -- strong emphasis  
 Mado ga aite iru zo.  
 'The window is open, (damn it)!'
- d. ze -- fairly strong emphasis  
 Mado ga aite iru ze.  
 'The window is open, y'know.'
- e. ne -- isn't it so? (tag question marker)  
 Mado ga aite imasu ne.  
 'The window is open, isn't it?'
- f. na -- tag question--like ne only stronger  
 Mado ga aite iru na(!)  
 'The window is open, isn't it!'
- g. ka -- question  
 Mado ga aite imasu ka.  
 'Is the window open?'
- h. wa -- insistence/femininity  
 Mado ga aite iru wa.  
 'The window is open.'
- i. no -- interrogative or softener (depends on intonation)  
 Ashita iku no?  
 'Are you going tomorrow?'  
 Ee, ashita iku no  
 'Yes, I'll go tomorrow.'

This is not an exhaustive list of items that have been labeled SFP's; rather these are the uncontroversial examples.<sup>2</sup> Still, the examples in (1) give the flavor of the information SFP's add to utterances. SFP's don't change the truth conditional meaning of utterances (most of the utterances represented in (1) are about the window being open); they instead show how speakers feel about what they are saying. The speaker may be quite convinced that the window is open, in which case a strong particle like yo could be used. Or the speaker might be unsure whether the proposition "the window is open" is true or false. In this case ka, which makes absolutely no claims

about the window's status, may be used, since ka requires the hearer to determine whether the window is open or not.

SFP's have been analyzed in a number of ways, but here I concentrate on demonstrating the problems inherent in two previous characterizations of their functions. Uyeno (1971) describes SFP's as performatives marking illocutionary force (IF), while Givón (1982) and Tsuchihashi (1983) (G&T) look at them as markers that fit on a speech act continuum from declarative to interrogative. I show how these analyses are both inadequate and outline an approach which builds upon the useful insights of the earlier accounts but more accurately reflects the kinds of attitudes that SFP's allow Japanese speakers to express. I utilize a framework based upon a "strength of commitment" scale that accounts for the use of SFP's in a principled way. I now turn to Uyeno's IF analysis.

2. SFP's and Illocutionary Force. Uyeno lists the syntactic properties of SFP's and she notes the sociolinguistic constraints on SFP use in detail, yet her account is inaccurate in that it does not capture the actual nature of the function of SFP's in utterances, it excludes certain lexical items from the class of SFP's, and it does not consider SFP's that may occur in non-final position. Each of these problem areas is discussed below.

Uyeno looks at SFP's as performative predicates, and particles like wa, yo, zo, ze, and sa are grouped together as particles of "insistence," while SFP's like ne and na are called "requests for compliance" (Uyeno 1971:27). The performative verb and associated IF of utterances with SFP's of the first class she labels as like STATE, while utterances with ka, the question particle, are associated with performative verbs and IF's like ASK (39). This leads us to wonder exactly what the IF's and/or higher predicates associated with each individual SFP are. Uyeno however, suggests neither Japanese performative verbs nor English equivalents that might differentiate the various SFP's.

Indeed, considering IF marking to be the primary function of SFP's (also the tactic of R. Lakoff 1972) leads to much difficulty when one tries to assign a performative sense to all SFP's. Although ka and yo might be paraphrased as Japanese equivalents of "I ask you" and "I tell you" respectively, the other particles are harder to associate with any specific IF. For Uyeno, the only difference among the SFP's with IF's like STATE is the strength of the speaker's insistence, so perhaps she intends to associate them as in (2), using two IF's, STATE and INSIST.

- (2) a. wa = "I state that I weakly insist that x"
- b. yo = "I state that I insist that x"
- c. sa = "I state that I strongly insist that x"
- d. ze = "I state that I quite strongly insist that x"
- e. zo = "I state that I very strongly insist that x"

There is something counterintuitive about an analysis of the class of SFP's as indicators of IF where most of them indicate basically the same force, yet Uyeno tries to do so with some combination of stating

and insisting like (2). The matter is further complicated when Uyeno discusses SFP's like ne and na, because she says they can be associated with at least four performative highest predicates: STATE, ORDER, ASK and SUGGEST (p. 132). With which of these verbs speakers associate ne/na must be determined by the addressee from other clues, since these two SFP's are treated by Uyeno as ambiguous for IF. If context or other factors are indicating IF, then what are the SFP's doing?

Speakers also use SFP's in utterances with many different IF's, regardless of whether the SFP's are more like "ask" or "tell" in traditional descriptions. The examples in (3) show instances of zo and yo with reported speech acts, which show that the same SFP may be used with varying IF's or underlying performative verbs.

- (3) a. kore wa okashii zo to omotta  
       this strange quot thought  
       'This is strange,' I thought.' (Uyeno 1971:73)
- b. Taroo, ki-o-tsukenai to kega o suru zo to chuuishita  
       not careful when injury get quot warned  
       'Taroo, if you are not careful you'll get injured!' he  
       warned.' (Uyeno:75)
- c. Naguru zo to odokashita  
       hit threatened  
       'I'll hit you!' he threatened.' (Uyeno:76)
- d. Otoko wa "Nihon wa madamada mazushii kuni na-n-da yo"  
       man Japan yet poor country be-comp-be  
       to tsubayaita.  
       muttered  
       'The man muttered, "Japan is still a very poor  
       country."' (Maynard 1984:14)

Furthermore, when describing one's own speech act, SFP's may be used with utterances containing speech act verbs.

- (4) a. ano hito wa kimi o butsu kamo shirenai to keikoko  
       that man you hit ..might..... warn  
       shiteiru-n-da yo/zo  
       ing-comp-cop  
       'I'm warning you that he'll hit you!'
- b. uchi ni iro to teian shite iru-n-da yo/zo  
       home to come (imper) suggest do -ing  
       'I'm (strongly) suggesting that you come home!'  
       (Tsuneko Nakazawa, consultant)

Utterances like those in (3) and (4) reveal that the SFP's are not indicating any specific IF but are instead somehow affecting IF's that have been marked in other ways (verb endings, lexical items, intonation, context, etc.), i.e. the SFP's in (3) and (4) demonstrate how strongly speakers feel about both the truth conditional content and the IF's of their utterances.

Another minor difficulty with the characterization of SFP as IF's

using STATE and INSIST that was proposed in (2) shows up whenever SFP's are combined, as in (5).

- (5) a. Kono bun ja jiki-shachoo wa, ore da yo ne  
 this rate at-topic head-of-company top. I cop SFP's  
 'At this rate, I tell you, I'll be the next head of  
 the company.' (Martin 1975:919)
- b. Ane da wa ne  
 rain cop. SFP's  
 'It is raining, isn't it?' (Uyeno 1971:64)

If each SFP in (5) is a verb of IF, the first predicate in each is no longer the highest, since the final SFP must be analyzed as another performative verb. Representing the IF of SFP's in a lower clause would rule out SFP's as IF markers under Uyeno's strict characterization of performatives as highest clause verbs (Uyeno:13), although this poses no problems for less stringent frameworks that allow for embedded performatives ("I regret to inform you that we are out of steak this evening").<sup>3</sup>

More problematic for Uyeno's SFP treatment are occurrences of SFP's which cannot be analyzed as highest clause performative verbs at all and therefore must be treated as members of different syntactic categories to continue to maintain the performative analysis. Some SFP's can occur in non-sentence-final positions (this is possible with sa, ne and perhaps the particle wa<sup>4</sup>) as shown in (6).

- (6) a. Ano ne, Bill wa ne, ii hito to omou.  
 umm SFP Bill top SFP good man quotative think  
 'You know, Bill, you know, I think he's a good guy.'
- b. Ee-to sa, hon wa sa, takai yo.  
 err SFP books top SFP expensive SFP  
 'AND, books (obviously), they're expensive (I tell you).'
- c. Ne(e) Taroo-kun kore wa nan da  
 SFP Taroo this top. what cop.  
 'Hey, Taroo, what's this?' (Uyeno:49)

The first phrases of (6a&b) both show ne and sa used with "hesitation phenomena" (equivalent to "umm" or "err" in English), which lack the usual finite predicates found in Japanese main clauses. In the second phrases of (6a&b) ne and sa are used with topicalized noun phrases that are associated with the predicates omou 'think' and takai 'be expensive'. In (6c), ne is sentence-initial, used somewhat like a vocative. Note that these aren't cases of "moved" SFP's, because a different SFP can occur sentence-finally, as yo does in (6b). If SFP's are attachable only to highest clauses, as Uyeno claims they are, these instances of SFP's (alone, with noun phrases and with hesitation phenomena) would have to be analyzed differently, perhaps as homophonous lexical items (this is Uyeno's approach). It is true that there is much apparent homophony in Japanese, even among its particles (cf. note 4), yet the effects of these particle uses are similar to their sentence-final effects. This implies that these SFP's are occurrences of

the same lexical items. To list these occurrences as separate lexical items would be to obscure the similarities, creating separate lexical items that convey similar speaker attitudes, yet differ only by syntactic properties. For example, the sa in (6b) adds emphasis and hints that the speaker feels that the information preceding sa is "obvius" in the same way that the sentence-final sa in (1b) above does.

The Illocutionary Force treatment of SFP's, then, does not account for combined SFP's or non-sentence-final uses of SFP's. (This requires Uyeno to claim that both SFP-like particles belong to other particle classes.) Nor does the IF account make clear how SFP's and their IF's are to be linked. A complete analysis of SFP's should account for these properties.

3. A scalar account of sentence-final particles. Givón (1982) makes a first approximation of what kind of information Japanese speakers actually convey when they use SFP's, and Tsuchihashi (1983) expands upon and provides evidence for the validity of Givón's framework.<sup>6</sup> Their main claim is that SFP's may be used to express a range of speech acts depending on the context of utterance, and that range prompts G&T to place SFP's on a continuum ranging from assertions to questions. G&T use a loose definition of SFP's, including one combination, wa ne, in addition to lexical items indicating uncertainty like janaika, kamoshirenai, kashira, and daroo/deshoo. These have traditionally have been labeled modals or mood markers (cf., for example, McClain 1981). The benefits of the scalar treatment over the IF analysis are that the scale allows for the different illocutionary effects possible with each particle (such as those in (3) above) by not associating whole SFP classes with one IF, and that membership in the class of SFP's is determined by how the use of a lexical item affects the interpretation of the IF's of utterances rather than by exclusive sentence-final use or mono-syllabicity, criteria which I have invalidated in the preceding discussion. Nonetheless, the scalar analysis needs some refinement to accurately account for what speakers can do with SFP's.

I suggest that the scale G&T propose is inaccurate for a number of reasons: they omit speech acts that do not fit neatly on their continuum, they provide no account for most SFP combinations and by concentrating on SFP's as speech acts they cannot capture the kinds of information speakers convey by using SFP's.

G&T gloss over the fact that some of the SFP's may be used with utterances having IF's other than those ranging between assertions and questions, which therefore cannot be placed neatly on a scale in between those two poles—specifically imperatives and exclamations.

As for imperatives, although G&T do hint that perhaps, by extending their scale past questions, it could cover imperatives (Givón 1982:107), they do not provide details to show how or why this is accomplished. This could be because they realize that particles like yo, na, and ne, which are near the declarative end of their continuum, may be used with imperatives, as in (7).

- (7) a. (O)kakenasai/kakete-kudasai/kakete-kure yo  
sit-command  
'Sit down, would you?/would you please!'  
b. Kakete kudasai na  
'Sit down please, would you?' (Uyeno:116)  
c. Mado o akenasai ne  
window open-command  
'Open the window, will you!' (Uyeno:122)

They would then be forced to try to put these SFP's at two different points on the continuum (cf. Table 1). Doing so would require G&T to call for yo<sub>1</sub> and yo<sub>2</sub>, na<sub>1</sub> and na<sub>2</sub>, and ne<sub>1</sub> and ne<sub>2</sub>. In other words they would create another unnecessary set of homophonous particles in Japanese.

Table 1: Tsuchihashi's Continuum (1983:374)

Interrogative										Declarative				
ø <sub>2</sub>	JANA KASHIRA	JANA KA	DARO	KA	NA	DESHOO	KAMOSHIRENAI	KASHIRA	NE	KANA	YO	WANE	ø <sub>1</sub>	SA WA

Additionally, G&T do not consider all of the illocutionary effects of marking exclamations with SFP's, although SFP's are quite commonly used with exclamations in conversation.<sup>7</sup> On the G&T continuum, exclamatory SFP's are placed further from the declarative pole than those that are neutral or assertive. This works out fine for them only because G&T do not include all the possible SFP's in their list. Some of these missing particles, particularly zo, may be used to indicate either surprise or strong assertions (which G&T consider different IF's because one may express some doubt when surprised). For example, (8) can be considered not only a strong declarative, it may be used as an exclamation, depending on the context of utterance, and could be used when a speaker is surprised at the hearer's actions.

- (8) Kimi wa hontoo-ni bakarashii zo!  
you top true-ly ridiculous sfp  
'You're really ridiculous! (and I'm certain of it!)

To account for speakers' use of zo with both very strong assertions and exclamations, G&T would again be required to place a SFP on two points in their scale.

A second difficulty with G&T's characterization is that the particle combinations (or polysyllabic SFP's) like those in (5) are not covered. This is odd, especially since they list wane as a SFP. Japanese speakers use many additional particle combinations. Uyeno includes wa ne, wa yo, wa yo ne, sa ne, yo ne, ka na, and ka ne



(1971:126), and Watanabe cites occurrences of zo yo and sa yo (1968:133). The effects that can be achieved by combining SFP's are complex—using yo ne, for example, expresses something paraphrasable as an emphatic tag:

- (9) ano onna wa kimasu yo ne  
 that woman come  
 'She will come, won't she?'

Deciding where an utterance with this kind of effect lies on a continuum from assertions to questions to imperatives will be difficult—is (9) less assertive than an equivalent utterance with only yo but more so than one with ne alone, or is (9) stronger than either? The other combinations pose similar problems for G&T's scale, which implies that the scale should not be based on speech act type after all.

That the speech act type scale does not actually capture what information speakers convey with SFP's is the final difficulty with the G&T analysis that I will mention. In the previous discussion we have seen many instances of utterances with SFP's where sentential elements other than the SFP's serve to indicate what speech act is occurring. For example, in (3) and (4) phonetically realized verbs indicate the speech act that is occurring while in (7) verbal morphology marks the utterances as imperatives, and in (8) only the context of utterance would determine whether the speaker is exclaiming or forcefully stating.<sup>8</sup> The following examples further demonstrate than an utterance may be an emphatic assertion, an order or a warning with the same SFP.

- (10) a. Ano hito ga kite-imasu yo.  
 that man come-ing  
 'He's coming, (I tell you!).'  
 b. koi to itte-'ru n' da yo  
 come-imper please quot telling nom cop  
 'I'm telling you to come!'  
 c. Ki o tsukero yo  
 care take-imper.  
 'Be careful (I warn you)!' (T. Nakazawa, consultant)

Obviously, factors that include verbal morphology and lexical meaning determine the IF, not the SFP yo alone.

Now that the disadvantages of the two previous treatments of SFP's have been outlined, I will turn to an alternative approach that will take advantage of the useful observations of Uyenó, Givón and Tsuchihashi and avoid their pitfalls.

4. SFP's and strength of commitment. I propose that SFP's are not used to indicate IF. When used sentence-finally, the effect of using a SFP is that speakers indicate an attitude toward some IF—they are still asking or telling, explaining or warning, etc. (as determined by other elements in the utterance and by context), but with a greater or lesser degree of strength or conviction (which I call commitment). The

scale proposed here hinges on the use of SFP's as indicating speaker commitment, and I believe it will account for conversational occurrences of SFP's in a principled way and will also make some interesting predictions about the kinds of utterances containing SFP's that should or should not have appropriate circumstances of utterance.

Commitment refers to a willingness to be held accountable to the truth conditional content and IF of an utterance (in other words how certain speakers are about the validity of their claims, feelings, suggestions, questions etc.-they know what they're talking about). More concretely, if someone uses yo, the indication is that they are quite certain that they have their facts straight, while using ne on the other hand shows that they would like the hearer to confirm what they say (note that this is a VERY simplistic characterization--I am leaving out the fact that speakers may use ne just to SEEM like they want confirmation in order to be polite, and the general use of SFP's to produce conversational implicatures).<sup>9</sup> I place the SFP's on a scale ranging from those indicating strongest commitment (zo yo) to weakest (janaikashira 'could it not be?'), as in the rough sketch in (11) (by no means a final OR accurate version since the work of figuring out the precise strengths of commitment implied by the individual SFP's is incomplete).

- (11) (strong) ZO YO..ZO..ZE..SA..YO..WA..NA..WA NE..NE..KA NA  
 ..NO..KA..DAROO..JANAICA..JANAIKASHIRA (weak)

Note that particle combinations are treated as polysyllabic SFP's and are gradations between the other SFP's on the scale. The scale in (11) is inaccurate, however, because it shows the SFP's in a vacuum. SFP's occur in conversational utterances, and the IF and other attitudes present in an utterance in context will affect the relative strength of commitment that the speaker can indicate with any SFP.

These interactions are advantageous for this hypothesis, because they avoid the proliferation of SFP's that caused problems for the G&T analysis. Depending on how lexical choice and SFP choice interact, a speaker can indicate a high degree of commitment with sa in an utterance with reinforcing adverbs as in (12a), a relatively lower degree with yo in a declarative (12b), but indicate somewhat weaker commitment with sa when a judgment verb appears in the utterance, as in (12c).

- (12) a. Mochiron, sonna koto wa atarimae sa  
 of course such thing matter of course  
 'That goes without saying, of course.' (Uyeno:83)  
 b. Kimi wa ii gakusei da yo  
 you good student cop  
 'You are a good student'  
 c. Taroo wa shigoto o yatte shimau-n daroo sa  
 work do finish suppose  
 'Taroo is finished, I suppose.' (fn. 10)

Sentence-final and non-sentence-final occurrences of SFP's may

receive unified treatment in this approach. Commitment marking need not apply to highest clauses exclusively, as it is not tied to an analysis requiring commitment markers to be performative verbs. Speakers express attitudes by using SFP's, and they may indicate a degree of commitment toward: (i) the truth conditional content and IF of an entire utterance when the SFP is the final element of the utterance; (ii) their beliefs about the truth of a verb phrase when the SFP is non-sentence-final (cf. 6); (iii) their certainty about the referent of a SFP-marked NP. Contextual cues are used to determine what the speaker is indicating commitment toward with sentence-initial SFP's and particles used with hesitation phenomena.<sup>11</sup> Speakers may even express different degrees of commitment toward their beliefs about different parts of an utterance (cf. 6b with sa and yo).

This scalar proposal also easily handles the occurrences of individual SFP's with many different IF's that were problematic for Uyenō. No close relation between SFP's and IF is stipulated, and SFP generation is restricted as little as possible. The scale's generality predicts it will be possible to use every SFP with any class of verbs, any combination of other attitude markers, any kind of IF, or any politeness level. The strength of commitment scale also does not prescribe that any particular combination of speakers of differing social status or sex role will have limited access to all of the SFP's.

Naturally, some combinations of SFP's and speakers/verbs/situations are less felicitous than others, but there are ways to determine appropriate uses of SFP's. There will be sentences that otherwise "make sense" (appear perfectly ordinary in other semantico-pragmatic respects) with SFP's attached that the grammar generates, that rarely, if ever, are actually uttered by certain groups of speakers or when conversational participants have certain relative social status. However, this apparent over-generation is held in check by a set of appropriateness conditions for SFP use, of the type hinted at by Prince (1978) in reference to "tacit assumptions" (p. 365) and Horn (1984) with regard to many different pragmatic and syntactic facts.

These conditions tell us what the combinations of SFP's with certain IF's, modalities, and social status will be, and they predict that other uses of SFP's will be extraordinary, but not ruled out entirely. Certain combinations of SFP's and verbs, (or crucially for this discussion, of certain SFP's and speakers) are ruled out either by the rarity of the occurrence of situations appropriate to their use or by what is considered polite behavior by segments of Japanese society. For instance, the restrictions on strong assertions (and strongly assertive SFP's) are many in Japanese, but the the appropriateness conditions will not rule out uncommon usages under special circumstances, when standards of politeness change, or when bizarre states of affairs obtain. (If Japan had a woman in a very high office, she would hear men using many "softening" particles and avoiding the assertive ones.)

When the commitment marking scale and the set of principles that determine appropriate SFP use combine and interact, the result will accurately reflect actual SFP use among speakers of Japanese, i.e. which utterances will be extraordinary and require special licensing

contexts and which will be ordinary utterances. Further work is needed, especially in the area of specifying the appropriateness conditions, but this proposal hopes to predict appropriate SFP usage while avoiding the problems of the earlier analyses.

## NOTES

1. The change in the form of "the window is open" has to do with formality markings. Some of the SFP's are more appropriate with formal styles (-masu endings) while others are more appropriate with the plain style (-ru endings)—these endings don't change the information expressed in the utterance.
2. In addition to SFP's used singly, as in (1), there are combinations possible, such as wa yo, wa ne, and wa yo ne, and these are discussed below.
3. Actually, the scale proposed below will also take care of this minor problem and also maintain the higher predicate analysis, because I look at these combinations as independent polysyllabic SFP's. Then they could be viewed as a single predicate in a performative analysis.
4. The problem with wa is that it is very hard to distinguish among homophonous particles pronounced [wa], such as the "topic" wa, the "contrast" wa, and the sentence-final particle wa.
5. This topic is further explored in Kendall (in prep.).
6. Since G&T actually use with the same general framework, I discuss their work as a unified whole.
7. A full discussion of the ordering elements on G&T's scale is beyond the scope of this paper.
8. I'm not debating whether exclaiming is an IF—G&T seem to think it is, so any problems with exclamations cause problems for them.
9. Implicatures, ironic uses, sarcasm, etc. will be calculable for SFP's in the same manner as they are for other utterances, i.e. utterances that appear pragmatically implausible will be assumed by the hearer to be cooperative in some way.
10. Note that sa in a question does not necessarily indicate that the speaker is weakly committed. In (i) I would say that the speaker is strongly committed to the question being uttered, which is the flavor of the gloss that Uyeno provided when originally citing the example.

(i) Kore nani sa?  
this what

'What is this? (you tell me)' (Uyeno:86)

Also, occurrences of daroo in utterances like (12c), where it acts like a form of the copula or a verb of judgment indicate that perhaps daroo should not be considered an SFP, but instead be grouped with some other type of sentential attitude markers.

11. The mechanics of marking commitment to NP's, VP's, utterances and hesitation phenomena has not yet been worked out to my satisfaction.

## REFERENCES

- Givón, Talmy. 1982. Logic vs. pragmatics, with human language as the referee: toward an empirically viable epistemology. *Journal of pragmatics* 6: 81-133.
- Horn, Laurence R. 1984. Toward a new taxonomy for pragmatic inference: Q-based and R-based implicature. To appear in D. Schiffrin, ed., *GURT 84: Meaning, form, and use in context: linguistic applications*. Georgetown University Press.
- Kendall, Sue Ann. in prep. Japanese SFP's as indicators of speaker commitment. University of Illinois dissertation.
- Lakoff, Robin. 1972. Language in context. *Language* 48.4:907-927.
- Martin, Samuel. 1975. A reference grammar of Japanese. New Haven: Yale.
- Maynard, Senko K. 1984. Functions of to and koto-o in speech and thought representation in Japanese written discourse. *Lingua* 64.1:1-24.
- McClain, Yoko M. 1981. Handbook of modern Japanese grammar. Tokyo: Hokuseido.
- Prince, Ellen F. 1978. On the function of existential presupposition in discourse. Papers from the fourteenth regional meeting of the Chicago Linguistic Society: 362-378.
- Tsuchihashi, Mika. 1983. The speech act continuum: an investigation of Japanese sentence-final particles. *Journal of pragmatics* 7: 361-387.
- Uyeno, Tazuko Yamanaka. 1971. A study of Japanese modality: a performative analysis of sentence particles. UMI: University of Michigan dissertation.
- Watanabe, Minoru. 1968. Shuujoshi no bunpooronteki ichizuke (Grammatical placement of sentence-final particles). *Kokugogaku* 72: 127-135.

## THE SEVERAL LOGICS OF QUANTIFICATION

William Labov

This report is one of a series of efforts to examine the semantics of grammatical elements in English, and to find out among other things why it is so difficult for us to write a clear and accurate description of a language.<sup>1</sup> The strategy that I and others have followed to answer such questions is to examine how people actually use the language, rather than how they think they use it, or should use it. I will be focussing in particular on the use of universal quantifiers in English: all, every, each and any.<sup>2</sup> An examination of these quantifiers in the language of every-day life shows that they are not governed in any consistent way by the logic of schoolroom grammar and scientific calculation (Labov 1984). The results support the view of those who suspect that our linguistic grammars have -- in spite of all our best efforts -- a strong prescriptive component (Fox and Geis 1984). The following inferences must be accepted in any introduction to logic (Copi 1982):

- (1) He did everything
  - => Given any individual thing whatever, he did it
  - => There does not exist anything that he did not do.
- (2) All of them caught hold of me
  - => Given any one of them, he caught hold of me.
  - => There was not any one of them who did not catch hold of me.
- (3) I was never still
  - => Given any time, I was not still
  - => There was not any time that I was still.

We will see that these inferences do not apply to (1-3) as they were spoken, and do not apply to a sizeable number of other sentences uttered in every-day life. Worse yet, for the majority of sentences that contain universal quantifiers, we have no way of knowing whether they apply or not.

In other studies of universal quantifiers -- particularly the rules that govern negative attraction and negative concord to the indeterminates any, ever and either, I examined alternate ways of saying the same thing (Labov 1972). In this investigation, I will be looking at the distribution of different meanings attached to the same forms. This might seem to be a less controlled operation, since the meanings people use must be influenced by what they are talking about, and in spontaneous speech -- even the formal section of an interview -- people talk about different things. One way of approaching the problem is to maximize it. In what follows, I will be comparing ordinary people talking about ordinary experience in private with important people talking about important subjects in public. I hope that the results will increase our understanding of the meanings of the universal quantifiers and the relation of logic to language.

# 1. The ordinary use of universal quantifiers

This section will illustrate the use of universal quantifiers in every-day speech, drawing from earlier analyses (Labov 1984). Two polar types of semantic interpretation are considered. The "strict interpretation" of any, each, all, every, and ever conforms to the traditional, proper or logical use: the quantifier is applied to a set to designate exhaustively all members of the set, with no exceptions. The "loose interpretation" of these quantifiers is applied to designate the members of the set as a whole, but not necessarily exhaustively. Exceptions are not excluded, so that the difference between 'all' and 'not all' is neutralized.

As listeners, we often do not know which of these two interpretations to make. In some contexts, the strict interpretation is most likely, while in others it is impossible. When universal quantifiers are applied to a set of known size, the strict interpretation is the most probable one.

(4) Now every one o' my kids turned back.

But in many every-day uses the strict interpretation must be ruled out by our knowledge of the facts of the matter:

(5) I left all my clothes down South.

Between these two extremes, there are a range of uses that

must be classified by the varying likelihood of a strict interpretation. One way of ordering these uses is to consider what objective evidence would be available to an observer who was on the scene at the referenced time and place. The following examples are drawn from a narrative of Jim Lynch, 64, an Irish-American resident of the Kensington neighborhood of North Philadelphia. Lynch represents the conservative speech pattern of older working-class Philadelphians. His use of the universal quantifiers is characteristic of the every-day speech that has been examined so far.<sup>3</sup>

Throughout his life, Lynch was known as a practical joker -- he was called "the Pest". The examples to follow are drawn from a story he told about the dirtiest trick he ever did. It was at a party held in mid-winter; there was snow on the ground. People were drinking a lot of beer; the women were using the upstairs bathroom, and the men were going out in the backyard. Lynch dressed up in a woman's hat and nightgown, and stationed himself out in the back yard. When the men came out, they thought they saw a woman out in the yard, and they went back in. After a while, people noticed quite a few men with wet pants legs, and someone figured out that Lynch was at work. They caught him and threw him into a snow bank.

None of the sets referred to are of known size. But some are easily denumerable.

- (6) So every time a fellow would come out in the side alley, I'd shuffle my feet and they could see that it was somebody with a hat on.

We don't know how many times this happened. But an observer on the scene would easily be able to count them and it seems most probable that Lynch did the same thing every time. The strict interpretation of every is favored. But in more cases the set is non-denumerable.

- (7) This party was in full swing, but all the women were going upstairs, and all the men were going outside, see.

No observer on the scene could tell if all the women went upstairs, or if all the men went out. We can infer that all the people who went outside were men, and that most of the people who went upstairs were women. But the interpretation of all as applied to the set of people at the party is undetermined.



Other uses of universal quantifiers are undetermined because they are applied to subjective states.

- (8) a. It never bothered me.  
b. That's the dirtiest trick I ever done.

There is no way for any external observer to know whether the statements applied in every instance that they might have applied.

We might decide to give the speaker the benefit of any doubt, and attribute the strict use of never and ever to these sentences, if it were not for the frequent occurrences of sentences like (9). These are obviously false if the strict interpretation of never, all, no and every is applied.

- (9) a. I'd never be still.  
b. They all caught hold of me.  
c. Now you don't have no neighbors.  
d. He did everything.  
e. We were no fat kids. There was only one fat boy in the neighborhood. We were all thin and wiry.

If we adhere to the strict interpretation of the universal quantifiers, we would be forced to label these utterances as 'false'. We might soften this interpretation by a pragmatic approach which considers them 'pardonable exaggeration'<sup>4</sup>. Or we may construct generalized implicit contexts for the universal quantifiers in conversation, such as 'apply to the set of all objects worth mentioning in this context.' (9a) might then be expanded to 'I'd never be still for any time worth mentioning', and (9c) to 'Now you don't have no neighbors worth mentioning'. Even with a term as expansive as 'worth mentioning', the number of pragmatic analyses needed expands rapidly as examples accumulate. (9b) can hardly be expanded in the same way; it must be understood as 'There were so many guys laying hold of me, it was as if everybody at the party laid hold of me'. (9d) seems to be expanded best as 'He did everything that had to be done', and (9e) can only be salvaged by re-interpreting the second sentence as applying to a different set: 'and even outside of our group, there was only one fat boy in the neighborhood.'

I do not see any general pragmatic approach that will avoid the recognition of two distinct meanings within the semantic interpretation of the sentence. Pragmatically, we can recognize the rules for the choice of the 'strict' or the 'loose' interpretation, where the difference between all and nearly all, never and almost never is neutralized. We could write a pragmatic rule that says:

- (10) If a speaker applies a universal quantifier to a situation where the strict interpretation is impossible, the loose interpretation applies.

There is massive evidence for the loose interpretation in many adverbial uses of all. Lynch says, for example:

- (11) a. It was all over the neighborhood ('many people knew about it').  
 b. all kinds of trash ('many kinds')  
 c. it all depends ('it depends on many things').

We also recognize an obligatory loose interpretation in the many uses of universal quantifiers as approximants:

- (12) a. the rocks 'n' all.  
 b. the vats 'n' all.  
 c. fights, and everything else.

The conventional loose, and obviously strict, uses of the quantifiers present fairly straightforward problems of interpretation. But there are a large number of sentences where the choice between the loose and strict interpretation seems undetermined. For the speakers I have examined, this is the case for about half of the universal quantifiers.

One way of getting at the problem is to consider the universal quantifiers as intensifiers. In sentences like

- (13) He was all tired.

this intensive meaning is the only one we can infer. Quantifiers with strict interpretation can be considered to be intensifiers. The concept applies more obviously to the cases of loose interpretation, where 75% is talked about as if it were 100%. Markers of intensity tend to cluster. Emphatic stress, adverbs like really, so and very, negative concord, and repetition often contribute jointly to the force of an utterance. Labov 1984 traces the distribution of these other markers of intensity across the various types of universal quantifiers subclassified by evidential context.

For all the speakers studied, the other marks of intensity were concentrated in sentences with undetermined uses of universal quantifiers: non-denumerable and subjective contexts. This was true even for two exceptional speakers who spoke with great precision and used only small numbers of undetermined quantifiers. This correlation supports the idea that in many of these contexts, the universal quantifiers are being used with the loose interpretation and act as intensifiers themselves. Unfortunately, we have no means of finding out in any one case whether the quantifier has this effect upon the listener -- until we devise experimental techniques to do so.

It seems likely that the intensive use of universal quantifiers is common, even their most common use in ordinary conversation. Moreover, the use of universal quantifiers as markers of intensity is more frequent than any of the long list of intensifiers described in Bolinger's Degree Words (1972), for some speakers more common than all the rest put together.

## 2. Quantifiers in Congressional hearings.

I recently began an examination of formal public discourse, with the help of my sociologist colleague and co-author, Teresa Labov. We selected a published record of two days of hearings held in 1975 before the Senate Committee on Violence and Vandalism in the Public Schools, headed by Senator Birch Bayh. We chose that material because it deals with a serious problem that is still with us, and a problem that presents a challenge to the largest principles of social order. We believe that it is possible to account for puzzling features of public language by a theory deduced from the general principles that deal with social order. The analysis to follow is a more detailed study of the universal quantifiers than is found in the first study of these materials (Labov and Labov to appear).

The first witness at the hearing was Albert Shanker, President of the American Federation of Teachers. The transcript of his opening two sentences gives an idea of the style of his public discourse:

- (14) Many authorities on education have written books on the importance of producing an effective learning environment in the schools by introducing more effective methods of teaching. None of them, however, seem to understand the shocking fact that the learning environment in thousands upon thousands of schools is filled with violence and danger. Violent crime has

entered the schoolhouse, and the teachers and students are learning some bitter lessons.

The hearings transcript also includes the written version of Shanker's statement and the written statements of most of the other speakers. The written version of (14) is almost the same as the spoken forms transcribed here, though at other points the oral statement departs quite widely from the written statement, particularly when there are oral exchanges with the chairman.

(14) includes a use of the universal quantifier none in "None of them . . . seem to understand". I take this in the strict sense, applied to a denumerable set of writers on education. There is one other strict use in the statement, and six other universal quantifiers.<sup>5</sup> On the whole the use of universal quantifiers is limited. There are a great many exact numbers, as in the following:

- (15) Now these figures I cited tie in with the dramatic increase in public school arrests that have taken place in 1974. From 9/73 through 2/74, there were 313 arrests. . . during the period 9/74-2/75, there were 612 arrests, or an increase of 95.6%. According to the NYCPD statistics, comparable increases are shown in a number of areas. Juvenile arrests of persons under 16 years of age has increased 10% within one year. Youth arrests of persons between the ages of 16 20 has increased 18.3%. Juvenile arrests for felonies has gone up 13%, and for misdemeanors 11%.

There are also many partitive expressions, especially when Shanker is assigning blame to others:

- (16) a. I submit to you that part of the responsibility for the increasing violence lies with some of these very books and writers themselves.  
b. The terrible thing now is that there is a good deal of covering up.

Every-day speech normally shows universal quantifiers in many of these contexts, as in "The whole thing is the responsibility of. . .", "Everything is covered up. . .". When Shanker does use universal quantifiers in what seems to be the loose sense, he is usually attributing views to others, as in (17), where he expands on the point of view of the school superintendent:

- (17) If he says to a student who was carrying money, well maybe it was your fault, that is really a way of saying . . . I've got all these pressures on me.

If I proceed with your case, it's going to take me away from all my other duties and responsibilities here.

or the perspective of a child:

- (18) The child each year has a greater and greater belief that he will never learn these things.

These loose uses of the universal quantifiers do not appear in the written version.

On first glance, Shanker's statement strikes us as reasonable but concerned. He displays a strong concern for objective evidence. He quotes exact figures and he avoids extreme statements. In fact, this is characteristic of all the important witnesses at the hearing. Figure 1 gives a view of the oral and written styles of the witnesses compared to the speech of Tom Lynch, by means of three stylistic indices. The sections of the Senate Hearings examined include:

AFL: Albert Shanker, oral and written.

NEA: James Harris, the Executive Secretary of the National Education Association, oral only.

NASP: Dr. Owen Kiernan, executive secretary of the National Association of Secondary School Principals, oral and written.

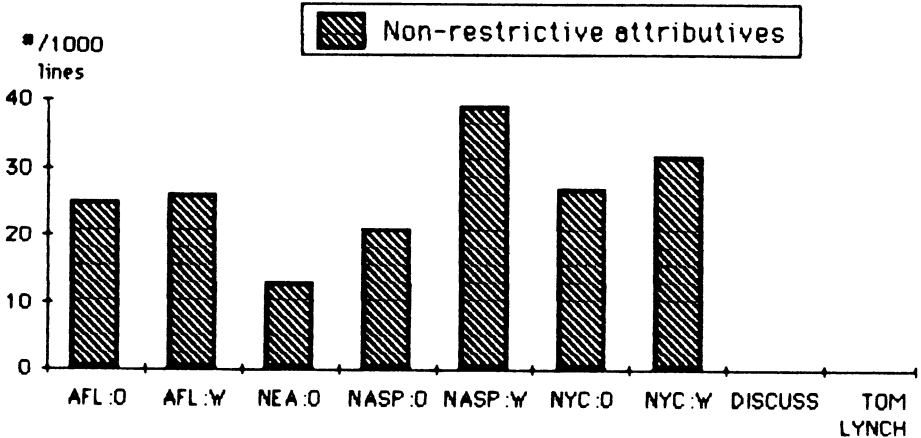
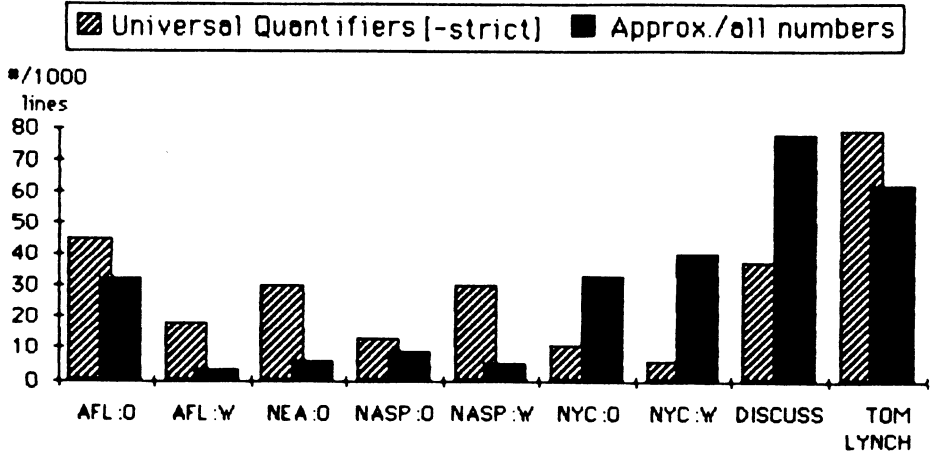
NYC: Irving Anker, Chancellor of the New York City Board of Education, oral and written.

DISCUSS: An extended discussion where all of these speakers except Anker exchanged ideas with the Chairman.

At the extreme right, Tom Lynch is shown for comparison. The horizontal axis shows the number of uses of three kinds of quantifiers per 1000 lines of the transcripts.

The upper half of Figure 1 shows two variables that are heavily concentrated in spontaneous speech, and appear with lower frequency in the formal statements, oral and written. The diagonally hatched bars show the frequency per thousand lines of universal quantifiers that do not clearly have a strict interpretation. Proceeding from the left, a fairly high frequency is shown by Shanker, but as we have seen, most of these non-strict senses are attributed to others. Other witnesses on the figure show a very low use of this indicator. At the right hand side, the frequency rises considerably for the discussion sections, where there are many adverbial uses of all, and rises to a high peak for Tom Lynch.

Figure 1. Three stylistic indicators in Senate Hearings  
and the speech of Tom Lynch, Philadelphia



This restricted pattern of universal quantifiers is matched by a second variable in the upper half of Figure 1. The solid black bars show the ratio of approximate expressions to all numerical expressions (times 100 to fit the vertical scale). Shanker uses only a few approximates: "for three or more years", "close to 1,000"; and many exact ones: "95.6%", "474 assaults". The discussion section of the hearing shows a very high value. Lynch also has a high value for this index. He shows an extraordinary number and variety of approximate expressions in his speech:

(10) one or two	fifteen or twenty
three or four	in the thirties
four or five	seventy-five or eighty
seven, eight	ninety, eighty
eight or ten	pretty near a hundred
ten or twelve	about four, five thousand
ten or fifteen	

and many fewer exact ones. The approximate number index is roughly parallel to the universal quantifiers. The chief exception is Anker (NYC). In both the oral and written column, his universal quantifier use is low but the proportion of approximates is high as a consequence of the topic he was dealing with. Chancellor Anker used much of his time to discuss the drug problem, and emphasized repeatedly that we are unfortunately missing exact figures on drug use and drug sales.

The low values for the approximate number index for the witnesses supports the view that they are trying to speak as precisely as they can in the hearings, and the restricted use of universal quantifiers is also consistent with this view.

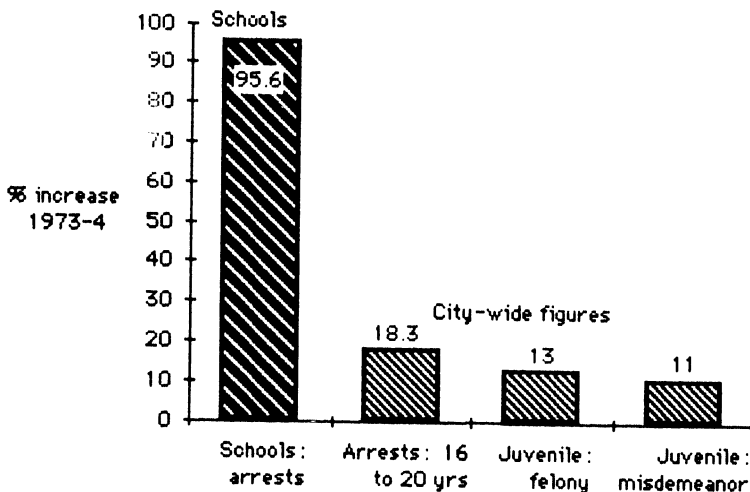
The third index follows a converse pattern, as shown in the bottom half of Figure 1; this is a feature common in formal discourse but absent in every-day speech. It is the use of non-restrictive attributes, as in Shanker's opening statement (14): "None of them, however seem to understand the shocking fact that the learning environment in thousands and thousands of schools is filled with violence and danger." There are many others: "crushing social problems"; "the mounting crime rate"; "grim statistics"; "sad story". These nonrestrictive attributives, with all of their peculiar semantic and syntactic properties, play a major role in our analysis of the underlying social propositions that govern the discourse, which I will return to below.<sup>6</sup>

So far, this public discourse appears as a reasonable mode of communication. Speakers seem to be striving for whatever hard evidence they can find; they apologize for approximations, and avoid exaggeration in their criticism of others. Their speech shows some influence of the non-logical system of every-day speech, but on the whole it seems to approximate the grammar of logical or scientific discourse.

### 3. Some inconsistencies in formal discourse.

Before we accept the conclusion of section 2, we have to account for certain puzzling inconsistencies in the testimony. One is contained in (15), quoted as an example of Shanker's use of exact numbers above. The argument is that the increase of arrests in the schools "ties in with" and is comparable to a widespread pattern throughout the city. If, however, we were to present these figures to a scientific meeting, we might be expected to draw different conclusions.

Fig. 2. NYC: comparative increases in arrests in the schools and in the city as a whole





The changes are comparable in direction but they are certainly not comparable in magnitude. Figure 2 compares the increases in arrests within the schools to increases in arrests in the city as a whole on the basis of Shanker's statement. It is evident that the increase of arrests in the schools is eight or nine times the general increase: the police have been very active in the schools. Yet he uses the word "comparable". This is puzzling, until we read further in Shanker's testimony, where it becomes evident why he did not call attention to the ninefold difference. Shanker's explanation for the increase in crimes is that the victims are afraid to complain:

- (20) The victims of assaults -- both teachers and students -- are reluctant to report them and to press charges because of the all-too-prevalent strategem of shifting blame from the assailant to the victim himself.

He elaborates on this theme at some length. Teachers will not complain because they may be accused of provoking the assault. Supervisors discourage complaints because of the time needed to make reports and attend hearings. Those who complain must pay legal fees, while civil rights groups pay for the defendants' expenses. Children who are mugged may be accused of having invited the attack by carrying too much money. The chairman interrupts the witness to express his astonishment at this last report, and he is assured that it has happened.

The business end of the Teachers' Union's argument is that Congress should reduce due process and the right of appeal for students, established in the Jan 22, 1975 Supreme Court decision of Goss et al. vs. Lopez et al.. We can understand Shanker's motivation in not emphasizing that the increase in arrests within the schools was much greater than the city-wide pattern. It is not so easy to understand why the Chairman did not point out the contradiction. If the increase in arrests was nine times greater in the schools than in the city as a whole, it does not seem to follow that victims are afraid to report crimes or press charges. And we know from an article published a year and a half later (Bayh 1977) that he was against the restriction of due process.

The second example of inconsistency is from Anker, the chancellor of the New York City Board of Education:

- (21) The big city is an area in which many of the crushing social problems of the city itself intrude and are acted out not only by the students themselves, but more often by forces that invade the schools, generating problems that have their genesis in the surrounding community. Of the 4775 incidents, for example, reported in 1973-74 -- the last complete school year -- of the 4775, 1020 were by intruders who gained entry into the school building by a variety of means.

Reading the report, we might be tempted to think that "more often" in line 4 is a misprint for "less often". But surprising enough, no one at the hearings intervened to say, "Excuse me, Chancellor, did you mean to say "more often"? 1020 is not more than 3755."

Again, it is not difficult to understand the speaker's motivation. He is urging Congress to provide money to place more police in the schools, in order to keep intruders out. It would hardly be consistent to point out that that of 4725 incidents, 3755 were by students already within the schools who could not be kept out.

There are other examples of inconsistencies in the use of quantifiers. But though there are many interventions to point out the astonishing nature of the facts being presented, there are none to call attention to these apparent contradictions.

The third example, taken from the testimony of the secretary of the National Association of Secondary School Principals, involves a non-restrictive attributive.

- (22) Speaking on behalf of some 35,000 principals, I want to strongly affirm our support of "student rights", however that much abused term may be defined.

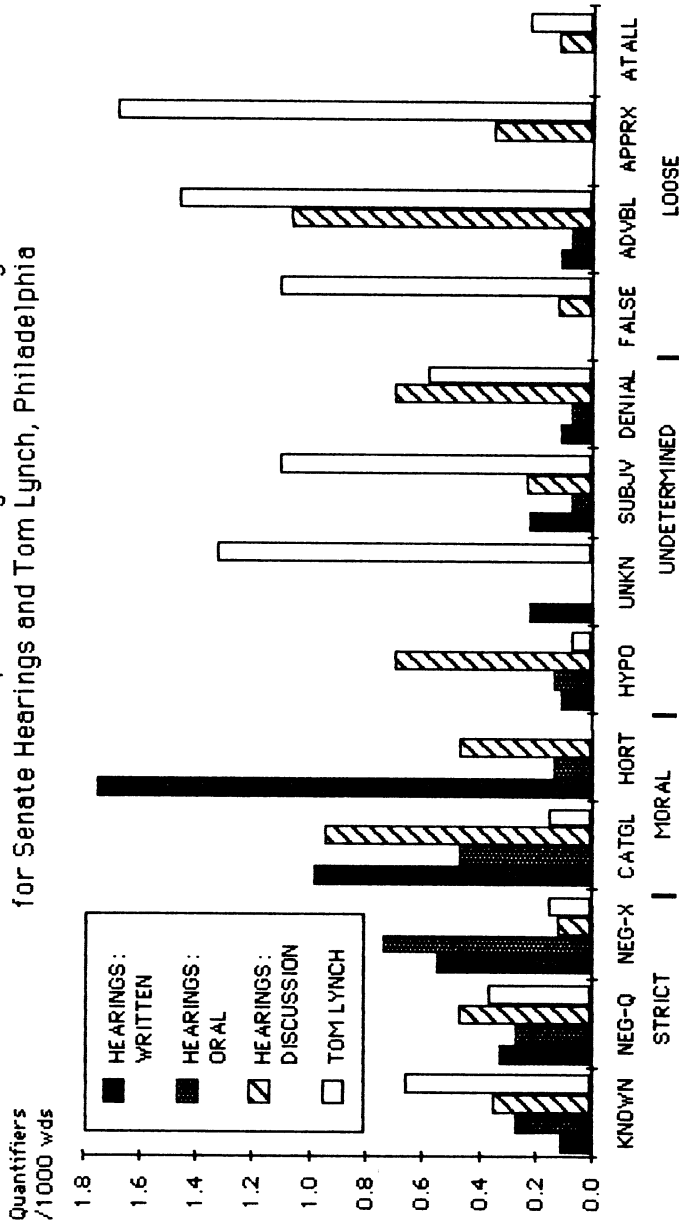
This is a clear syntactic oxymoron. Literally, the speaker is supporting something that he believes is wrong. No one asked the speaker why he would support a claim for students rights in a situation where he thought it was an abuse of the language to call it a case of student rights.

There are several ways to approach these inconsistencies. First, it must be understood that this discourse, and much other public discourse, is carried on in a context of crisis. The speakers are engaged in showing that the need for action has long since passed the point where any reasonable person would be impelled to act. In this case, Congress is not empowered to act until it is abundantly clear that all local resources have failed to solve the problem: teachers, principals, police, militia, judges, mayors, city councils and state governments. Witness after witness at the hearings says, "I have been waiting for Congress to act for years." It follows that the evidence brought forward is not comparable to evidence in a scientific inquiry, where numbers are used to determine the state of affairs. The speakers already know the state of affairs. The point of their testimony is that the troubles are so far past the point where action is needed that it is immaterial whether the increase in arrests is greater or less in the schools or outside of them; or if the proportion of attacks by outsiders is 3:1 or 1:3. In the crisis context, it is likely that anyone who intervened to point out the discrepancy would be open to the charge that he is taking 1,020 attacks by outsiders very lightly. In the context of the moral propositions that dominate the discourse,<sup>7</sup> any attempt to estimate the size of the problem precisely can be interpreted as an inadequate expression of concern. We are dealing with a discrete logic which does not suffer quantitative distinctions. Here formal discourse uses universal quantifiers in the hortatory and categorical senses to intensify and evaluate utterances, while every-day speech uses these quantifiers with the loose interpretation to achieve the same ends.

#### 4. The semantics of universal quantifiers in the hearings

Figure 3 analyzes the use of universal quantifiers in greater detail than Figure 1. The vertical axis is now quantifiers per thousand words. The horizontal axis classifies the quantifiers by their semantic interpretation: strict on the left, loose on the right, and undetermined in the middle. A fourth category of Moral is introduced, to be explained below. These major categories are assigned on the basis of a more detailed classification directly above them, which is based on the evidential context. The distribution of universal quantifiers is not shown for individual speakers, but summed under four over-all types: the written

FIGURE 3. Universal quantifiers by evidential categories  
for Senate Hearings and Tom Lynch, Philadelphia



statements submitted at the hearings; the oral statements; the discussion during the hearings; and spontaneous speech of Tom Lynch, taken as representative of every-day speech.

At extreme left are the evidential contexts that favor strict interpretation: known sets, and then negation or limitation of a quantifier: "not all", "almost never", etc. The third element is NEG-X or assertion of non-existence: "There is no information on this." This is a reasonable context for strict interpretation, since a single observation would be enough to falsify it.

In general, there are no big differences in the use of the strictly interpreted universal quantifiers on the left. But the group of categories on the right, which dictate a loose interpretation, show sharp differences. For the formal statements, both in speech and writing, these loose interpretations are almost non-existent. The diagonally hatched columns show a very high value for the discussions during the hearings, particularly in the adverbial loose interpretations. The speech of Tom Lynch, as shown by the blank columns, yields a very high frequency of loose interpretation in three of the four categories. The use of conventionally loose quantifiers appears to be one of the strongest stylistic features of every day speech, and their absence one of the marks of formality.

The two central "undetermined" categories are the non-denumerable sets as in (7), where membership is unknown, and subjective opinions, as in (8). For these we observe a clear separation between Tom Lynch, representing every-day speech, and the hearings as a whole. Under this "undetermined" rubric I have included two other categories which were not considered before. One is the denial of the universal quantification, as in:

(23) You and all the other witnesses have such a wealth of information to give us, we cannot ask all we wish.

--Sen. Bayh, p. 82.

Here the scope of the negation includes the universal quantifier (the NEG-Q interpretation of Carden 1970). This might be interpreted to mean that Bayh has reviewed, one at a time the individual questions he would like to ask, and has drawn a line to exclude some: a strict interpretation. But it might also be taken in the loose sense, that there are a great many questions he cannot ask. In this particular case, the loose interpretation includes the strict interpretation. The distributions make it seem the most probable one, since the discussion shows a fair number of these constructions, even more than spontaneous speech.

On the other end of the "undetermined" group, there are hypotheticals like the following:

- (24) Although he or she might have committed a grievance that requires discipline, if that discipline is not explained to him in detail, it might reawaken all the old prejudices to which they have been subjected.

-Sen. Bayh, discussion, p. 77

The universal quantifier is contained within the evidential context of the hypothetical if, and the irrealis might as well. In this case, the set being quantified is itself subjective. The following example refers to a more concrete set, but also embedded in a hypothetical structure:

- (25) If we were to go back then we could probably compile tremendous lists of injustices that were committed against students who had no opportunity to respond, and no recourse.

--A. Shanker, discussion, p. 73

Since the situation is hypothetical, the evidential possibilities for interpretation must fall into the category of "undetermined".

The general category of "moral" uses of universal quantifiers was not used in any previous analysis, but emerged here as a characteristic of formal, public discourse. They are the only uses of universal quantifiers which are more frequent in the hearings than in every-day speech: they are especially prominent in the most formal material, the written statements. The moral uses are subjective; but they do not refer to subjective states of the speaker or author. Instead, they make reference to positions held by society as a whole. These are "categorical" uses of the universal quantifiers: they apply almost by definition to all possible members of the set. Anker's written statement includes many examples:

- (26) a. drug abuse, which affects all segments of the youth culture"  
 b. They need what all human beings need and want.  
 c. Unless this is done. . . I fear for the future of the great cities of this country, and all of its proud institutions.

It would not be relevant to search through all of the proud<sup>8</sup> institutions of the United States for counter-examples -- institutions the author did not fear for. The fear appears to be centered about a more abstract object than the

individual institution, but the set of institutions as a whole. The identification of such moral uses is simpler for the other sub-category of "hortatory" uses, where the predicates of moral obligation are explicitly added, as in these examples from the same statement:

- (27) a. All of these problems demand the attention of this sub-committee and the combined efforts of all of the political, social and economic agencies.  
b. The problem of narcotics addiction and substance abuse is a massive, grim, frustrating and challenging one which calls for the combined efforts of all community and governmental agencies to tackle a problem that has taken a dreadful toll of our most valuable social resources. . .

The verbs "demand" and "call for" are hortatory and make plain the all-or-none character of the quantification involved. Moral obligations of this sort are imposed on all individuals and institutions. Since (26c) follows (27b) directly, it is even clearer that the quantification over the "proud institutions" is a part of this compulsory semantic. In Shanker's statement, we find even more clearly:

- (28) Student involvement in any and all programs is imperative.

We might differentiate the moral uses of quantifiers from the others by constructing appropriate responses to possible challenges. For the conventional loose or subjective use, it is typical to find retreats or modifications:

- (29) --Do you mean you were never still?  
--Well hardly ever, you know what I mean. I was very active.

while a challenge to a hortatory use is appropriately met by a reinforcement. In response to Shanker's (28), one might find:

- (30) --You mean we all have to be involved?  
--I mean every single one of you.

This response is possible because the hortatory and categorical predications are put forward in the crisis context. Here it is not relevant to point out any limitations in the degree to which the major propositions are true.

It is evident that the moral uses of the universal quantifiers are [+intensive]. They represent an important device for intensification in formal discourse, and are almost in complementary distribution with the intensifying uses of the loose interpretation in every-day speech. The black columns in Figure 3 show high values for both categorical and hortatory categories, reversing the pattern found in the other sections of the chart. The uses of universal quantifiers by the witnesses in the hearings is not as remote from the patterns of every-day speech as first appeared. They use a slightly different set of linguistic forms to accomplish the same goal of intensifying the most highly evaluated semantic elements.

## 5. The grammar of English.

A systematic treatment of the speech acts involving the universal quantifiers requires articulation with the larger principles of social order. Here we are concerned with the semantic analysis of the universal quantifiers as they appear in the grammar of English sentences. How should they be represented?

The traditional approach would be to continue to represent them with the strict interpretation. In terms of discrete features, they would be [-partitive], opposed to the [+partitive] quantifiers some, many and most. One could add rules, possibly based on universals from speech act theory, that neutralize [partitive] in certain contexts, perhaps [+intensive]. The strategy seems to follow the reasonable general principle of starting with the most highly differentiated system, with strictly defined universal quantifiers opposed to all other quantifiers, and deriving the less differentiated system from it. But no general solution would deal with the specific behavior of the four quantifiers involved.

Each is almost entirely limited to formal speech and writing, and to the strict interpretation. All as we have seen demands the loose interpretation in many contexts and favors it in others. Any carries the [+intensive] feature more consistently than any other. It is unlikely that a set of universal rules can serve the needs of language learners who have to master the intricacies of this system. The particular configuration we have in English is the result of an historical evolution of the distribution of the [intensive] feature. This would be reflected in dictionary descriptions of particular constructions like at all but also general



instructions on the availability of the loose and strict interpretations.

Finally, we may want to consider the consequences of this analysis for the relations of language and logic. I have pointed to a number of areas where logical inferences cannot be drawn as school book grammars demand, where the more precise or mathematical use of quantifiers is generally inhibited. It appears ever more likely that the rules of logical inference taught in the schools are restricted in their application to public discourse, and we must continue to ask whether or not these rules form the proper basis for the grammar of natural languages.

#### FOOTNOTES

<sup>1</sup>This is the third in a series of papers that examine the relations of social and emotional expression to representational content in language, following Labov 1984 and Labov and Labov (to appear). I have drawn on the findings of the first two papers in this one, and I am particularly indebted to my co-author T. Labov for many of the social principles and insights into public discourse. I am grateful to Gillian Sankoff for a number of suggestions and corrections.

<sup>2</sup>One version of a semantic analysis of these four quantifiers appears in Labov 1972, Ch. 4. As demonstrated there, the forms of any that incorporate a negative element are included: nobody, noone, nowhere, none, etc.

<sup>3</sup>Lynch was interviewed by Anne Bower, in the course of research on Linguistic Change and Variation in Philadelphia, supported by the National Science Foundation. A more detailed view of his use of universal quantifiers is found in Labov 1984.

<sup>4</sup>A term I owe to Guy Carden.

<sup>5</sup>See below for the special character of these other uses of universal quantifiers, actually attributed to other persons.

<sup>6</sup>Shanker's sentence quoted here also contains an instance of a quantifier that is specialized for formal discourse: the hyper-quantifier thousands upon thousands.

<sup>7</sup>A basic moral predicate of social order is that "In a good society, persons should be secure from violence". It is the repeated violation of this proposition which leads speakers to express fears for the future of our society.

<sup>8</sup>The non-restrictive use of proud here echoes the high concentration of non-restrictive adjectives throughout this section, another of the intensifying devices of public discourse.

#### REFERENCES

- Bayh, Birch 1977. New directions for juvenile justice. Trial Feb 1977, pp. 20-23.
- Bolinger, Dwight 1972. Degree Words. The Hague: Mouton.
- Carden, Guy 1970 A note on conflicting idiolects. Linguistic Inquiry 1:281-290.
- Copi, Irving M. 1982. Introduction to Logic. 6th Edition. NY: McMillan.
- Fox, Robert A. and Michael L. Geis 1984. Mental logic and human sentence comprehension. Ms.
- Labov, William 1972. Negative attraction and negative concord in English grammar. Language 48:773-818.
- Labov, William 1984. Intensity. GURT '84:43-70.
- Labov, William and Teresa Labov to appear. Public discourse and the problem of social order. To appear in Proceedings of the Conference on Discourse Analysis and Public Life, Groningen, January 1985.
- U.S. Congress, Senate 1975. Committee on the Judiciary. Subcommittee to Investigate Juvenile Delinquency. Hearings on the Nature, Extent and Cost of Violence and Vandalism in our Nation's Schools. 94th Congress, 1st Session.

# The Category Structure of Kusaal\*

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## 0. Introduction

Kusaal, the language of the Kusasi, is spoken in northeasternmost Ghana and adjacent Bourkina Fasso (*aka* Upper Volta). There are approximately 122,000 speakers in Ghana and an additional 12,200 in Bourkina Fasso. Kusaal is a Gur (or Voltaic) language, classed in a Central subclass of the Moore-Gurma Group. It is most closely related to e.g. Moshi, Dagbani, Gurenɛ, Mampruli and Dageri.

The focus of this paper is the categorial status of nominal modifiers in Kusaal. Put simply: does Kusaal have adjectives or not? I present here the data that I have which bear on answering this question and offer a tentative answer in the negative. After a necessarily brief structural sketch, I will present three arguments which suggest that if there are adjectives in Kusaal, then wherever they occur, they are either verbs or nouns. I will then briefly consider how to embed an analysis of this data into X-bar theory.

## 1. Structural Sketch

Kusaal has a strict SVO word order. It has postnominal modifiers and determiners and prenominal possessor NPs, as illustrated in examples (1-2):

- |                              |                                     |
|------------------------------|-------------------------------------|
| 1.a akúgr wáʔad              | <i>Akugr dances</i>                 |
| .b akúgr kád-tě bó:g-la      | <i>Akugr is chasing the goat</i>    |
| .c bó:g-wā kád-tě akúgr      | <i>This goat is chasing Akugr</i>   |
| 2.a awín yěd bó:g            | <i>Awin sees a goat</i>             |
| .b awín yěd bó kodr          | <i>Awin sees an old goat</i>        |
| .c awín kád-tě akúgr bó:g-la | <i>Awin is chasing Akugr's goat</i> |

The verbal morphology is relatively straightforward. There are two aspectual suffixes (-tě 'imperfective' and -ya 'perfective') and preverbal auxiliaries which code temporal reference and polarity:

- |                    |   |
|--------------------|---|
| 3.a awín wáʔad     | <i>Awin dances</i>                      |
| .b awín wáʔadtě    | <i>Awin is dancing</i>                  |
| .c awín wáʔaya     | <i>Awin has danced</i>                  |
| .d awín na wáʔ     | <i>Awin will dance (neutral)</i>        |
| .e awín sa na wáʔ  | <i>Awin will dance (tomorrow)</i>       |
| .f awín da: na wáʔ | <i>Awin will dance (after tomorrow)</i> |
| .g awín sa wáʔad   | <i>Awin danced (yesterday)</i>          |

.h awín dā: wáʔad	<i>Awin danced (before yesterday)</i>
.i awín pò wáʔada	<i>Awin didn't dance</i>
.j awín kò wáʔada	<i>Awin won't dance</i>

Nominal morphology is equally straightforward: nouns are generally overtly marked to show singular and plural number by pairs of suffixes. Which pair of suffixes a given noun takes is largely arbitrary, though there are some semantically-based generalizations. Examples of nominal forms from the major morphological subclasses are given in the chart on the next page.

The parentheses in the Base forms mark the result of a morphological rule of **Stem Truncation**, which neutralizes the contrast between [V], [V:] and [ViʔVi]. This rule applies to both nouns and verbs when their base forms occur as individual words.

Though this suffixial morphology is familiar "noun class" morphology of west African languages, in Kusaal this classification of the nouns is not reflected in any concord system. The verb does not agree with its object or subject. The third person pronouns in the singular are *o* 's/he' and *de* 'it', and reflect a human/nonhuman contrast rather than the class system suggested by the number morphology. Nor is there any noun phrase-internal concord either.

The forms listed as "long" in the table occur in a limited environment. The last word in a polarity question, certain constituent questions, and negated declaratives occurs in its "long" form. A few examples of this phenomenon, discussed further in England and Ladusaw 1984, must suffice here. Given the syntax of Kusaal, a word of *any* syntactic category could come to be the final word in a sentence, as the examples in (4-10) illustrate. The final word, whatever it is, must appear in its long form.

4.a awín wáʔad	<i>Awin is dancing</i>
.b awín wáʔada:	<i>Is Awin dancing?</i>
5.a awín yēd bó:g	<i>Awin sees a goat</i>
.b awín yēd bó:ga	<i>Does Awin see a goat?</i>
6.a awín yēd bó kodr	<i>Awin sees an old goat</i>
.b awín yēd bó kodre	<i>Does Awin see an old goat?</i>
7.a awín yēd bó:gwā	<i>Awin sees this goat</i>
.b awín yēd bó:gwā:	<i>Does Awin see this goat?</i>
8.a o na yo:m be:wg	<i>S/he will sing tomorrow</i>
.b o na yo:m be:go	<i>Will s/he sing tomorrow?</i>
9.a o yēnnē bó:g be peʔewg	<i>S/he saw a goat or a sheep</i>
.b o yēnnē bó:g be peʔego	<i>Did s/he see a goat or a sheep?</i>
.c *o yēnne bó:ga be peʔego	

## Noun Class Morphology

<b><u>Gloss</u></b>	<b><u>Base</u></b>	<b><u>Sing.</u></b>	<b><u>Plural</u></b>	<b><u>Long Sg.</u></b>	<b><u>Long Pl.</u></b>	<b><u>Class</u></b>
sheep	pé(ʔɛ)	péʔɛwɔ	péʔɛs	péʔɛgo	péʔɛsɛ	og/s
hand	nú(ʔũ)	núʔũg	núʔũs	núʔũgo	núʔũsɛ	
grass	mɔ́(:)	mɔ́:g	mɔ́:s	mɔ́:go	mɔ́:sɛ	
hawk	sɛl	sɛlog	sɛlɪs	sɛlogo	sɛlɪsɛ	
basket	pè(:)	pè:wɔ	pè:d	pè:go	pè:dɛ	og/d
cloth	fú(:)	fú:g	fú:d	fú:go	fú:dɛ	
animal	kɔ́b	kɔ́bɔg	kɔ́bɛd	kɔ́bogo	kɔ́bɛdɛ	
skin	gbán	gbáwɔ	gbánaʔ	gbáwɔ	gbánna:	og/a
basket (flat)	pén	péwɔ	pénaʔ	pénɔgo	pénna:	
a tree	pús	púsɔg	púsɪs	púsɔga	púsɪsɛ	g/s
ghost	sé(:)	sé:g	sé:s	sé:ga	sé:sɛ	
goat	bó(:)	bó:g	bó:s	bó:ga	bó:sɛ	
alligator	ó(:)	ó:g	ó:d	ó:ga	ó:dɛ	g/d
jute fibre	pí(:)	pí:g	pí:d	pí:ga	pí:dɛ	
Blackb. tree	á:d	á:ɔg	á:daʔ	á:ɔga	á:da:	g/a
blackberry	á:d	á:ɔɾ	á:daʔ	á:ɔɾɛ	á:da:	r/a
yam	bús	búsɾ	búsaʔ	búsɾɛ	búsa:	
anthill	yɔ́(:)	yɔ́:r	yɔ́yaʔ	yɔ́:rɛ	yɔ́ya:	
gourd	gá(ʔá)	gáʔáɾ	gáʔáʔ	gáʔáɾɛ	gáʔá:	
egg	gɛl	gɛl	gɛlaʔ	gɛlɛ	gɛla:	ɪ/a
calabash	wám	wám	wámáʔ	wámɛ	wámá:	
monkey	wá:N	wá:ɔ	wá:mɪs	wá:ɔŋá	wá:mɪsɛ	N/s
beetle	páN	páɔ	pá:s	páɔŋá	pá:sɛ	
a bird	pé(:)	pé:f	pé:s	pé:fo	pé:sɛ	f/s

- 10.a o po yē? bó:ga? *S/he didn't see a goat*  
 .b o po yē? pɛ:go? *S/he didn't see a basket*  
 .c o po yē? bó:g bɛ nída? *S/he didn't see a goat or a person*  
 .d \*o po yē? bó:ga bɛ nída?

The long form of a word is generally formed from consonant-final short forms by the addition of a low vowel ([a], [ɔ] or [ɛ]). Which vowel is added cannot be predicted phonologically. The long forms of nouns are determined by the noun class of the noun. Consonant-final verb forms have their long form determined by their aspectual suffix. Vowel-final forms simply lengthen the vowel. The source of this curious alternation is historical: apparently Kusaa has reduced the nominal class suffixes of Gur by first lowering and then deleting the final vowels. This deletion seems to have been blocked sentence-finally in these constructions, giving rise to this curious hybrid of an inflectional process and cliticization.

Describing the base form of the noun leads us directly to the matter at hand: are the modifiers of nouns to be considered adjectives? To consider this question we turn to an examination of the NP-internal syntax of Kusaa.

## 2. NP Internal Syntax

The category Determiner is optional in the Kusaa noun phrase: a bare noun will be read as indefinite:

- 11.a awín gottē bó:g *Awin is watching a goat*  
 .b awín gottē bó:s *Awin is watching some goats*

There are two enclitic definite determiners: -la 'distal' and -wā 'proximal'. These determiners attach to the final word of the head of the nominal phrase and show no indication of number:

- 12.a awín gottē bó:g-la *Awin is watching the goat*  
 .b awín gottē bó:s-la *Awin is watching the goats*  
 .c awín gottē bó:g-wā *Awin is watching this goat*  
 .d awín gottē bó:s-wā *Awin is watching these goats*

Numerals and other quantifiers appear phrase-finally. The presence or absence of a definite article distinguishes partitive and simple noun phrases, respectively.

- |      |                          |   |
|------|--------------------------|---|
| 13.a | bó:s-ayi kadtē akugr     | <i>Two goats are chasing Akugr</i>          |
| .b   | bó:s-la ayi kadtē akugr  | <i>Two of the goats are chasing Akugr</i>   |
| .c   | bó:s-wā wosa kadtē akugr | <i>All of these goats are chasing Akugr</i> |

The important thing to note about these determiners is that in each case the noun retains its number marking. This is not the case with other forms of modification:

- |      |                    |  |
|------|--------------------|--|
| 14.a | bó kāngā kad akugr | <i>This goat (not that one) chased Akugr</i> |
| .b   | bó bāmmā kad akugr | <i>These goats (not those) chased Akugr</i>  |
| .c   | bó kān kad akugr   | <i>That (point) goat chased Akugr</i>        |
| .d   | bó bān kad akugr   | <i>Those (point) goats chased Akugr</i>      |

Here the noun **bó:g/bó:s** appears in its base form: the stem to which the usual number suffixes are added, shortened by the stem truncation rule which neutralizes vowel length in stems. Note that though there is no indication of number on the noun, the noun phrase as a whole is marked. These demonstratives have different forms (morphologically similar to third person pronouns) for singular and plural. They are not members of the same category as **-la** and **-wā**, as they may cooccur.

When nouns are modified by the forms which I will call "putative adjectives", the same truncation of the noun occurs:

- |      |          |                                 |
|------|----------|---------------------------------|
| 15.a | pe kodr  | 'an old sheep', 'an old basket' |
| .b   | pe koda? | 'old sheep', 'old baskets'      |
| .c   | bo kodr  | 'an old goat'                   |
| .d   | bó koda? | 'old goats'                     |
| 16.a | pe bedr  | 'a big sheep', 'a big basket'   |
| .b   | pe beda? | 'big sheep', 'big baskets'      |
| .c   | bó bedr  | 'a big goat'                    |
| .d   | bó beda? | 'big goats'                     |

In these cases, the number is marked on the last element of the NP, not on the presumed head noun. There are two points to notice here. First note that the loss of number marking and truncation of long vowels leads to homonymous stems in many cases. Hence the alternative glosses in these examples. The word **pe:wg** 'sheep' (high) and **pe:wg** 'basket' (low) both have the stem **pe** (though they differ in tone). The former is a noun of the **og/s** class while the latter is of the **og/d** class. The word **bó:g** 'goat' is of the **g/s** class. The putative adjectives **kodr/koda?** 'old' and **bedr/beda?** 'big' do not alter their forms to indicate the class of the noun modified. The second point to note is the ending on the putative adjectives: the **r/a** alternation is the mark of one of the major noun classes.

The first group of determiners mentioned, *-la*, *wā*, and the numerals and quantifiers may appear as expected at the end of the NPs in (15) and (16). The demonstratives *kāngā*, *bāmmā*, etc. occur after these putative adjectives, and their effect on them is exactly what the adjectives have on the nouns:

- |      |              |                                  |
|------|--------------|----------------------------------|
| 17.a | pe kod kāngā | <i>'this old sheep/basket'</i>   |
| .b   | pe kod bāmmā | <i>'these old sheep/baskets'</i> |
| .c   | bo bed kām   | <i>'that big goat'</i>           |
| .d   | bó bed bām   | <i>'those big goats'</i>         |

The loss of the number marking on all but the rightmost noun, putative adjective or demonstrative is obligatory. Indication of number does not, however, necessarily disappear from the head noun. The noun 'man', for example, does not show number by suffixation but rather has two morphologically unanalyzed forms: *dau* (singular) and *dap* (plural) as shown in (18). When modified by a demonstrative or a putative adjective, the form does not alter as shown in (19) and (20). This is not generally true of human nouns, as (21) indicates.

- |      |                        |                          |
|------|------------------------|--------------------------|
| 18.a | dau-la                 | <i>the man</i>           |
| .b   | dap-la                 | <i>the men</i>           |
| 19.a | dau kāngā              | <i>this man</i>          |
| .b   | dap bāmmā              | <i>these men</i>         |
| 20.a | dau gij                | <i>a short man</i>       |
| .b   | dap gimis              | <i>short men</i>         |
| 21.a | pua <sup>?</sup> -la   | <i>the woman</i>         |
| .b   | pua <sup>b</sup> -la   | <i>the women</i>         |
| .c   | pua <sup>?</sup> vēliŋ | <i>a beautiful woman</i> |
| .d   | pua <sup>?</sup> vēlis | <i>beautiful women</i>   |

### 3. Predicative Putative Adjectives

Let us assume that the forms *vēliŋ* and *gij* are adjectives in these noun phrases, being used attributively, and then ask how they may be used predicatively. It turns out that the question of how one says *the woman is beautiful* has two answers:

- |      |                                 |                                |
|------|---------------------------------|--------------------------------|
| 22.a | pua <sup>?</sup> -la vēl        | <i>the woman is beautiful</i>  |
| .b   | pua <sup>?</sup> -la anē vēliŋā | <i>the woman is beautiful</i>  |
| .c   | puap-la vēl                     | <i>the women are beautiful</i> |
| .d   | puap-la anē vēlise              | <i>the women are beautiful</i> |



- |      |                   |                          |
|------|-------------------|--------------------------|
| 23.a | dau-la gim        | <i>the man is short</i>  |
| .b   | dau-la anē giŋgā  | <i>the man is short</i>  |
| .c   | dap-la gim        | <i>the men are short</i> |
| .d   | dap-la anē gimise | <i>the men are short</i> |

The form **anē** in the (b) and (d) examples is a copula verb which may also link subject NPs and predicate nominals:

- |      |                       |                                |
|------|-----------------------|--------------------------------|
| 24.a | awin anē pua?         | <i>Awini is a woman</i>        |
| .b   | awin anē dau          | <i>Awini is a man</i>          |
| .c   | awin nē akugr anē dap | <i>Awini and Akugr are men</i> |

What are the forms **vēl** and **giŋ**? They are verbs: the verb-form of the putative adjectives. I can adduce three arguments from my limited data that support the analysis of the forms in these sentences as verbs. These arguments do nothing to disallow an analysis of the other forms as nouns. Hence the suggestion that if there are adjectives in Kusaa, they are always either nouns or verbs. I shall henceforth refer to the forms like **vēl** and **giŋ** as V-form adjectives, and the **vēlingā** and **gimise** as N-form adjectives.

### Morphological Criteria

All N-form adjectives show number marking by pairs of suffixes which are possible noun suffix pairs:

- |      |                    |               |                 |
|------|--------------------|---------------|-----------------|
| 25.a | <b>r/a class:</b>  | tetaʔar/teta: | 'tall'          |
|      |                    | maʔasr/maʔasa | 'green, tender' |
| .b   | <b>og/a class:</b> | bo:log/bo:la  | 'soft'          |
| .c   | <b>o/a class:</b>  | pi:l/pi:la    | 'white'         |
|      |                    | to:l/to:la    | 'hot'           |
| .d   | <b>og/d class:</b> | we:wg/we:d    | 'red'           |
| .e   | <b>g/s class:</b>  | bā:lig/bālis  | 'slim'          |
| .f   | <b>f/s class:</b>  | fī:f/fī:s     | 'small'         |

The forms listed in (25) all have endings like some other nouns do. These are the forms used post-nominally as attributive adjectives. The forms like **vēlingā** which are used after the copula **anē** are all forms which look like the long forms of some noun. (Generally it is the long form of the expected class, though in a few cases about which I

can say nothing intelligent here, it is the long form expected for some other class.) Hence on morphological criteria N-form adjectives pattern with nouns.

N-form adjectives are subject to the same suffix deletion rule that nouns undergo when a demonstrative is added. When used after *anē* they show agreement in number just as predicate nominals do. V-form adjectives, on the other hand, are invariant in number just as verbs are. I have no instances in my data of a clear V-form adjective occurring with the suffixial morphology of verbs, but this would, in any case, be only the two aspectual suffixes. One would, on independent grounds, not expect the imperfective suffix to be compatible with these presumably stative verbs, but it is predicted that the perfective *-ya* should be compatible with adjectives given the right context.

On simple morphological tests, then, these adjectives seem to be able to look like either verbs or nouns, and their behavior seems consistent with their in fact *being* verbs or nouns.

### Coordination

Kusaal presents us with an apparently elegant diagnostic for the category of the head of a phrase. Conjoined constituents take one of two coordinators, *nē* or *ka*, depending upon the category of their head, *nē* being used for conjoining noun-headed phrases and *ka* for verb headed phrases. The expected distribution of these items is borne out by the data in (26):

- |      |  |   |
|------|--|---|
| 26.a | <i>akugr nē awín kad bo:g la</i>         | <i>Akugr and Awín chase the goat</i>          |
| .b   | <i>akugr kad bo:gla nē pe?ewgla</i>      | <i>Akugr chases the goat and the sheep</i>    |
| .c   | <i>*akugr k' awín kad bó:gla</i>         |   |
| .d   | <i>*akugr kad bó:gla ka pe?ewgla</i>     |   |
| .e   | <i>dau nē pua? la kad bo:g la</i>        | <i>the man and woman chase the goat</i>       |
| 27.a | <i>akugr gosud bí:g-la ka dogud mūt</i>  | <i>Akugr watches the child and cooks rice</i> |
| .b   | <i>*akugr gosud bí:g-la nē dogud mūt</i> |   |
| 28.a | <i>akugr wa?am ka bāl</i>                | <i>Akugr is tall and thin</i>                 |
| .b   | <i>*akugr wa?am nē bāl</i>               |   |
| .c   | <i>akugr a bālīga ka a gínǵǵǵ</i>        | <i>Akugr is thin and short</i>                |
| .d   | <i>*akugr a bālīga nē a gínǵǵǵ</i>       |   |
| .e   | <i>akugr a bālīga nē gínǵǵǵ</i>          |   |
| .f   | <i>*akugr a bālīga ka gínǵǵǵ</i>         |   |

The data that I have shows that, though the coordinator *need* not always be present in all cases of coordination, when it is present, its form is always determined by this rule. The examples in (28) show that N-form adjectives are coordinated with the noun coordinator, while the V-form adjectives are coordinated with the verb coordinator.

#### The specifier *sed*

The intensifier *sed* 'really' can only be used to intensify verbs. V-form adjectives may be intensified with *sed*, but N-form adjectives may not. (They may sometimes be reduplicated for intensification.)

- |      |                              |                                |
|------|------------------------------|--------------------------------|
| 29.a | o <i>sed</i> zod             | <i>he is really running</i>    |
|      | .b o <i>sed</i> gim          | <i>he is really short</i>      |
|      | .c *o <i>anē sed</i> girjã   |                                |
| 30.a | o <i>sed</i> vël             | <i>she is really beautiful</i> |
|      | .b *o <i>anē sed</i> vëlingã |                                |
|      | .c o <i>anē vëla vëla</i>    | <i>she is really beautiful</i> |

#### **4. Does Kusaal have Adjectives?**

It is possible that N-form adjectives are simply derived from V-form adjectives (or vice-versa). This is suggested by the forms adduced here which have a full paradigm of six forms: verb, N-form base, N-form singular short, N-form singular long, N-form plural short, and N-form plural long. Of the twenty-three potential adjectives in my corpus, thirteen have a full paradigm. The form of these adjectivals does not indicate clearly whether a putative derivation process should be considered to proceed from V-forms to N-forms: the V-form adjectives are either identical to the N-form stems or the stem plus a final *-m*. Equivalently, the N-form adjectives could be derived by stripping the V-form adjective of its final *-m* (if any) and adding some nominal number suffix pair.

The remaining ten potential adjectives occur as either a full N-form paradigm with no V-forms, or else simply as verbs. These forms tend to be paired up by elicitation of translations, but are not, I think, morphologically related. Hence *teta?* 'big' has only N-forms. Attempts to put some form of this adjective in a verbal context elicited *zueya*, which turns out to be an enchoative meaning 'become big' or 'grow up'. The verb *pa:d* 'small' has no N-forms. Attempts to put this verb after the copula *anē* elicited:

30. ?o mor po:du

*he has smallness*

by a nominalization process which turned the verb into a mass noun. Whatever derivational relation exists between the N-forms and V-forms of full paradigm adjectives is clearly not one which is creatively applicable.

The situation as I have laid it out is probably familiar to those acquainted with west African languages. Welmers 1973, in a chapter titled "Adjectives and Unadjectives" devoted to warning us from leaping thoughtlessly from 'nominal modifier' to 'adjective' discusses the case of another Gur language, Suppire, in which similar facts obtain. There, attributive adjectives take nominal morphology and trigger the loss of the morphology on the modified noun. The NP thus formed in Suppire, however, can be argued, presumably in virtue of its concord system, to be of the class of the adjective, not that of the presumed head noun. Welmers concludes (p. 264) "the data strongly suggest that the forms in question are nominal, and that they combine with the stems of other nouns to form a type of compound noun, the class of which is the modifier rather than the head." As in Kusaal, the inability to establish a regular morphological relation between such forms and verb forms clouds the derivational position. On the basis of the data that I have, I must arrive at essentially the same conclusion as Welmers: (p. 267) "It would require more data and analysis to define the status of qualificatives satisfactorily in terms of the total structure of the languages, but it is clear that one must be most suspicious in respect to a class of 'adjectives'".

## 5. Kusaal "Adjectives" and X-bar syntax

I conclude here with a brief consideration of the data discussed here within X-bar theory. X-bar theory is a cluster of assumptions about phrase structure. Most important in this matter are the assumptions that lexical categories are to be treated in terms of a feature system and that phrasal categories are projections of those categories. The argument for this position in syntax is parallel to that for the interpretation of phonological segments as bundles of features. To interpret categories as co-equal pigeonholes in the lexicon prohibits the capturing of cross-categorial generalizations, or rather, makes all cross categorial generalizations equally natural. The claim of X-bar theory is that rules generalize across certain 'natural classes' of categories. Interpreting categories as feature bundles allows certain rules to be formulated compactly and others to be not so easily formulated. Motivation for such feature systems is to be drawn from a study of which classes of categories are treated as natural classes by the syntactic rules of languages.

Kusaal's "adjectives" find no straightforward treatment as a major category within an X-bar analysis. All of the syntactic rules that I have found treat V-form adjectives and verbs identically, suggesting that there is no major categorial distinction between them. The rules that I have discussed here likewise treat N-form adjectives and nouns identically. Even should a rule be found which did distinguish between the two, it would be reasonable to question the justification for considering the distinction to be one between major categories rather than as between subcategories within the major categories of nouns.

On this view, the question of whether Kusaa, or any language, has adjectives or not is a question about the distinctions drawn by its syntactic rules. The categories of the lexicon are as much a projection of the rules of the language as vice versa.

### Footnotes

\*The analysis presented here is the result of joint work with Nora C. England of The University of Iowa and is based on data from one native speaker of the Bawku, Ghana, dialect. I am grateful for comments from Geoff Pullum and the participants at the January meeting of the Northern California African Linguistics Association. This research has been supported by research grants from the University of California, Santa Cruz, and the University of Iowa. I gratefully acknowledge the support of the Syntax Research Center of UCSC and University House of the University of Iowa.

### References

- England, N. C. and W. A. Ladusaw (1984) "Question formation in Kusaa," *Studies in African Linguistics, Précis from the 15th Annual Conference on African Linguistics*.  
Welmers, W. E. (1973) *African Language Structures*, University of California Press.

WHERE HAVE ALL THE ADJECTIVES COME FROM?  
THE CASE OF CHEROKEE\*

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R.M.W. Dixon, in his paper "Where have all the adjectives gone?" (1977), states that "not all languages have the major word class Adjective. Either they have no Adjective class at all, or else there is a small non-productive minor class that can be called Adjective" (p. 20). Dixon examines the way in which concepts belonging to seven semantic types (DIMENSION, AGE, VALUE, COLOR, SPEED, PHYSICAL PROPERTY, and HUMAN PROPENSITY) are expressed in a number of languages, and he establishes two typological dimensions along which languages may vary: a language may have an open or closed adjective class, and may be dominated by either verbs or adjectives, or may be neutral.<1>

In a language with an open adjective class, all or most of the concepts in all seven adjectival semantic types will be expressed by the same part of speech, either verb (as in Yurok or Mandarin) or adjective (as in English). Thus, a language can have an open adjective class without having any adjectives. In a language with a closed adjective class, only some of the adjectival concepts will be expressed by adjectives (typically those in the types DIMENSION, AGE, VALUE and COLOR, which have relatively small, finite memberships), and the rest (typically those in the large, open-ended types PHYSICAL PROPERTY and HUMAN PROPENSITY) will be associated with some other part(s) of speech, such as verb or noun.<2> In a strongly adjectival language, all seven semantic types are associated with the class adjective (as in Dyirbal). In a strongly verbal language, there are many adjectival oppositions, such as 'raw'/'cooked' for which the marked pole is realized by a verb, and the unmarked pole by an adjective (as in Alamlak) or noun (as in Hausa). In a neutral language, but for most oppositions, both poles are associated with adjectives (as in English).

It is not always clear how to fit a given language into Dixon's typology. Even within his own survey, certain judgments on part-of-speech classification seem to have been made with difficulty. For example, Dixon says of Telugu (p. 51):

Some (or perhaps all) of the roots which have basic membership of the Adjective class can also be used extensionally as nouns in semantically marked contexts . . . ; in view of this, Adjectives are shown as 'A(-N)' in [his] Table 2 . . . . A number of Telugu roots can function as nouns or as adjectives--they are shown as 'N-A' in Table 2 . . . . (Whereas the A(-N) items appear to be basically

adjectives . . . the N-A items are basically nouns, that can also function as adjectival modifiers.)

In Tzotzil (p. 53):

The Adjective class appears to be open; it includes COLOR, AGE, VALUE, and SPEED terms. Some DIMENSION concepts are expressed through adjective roots . . . but others are rendered by transitive verbs--hamal 'wide' is derived from ham 'to open, reveal' . . . some physical property concepts are expressed by verb roots, e.g. transitive hux 'sharpen' . . . .

Problematic points include deciding the basic part of speech of a root common to surface forms of several categories, and deciding whether a given surface form really is derived at all (consider such English forms as bashful and uncouth). Dixon does not commit himself to an explicit theory of morphology, and in particular he does not appear to consider the possibility that a language might contain a small number of basic adjective roots, but a large number of surface adjectival forms, most of them derived from non-adjectival roots. Such a language might, by certain of Dixon's criteria, be diagnosed as have a closed adjective class, but, by other of his criteria, might be diagnosed as having an open adjective class.

Linguists have claimed that the Southern Iroquoian language Cherokee has no adjectives at all, assigning those words which belong to the adjectival semantic types either to the category verb, or in a few cases, to the category particle (King 1975, Cook 1979).<3> Under such analyses, Cherokee could be said either to have an open adjective class and to be strongly verbal, or (if the few concepts represented by particles were considered to be true adjectives) to have a closed adjective class and, again, to be strongly verbal.

We propose that Dixon's methodology in classifying adjective behavior across languages might be insightfully improved by making explicit reference in the taxonomy to a distinction between underlying and surface levels of description, a distinction which he himself makes in the Theoretical Preliminaries section of his paper. In this paper, we argue that Cherokee represents a type of language intermediate between the possibilities presented by Dixon (and not specifically entertained by him), namely one in which (apart from a few adjectival concepts which are represented by true verbs) there is a large class of true adjectives which can be distinguished from other parts of speech, and which consists of two sub-classes: a small class of words with purely adjectival roots, and a much larger class of words with verbal (or, more rarely, nominal) roots. Cherokee has an open adjective class at

a surface level and a closed adjective class at an underlying level; and at the surface Cherokee is strongly adjectival, while underlyingly it is more strongly verbal.

We will first present evidence to show that there is indeed a category adjective in Cherokee, distinct from the categories particle, verb, and noun. We will then examine briefly the derivational relationships that exist between surface adjectives and their roots, and the placement of Cherokee in Dixon's typological framework.

### Cherokee Parts of Speech

Cherokee adjectives can be distinguished from the other parts of speech (particles, verbs, and nouns) on the basis of morphological and syntactic criteria.

The particles, which correspond to adverbs (to:yi 'outside'), conjunctions (ale 'and, or'), and adpositions (ti:tla 'toward') in other languages, are uninflected in Cherokee. Adjectives, in contrast, are inflected to agree with the nouns they modify in animacy, person and number. Many adjectives may be used adverbially; adverbs, however, cannot in general be used adjectivally. Moreover, adjectives, unlike particles, can stand as predicates.

Verbs in Cherokee, as in the other Iroquoian languages, are distinguished by their complex derivational and inflectional morphology. Deverbal adjectives show the internal morphology associated with the verbs from which they are derived, but adjectives cannot take verbal inflectional morphology, so they are not marked for negation or aspect or mood, for example, even when they are used as predicates. Negation and aspect/mood (other than simple present) must be marked on the copula for adjectives. Example (1) illustrates a simple present for a verb (a) and an adjective (b); examples (2) and (3) show negative and imperfective past forms for verbs and adjectives.

- (1) a. U:-li:ye:t-iha. (verb)  
       3sg.-moan-PRESENT  
       'S/he's moaning.'  
       b. Uw-otú:hi. (adjective)  
       3sg.-pretty  
       'She's pretty.'
- (2) a. Hla y-u:-li:ye:t-iha. (verb)  
       not NEGATIVE-3sg.-moar-PRESENT  
       'S/he's not moaning.'  
       b. Hla uw-otú yi-ki. (adjective)  
       not 3sg.-pretty NEGATIVE-is  
       'She's not pretty.'
- (3) a. U:-li:ye:t-i:skv:?i. (verb)  
       3sg.-moan-IMPERFECTIVE:PAST  
       'S/he' was moaning.'



- b. Uw-otú            ke:-sv:ʔi.            (adjective)  
       3sg.-pretty is-PAST  
       'She was pretty.'

Verbs and adjectives take pronominal prefixes, which refer to one or two arguments for verbs, and to the modified noun for adjectives. Adjectives and one-argument verbs are marked in the lexicon as taking one of two sets of prefixes, here referred to as set A and set B. The A and B prefixes correspond, respectively, to the "agent" (or "subjective") and "patient" (or "objective") prefixes, in the other Iroquoian languages. A-marked verbs and adjectives differ from one another in third person singular inanimate agreement: while third person singular inanimate verbs always take a pronominal prefix (4a), adjectives beginning with certain consonants (including /s/) may lack a prefix (4b). Both verbs and adjectives take the same third person singular animate prefixes (4a, c).

- (4) a. A:-sv:-ka.  
       3sg.-smell-PRESENT  
       'It smells; S/he smells.'  
       b. Sakho:nike:ʔi.  
           blue  
           'It's blue.'  
       c. A:-sakho:nike:ʔi.  
       3sg.-blue  
       'S/he's blue.'

Cherokee verbs appear in one of two shapes, tonic or atonic (these terms are from Cook 1979). A verb assumes the tonic shape when used indicatively as a main verb, and the atonic shape when in a subordinate clause; the atonic involves a slight modification of the pronominal prefix and a special atonic accent on the penultimate vowel, which, if necessary, is lengthened to accommodate it.<5> The atonic accent is shown with an acute accent mark (´) in the examples; tonic accent patterns are left unmarked in this paper. Adjectives, however, have only one accent pattern: the atonic accent is assigned to the rightmost long vowel, whether the adjective is used as a main or subordinate predicates or as an attributive. Example (1), above, repeated as (5), illustrates predicate constructions for verbs (a) and adjectives (b); (6) illustrates relative clause constructions. (7) illustrates an attributive.<6>

- (5) a. U:-li:ye:t-iha.                    (verb)  
       3sg.-moan-PRESENT  
       'S/he's moaning.'

- b. Uw-otú:hi. (adjective)  
 3sg.-pretty  
 'She's pretty.'
- (6) a. na ake:hy ts-u:-li:ye:t-i:ha (verb)  
 that woman RELATIVE-3sg.-moan-PRESENT  
 'the woman who is moaning'
- b. na ake:hy uw-otú tsi-ki (adj)  
 that woman 3sg.-pretty RELATIVE-is  
 'the woman who is pretty'
- (7) uw-otú ake:hya (adjective)  
 3sg.-pretty woman  
 'pretty woman'

It should be noted that Cherokee has a small number of true verbs which represent PHYSICAL PROPERTY and HUMAN PROPENSITY concepts. Like other verbs, they are inflected. Compare (8a), a present, to (8b), a negative, and (8c) a past.

- (8) a. U:-yo:s-iha.  
 3sg.-hungry-PRESENT  
 'S/he's hungry.'
- b. Hla y-u:-yo:s-iha.  
 not NEGATIVE-3sg.-hungry-PRES  
 'S/he's not hungry.'
- c. U:-yo:s-i:skv:?i.  
 3sg.-hungry-PAST  
 'She was hungry.'

Also like other verbs, and unlike adjectives, these verbs have distinct tonic and atonic patterns. The atonic is used not only in subordinate constructions (9a), but also as an attributive (9b). Compare the tonic form in (9c).

- (9) a. na ake:hy tsi-ka-hlv:-ska  
 that woman RELATIVE-3sg.-sleepy-PRESENT  
 'the woman who is sleepy'
- b. ka-hlv:-sk ake:hya  
 3sg.-sleepy-PRESENT woman  
 'sleepy woman'
- c. Ka-hlv:-ska.  
 3sg.-sleepy-PRESENT  
 'S/he's sleepy.'

Cherokee nouns fall into two classes. There is a substantial class of concrete nouns which have tonic accent patterns; there are also many transparently deverbal nouns (primarily agentives and instrumentals) which have atonic accent on the rightmost long vowel. All adjectives, on the other hand, have atonic accent. Like adjectives, nouns are not marked for

such categories as negation, aspect, and mood, which are marked on the copula instead. Unlike adjectives, which are always marked for the number of the modified noun regardless of animacy, many inanimate nouns are not inflected for number (10a,b).

- (10) a. ka:ké:t nv:ya  
           heavy rock  
           'heavy rock'  
       b. ti:-ka:ké:t nv:ya  
           PLURAL-heavy rock  
           'heavy rocks'

Word order in Cherokee is relatively free, within the noun phrase as elsewhere. There is a tendency, however, for adjectives to precede the nouns they modify; nouns rarely modify other nouns, but when they do, the modifier tends to follow the modified (Pulte and Feeling 1975, p. 330).

### The Derivation of Adjectives

Many Cherokee adjectives are transparently derived. Participles, for example, are formed productively from verbs, in most verb classes by means of the suffix *-ta*. The adjective 'rotten,' for example, is a participle *u:kó:sita* formed on the verb stem /ko:s/ 'decay' (the *i* is epenthetic). Likewise, 'dirty' is the partitive form *ka:tahá:ʔi* formed on the noun *ka:ta* 'soil.' Note that both adjective forms receive the atonic accent on their rightmost long vowels.

Many adjectives, however, bear no suffix: *é:kwa* 'large,' *uwé:thi* 'old (inanimate),' *u:yó:ʔi* 'bad,' *a:yanú:li* 'fast,' etc. These, it will be observed, belong to the semantic types DIMENSION, AGE, SPEED, and VALUE which are typically represented in the small set of true adjectives in one of Dixon's 'closed-class' languages. The fifth such semantic type, COLOR, is less clear-cut in Cherokee: *ki:ké:ʔi* 'red' is clearly founded on *ki:ka* 'blood,' but other color terms appear to be unsuffixed, while still others bear the same suffix *-e:ʔi* but do not appear to be derived from other forms.

This latter state of affairs recurs throughout the adjective inventory of Cherokee: certain suffixes are common, some of them identical in form to verbal aspect and mode suffixes, but it is possible neither to relate the root in question synchronically to some other, non-adjectival form, nor to isolate the meaning of the suffix. For instance, *ka:ké:ta* 'heavy' contains the common adjectival termination *-ta*, but seems not to be related to any noun or verb, and is certainly not a participial form; indeed, if we are not to posit several suffixes of the shape *-ta*, it makes more sense to analyze participles as formed on verb stems by the addition of an

ADJECTIVAL suffix -ta. Likewise, ordinals are formed on cardinals by the addition of the same terminal -e:ʔi found in color terms: sko:hi 'ten,' sko:hi:né:ʔi 'tenth.'

Recall that all these adjectives bear the atonic accent. Since finite verbs only take this accent in subordinate clauses, and since nouns appear not to take the accent unless derived, it might at first be argued that the presence of the accent on adjectives itself argues that they are all derived, and that Cherokee is simply an open-class language of the verbal kind. But what is a morphologically simple form like e:kwa 'large' to be derived from? And, even if a form like ka:ke:ta 'heavy' were to be assigned its accent by virtue of the suffixation of -ta, the synchronic status of the putative stem /ka:ke/ is not at all clear.

Consider, however, the loan from English asamá:ti 'smart, intelligent.' This form clearly belongs to the semantic type HUMAN PROPENSITY, and if Cherokee were a strongly verbal open-class language, one would naturally expect it to have been borrowed as a verb, which it was not. On the alternative assumption that Cherokee is a closed-class language, it would be highly unlikely for 'smart' to be borrowed into that closed adjective class; what other part of speech might it then be? If not a verb, then either a noun or a particle--yet clearly this is not a derived form (it is morphologically simple, except for the added third person animate prefix a-), and underived nouns and particles do not receive the atonic accent. Nouns borrowed into Cherokee consistently receive a TONIC accent pattern: wa:tsi 'watch, clock,' Tsi:sa 'Jesus,' etc. Consider also particles, such as to:yi 'outside' and ale 'and, or, almost.' The obvious alternative explanation is that 'smart' has been borrowed directly into an open class of true adjectives, all of which redundantly receive the atonic accent.

Once the surface form asamá:ti had been borrowed into the surface open class, it would have to be analyzed in the lexicon as a basically adjectival root. However, there is still no explanation for its atonic accent if this accent is viewed as a result of morphological derivation: derived adjectives would receive their accent by virtue of their derivation, but certain adjective roots, including /sama:ti/ 'smart,' would have to be specified for inherent accent, and the generalization regarding the accenting of all Cherokee adjectives would be missed. Such a closed-class analysis would still optimally require a late rule accenting all adjectives, thus acknowledging that, at the surface, adjectives form a natural (open) class with respect to this rule (and with respect to the distributional facts described above).

Underlyingly, then, Cherokee has a small, closed class of true adjective roots; most adjectival concepts are expressed with deverbal or denominal forms. (There are also a few verb

roots corresponding to adjectival concepts, which surface as stative verbs). On the surface, however, Cherokee has the character of an open-class language.

### Typological Considerations

At an underlying level, Cherokee must be considered a closed-class language: there are a small number of roots which surface as adjectives and which cannot plausibly be assigned to the other parts of speech (e.g. /e:kwa/ 'large'). In addition to that class, there are a large number of verb roots which may surface as adjectives (e.g. u:kó:sita 'rotten' from the verb stem /ko:s/ 'decay'), and there are a small number of stative verb roots which always surface as verbs, though they may be considered as expressing adjectival concepts (e.g. u:yo:siha 's/he is hungry' with stem /yo:s/ 'be hungry': see (8)).

At a surface level, Cherokee must be considered an open-class language, with adjectival concepts represented by adjectives (and not by verbs). Despite the large number of adjectives with verbal roots, it would be wrong to claim that Cherokee expresses adjectival concepts with an open class of verbs, because this would fail to capture the similarity between root-adjectival forms (like é:kwa 'large') and deverbal adjectives (like u:kó:sita 'rotten'), and it would fail to capture the difference between both these types on the one hand and verbal words (like u:yo:siha 's/he is hungry') on the other.

Recall that Dixon distinguishes strongly adjectival, strongly verbal, and neutral languages, depending upon which parts of speech are used to express adjectival oppositions. It appears from his discussion, which makes reference to verb and noun roots, that he intends this classification to be applicable at an underlying level. At any rate, since all but a very few adjectival concepts are expressed by adjectives at the surface, Cherokee would, trivially, be considered strongly adjectival with respect to surface forms. At an underlying level the matter of a three-way distinction is a non-issue, because all closed class languages must be strongly verbal. Under Dixon's definition, it appears that only open-class languages with true adjectives (as opposed to verbs, as in Yurok and Mandarin) can be considered strongly adjectival. And, since most adjectival oppositions must be realized by adjectives in a neutral language, a language cannot be neutral if it has only a small number of adjectives to begin with.<7> However, both open- and closed-class languages may be strongly verbal: Cherokee is a closed-class strongly verbal language, underlyingly.

Cherokee adjectives come from many sources, but they form a distinct and natural, if largely derived, class.

## Notes

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<1>There are other adjectival semantic types not considered by Dixon and not discussed here.

<2>SPEED may be expressed by adverbs in some languages.

<3>It is plausible to claim that the Northern Iroquoian languages have no adjectives, and this may well have been true for Cherokee at an earlier stage.

<4>This fact has led Cook (1979) to call adjectives "uninflectible verbs."

<5>There is a late rule which deletes a final vowel (and a preceding laryngeal) except in phrase-final position. All final vowels in Cherokee surface as short: even a penultimate vowel lengthened to accommodate atonic accent will be shortened if it becomes final by virtue of final vowel deletion (6b).

<6>Note, in (6b), that the relative clause marker cannot occur on the adjective; like other inflectional morphemes, it is placed on the copula.

<7>Dixon allows for neutral closed-class languages; such languages would have very large, but closed, adjective classes. It is not clear how a very large class of adjectives is determined to be closed.

## References

- Cook, William Hinton. 1979. A grammar of North Carolina Cherokee. Yale University dissertation.
- Dixon, R.M.W. 1977. Where have all the adjectives gone? *Studies in Language* 1:19-80. [Reprinted, with minor alterations and additional references, in Dixon, R.M.W. 1982. *Where have all the Adjectives Gone*, pp. 1-62. Berlin: de Gruyter.]
- Pulte, William and Durbin Feeling. 1975. Outline of Cherokee grammar. In Feeling, Durbin. 1975. *Cherokee-English dictionary*, ed. by William Pulte, pp. 235-355. Tahlequah, OK: Cherokee Nation of Oklahoma.
- King, Duane Harold. 1975. Grammar and dictionary of the Cherokee language. University of Georgia dissertation.

## Formulaic Patterns in the Maya Script

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### Introduction

The culture identified as the Classic Maya was located in the southern part of the Yucatan peninsula and the northern lowlands of Guatemala. One of the diagnostic characteristics of Classic Maya culture is the system of hieroglyphic writing which has been preserved on carved limestone stelae, altars, stucco tablets, wooden and limestone lintels, and on painted murals and ceramics. Although basically the same system of writing was still in use among Yucatec speakers at the time of the Conquest, discussion in this paper is restricted to the writings of the Classic Period, which lasted approximately from A.D. 250 to 900. Although it appears that more than one language was recorded, the bulk of the Classic inscriptions were probably the creations of speakers of a Cholan or possibly a Tzeltalan, language.

In the last 20 years glyphic studies have progressed to the point that the Maya script can no longer be characterized as a pictographic or partial writing system incapable of recording a language. Topics currently under investigation include phonetic values of specific glyphs as well as questions regarding word order, ergativity, and the presence of transitive constructions. Although the script clearly records language, the degree to which the Classic Maya were a literate society has not been established.

One of the characteristics of oral recitation is the presence of formulaic expressions. These set phrases function as units which can be strung together in various patterns to facilitate composition by orators, and to hold the attention of a listening audience. In a setting where a missed word or sentence cannot be checked by looking back at a text, or waiting for the statement to be repeated on the Eleven O'clock News, it allows the poet or reciter to keep the focus on the important information by making the mode of presentation as predictable and free from distraction as possible.

It is frequently the case that when a written literature contains a large proportion of formulaic expressions it is because it is the product of a society which is only partially literate, either because writing has only recently been acquired, or because literacy is limited to a particular social group within it. Familiar examples of this phenomenon include the Homeric Epics and early Anglo-Saxon poetry. Evidence of written texts which are a product of a primarily oral society is also present in the writings of the ancient Maya, both in the highly structured manner in which the texts are organized, and in the

formulaic expressions which make up such a large proportion of the texts. In the first part of this paper I describe the basic compositional units of the Classic inscriptions, and look at how these are combined into larger texts. I then discuss in greater detail a few of the formulaic expressions which are such a prominent part of these writings.

### **Composition of the texts.**

There is no reason to believe that the extant Maya texts in any way represent a complete corpus. Because of the humidity in most of the Maya area, none of the bark paper books from the Classic Period have survived in a readable state. The main sources of texts besides the carved monuments and tablets are the hieroglyphics found on pottery. Texts found on funerary ceramics, while not well-understood, tend to follow a set pattern that Coe (1973) terms the Primary Standard Sequence. The focus in this paper, however, is limited to the texts of the monumental inscriptions, which, partially because of their calendrical information, have provided the greatest success in decipherments.

There are three types of compositional units found in the inscriptions: calendrical statements, verbal expressions, and name phrases. The most frequent patterns in the inscriptions begin with dates. Calendrical statements may be divided into three groups. The first, found only at the beginning of a text, is a full Initial Series date which includes a Long Count (the number of days since the beginning of this era about 3000 B.C.), and various supplementary information about the lunar cycle, the nine-cycle, and the Calendar Round (which places any day within a period of 52 years). The second type is a date calculated by adding or subtracting a specified number of days (a distance number) from a date given previously in the text. A third type is simply a Calendar Round date (a day number, day name, month number, month name) found either at the beginning of an inscription or within a text at the beginning of a subordinate statement.

Mayan languages are verb-initial, and in the Quichean, Yucatecan, and Western Mayan families the unmarked word order is VOS. This is the word order found in Maya writing. Following the calendrical units, the preposed time adverbials, we find verb phrases, event glyphs, followed by the names of historical persons. Verbs usually have only one argument, even though they are frequently prefixed by *u*, the ergative third person. Since ergative person-markers are also used to indicate possession on nouns, some argue that these verbal phrases are actually nominal constructions, or possibly antipassives, while others believe that some are true transitive expressions with the direct object incorporated in the verb glyph itself. Examples of this will be given below.

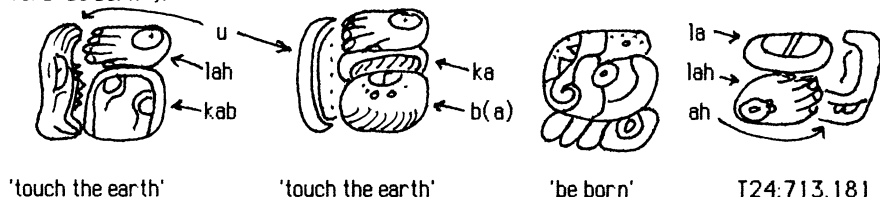


Event glyphs which have been deciphered include birth, heir-designation, accession to power, death, anniversaries of these events, and blood-letting rituals which were performed in honor of these events and in celebration of new year dates and period endings.

The event glyphs are followed by the name phrases of the subject, which include one or more name glyphs, and often a series of titles, epithets, and parentage information. The basic pattern of date+event+subject may be repeated many times within a text. A single inscription may give several events in the life of one individual, or it may, like the Tablet of the Sun at Palenque, for example, give the birth and accession dates for an entire series of rulers at a single site.

### Formulaic verbal expressions.

Lounsbury (1980:113f) identified a variant of the 'birth' glyph, which is actually the phrase 'to touch the earth'. Similar metaphors for birth are found in modern Cholan languages. The glyph consists of a hand placed over *kab* 'earth'. *Kab* can be indicated either by the day sign Caban, which represents the earth, or by the syllabic spelling T25:501, *ka* + *ba*. The ergative/possessive person-marker which is prefixed to the glyph indicates that the expression is either transitive and signifies 'he touched the earth', or it is nominal and signifies 'his earth-touching' (the more common birth glyph, the up-ended frog, never has the ergative *u* prefix because it is an intransitive verb 'be born').



Although the person-marker and the word 'earth' can be read, a phonetic reading for the hand signifying 'touch' has not been proposed. This hand (T713)<sup>1</sup> is sometimes read phonetically as */ah/*. Kelley (1976:137ff) originally assigned the reading */ah/* to T217, another hand variant, on the basis of a connection noted by Thompson (1950:280) between the Yucatec root */ah/* which means 'to end, finish', and */ah/* meaning 'to buffet with the palm of the hand'. T217 is frequently found associated with dates which end

various time periods. This glyph is virtually identical to T713, the only apparent difference being that T713 is larger, that it is a main sign rather than an affix.

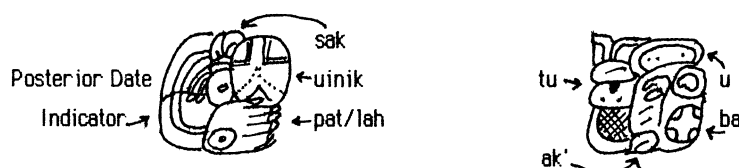
There is additional support for reading T713 as */ah* in the sorts of affixes frequently associated with it, which I would read as phonetic complements. It is frequently followed by T181, *ah*. Since this is a common verbal affix, it is not in itself significant. However, it is frequently preceded by T24 which Schele (1982) and MacLeod (n.d.) consider a possible candidate for *a/*, */a*, or possibly *V/*. Thompson's Catalog (1962:303f) list 27 examples of the sequence T24:T713.181 ( */a* + */ah* + *ah*) in which the first affix, and possibly the last, may be functioning as phonetic complements.

A */ah* reading has not, to my knowledge, been suggested for T713 in the birth metaphor, and it is possible that here it signifies 'touch' apart from any phonetic reading. It is not, however, too far afield to notice the association between the meanings 'slap' and 'touch', although the only language in which I have been able to find */ah* with the meaning of 'slap' is Yucatec. The case for a */ah* reading would be stronger if it were also common in modern Cholan or Tzeltalan languages. This 'birth' variant, although not frequent, is repeated four times in the inscriptions of the three temples of the Group of the Cross, dedicated to Chan Bahlum at Palenque. They occur in the birth expressions of GI, GII, and GIII, the mythological personages which make up the Palenque Triad.

Another example of formulaic expressions comes from the main tablet of one of these temples, the Temple of the Cross. The tablet is divided in half by a scene in which Chan Bahlum is shown facing his father Pacal. The first half of the inscription begins with an Initial Series date almost 7 years before the beginning of this era. It gives the dates of the birth of the mother of the gods and her offspring, the gods of the Triad, and it gives the date of her accession to power. The right half of the tablet records the birth and accession dates of nine historical rulers. Although there are several ways to indicate 'accession to power' the same phrase is used ten times in this inscription. Each ruler's phrase begins with a distance number or a Calendar Round date followed by a birth glyph and the name of the ruler. A posterior date indicator is prefixed to the accession statement so that typically an entire phrase reads something like, "On such a date, or it was so-many-days since was born [ruler's name], until his accession. . . ." The accession statement itself is composed of two glyph groups. The first element may be

prefixed by the posterior date indicator 'until'. Schele (1984:28) translates the rest of the phrase as 'he took office as *sak uinik* of the succession'.

The first part of the phrase is a hand (T713) beneath the symbol *sak* 'white, pure, gleaming' and the glyph for the 20 day period, *uinal* or *uinik*. The second word, *uinik*, may also mean 'man' or '20'. Schele's interpretation is that the first part of the glyph signifies the title *sak uinik* 'resplendent or pure man' (literally 'white, bright man', in Colonial Yucatec applied to the Spanish). Schele, following the reading proposed by Taak (1976:47), interprets the hand beneath *sak uinik* as *pat*, which may mean 'back' as in 'back of the hand' and 'to take office'. The existence of parallel expressions with different titles given above the hand support this interpretation.



T713/757 Accession Phrase

If, however, we interpret T713 as *lah*, the reading discussed in relation to 'touch the earth', then the phonetic rendering of the first part of the phrase is *sak uinik lah*. In Laughlin's Tzotzil dictionary (1975:371) there is an intransitive verb listed in the entry for *vinik* 'man' (the Tzotzil cognate of *uinik*) which means 'to be born': *vinkilah*. It could be that here we have another expression for birth, and that this 'accession' phrase actually reads 'from his illustrious birth to his accession'. There are two examples of *uinik* + *lah* without a preceding *sak* among the stucco fragments of Temple 18 at Palenque (Schele 1982: Charts 8:17, 120:2). However, before a solid case can be made for the 'birth' reading, some explanation for the alternate titles above the hand in similar phrases must be given. At this point, a *pat* reading is favored.

The second part of the phrase is the sequence T89(or 92).1(or 204):757. It is the jog glyph preceded by phonetic signs for *tu* and *u*. T757 is a very common glyph. It has several functions, one of which is as a syllabic sign for *ba*. Its most common function is as a verb, identified by Schele (1982:57ff) as a general verb used in auxiliary constructions. In a paper read at the Taller Maya VII (Macri 1984) I have proposed that

in verbal contexts the sequence T1.60.757 should be read *u ak' (u) b'a* 'to present oneself, to offer oneself'. The fact that the verb is reflexive accounts for its being preceded by the ergative person marker.

In modern Tzotzil we find the phrase *Tak' b'a ta k'ob' kahvaltik* (Laughlin 1975:40) which means 'to partake of the sacraments', literally, 'to offer oneself into the hand of god'. Thompson (1950:32) points out that 'hand of god' (in Yucatec) was a metaphor for the sacrificial knife. I believe that this phrase is found in the inscriptions in T757 followed by the Ahau-in-hand glyph, a sequence associated with ritual blood-letting events. So, in addition to its function as the syllabic sign *ba*, T757 also means to 'offer oneself' in the context of ceremonial blood-letting.

In the accession expression T757 is preceded by T89 or T92 which has the value *tu*, and in this case would appear to be a contraction of the preposition *ta* or *ti* and the ergative person marker *u*. The entire phrase would then read either, 'count until his taking office as *sak uinik* for/of/by his offering himself' or 'from his white (illustrious) birth, to his offering himself', that is, to his accession blood-letting rites.

### Formulaic nominal expressions.

A possessive construction typical of Mayan languages is the possessive pronoun prefixed to the possessed noun, followed by the possessor. The first example is from Chol, the second from Tzotzil:

iy -	išim	k	tyat	
3POSS	maize	1POSS	father	
	his	maize	my	father
	'my father's maize'			(Warkentin and Scott 1980:26)

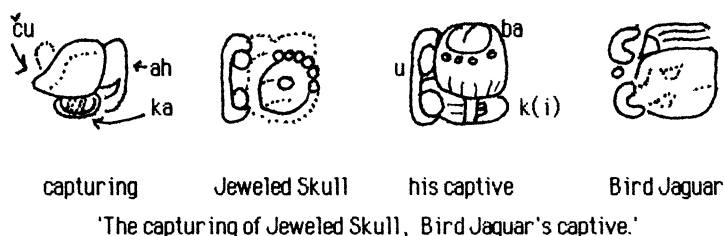
s -	k'ob	ti	bolom	
3POSS	hand	the	jaguar	
	his	paw	the	jaguar
	'the jaguar's paw'			(Cowan 1969:56)

I would like to point out two examples of this construction found as formulaic expressions in the glyphs. The first is associated with scenes of capture and consists of the ergative/possessive person-marker *u* followed by *bak* 'captive' spelled with the

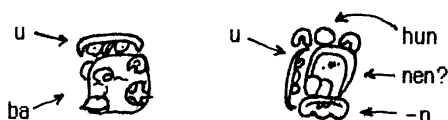
syllabic signs *ba* and *k(i)*. This is then followed by the name of a ruler. The phrase is sometimes preceded by the capture glyph and the name of the captive. The phrase reads:

( <i>č</i> u + ka + ah ([name of captive]))	u	ba + k(i) [name of captor]
čuk - ah	"	u bak "
'capture' GERUND?	"	3POSS 'captive' "
'( the capturing of [name of captive]), [name of captor]'s captive'		

Schele (1982: Chart 34) lists over 17 examples of this construction. The example given below is from Yaxchilan, Lintel 8, A3-4, E1-2:



The second phrase I would like to discuss has been identified as 'child of mother' (Schele 1982: Chart 133:1-12). It occurs after the name phrase of a ruler and before the name of his mother. I would like to suggest that this is a possessive phrase similar to the last part of the captive expression. The first glyph is the jog glyph discussed above, here, I believe, used phonetically for *ba*. It is prefixed by the ergative/possessive person-marker *u* and is followed by T606, a glyph of unknown meaning which itself is prefixed by *u* and a single dot or circle representing the number one. It is followed by the affix for the syllable *na* or *an*. In both Tzotzil of San Andres (Hurley Vda. de Delgaty and Ruiz Sanchez 1978:17) and Tzotzil of Zinacantan (Laughlin 1975:75) *ba* is listed as having the meaning 'first-born'. The 'child of mother' phrase might then be interpreted as follows:



u        ba        hun        unen    [name of mother]  
 3POSS first-born #1    child        "  
 '[name of mother]'s firstborn child'

The exact reading of the last part of the phrase remains uncertain. The placement of the single circle for 'one' varies with respect to the prefix *u*. Of the 12 examples given in Schele's Chart 133, 7 show the glyph for *u* spanning the length of both the circle for 'one' and T606, indicating that *u* is to be read first. Two of the examples are drawn in such a way that they suggest the 'one' is to be read first, one example is ambiguous, and two have only one of the two elements. One explanation for the variation may be that the 'one' is intended as a semantic determinative, indicative of the fact that the phrase identifies the ruler as the woman's first child, and is not meant to be read phonetically.

It is interesting to note the occurrence of T191.I:606:23 twice on the tablets of the Temple of the Inscriptions at Palenque. The first is on the middle panel at F7, and the second is at A1 on the west panel. In both cases Pacal is named as the mother of the gods of the Palenque Triad. Since more than one child is named T757, *ba*, as the modifier 'first' does not occur.

If we exclude the circle for 'one' as a phonetic indicator, we are left with two remaining phonetic clues. One is the prefix *u*, which may stand for the sound *u*, or for the third person ergative/possessive prefix. The other is the suffix T23 which may stand for the sound *na*, *an*, or a final *n* following a syllable containing any vowel according to the principle of neutral vowel complementation (Justeson 1978:292ff). This would then give us a reading *u*\_\_\_ *n*.

In the entries for *ba* in both of the dictionaries mentioned above, there is also the phrase *ba unen* 'first-born child'. This phrase matches with most of the reading for the 'child of mother' phrase, except that until the value of T606 has been established, we cannot be certain that the last word is actually *unen*. If T1.606:25 is *unen*, then the expected value of T606 would be *ne* or *nen*. The identification of the object represented by the sign is not clear, and what few examples there are of it in contexts other than the

'child of mother' phrase, shed little light on the problem, except to show that even in other environments it may occur with T25 affixed (for example, Palenque Tablet of the Sun, P4, and Piedras Negras Throne 1 (Schele 1982: Chart 21:6,16)), suggesting that the word signified ends in *n*.

The word for 'mirror' is *nen* in many Mayan languages, including the Western Mayan subgroup, but the glyph most commonly associated with 'mirror' is T617 which is distinct from T606, but shares the features of curved lines across the lower section of the glyph and of often having a partial, rather than a full, outlining cartouche. Although the exact reading of the phrase is uncertain, it clearly follows the pattern of a Mayan possessive noun phrase.

It is of interest that in the middle panel in the Temple of the Inscriptions at Palenque where Pacal is named as the mother of OI, OII, and OIII of the Palenque Triad where the 'child of mother' is actually plural 'children of mother' the jog glyph is absent from the phrase. That is, the *u ba* 'her firstborn' is deleted, and we have only *u unen* 'her child(ren)' (in most Mayan languages number marking on nouns is optional).

### Summary.

In this paper we have looked in detail at four different formulaic expressions found in Maya writing. I have tried to demonstrate how glyphicists approach some of the problems presented by the glyphs, and at the same time to show how patterns in the glyphs reflect patterns common to formal styles of oral recitation. Although it has not been possible to give examples from modern Mayan languages, the use of similar rhetorical devices can be found among Mayan speakers today.

Glyphic studies have advanced to the point that they must be taken seriously as attested sources of Mayan languages which can contribute to our knowledge of Mayan historical linguistics in important ways. Maya writing is also of interest to the study of writing itself. Because it developed apparently without influence from the Old World, the Maya script offers some unique solutions to the problems of visually recording language.

### Footnote

- 1 Schele refers to the hand in this phrase as the 'inverted hand', but in fact, it follows the same rotation pattern as affixes, always keeping the same side adjacent to the main sign, or in this case, since both signs are the same size, keeping the same side adjacent to

the sign it occurs with. Therefore when T713 is at the top the fingers point to the left, and when it is at the bottom they point to the right.

## References

- Coe, Michael D. 1973. *The Maya scribe and his world*. New York: The Grolier Club.
- Cowan, Marion M. 1969. *Tzotzil Grammar*. Tlalpan, Mexico: SIL.
- Hurley Yda., A. and A. Ruiz Sanchez. 1978. *Diccionario Tzotzil de San Andres con variaciones dialectales*. Mexico, D.F.: SIL.
- Justeson, John S. 1978. *Maya scribal practice in the Classic Period: a test-case of an explanatory approach to the study of writing systems*. Unpublished dissertation, Stanford University.
- Kelley, David H. 1976. *Deciphering the Maya script*. Austin: University of Texas Press.
- Laughlin, Robert A. 1975. *The great Tzotzil dictionary of San Lorenzo Zinacantan*. Washington, D.C.: Smithsonian Institution.
- Lounsbury, Floyd G. 1980. Some problems in the interpretation of the mythological portion of the hieroglyphic text of the Temple of the Cross at Palenque. In Merle Greene Robertson, ed. *Third Palenque Round Table, 1978.*, pp. 99-115. Austin: University of Texas Press.
- MacLeod, Barbara. n.d. *An epigrapher's annotated index to Cholan and Yucatecan verb morphology*. Unpublished ms.
- Macri, Martha J. 1984. *Una nueva interpretacion de T757*. Paper presented at the Taller Maya VII, Merida, Yucatan.
- Schele, Linda. 1982. *Maya glyphs: the verbs*. Austin: University of Texas Press.
- . 1984. *Notebook for the Maya hieroglyphic writing workshop at Texas*. March 10-11, 1984. Austin: Institute of Latin American Studies, University of Texas.
- Taack, George. 1976. Accession glyphs on Maya monuments: A linguistic approach. *Anthropological Linguistics* 18.1:29-52.
- Thompson, J. Eric S. 1950. *Maya hieroglyphic writing, an introduction*. Washington: Carnegie Institute.
- . 1962. *A catalog of Maya hieroglyphs*. Norman: University of Oklahoma Press.
- Warkentin, Viola and Ruby Scott. 1980. *Gramatica Ch'ol*. Tlalpa, Mexico: SIL.



LATIN WORD-MEDIAL CONSONANTS LOST IN PORTUGUESE:  
EARLY AND DELAYED CONJUGATIONAL REVERBERATIONS  
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1. It has been known, for well over a century, that Galician-Portuguese, at undetermined preliterate dates, lost up to five intervocalic consonants (simple, not lengthened) in words inherited from ancestral languages -- primarily, but not exclusively, Latin. These losses have been traditionally -- and doubtless correctly -- dealt with as instances of regular sound change, whether the analysts appealed to sound correspondences ("laws") or to phonological rules. Interestingly, in as many as three concrete cases of such loss a neighboring language as closely related to Galician-Portuguese in other respects as is Spanish offers no counterparts; as if by way of compensation, Spanish tends to lose two simple consonants, namely f word-initially before any vowel (and also intervocalically) and g word-initially only before front vowels;<sup>2</sup> of these the former has been fully preserved in Portuguese, while the latter, to be sure, was shifted ([g] to [ʒ] via [ʝ]) in certain instances, rather than being doomed to indiscriminate loss.<sup>3</sup>

We shall not be here directly concerned with the fine details of these sound changes, nor with their relative chronology, and least of all with the circumstantial justification of apparent exceptions from them, but solely with the rhythm of their impact on conjugation. Some of the concluding ripples produced by that impact are still observable in action, as it were: Such has been the slowness and complexity of partly morphological, partly lexical reactions and ensuing adjustments to a chain of revolutionary phonological upheavals. The basic raw facts have been ascertained and documented in a series of historical grammars of Galician-Portuguese and in a slightly shorter parallel series of historico-comparative grammars of Romance, starting with the manual of K. von Reinhardtstoettner (1878: §§ 15, 17, 21, 23, 29) and with the opening volume of F. Diez's magnum opus (1836: 218, 222, 227, 235-7, 242).

Accordingly, we have thus divided our responsibilities. The senior partner, a comparativist and diachronic linguist by training, will provide the gross outline of the process, as observable from without; the junior partner, a native speaker of Brazilian Portuguese (with, specifically, a Minas Gerais and Goiás background), will add some elaborative remarks -- in the context of the aftershocks of the aforementioned quakes -- on certain choices still available to the educated native speaker and writer of her country -- remarks flowing chiefly from her intuitive grasp of the language. At intervals, European Portuguese and Spanish will be brought in by way of a foil.

2. Of the five situations in which a loss took place, four -- at first glance -- occurred without immediately affecting the survival of the words at issue, which belonged to a variety of form classes. The fifth, by far the least frequent, probably confined to verbs, pan-Romanic and, by implication, the oldest of all (Richter, 1934: §§8 and 9), resulted either in the loss of the lexical unit which was, or might have been, so affected, or in its escape from extinction at the cost of essentially non-phonological restructuring.

Consider the vicissitudes of the following model items, assumed for a variety of reasons to have been transmitted by word of mouth and here selected, wherever possible, from the ranks of form classes other than verbs, with the ancestral form preceding in each instance its outgrowth:

(a) GRADU 'step, degree' > grau 'id.; rank, order, station'; VADU 'ford' > vau;

(b) CAELU 'sky, heaven' > céu; TĀLĒS 'such' (pl.) > tais;

(c) LĀNA 'wool' > lã (via OPtg. lãa); LŪNA 'moon' > lua (via OPtg. lũa);

(d) LĒGĒS 'laws' > leis; MAGIS 'more' > mais 'id.' beside mas 'but' (however, FŪGERE 'to flee' > fugir);

(e) TRAHERE 'to drag, pull' > trazer 'to bring' (a substitute for OPtg. trager which, in turn, probably betrays the influence of parental AGERE 'to push from behind, drive'); VEHERE alongside deponential VEHI 'to transport, carry on one's back and shoulders': doomed to extinction in all Romance languages.<sup>4</sup>

The Spanish counterparts of the eleven words preserved are, and have been practically from the start: grado, vado; cielo, tales; lana, luna; leyes (OSp. also leys), (heavily stressed) más beside (lightly stressed) mas; traer.<sup>5</sup>

For the student of diachronic phonology it is arresting to observe how most of the slots thus vacated were rather speedily filled (thus, Latin intervocalic -T- yielded Romance secondary -d-, as in the past participial endings -ado, -ido, and anciently also -udo, from ancestral -ATU, -ĪTU, and -ŪTU); how, in Galician-Portuguese, a new -l- and -n- arose through degemination of Lat. -LL- and -NN-, as in Castela 'Castille', lit. '[a string of] armed camps', and in ano 'year', from CASTELLA (pl., a morphological variant of CASTRA) and ANNU, respectively. Then again, /ge/, /gi/, spelled -gue-, -gui-, once more sprang into existence through reorganization -- in the direction of levelling -- of certain verbal paradigms, as when OPtg. erger 'to raise' (traceable in the last analysis to ERIGERE), under pressure from ergo 'I raise', erga 'I may raise', etc., became erguer /erger/ -- comparable in this respect to Sp. erguir. In addition, isolated borrowings from Germanic, involving originally /gwe/, /gwi/ -- as in guerra 'war' --

in the end, after reaching the stage of /gʁɐ/, enriched the representation of /ge/, /gi/.

There are on record instances of restitution of lost consonants (a) through borrowing of cognates from Eastern and Southern neighbors (including exceptional instances of false restitution); (b) through adoption of learned counterparts (Latinisms, "cultismos"); and (c) through switch to variants of the given radical displayed by other members of the same paradigm. Only a few specimens of these processes will cross our path. Further complications stem from the fact that, aside from chronological divergencies, the loss of ground did not occur in the same fashion for the individual consonants affected by this trend. One assumes, on the basis of parallels, that intervocalic /d/, before disappearing, passed through a fricative stage, [ð]; and that [ǰ] changed to something like [j] on its way to zero; but even indirect evidence is scant. In the case of /l/ between vowels, there appears to have occurred a single leap from existence to non-existence, without any intermediate stages. In sharp contrast to this state of affairs, /n/ practically never disappeared at once, but in the majority of cases permanently nasalized the preceding vowel, as in BENE 'well' > Lisbonese /bãj/, Brazilian /bẽj/. In a minority of cases, the development went further, either through straight denasalization, as in LUNA > OPortg. lũa > mod. lua, or by denasalization followed by restitution of some nasal, which need not be the original /n/, but may be an /m/ or a /ñ/ as well; cf. UNA 'one' (f.) > OPortg. ũa > mod. uma, dial. unha. This number of steps explains why the loss of n, where it occurred at all, postdated the loss of d, ǰ, and l (not to mention h) by a considerable margin, taking us as a rule to the end of the Middle Ages.

3. It was to be expected from the outset that changes of such magnitude would have measurable consequences (a) for the bare survival and preservation of rank of certain verbs (as well, to be sure, as of certain nouns, etc.), simply as lexical units; and (b) for the crystallization and/or further development of given conjugational schemata. Upon further inspection such prognoses turn out to be well-founded.

What one normally witnesses, among verbs, is a two-step development -- a situation readily understandable especially where the eventual loss of an -n- is involved: VIDERE 'to see' > OPortg. (disyllabic) veer > mod. ver; similarly, CREDERE 'to believe' > OPortg. creer > mod. crer; RIDERE 'to laugh' > OPortg. riir > mod. rir; VENIRE 'to come' > OPortg. vẽir, viir > mod. vir. Where the newly contiguous vowels are sufficiently differentiated, as when a back or a central vowel is followed by a front vowel, no contraction occurs, hence a single-step development is apt to be involved, at least in the standard: MOLERE 'to grind' > old and mod. moer, RÔDERE 'to gnaw' > old and mod. roer, SALIRE 'to hop' > old and mod. sair 'to go out, leave'. In Peninsular dialect speech the evolution can go one step farther, as when RADERE 'to scrape' > OPortg. raer survives vestigially as rer, or as when CAD-ERE, V. Lat. \*-ERE > OPortg. caer, rather than yielding, in turn, to cair

sporadically gives rise to quer. In contrast, Spanish ordinarily has kept its sequences of two identical (or near-identical) vowels, hence LEGERE > leer, as against Ptg. ler from older leer; PROVIDERE 'to furnish, provide' > proveer as against Ptg. prover via older proveer; OSp. riir > mod. reír (with vowel dissimilation, like decir 'to say' and freír 'to fry') vs. Ptg. rir and, in their retinues, Sp. sonreír, anciently sonriir 'to smile' < SURRIDERE vs. Ptg. sorrir. In the case of a very few extra-frequent verbs, both languages, in the end, have practiced contraction: SEDERE 'to sit' > OSp. OPTg. seer 'to sit, be' > mod. ser 'to be'; VIDERE 'to see' > OSp. OPTg. veer > mod. ver. Regular in Spanish cross-temporally, but in Portuguese solely at the medieval stage has been its compound POSSIDERE 'to own, possess' > OSp. posseer > mod. poseer, whereas OPTg. posseer -- as if retreating before the threat of \*posser -- allowed itself to be attracted by atribuir, confluir, and similar learned formations, succumbing in the end to the lure of possuir. Where -n- was in jeopardy, the hazard materialized only in Portuguese; witness PONERE 'to place' > Sp. poner vs. OPTg. põer > mod. pôr; TENERE 'to hold' > Sp. tener 'to hold, have' vs. OPTg. tẽer > mod. ter; and aforementioned VENIRE 'to come' > Sp. venir vs. OPTg. vẽ-, vĩ-ir > mod. vir, plus their respective compounds; on coll. Br.-Ptg. conter see below. This superficial confrontation of the two languages shows at a glance that, where comparison is at all feasible, the ultimate reverberations of the consonant loss -- itself sometimes arrived at via some such intermediate stage as the dissolution of a nasal in the preceding vowel -- tended to linger on distinctly longer at or near the Atlantic Coast than in the Center of the Peninsula, with appropriate consequences also for New World Romance.

4. A seldom witnessed phenomenon has been the replacement of an "endangered" consonant by a relatively "safe" or "resistant" one. Thus, SANARE 'to make sound, heal, cure', after having actually reached in the Middle Ages the foreseeable form sãar, was headed toward becoming \*sar (i.e., toward acquiring a form roughly comparable to that of dar 'to give' < DARE) when -- as if through false restoration of -r-, a phoneme resistant to attrition, at least, word-medially and not infrequently substituted for other sonorants -- mod. sarar 'to overcome sickness, recover health' came into existence. It is possible that contact with some such near-synonymous verb as curar 'to heal' had a not insignificant therapeutic share in this development. To this day, the past ptc. curado is widely used for recovery from any illness (e.g., conversationally: E sua gripe? -- Está curada). Significantly, even though Portuguese, to express 'sound, hale, hearty, healthy, sane', places at the disposal of its speakers the adj. (m.) são, (f.) sã -- a cognate of Fr. sain, Sp. and It. sano, etc. and, like them, an offshoot of SANUS -- , it also boasts an idiosyncratic, practically synonymous derivative, namely sadio, undoubtedly echoing Late Lat. SANATIVUS, a word which the congeners of Portuguese have allowed to perish. Sadio, as against são, carries the advantage of lighter exposure to ambiguity, just as sarar surpassed sãar in degree of resistance to attrition.<sup>7</sup>

Observe that, in the absence of metrical evidence, it is difficult to determine whether such medieval graphies as leer, riir were still disyllabic or already monosyllabic at any given cut-off point; however, in order for sāar to have emerged from its predicament as sarar, it must at the critical stage still have been disyllabic.

5. One set of problems of the first magnitude we have already touched upon in passing are those involving the disambiguation of homonyms and near-homonyms in the ranks of verbs. Two major sub-categories can be here established; each carries with it its own remedies:

(1) Either two forms pertaining to the paradigm of the same lexical item -- forms neatly distinguished from time immemorial in a typical verb -- happen, by way of exception, to collapse, or to threaten to collapse, ordinarily in consequence of a peculiar sound development;

(2) Or, constituents of two different verbal paradigms, at a certain juncture, may begin to sound alike, normally once more as a result of a distinctive phonological process. In Romance, the irksome coincidence may involve two (or more) persons, numbers,<sup>8</sup> tenses, or moods. The phenomenon cuts across several languages, which -- for all that one knows -- may display different degrees of tolerance. Programmatically, we must here confine ourselves to such situations as have been provoked by loss of one of the chosen intervocalic consonants.

In the rhizotonic forms of the preterite, Lusophones have traditionally preferred such light contrasts between the 1st and the 3d sg. as pude 'I could' vs. pôde 'he could', pus 'I placed' vs. pôs 'he placed', tive 'I had' vs. teve 'he had', but did not seriously mind complete identity of forms, as in quis 'I, he (suddenly) wanted', soube 'I, he learned'. Only in one instance were the final vowels markedly differentiated: vim 'I came' vs. veio 'he came', in lieu of the original pair vīe vs. vēe, from VENĪ and VENIT, respectively. The eventual denasalization of the 3d sg. form alone and the expansion of the oral monophthong (e) into a falling diphthong (ei) destroyed the last semblance of symmetry between I and III, apparently making an unequivocal marking by -o imperative. Contrast this delicate interlocking with the across-the-board solution advocated by Castilian: pude~pudo, puse~puso, quise~quiso, supe~supo, tuve~tuvo, vine~vino.<sup>10</sup>

Different sorts of solution have been seized upon in Portugal and in Brazil (to postpone comment on the therapeutic device favored by speakers of Spanish) to avert the collision of certain pres. ind. and pres. subj. forms in the case of the one and only verb whose erratic paradigm presented the risk of such an internal clash. The verb at issue, a descendant of Lat. VADERE 'to go hastily, rush', has, we recall, entered, since before the dawn of textual tradition, into the composite paradigm of ir 'to go'. The two forms headed for collision were direct descendants of VADIMUS 'we rush' and VADAMUS 'let us rush!'; the medieval Portuguese counterparts were vamos and vaamos. Mandatory contraction of the two consecutive near-identical

central vowels threatened to produce a form inadequately differentiated from its counterpart in the indicative. In this emergency speakers of Lisbonese allow the a phoneme in the indicative to be rendered by an allophone one expects to hear before a nasal, namely [vəmuʃ], while using, in defiance of the norm, the alternative allophone in the subjunctive, namely [vamuʃ] -- unless they altogether surrender and switch allegiance to imos, extracted from ir. Playing here with the [v] : [a] contrast is, typologically, the same device that Lisbonese speech, as codified by A. dos R. Gonçalves Viana, uses in effectively opposing amamos 'we love' to amámos 'we loved'. The average Brazilian, being unskilled in the use of this phonological trick, can be expected to fall back on all sorts of circumlocutions for the indicative/subjunctive and the present/preterite predicaments, e.g., through replacement, where circumstances so warrant, of the 1st pl. by a gente, which governs the non-ambiguous 3d sg. Most of the remaining forms of the present-tense paradigms of ir, incidentally, are exempt from ambiguity: ind. vou, vais, vai, ... ides; subj. vá, vás, vá, ... vades, except for the 3d plural, which once more allows vão to straddle both moods: No Lisbon-style solution is this time available.

The most archaic Spanish texts, some of them dialectally tinted, still had recourse to vaa(mos) in the subjunctive. Therapeutic measures included preservation (or restoration) of the d: vada, or an experiment, destined to be successful, with innovative vaya, in transparent imitation of (h)aya 'let me, him, her, it have!', also 'let there be!', and in rhyme with older caya, subsequently transmuted into caiga 'let him fall', leaving only the old imper. ¡vamos! 'let's go and do it!' intact -- at present, functionally, more an interjection than a member of a verbal paradigm (Hanssen, 1913: § 231).

To round out this account: Portuguese lacks any particle that marks, say, the subjunctive mood -- on the order of Rum. să and Fr. que -- or any particle announcing or otherwise identifying a tense, so that the respective kinds of ambiguity can indeed become troublesome. However, drawing the requisite distinction between, say, the 1st and the 3d pers. sg. is something that can be accomplished through extension of the scope of the personal pronouns, who thus gradually tend to become inflectional prefixes, as has happened on a grandiose scale in Modern French. Now spoken Brazilian Portuguese, in the wake of the elimination of tu and vós by você, vocês, respectively, has undergone an all-encompassing coalescence of the 2nd and 3d pers. verb forms, sg. and pl. alike; and once speakers become accustomed to saying Você soube 'thou learnedest', êle, ela soube '(s)he learned', they extend this habit to eu soube 'I learned', all of which contributes mightily to disambiguation. In Spanish the heightened frequency of yo, él, ella before ambivalent quiera, quería, quisiese, quisiera has likewise been observed -- but on a scale incomparably more modest.

6. Where two different verbs are involved in a (near-) homophonous relationship, the coincidence of the paradigms may be total, or pervade a varying number of forms, or be restricted to just one

form; also, the forms so affected may occupy the same niche or different niches within the edifices of the two paradigms.<sup>11</sup> Again, we shall confine ourselves to situations characterized by loss of a medial consonant.

The disappearance of intervocalic -D- and -L- threatened to lead to a head-on collision between VALĒRE 'to have the power or strength, be healthy' and VADERE 'to go, walk, rush', which latter, in turn, had, we recall, entered with its near-synonym EŌ, ĪRE into a kind of suppletive or symbiotic relationship. According to the predictive rule, Forms II-VI of the pres. indic. of the parent language, namely VAL-ĒS, -ET, -ĒMUS, -ĒTIS, -ENT, should have yielded OPtg. *\*vae(s)*, *\*vaemos*, *\*vaedes*, *\*vaem*, with the prospect of certain further gambits (*\*vai*, *\*vaeis*, etc.). Nothing of the sort actually happened; one finds instead: *vale(s)*, etc., as if the rule deleting VIV had never sprung into existence.<sup>12</sup> Since, on circumstantial evidence (witness Fr. *vaux*, *vaut*; Sp. *val-g-o*, -es; It. *val-g-o*, -i), we are dealing here with a vernacular formation not exempt from obedience to rules, either restoration or especially-motivated preservation of -L- must be involved. The only reason for the avoidance of *\*vae*s, etc. could have been prior occupation of these vital slots by the offspring of VAD-IS, -IT, ... 'thou goest, he goes, ...'. Only a fine-tuned statistico-chronological inquiry will some day determine whether VADERE / ĪRE enjoyed precedence over VALĒRE on account of the earlier loss of -D- or as a result of the verb's higher incidence, superior grammatical rank, and phraseological importance, etc. The process of restoration may well have worked thus: The 1st pres. ind. VALEŌ and the entire pres. subj. VALEAM, etc. no longer had any intervocalic /l/ in Late Latin in view of the compression of these (and similar) forms into /vaλ-o, -a/ -- and palatal l was exempt from erosion and eventual disappearance. On the model of OPtg. *ponho*, *pōes*, ... (from *pōer* 'to place'), *tenho*, *tēes*, ... (from *tēer* 'to have, hold, own'), and *venho*, *vēes*, ... (from *vēir*, *vīir* 'to come') -- given the well-known affinity of n with l and the status of underlying phoneme that n may be said to have had in, say, *pōes*, *tēes*, *vēes* -- the l could indeed have been restored, or even preserved,<sup>13</sup> in *vale(s)*, etc. and the threat of irksome homonymy thus averted.

One of the most dramatic lexical collisions due to consonant erosion exclusively involved the Latin families of Class. CADĒRE (*\*CADĒRE* in folk speech) 'to fall' and CALĒRE 'to be warm'. As if their partial overlap were insufficient, the descendant of ancestral CĀNĒRE 'to have white or graying hair', INCĀNĒSCERE 'to turn white or hoary', was likewise caught in this tangle. How far things were allowed to go can be inferred from the fact that in a single late-medieval text available in a scrupulous critical edition, namely the "Orto do Esposo", *aqueecer*, 'to happen' (cf. Gr. *Vorfall*, *Zufall*) and *aqueecer*, 'to warm up' could smoothly function side by side, the former being flanked by (a) *queecimento* 'accident'. Otherwise the two domains of 'falling' (*cayr*, *caidiço*, *caymento*; *queeda*; *esque(e)cer* [both transitive and impersonal], *esque(e)cimento*) and

of 'heating', 'exciting' (esqueentar, esqueentamento; qua- or que-entura 'fever'; queente) were rather neatly distinguished, to say nothing of the separate place reserved for cão '(turned) white' (of hair) < CANU.<sup>14</sup> To some extent the later development served to wipe out any overlap or even to block any risk of ambiguity, as when, little by little, cã(s) 'white hair' < CANAS and encanecer 'to turn white', with restoration of -n- (under joint Latin and Spanish pressure?), have been disentangled, the adj. cão jettisoned, and equivocal encaecer altogether withdrawn from circulation.

In the cognate languages CADÈRE /~~\*-~~ÈRE and CALÈRE, in the company of their satellites, have peacefully coexisted without infringing on each other's territories,<sup>15</sup> witness Fr. (obs.) ch(e)oir 'to fall' (replaced by tomber, lit. 'to tumble'), ch(e)ance 'luck, fortune, chance' (lit. 'the falling of dice'), chute 'fall' plus déchoir 'to fall (from high estate)', déchéance 'downfall', échoir 'to fall due, fall to one's share', échéance 'maturity of bill', on the one hand; and (obs.) chaloir 'to be warm or hot, be of relevance', nonchalance 'listlessness, unconcern', chaleur 'warmth, heat', chaleureux 'warm, affectionate', on the other. In Spanish, similarly, caer 'to fall', caída '(down)fall', decaer 'to decay, decline', recaer 'to fall back, relapse', acaecer 'to happen', (obs.) encaecer 'to give birth to', (obs.) escaecer 'to forget' (lit. 'to drop from one's memory'), etc.,<sup>16</sup> have not, in any way, interfered with caliente 'warm' (of water), caluroso 'warm' (of climate or human attitude), calor / OSP. calura 'warmth, heat', calentar 'to heat' alongside (rare) calecer 'to become hot', acalorar 'to warm, heat, excite, encourage', calentura 'fever', acalenturarse 'to become feverish', (r) escaldar 'to become red-hot', escalfar 'to poach, burn, bake brown'.

In Portuguese, however, ca(d)- and ca(l)- have both, in the last analysis, been reduced to /K<sub>1</sub>/ vs. /K<sub>2</sub>/, with /Ka-/ and /Ke-/ acting as occasional, sporadic variants, witness qu-eda 'fall' beside qu-ente 'warm'. The verb for 'falling', in the Standard, changed from ca-er to ca-ir during the late Middle Ages, conceivably in imitation of sair 'to leave, depart' and, to some extent, also of trair 'to betray', except that in certain dialects of metropolitan Portuguese the evolution ran the following extra-lively course: caer > queer > quèr, quèl, sharply clashing in the quality of its nuclear vowel with those of crer, ler, ser, ter, ver, to cite familiar examples of monosyllabic infinitives. At present, characteristic debris of the former ca(d)- and ca(l)- families will be tententially differentiated, in any Portuguese-speaking territory, by contrastive use either of prefixes (zero or a- vs. es-) or of otherwise fairly colorless interfixes (-eç- vs. -ent-). In the semantic realm of 'heat, warmth', the idiolect of one native Brazilian does not at all include aquentar, relegates quantar to the fringe as rural, but grants full recognition to esquentar and aquecer, endowing the former especially with figurative meanings (as in "heated debate", cf. E. to warm up); requentar 'to heat again' has entrenched itself as an iterative verb;<sup>17</sup> however, judging from



lexicographic evidence, the reverse distribution of semantic nuances and overtones can also be corroborated.<sup>18</sup> In the retinue of esquecer (Lisbonese: esquêcer) 'to forget' one can safely place: esquecidoço 'forgetful' (=Sp. olvidadizo), esquecimento 'oversight', and esquecível 'worthy of oblivion'.<sup>19</sup>

From this network of connections quedar emerges as a real troublemaker, first through the uniqueness of its formal relationship to cair, a verb to which it continues to be solidly attached, as a verbal abstract, on the semantic side; second, through its interference with the free development of quedar 'to stop, remain still' < QU(I)ETARE 'to quiet' (with ficar lending itself readily as a substitute; contrast the thwarted growth of quedar in Portuguese with the verb's unimpeded blossoming in Spanish<sup>20</sup>); and third, through the collapse of the old bridge to esquecer: Noun and verb have become isolates, sharing the one negative feature of resisting any association with 'heat'.<sup>21</sup>

7. A verb debilitated by loss of its central consonant pillar may tend to become conjugationally defective; small wonder that Portuguese surpasses Spanish in the number of lacunary paradigms. Both languages, to this day, share the hollowness of roer 'to gnaw, nibble',<sup>22</sup> from RODĚRE; but OPTg. raer, via reer, before long yielded rer, which has survived in isolated dialects only, as (a)rrer, being in addition confined to strictly technical uses.<sup>23</sup> Otherwise, after passing through an intermediate state of defectiveness,<sup>24</sup> it became extinct in Portuguese, as against its undiminished vigor in Spanish. For 'scraping, scratching' the present-day Lusophone puts to use rapar, of other than Latin provenience (Meyer-Lübke, 1930-35: §7057); also raspar and aranhar.

Where Latin radical-final V1V was at issue, only the Portuguese partner, foreseeably, was "hollowed out": Witness doer 'to ache, hurt' < DOLĚRE, moer 'to grind' < MOLĚRE, and soer 'to be wont to' < SOLĚRE, as against Sp. doler, moler, soler. Of these three similarly architected verbs doer seems to have suffered no shrinkage of use (its pres. ptc. doente serves as the basic word for 'ill, sick', matching Sp. enfermo and Fr. malade in this respect).<sup>25</sup> Moer in its primary sense appears to be equally well represented on either side of the language border; yet the familiar figurative use of Sp. moler 'to wear out through ceaseless talk' is alien to Portuguese, even though moer, on a more modest scale, is tantamount to 'harassing' (tr.), 'mulling sth. over' (intr.), and 'tiring oneself out', particularly in the stereotyped phrase estou moído 'I'm worn out.' Soer tends to be restricted to the 3d pers.; in other contexts speakers appeal to costumar.

There is a good chance that OPTg. chouvir 'to close' < CLAUDĚRE and goir 'to enjoy' < GAUDĚRE, as well as obscene peer < PEDERE became defective verbs before altogether losing their foothold in the Portuguese lexis.<sup>26</sup>

8. Total lexical loss in Portuguese, at a stage amenable to direct observation, vs. unfettered survival in Spanish -- against the backdrop of consonant attrition -- characterizes, aside from the

aforementioned case of RĀDERE, also the biography of ADDĒRE 'to add'. Ptg. adir is palpably late and learned, as is shown, e.g., by its otherwise inexplicable switch to the -ir conjugation class, cf. abstrair 'to abstract, detach' < ABSTRAHERE, exprimir 'to express, manifest, reveal' (=Sp. expresar) < EXPRIMERE, as against genuinely vernacular trazer, orig. trager 'to bring' < TRAHERE 'to drag', espremer 'to squeeze, wring out' < (=Sp. exprimir) < EXPRIMERE; also, it lacks any counterpart in Spanish (except for the action noun adición and its offshoots). Adir is clearly a pale substitute for OPtg. ēader, enader, a verb completely antiquated at present, but once used copiously<sup>27</sup> and best explained as a reflex of IN+[N]ADDERE and thus a counterpart of OSp. ēñader, which in turn was gradually transmuted into añadir, in harmony with two broad trends, and has lingered on unimpaired after this adjustment, cf. such common phrases as de añadidura 'extra, into the bargain' and por añadidura 'besides' (see Malkiel, 1975: 512-20). The verbs actually used instead in Modern Portuguese are agregar (far more sparingly than in Spanish), aditar, and, above all, acrescentar, idiosyncratically Portuguese with this meaning, since Sp. acrecenar invariably refers to 'increasing, promoting, fostering' rather than to plain 'adding'. The leap from -er to -ir, unlike the state of affairs in Portuguese, is, we repeat, highly characteristic of Late Old Spanish, as is prefix-like e->a-; whether the Luso-Latin archetype had an \*-NN- (like its Proto-Spanish counterpart) or just an \*-N- does not follow unequivocally from the garbled medieval spellings.

9. An entirely different process, namely the replacement of an eroded verb with a substitute drawn from within the same family, is demonstrated by the vicissitudes of crer 'to believe'. Crer, to be sure, is still in use, flanked by the verbal abstract crença 'belief' (akin to Fr. croissance, Sp. creencia, E. credence, from Church Lat. CRĒDENTIA minted alongside preëxistent FIDĒS), but a large proportion of present-day speakers prefer acreditar, built on the verbal noun crédito, used on a world-wide scale as a banking term, for 'loan': Gr. Kredit, R. kredit, Fr. crédit, etc. Unquestionably, formal counterparts of the substitute verb exist elsewhere, witness Fr. accréditer, E. accredit, G. akkreditieren, It. accreditare, Sp. acreditar. The word's semantic range in those languages is, as a rule, narrow and technical, alluding to diplomatic maneuvering ('to proffer or accept ambassadorial credentials') or, once more, to banking operations ('to give or gain credit'). In Brazil, the banking term has been truncated to creditar. Only in Portuguese has the shriveling of the descendant of CRĒDERE enabled acreditar to qualify as a widely-acknowledged substitute word.

At this point one may ask why \*positar, easily extractable from depositar 'to entrust to (for safekeeping)' and comparable to E. posit, did not similarly tend to dislodge pôr, from older pōer < PONERE. Our answer to such a query would be that the word-central nasal, although absent from the infinitive for several centuries, has succeeded in entrenching itself in other sectors of the para-

digm: pres. subj. ponha, impf. punha, 2d pl. pres. ind. (in Lisbon) pondes, etc., while the loss of ancestral D, as in crer, ser, and ver, rapidly pervaded the entire paradigm,<sup>28</sup> thus making the availability of a tendential replacement all the more urgent.

Among the various patterns of verbal abstracts (action nouns) apt to give rise to secondary verbs potentially qualifying as substitutes those drawn upon most consistently during the period of gestation were the nouns descending from parental -TIO/-TIONE. Thus, BENEDICERE 'to bless', lit. 'to speak well' (as against MALEDICERE 'to curse', lit. 'to speak badly, harshly') cut loose from the primitive DICERE > dizer and became benzer. For a roughly parallel split contrast the French simplex dire with bénir and its two polar opposites, maudire 'to curse' beside médire 'to slander, vilify'; all three verbs, incidentally, show different degrees of cohesion with dire, and the Italian proper names Benito beside Benedetto also point to complications at the past-participial level. To revert to Portuguese, benzer is overshadowed by abençoar, based on benção < OPTg. bençom < BENE(DI)CTIONE. At the negative end of the line, one finds both amaldiçoar and maldizer (the latter in the company of the two participles maldizente and maldito). Maldizer alone is available for 'slandering' and thus, semantically, matches Fr. medire; maldizente, as a rule, shares this responsibility ('evil-speaking', 'slanderer'). Alternatively, maldizer (=Fr. maudire) competes with amaldiçoar, without equaling its strength, and drags behind it maldito, common in racy imprecations, in that direction. In judging this entire family, abounding in all sorts of cultural implications, it is vital to remember that the survival of the D is controlled by closeness of the association of these compounds with the simplex: Apparently 'blessing' is less firmly bracketed with 'saying' than are 'cursing' or 'slandering'.

The most complexly-structured biography, and one entirely at variance with the events independently observed in Spanish, is that of OPTg. traer 'to betray, double-cross' (=OSp. trair, witness to this day traidor 'traitor, treacherous'), from ancestral TRADERE. At the modern stage traer, presumably after having run the risk of attrition to \*treer > \*trrer and, at the same time, having fallen under the spell of sair 'to go out, leave' (from SALIRE) and having further been swayed by the transmutation of OPTg. caer 'to fall' into cair, has given way to trair. The move in that direction, familiar more from the history of Spanish (cf. eñader > añadir) than from that of Portuguese, was to produce a difficulty as soon as, in the wake of Humanism, the numerous compounds of TRAHERE 'to pull, drag', absorbed -- unlike the simplex -- as learned words, were likewise assigned to -trair in Portuguese lexical space, in dramatic contrast to the course of events pursued by Spanish; hence abstrair 'to abstract', atrair 'to attract', contrair 'to contract, draw together', detrair 'to detract, malign', extrair 'to extract', etc., vs. abs-, a-, con-, de-, ex-traer. The continued coexistence of trair 'to betray' and of a whole phalanx of compounds which genetically as well as semantically are much closer to trazer (older trager < TRAHERE) than to trair might have become an unsurmountable

obstacle were it not for the sociolinguistic fact that the -trair words do not at present belong, and have, one gathers, at no time pertained, to genuine folk speech, a circumstance which has reduced the hazard of any friction with thoroughly vernacular trair < TRADERE. Still, any Lusophone who feels uncomfortable about trair is at liberty to appeal for help to atraçoar for 'betraying', from OPTg. traçom (= mod. traição), based on TRADITIONE.

Finally, OGal.-Ptg. goir/gouvir from GAUDERE 'to rejoice', apparently influenced, in its switch to the -ir conjugation class, by AUDIRE 'to hear' with which it shared the AUD- kernel, yielded ground to gozar, extracted from gozo 'enjoyment' < GAUDIUM.

10. While pôr, ter, vir, as well as ver have been, in every respect, too important to have suffered, from erosion, damage irreparable in the long run, their less privileged compounds have occasionally come close to doing so. OPTg. avir, from ADVENIRE (a verb to whose family we owe Fr. aventure, E. adventure, etc.), was anciently one of the principal words available for rendering the concept of 'to happen'. Conversely, mod. advir (with a Latinized prefix tending to remove it from vernacular vir, consequently a hybrid) is severely restricted to literary use, having long since yielded pride of place to acontecer, ocorrer, and passar in less lofty contexts. More common are convir 'to make an arrangement', (impers.) 'to suit', and sobrevir 'to occur unexpectedly'. Ptg. revir 'to come back' is used at rare intervals in comparison with voltar, while Fr. revenir nicely balances retourner; true, the relevancy of this example is weakened by the fact that Sp. revenir, though unaffected by erosion, is also confined to marginal use.<sup>29</sup> Contar has been spared decay, in part because in colloquial Brazilian it no longer ranks as a compound of ter sharing that verb's conjugational idiosyncrasies, so that 'it contains' is rendered by paroxytonic conte (the way 'he eats' is come and 'he drinks' is bebe, from comer and beber, respectively), rather than by oxytonic contém, as in the literary standard (Macedo, 1984: 327, who reports that even pôr here and there yields ground to "regular" botar and colocar). Finally, the willingness of certain native descriptive or prescriptive grammarians to postulate a separate conjugational class in -or, based on the infinitive and on the 1st pl. pres. ind., for lexical items such as compor 'to compose' and supor 'to suppose', with -or being thus placed on the same hierarchical plateau as traditional -ar, -er, -ir, may rank as one more symptom of a disintegrative trend stemming from the loss of n in PONERE > pôr (via pöer).

11. The possibility of remedial borrowing of a cognate from Spanish is a solution at most grudgingly admitted by Lusophiles. Yet while OPTg. espir, mod. despir 'to strip, shed' (found also in Galician and in Western Asturian) look like perfect Western reflexes of EXPEDIRE 'to extricate, disengage, set free', OPTg. espedir, mod. despedir 'to dismiss, send away' give the impression of echoing Sp. (d)espedir, which in turn might well represent a local blend of EXPEDIRE and PETERE 'to request': OSp. espedir-se 'to request a leave of absence (from the overlord)'. The intricate mosaic of the vicissitudes of this verb family has been laboriously pieced together

elsewhere (e.g., Malkiel, 1981: 127-9, with references to earlier probings). Suffice it at this point to state that 'I dismiss' was, for centuries, (d)espido in Portuguese rather than, as at present, despeço (arrived at secondarily under pressure from peço 'I request') -- and that the older conjugational model points invariably in the direction of a fairly old Castilian loan.<sup>30</sup>

12. With a more generous slice of time at our disposal we might profitably have discussed a few additional "case histories", e.g., the changing fortunes of (RE)MANĒRE 'to stay, dwell, abide' (OPTg. māer > maer; remāer), which the speakers might have saved from attrition and eventual disappearance by allowing it to become \*mair. The changing status of a few descendants of MONĒRE 'to admonish' and PŪNIRE 'to punish' is another topic that had to be postponed. We could also have pointed out that, under a special constellation of circumstances, two verbs bequeathed by Latin can turn out to be in each other's way in Spanish rather than in Portuguese. Thus, so far as IUNGĒRE 'to join' and UNG(U)ĒRE 'to anoint' are concerned, Portuguese neatly pits jungir (perhaps transmitted through a learned conduit) against ong-er, -ir, while Spanish, already wavering between uñir and uncir 'to yoke', could not afford to reserve, in addition, a niche for an identically-sounding verb conveying an entirely different message. While this problem casts welcome light on homonymic collisions in the verbal domain, it does not directly hinge on the risks to which certain verbs plagued by loss of intervocalic consonants are exposed. More immediately relevant to our inquiry, but awaiting a liberal quota of preliminary pioneering research, is the issue as to why LEGERE 'to read' produced at first leer, later -- via vowel contraction -- ler in Portuguese, whereas the compound ELĪGERE ("recomposed" \*ELĒGERE) 'to choose, (s)elect' yielded medieval enleger, modern eleger, with a characteristic /ʒ/, while in Old Spanish leer and esleer harmonized.<sup>31</sup>

In any event, if a quick glance at the ranks of -er and -ir verbs has enabled us to identify so many and such stimulating situations involving primary and secondary repercussions of consonant loss in Portuguese, one readily envisions the size of a potential harvest had the entire Portuguese lexicon been subjected to comparably close inspection.

#### END NOTES

1. Nasalization of the preceding vowel, potentially conducive to total loss of the nasal, appears in Germanic toponyms, such as Guimarães. Loss of -l- and nasalization coöccur in the Arabism OPTg. fuão 'Mr. So-and-so-', later replaced (with some help from Spanish?) by fulano.

2. Cf. Late OSp. raéz (previously rafez, rahez) 'cheap', from Arabic; FÖRMÖSU 'shapely' > OSp. fermoso > mod. (h)ermoso 'handsome'; GELĀRE 'to freeze' > (h)elar.

3. Note the contrast between FUGERE 'to flee' > fugir (a treatment characteristic of verbs) and REGE 'king' (a course followed

chiefly by nouns). If this distinction holds ground, it can be argued that OPortg. leer (mod. ler) 'to read' < LEGERE was influenced in its behavior by lei 'law' < LEGE.

4. Among the few non-verbal examples of intervocalic h, the vicissitudes of NIHIL(UM) ~ NIL 'nothing', originally an opaque compound (from \*NE + HILUM, see Ernout and Meillet, 1959-60: 294b-295a), need not be discussed here, since the word has survived only vestigially, in North Central Sardinia and in Dauphiné (Meyer-Lübke, 1930-35: § 5922a). Conversely, COHORS, -TIS 'courtyard' was a simplex; yet, on the strength of epigraphic evidence and of transcriptions with Greek characters, it was universally pronounced C(H)ŌRS, -ORTE and, at a later date, even CURTE, and the same holds for its derivatives in -ĀLE, \*-ĪLE, as was made clear by Meyer-Lübke (1930-35: §§ 2032-33) and Ernout and Meillet (1959-60: 131a). Standing in a class by itself, PRAEHENDERE 'to seize, grasp', a blurred compound of PRAE- and \*HENDERE, was pronounced PRENDERE already within the confines of Latin and is thus irrelevant to the problem under scrutiny. Its compression into a single, indivisible word is confirmed by the rise of APPR(AE-H)ENDERE ('to grasp' > 'to learn') and COMPR(AE-H)ENDERE ('to grasp' > 'to understand'). The basic offshoots are Portg. Sp. aprender, comprender; the learned variants Portg. a-, com-preender, Sp. aprehender show semantic specialization.

5. On the Old Spanish side of the situation it suffices to consult R. Menéndez Pidal (1941: §§ 38, 41, 43, and 1950: 260-1); E. Alarcos Llorach (1954: 330-42, and 1968: §§ 146, 149, 154); also R. Lapesa (1980: §§ 18, 40). In regard to the state of business in Portuguese, information can be culled from specialized grammars (including J.J. Nunes, 1919: 83, 98, 103, 105, 107-9, and J. Huber, 1933: §§ 159, 199 [with further literature], 227, 244, 251) and the sections on phonology of historico-comparative grammars (stretching from W. Meyer-Lübke, 1890: §§ 436-7, 450, 454, 457, etc., to Lausberg, 1956: §§ 297, 377, 385, 395, 405 -- in addition to the sources mentioned in the previous notes). Rich in illustrations of the vicissitudes of Lat. -l- and -n- in Portuguese is J. Leite de Vasconcelos (1959: 138-44, 266-8).

6. It is arguable that the complications which the conjugation of OPortg. (re)māer 'to abide, dwell' < (RE)MANERE brought with it were in part responsible for the adoption of such more manageable inchoative forms as permanecer and remanescer 'to remain'.

7. Leite de Vasconcelos likens sadio to vadio 'idle, lazy, vagrant, truant', 'loafer, bum' and padeiro 'baker'; observe the Peninsular use of a to mark the contraction of two pretonic a's (1959: 138-9). Responsible for correctly etymologizing sarar was J. Cornu (1882: 95; 1904-6: § 255), who improved upon an earlier view advocated by F. Diez and F.A. Coelho. We owe the most circumstantial word history to C. Michælis de Vasconcelos (1910: 389-92) who, in addition to dating and documenting saar and sarar, pointed out sporadic traces of sāar and even of (Latinizing?) sanar. The parallel she drew with ĀLās 'wings' > OPortg. as > mod. asas, however, is dubious, since -- unlike the

noun -- the infinitive was accompanied in its shift by the entire paradigm. On the semantic plethora of mod. são ('they are', 'healthy', 'saint') see Celso Cunha (1978:60).

8. The classic example of Type (1) is offered by the imperfect tense, which at the Latin stage neatly distinguished its paradigmatic ingredients: AMAB-AM, -AS, -AT, ...-ANT (from 'to love'), whereas in Old Italian I and III coincided (amava), a state of affairs which prompted later generations of speakers to differentiate them (amavo...amava). In modern French I, II, III, and VI have collided in actual pronunciation: [ɛm], creating one of those numerous situations in which the use of the personal pronoun had to be generalized (j'aime,...). Cf. Sp. ve '(he) sees' and ¡ve! 'see!' (which, it is true, is distinctly rarer than ¡ve! 'go!', from ir, a suppletive verb).

9. Spanish and standard Portuguese alike have prevented ancestral ES 'thou art' and EST '(he) is' from colliding, yet in so doing either language has followed its own innovative course: eres vs. es; és vs. é. By allowing andar 'to walk' to adopt the endings of tener 'to have, hold' in the preterite (anduv-e, -iste, etc.) Hispanophones have managed to keep apart the pres. ind. and the pret. at least in the 1st pl. of this one verb: andamos vs. anduvimos, a privilege which speakers of Brazilian Portuguese must forgo.

10. The products of FUI~FUIT are similarly distributed: Ptg. fui~foi vs. Sp. fui~fue; i.e., the carrier of the distinction is in one language the stem vowel, in the other the desinential vowel. Akin to the treatment of vir in the 3rd sg. pret. was that of dar 'to give': The u [w] of deu [dew] via [dɛw] '(he) gave' clearly cannot go back to DEDIT, a reduplicative archetype that might, at best, have produced uncharacteristic \*dei [dɛj]. If so, Sp. dio could well have gone through the same evolutionary stage, reflecting the change éu [ɛw] > io familiar from Deus 'God' (and adeus! 'good-bye!'), judeu 'Jew', romeu 'pilgrim', etc.; see Malkiel (1976: 435-500). The loss of medial D in deu increases the relevance of this example, which for precisely this reason also invites comparison to VIDIT '(he) saw' > Ptg. viu, whereas Old Spanish was split between vio and vido (a form still abundantly found in dialect speech; see Malkiel, 1960: 281-346). To revert to Ptg. veio '(he) came', it is palpably closer to Western OSp. veno (as present in a cluster of texts studied by K. Pietsch) than to mod. vino. On balance, veio, deu, and viu testify to the bonds that united certain verbs which had suffered loss of their pillar consonants.

11. Randomly selected illustrations include: E. cleave 'sever, split' / cleft vs. cleave 'adhere' / cleaved; E. lie (=Gr. liegen) / lay vs. lie (=Gr. lügen) / lied, with numerous deviations in colloquial varieties; E. lay / laid vs. lie / lay; Sp. ¡sé! 'be!' vs. se 'I know'; Fr. teint '(he) t(a)ints, colors' vs. tint '(he) had, got', both pronounced [tɛ̃], from teindre and tenir, respectively. On the problem of near-homonymy see Malkiel (1979:1-36).

12. C. Michaëlis de Vasconcelos once briefly toyed with the

idea that valer was, at least in part, a Latinism (1910: 365-7, 389-92), but, fortunately, gave it up in her Glossary to the Cancioneiro da Ajuda.

13. Additionally, the use of valer, valor, valia, etc. as commercial terms over, practically, the entire Romance domain could have lent collateral support to the -l-.

14. See Maler (1964: s.vv.), whose helpful Modern Portuguese glosses in themselves often constitute eloquent pieces of evidence.

15. Except that CALÈRE, along with CANÈRE 'to be white-haired', CARÈRE 'to lack', CAVÈRE 'to heed' may have been instrumental in shifting CAD-, at an early juncture, from the -ERE to the -ÈRE conjugation class, at least in folk parlance. Observe that CALÈRE, unlike the state of affairs in Catalan, Occitan, French, and yet other congeners, fell short of developing into a full-fledged verb in Luso- and Hispano-Romance, where it may indeed be a Gallicism or Provençalism (see Christmann, 1958: 26-31, who remained unaware of the symptomatic value of the preservation of l).

16. Additional members of the family can be gleaned from any dictionary: acaecimiento 'event' (less common at present than acontecimiento), caedizo 'ready to fall', caedura 'loose threads that fall from loom', recaída 'relapse, backsliding', etc. (We omit from our Spanish and Portuguese inventories such formations as were transmitted through learned channels, e.g. caduco 'decrepit, transitory'.) See further Malkiel, Forthcoming, where Mod. Gal. que(e)r and dial. Ptg. (Xalma) quel are documented.

17. Here are some illustrative phrases and sentences coined spontaneously by Raquel Teixeira: um quarto aquecido 'a room equipped with a heating system' as against um quarto esquentado 'a roomful of hotly-arguing people'; ela esquentou (vs. requentou) a comida; o paleto esquentou a criança 'the coat kept the baby warm'; eu me aqueci com a bebida 'the drink made me feel warm'; eu me esquentei com a bebida 'the drink warmed me, and I got high'.

18. Thus Taylor (1958: s.vv.), who typically favors Brazilian over Portuguese usage, credits aquecer-se not only with the meaning 'to warm oneself' (hence aquecedor 'heater', aquecimento 'heating'), but also, in conjunction with com, with the figurative meaning 'to get angry (at)'; he records not only esquentar 'to heat up, incense', shoring up its position with a pair of foreseeable derivatives: esquenta-d(ic)o 'hot-headed' and esquentador 'heater, heating', but also reserves a niche in his edifice for aqueantar 'to warm, heat, stimulate, animate'.

19. From H.H. Carter's edn. (1952-53: 71-103) of an Old Portuguese verb dictionary we have excerpted the following entries: 2310 recalesco 'de cabo [aquecer]'; 1850 obliviscor 'esquecer'; 2705 tepeo (tepesco) 's'esqueêtar'; 373 calefacio and 374 caleo (calesco) 'esquetar'; 517 comcaleo 'esquetar' and 996 [a]lestuo (bullio) 'esquentars(s)e'; 1400 incaleo 'queecer' [=Osp. calecer]. These entries should be assessed against the background of 1401 incaneo 'êcaecer' [matching tightly Sp.



encanecer rather than OSp. encaecer 'to give birth to'] and of 1413 incido 'queer' [i.e., a side-line of and, phonologically, the alternative to caer > cair].

20. Maler's data (1964: 130a) show the health and strength of OPtg. quedar 'to cease, discontinue', later overlaid (in part) by deixar (de+ inf.).

21. Ptg. olvid-ar, -o, -adiço, listed in certain dictionaries, give the impression of being borrowed from Castilian.

22. Except that this verb has the unique distinction of exhibiting three rival forms at certain points of its paradigm, e.g., in the 1st pres. ind.: roo ~ royo ~ roigo, a three-way split which may inhibit some speakers and especially writers and discourage them from making use of such dubious forms.

23. See J. Leite de Vasconcelos (1895-6: 132) and C. Michaëlis de Vasconcelos (1910: 365-7). The former supplies the forms rer, rendo, rido, and the definition 'rapar o sal das marinhas', pinpointing the use of the verb at Alcacer-do-Sal, Setúbal, Aveiro; the latter supplies, by way of Galician parallels, (de)caer > (de)queer and maer > meer; identifies at Alcacer-do-Sal the three rival forms of the infinitive: raer, rer, and arrer (while labeling reer as medieval); records two meanings: 'vassoirar o forno depois de aquecido para a cozedura' and 'rapar ou puxar com o rodo o sal das marinhas'; and, in addition, has overheard the derivative rêdoria 'acção de rapar o sal'.

24. Defectivity based on partial obsolescence may go back to a situation such as the distribution of ra- : re- in typical Old Portuguese texts: pret. rray, p. ptc. rraído beside inf. rreer.

25. The two languages operate with similar constructions of do(1)er: Ptg. dói-me o polegar agrees with Sp. me duele el pulgar 'my thumb (or big toe) hurts'.

26. A close parallel to goír has been dial. oír 'to hear' (Além-Minho): After the contiguity of ou (from AU) and i, triggered by the loss of -D-, had created a phonotactically undesirable sound sequence, speakers had the choice between (a) reducing ou to o or (b) erecting a new buffer by means of intercalary -v-: Hence goír, oír vs. gouvir, ouvir.

27. Illustrations are offered by Carter (1952-53: No. 89 -- êader) and by Maler (1964: 79b -- emader, with numerous scribal variants; cf. the verbal abstract emadimento).

28. The 2d pl. forms of the pres. ind. -- alien to Brazil's colloquial usage -- credes, ledes, ides (subj. vades), rides, pondes, tendes, vindes -- display a d [ʃ] traceable to desinential -TIS, much as these verbs' pl. impts. (ide, vinde, etc.) exhibit a d echoing -TE. All these items are thus irrelevant to the problem under discussion.

29. As a reflexive verb it means 'to be consumed by degrees, discharge moisture; give up a point obstinately contested, be pricked and grow sour', the two standard verbs for 'returning' being volver and regresar.

30. The conjugational pattern irgo, ergues, ... irga; sinto, sentés, ... sinta is incontrovertibly Western, even where it has overlaid an older schema, such as senço, sentés, ... sença. Conversely, the spread of metaphonic i from I to II, III, VI (as in agrido, agrides, etc., from agredir 'to assail') betokens the imitation of a Castilian model (pido, pides, ...), unthinkable before the 15th century.

31. Enleger can be cited from numerous medieval sources, e.g., the text edited by Maler (1964: 82b, with the corresponding p. ptc. enleito). Carter's verb vocabulary, unfortunately for our purpose, offers only [e]scolher (1952-53: No. 1032). Esleer was acceptable to Don Juan Manuel.

#### REFERENCES

- Alarcos Llorach, Emilio. 1954. Resultados de la Ge, i en la Península. Archivum 4.330-42.
- \_\_\_\_\_. 1968. Fonología española. Rev. 4th edn. Madrid: Gredos.
- Carter, Henry Hare. 1952-53. Ed., A fourteenth-century Latin -- Old Portuguese verb dictionary. Romance Philology 6:2-3.71-103.
- Christmann, Hans Helmut. 1958. Lateinisch calere in den romanischen Sprachen, mit besonderer Berücksichtigung des Französischen. Mainzer Romanistische Arbeiten, 3. Wiesbaden: Franz Steiner Verlag.
- Coelho, Francisco Adolfo. 1874-79. Questões da língua portuguesa. 2 vols. Porto: E. Chardron.
- Cornu, Jules. 1882. Études de grammaire portugaise, 4. Étymologies. Romania 11.81-96.
- \_\_\_\_\_. 1904-6. Die portugiesische Sprache. Grundriss der romanischen Philologie, ed. G. Gröber, Vol. 1, rev. 2nd edn., 916-1037. Strassburg: Karl J. Trübner.
- Cunha, Celso. 1978. Gramática do português contemporâneo. 7th edn. Belo Horizonte: Editora Bernardo Álvares S.A.
- Diez, Friedrich. 1836. Grammatik der romanischen Sprachen, 1. Bonn: Eduard Weber.
- Huber, Joseph. 1933. Altportugiesisches Elementarbuch. Heidelberg: Carl Winter.
- Lapesa, Rafael. 1980. Historia de la lengua española. Rev. 8th edn. Madrid: Editorial Gredos.
- Lausberg, Heinrich, 1956. Romanische Sprachwissenschaft, 2: Konsonantismus. Sammlung Götschen 250. Berlin: W. de Gruyter & Co.
- Leite de Vasconcelos, José. 1895-96. Notícias filológicas. Revista Lusitana 4. 122-34.
- \_\_\_\_\_. 1959. Lições de filologia portuguesa. Rev. 3d edn., with additions by Serafim da Silva Neto. Coleção brasileira de filologia portuguesa. Rio de Janeiro: Livros de Portugal.
- Macedo, Alzira Tavares de. 1984. Parallels between language acquisition and language change: The Portuguese future subjunctive. Proceedings of the ... Berkeley Linguistics Society 10.324-37.
- Maler, Bertil. 1964. Ed., Orto do Esposo, Vol. 3: Correções,

- estudo das fontes e do estado da língua, glossário, lista dos livros citados e índice geral, *Romanica Stockholmiensia* 1. Stockholm -- Göteborg -- Uppsala: Almqvist & Wiksell.
- Malkiel, Yakov. 1960. Paradigmatic resistance to sound change. *Language* 36. 281-346.
- \_\_\_\_\_. 1975. Conflicting prosodic inferences from Ascoli's and Darmesteter's Laws? *Romance Philology* 28:4.482-520. (Excursus B: From Old Spanish añader to modern añadir....)
- \_\_\_\_\_. 1976. From falling to rising diphthongs: The case of Old Spanish ió < \*éu (with excursuses on the weak preterite, on the possessives, and on judío, sandío, and romero). *Romance Philology* 29:4.435-500.
- \_\_\_\_\_. 1979. Problems in the diachronic differentiation of near-homophones. *Language* 55.1-36.
- \_\_\_\_\_. 1981. A hidden morphological factor behind instances of erratic distribution of ç and z in Old Spanish? *Romance Philology* 35:1.105-29.
- \_\_\_\_\_. Forthcoming. From Old Portuguese caer 'to fall' to modern cair: three explanations. To appear in *Kentucky Romance Quarterly*.
- Menéndez Pidal, Ramón. 1941. *Manual de gramática histórica española*. Rev. 6th edn. Madrid: Espasa-Calpe.
- \_\_\_\_\_. 1950. *Orígenes del español: estado lingüístico de la península ibérica hasta el siglo XI*. (=Obras completas, 8.) Rev. 3d edn. Madrid: Espasa-Calpe.
- Meyer-Lübke, Wilhelm. 1890. *Grammatik der romanischen Sprachen*, 1: *Romanische Lautlehre*. Leipzig: Fues's Verlag / R. Reisland.
- \_\_\_\_\_. 19[30-]35. *Romanisches etymologisches Wörterbuch*. Rev. 3d edn. Heidelberg: Carl Winter.
- Michaëlis de Vasconcelos, Carolina. 1910. Mestre Giraldo e os seus tratados de Alveitaria e Cetraria, Part 2: Estudos etimológicos. *Revista Lusitana* 13.222-432.
- \_\_\_\_\_. 1920[-22; written in 1905]. *Glossário do Cancioneiro da Ajuda*. *Revista Lusitana* 23. v-xii, 1-95.
- Nunes, José Joaquim. 1919. *Compêndio de gramática histórica portuguesa: fonética -- morfologia*. Lisboa: A. M. Teixeira.
- Reinhardtstoettner, Karl von. 1878. *Grammatik der portugiesischen Sprache auf Grundlage des Lateinischen und der romanischen Sprachvergleichung bearbeitet*. Strassburg & London: Karl J. Trübner.
- Richter, Elise. 1934. *Beiträge zur Geschichte der Romanismen*, 1: *Chronologische Phonetik des Französischen bis zum Ende des 8. Jahrhunderts*. Suppl. 82 to *Zeitschrift für romanische Philologie*. Halle: Max Niemeyer.
- Taylor, James L. 1958. *A Portuguese-English dictionary*. Stanford University Press.

# Assertions from Discourse Structure

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## Introduction

As part of an ongoing study of discourse structure of natural texts, we have identified a particular class of propositions that affect the hearer's perception of the coherence and communicated content of texts. As an example, if the text (spoken in a suitable situation) is:

"I'm hungry. Let's go to the Fuji Gardens."

then the most natural interpretation is that the Fuji Gardens is a restaurant at which the speaker would like to eat with the hearer. The text is heard as exhibiting a problem-and-solution structure. Consequently, we can say that there is a proposition which says that there is a "solutionhood" relation between the two sentences. In this case, going to the Fuji Gardens (partially) solves the hunger problem.

The solutionhood construct is one type of *relational propositions*. Note that the proposition about solutionhood is not stated explicitly in the text.

Although phenomena resembling relational propositions have been recognized, there is no widely accepted explanation of how they arise from text. This paper characterizes relational propositions and presents a theory of discourse structure to explain them. In this Rhetorical Structure Theory (RST), relational propositions arise in direct correspondence to particular elements of the structure of a discourse.

We present Rhetorical Structure Theory progressively during analysis of a published, two-paragraph political advocacy text. The text involves substructures for informing, giving evidence, conceding, requesting an action, justifying a presentation, asserting conditionally, and others.

The two elements that form the basis for this paper, relational propositions and Rhetorical Structure Theory, have both been described in more detail elsewhere. The explanatory relation between them, however, has not [Mann & Thompson 83, Mann 84].

[Mann & Thompson 83] examines various other theoretical constructs, including implicature, presupposition and indirect speech acts, to see whether they account for the textual properties of relational propositions. It concludes that these constructs do not account for them. The paper also discusses relationships between relational propositions and the work of Grimes, Hobbs, van Dijk, Martin, Longacre, Beekman and Callow, and it includes analyses of several texts.

# 1 The Phenomenon of Relational Propositions

The Fuji Gardens statement and the solutionhood relation have already illustrated that relational propositions need not be signalled explicitly in order to be recognized.<sup>1</sup> Extending the example, we now describe properties relational propositions hold more generally, giving special attention to those properties that can be accounted for by Rhetorical Structure Theory.

## 1.1 Relational Propositions Assert

In our informal presentations of relational propositions, virtually everyone recognizes that texts such as the political letter analyzed in this paper convey the particular relational propositions that we attribute to them, even though it does not represent them explicitly. If the text author were to deny a particular relational proposition, most readers would be surprised and puzzled about the status of the part of the text containing that proposition.

This general consensus testifies that the relational proposition is conveyed. Further evidence lies in the apparent redundancy or somewhat bizarre markedness that occurs when the relational proposition is asserted explicitly by adding a clause to the text:

"I'm hungry. Let's go to Fuji Gardens. Our going to Fuji Gardens would contribute significantly to solving the problem of my hunger."

## 1.2 Relational Propositions are Coherence Producing

One way to demonstrate that a relational proposition is coherence-producing is to insert a denial of the relational proposition into the text. Doing so makes some portion of the text a non-sequitur:

"I'm hungry. Let's go to the Fuji Gardens. Of course, going to the Fuji Gardens won't do anything about my hunger."

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<sup>1</sup>We use constructed examples in this section only, for expository reasons. RST is a theory of natural text; it was developed entirely on natural texts, such as the political advocacy text analyzed below.

The second sentence above has become a non-sequitur, and as a result the text as a whole is incoherent. Relational propositions are *always* coherence-producing in this way. We will see later that this is a consequence predictable from RST, particularly from the structural forms that RST posits. Also, relational propositions are *always* present in coherent multisentence texts.

### 1.3 Other Kinds of Relational Propositions

The list below names several kinds of relational propositions besides solutionhood, and gives an example of an asserted, coherence-producing proposition for each. These are drawn from the larger collection of [Mann & Thompson 83]; we believe that still more kinds of relational propositions could be discovered or perhaps created.<sup>2</sup>

- EVIDENCE: They're having a party again next door. I couldn't find a parking space.
- ELABORATION: I love to collect classic automobiles. My favorite car is my 1899 Duryea.
- MOTIVATION: Take Bufferin. The buffering component prevents excess stomach acid.
- THESIS/ANTITHESIS: Players want the referee to balance a bad call benefiting one team with a bad call benefiting the other. As a referee, I just want to call each play as I see it.
- CONCESSION: I know you have great credentials. I'm looking for someone with great experience.
- CONDITION: Give her a subscription to *Science* magazine. She'll be in seventh heaven.
- REASON: I'm going to the corner. We're all out of milk.
- JUSTIFICATION: Let me make one thing perfectly clear. I am not a crook.

We desire a theory that will answer two questions about relational propositions:

1. What relational propositions are possible?

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<sup>2</sup>We have abundant natural correlates for these constructed examples. They have been designed to illustrate the fact that the relations and relational propositions are identifiable without any explicit signalling, such as a clause, conjunction, or lexical selection.

## 2. What relational propositions does a particular text assert?

The answers come from studying discourse.

## 2 Rhetorical Structure Theory

RST has not been developed simply to account for relational propositions; it arose from a much broader desire to understand text and communication and to learn how texts may be created. We identified and began studying relational propositions only after RST had largely assumed its present shape.

We wanted a theory of text organization--a way to describe what kinds of parts a text can have, how they can be arranged, and how parts can be connected to form a whole text. We especially valued the following attributes.

1. **Comprehensiveness:** The theory should apply to many kinds of text.
2. **Functionality:** The theory should be informative in terms of how text achieves its effects for the writer.
3. **Scale insensitivity:** The theory should apply to a wide range of sizes of text and should be capable of describing all of the various sized units of text organization that occur in a large text.
4. **Definiteness:** The theory should lend itself to formalization and computer programming;
5. **Constructive potential:** The theory should be usable in text construction as well as text description.

We developed this theory primarily in response to small written texts, although it has also been applied to larger texts. We have constructed RST descriptions for a variety of texts, including:

- Administrative memos
- Personal letters
- Advertisements
- Editorial letters in magazines
- Complete *Scientific American* articles
- Newspaper articles
- Public notices in magazines
- Research technical reports
- Travel brochures
- Cookbook recipes

To introduce the theory, let us consider the analysis of a text that appeared in a political newsletter, The Insider, Vol. 2.1, July 1982.<sup>3</sup> The Insider is the California Common Cause state newsletter. This text was the "con" part of a "pro" and "con" pair of letters on the issue of California Common Cause's endorsement of the nuclear freeze initiative, which was then on the California state ballot.

The text has been reformatted, numbered, and divided into units. Units are roughly equivalent to clauses, except that that relative clauses and complement clauses are considered to be part of the unit in which their governing item appears, rather than as independent units. As long as the whole text is analyzed, the size of the minimal units can vary without affecting the larger analysis.

1. I don't believe that endorsing the Nuclear Freeze Initiative is the right step for California CC.
2. Tempting as it may be,
3. we shouldn't embrace every popular issue that comes along.
4. When we do so
5. we use precious, limited resources where other players with superior resources are already doing an adequate job.
6. Rather, I think we will be stronger and more effective
7. if we stick to those issues of governmental structure and process, broadly defined, that have formed the core of our agenda for years.
8. Open government, campaign finance reform, and fighting the influence of special interests and big money, these are our kinds of issues.

---

<sup>3</sup>Letter used by permission



9. (New paragraph) Let's be clear:

10. I personally favor the initiative and ardently support disarmament negotiations to reduce the risk of war.
11. But I don't think endorsing a specific nuclear freeze proposal is appropriate for CCC.
12. We should limit our involvement in defense and weaponry to matters of process, such as exposing the weapons industry's influence on the political process.
13. Therefore, I urge you to vote against a CCC endorsement of the nuclear freeze initiative.

(signed) Michael Asimow, California Common Cause Vice-Chair and UCLA Law Professor

How is this text organized? At the most general level, the text as a whole functions as a request to vote in a certain way. At its coarsest level of decomposition, it has two parts. One part presents the request, presented in segment 13, and the remainder supports that presentation.

The theory has a number of patterns, called *rhetorical schemas*, that represent organizational information about text. To represent the particulars of two-part decomposition of the text, we use one of these rhetorical schemas, the Request Schema, Figure 1.

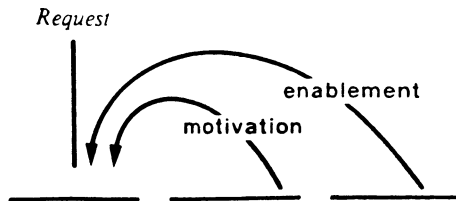


Figure 1: Request Schema

A text that instantiates the Request Schema has a nuclear part, called the *nucleus*, that presents a request. It also has one or more supplementary parts, called *satellites*, that are functionally related to the nucleus. Satellites are related to the nucleus by a named *relation*. Here we have relations named *motivation* and *enablement*.

Let us illustrate the parts of a Request Schema in a short example:

"Call me. I have a surprise for you. My extension number is 110."

The nucleus is "Call me," the motivation satellite is "I have a surprise for you," and the enablement satellite is "My extension number is 110." These elements can be arranged in any order and still be an instance of the Request Schema. Schemas do not encode the order of segments; in this case, the segments can be rearranged freely without disturbing their meaning or structural relation.

Satellites are all optional, so we can delete either one in this example and still instantiate the Request Schema--but there must be at least one satellite. The political text has a motivation satellite, segments 1 through 12, but no enablement satellite.

We analyze each of the two top-level segments of the political text in the same way. The final segment is a single unit, so we don't try to divide it. The first segment, 12 units long, consists of a claim (unit 1) and two arguments that give evidence for the claim. We analyze this arrangement with the Evidence Schema (Figure 2), in which the claim is the nucleus and an *evidence* relation connects the nucleus to the satellite. Figure 3 shows the resulting structure.

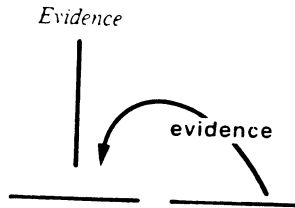


Figure 2: Evidence Schema

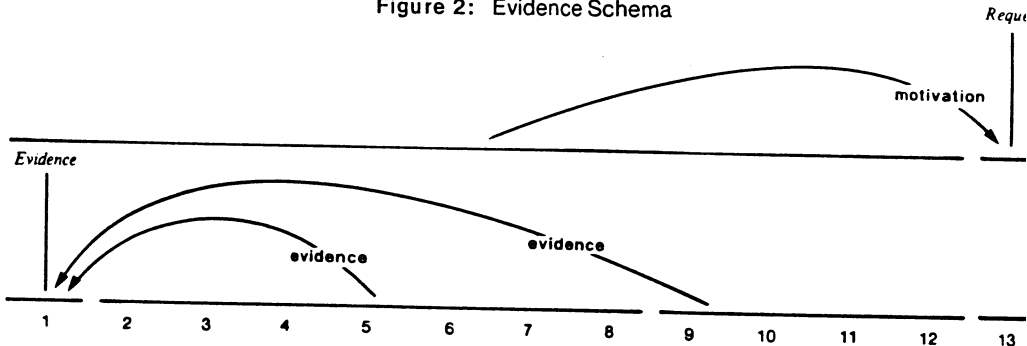


Figure 3: The Upper Structure of the Political Text

Both of the nuclei obey what we call the *Most Favorable Audience Rule*: For the most knowledgeable and positively predisposed hearer, the nucleus alone would be sufficient to perform the function of the structure; the satellites function to increase the likelihood that the nucleus will succeed. This rule is a summary of many observations about the rhetorical structures of texts. It does not always hold, but there is a strong, unexplained tendency for it to hold.

In this case of the Request Schema, presenting the request (to vote in a certain way) to a favorably predisposed hearer would be enough to get that reader to vote as desired; the supporting argument makes the desired vote more likely for most readers.

This application of the Evidence Schema contains two arguments: One says that the proposal is wasteful, and the other says that better alternatives exist. They make the reader more likely to accept the claim that endorsement is not right.<sup>4</sup>

The analysis goes on, down to single units. Figure 4 shows the additional schemas used. They are drawn from a larger set of about 25 schemas, defined through use of about 30 relations.

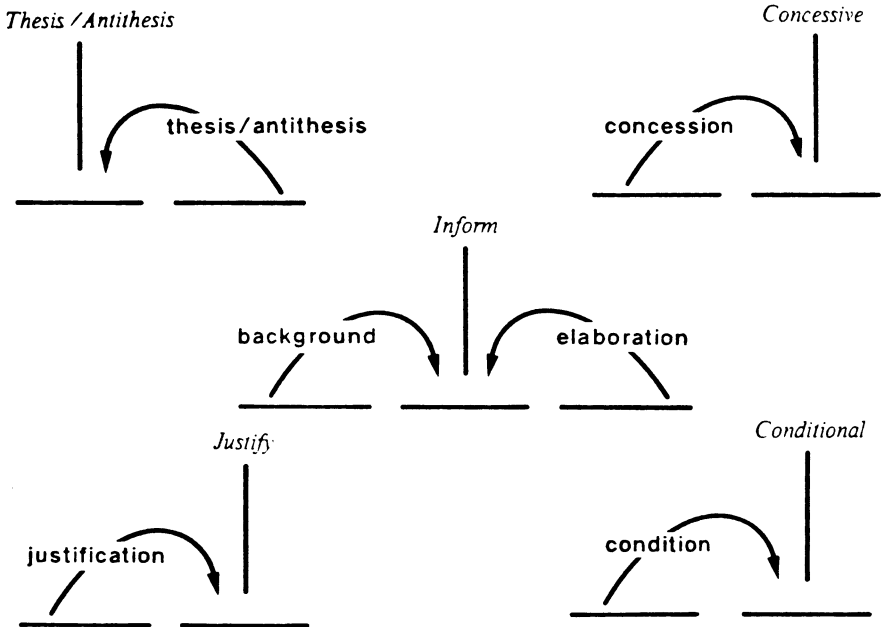


Figure 4: Other Schemas Used to Analyze the Political Text

<sup>4</sup> Although the unit begins "I don't believe that..." the claim here is really about whether this step is right for CCC. The evidence that follows in units 2 through 11 is about what benefits CCC, not about whether the author believes this claim or not. RST does not represent the indirectness of the form of the claim.

To illustrate the relations used here, we turn back to the text.

The *thesis/antithesis* relation connects units 11 and 12. 11: "But I don't think endorsing a specific nuclear freeze proposal is appropriate for CCC." 12: "We should limit our involvement..."

The *concessive* relation connects units 2 and 3: 2: "Tempting as it may be," 3: "we shouldn't embrace every popular issue that comes along."

Unit 8 is an *elaboration* for the Inform Schema; it lists instances, such as open government and campaign finance reform.

Unit 9 says "Let's be clear." This is in a *justification* relation to the argument that follows, in 10 through 12. It obtains permission to present a second argument, defending the same conclusion.

Finally, units 4 and 5 are in a *condition* relation. 4: "When we do so..." 5: "we use precious resources..."

Figure 5 shows the structure of the whole text.

## 2.1 Definition Mechanisms of RST

How is RST defined? How do claims about particular texts arise from an RST analysis of it? The theory is defined in terms of just three mechanisms: schemas, schema application conventions, and relation definitions.

Schemas are simply sets of relations. There is no schema-specific information beyond the identities of the relations that comprise the schema.

Schema application conventions are descriptions of what it means for a particular span of text to instantiate a schema. Its conventions are easy to state:

1. One schema is instantiated to describe the entire text.
2. Schemas are instantiated to describe the text spans produced in instantiating other schemas.
3. The schemas do not constrain the order of nucleus or satellites in the text span in which the schema is instantiated.
4. All satellites are optional.
5. At least one satellite must exist.
6. A relation that is part of a schema may be instantiated indefinitely many times in the instantiation of that schema.

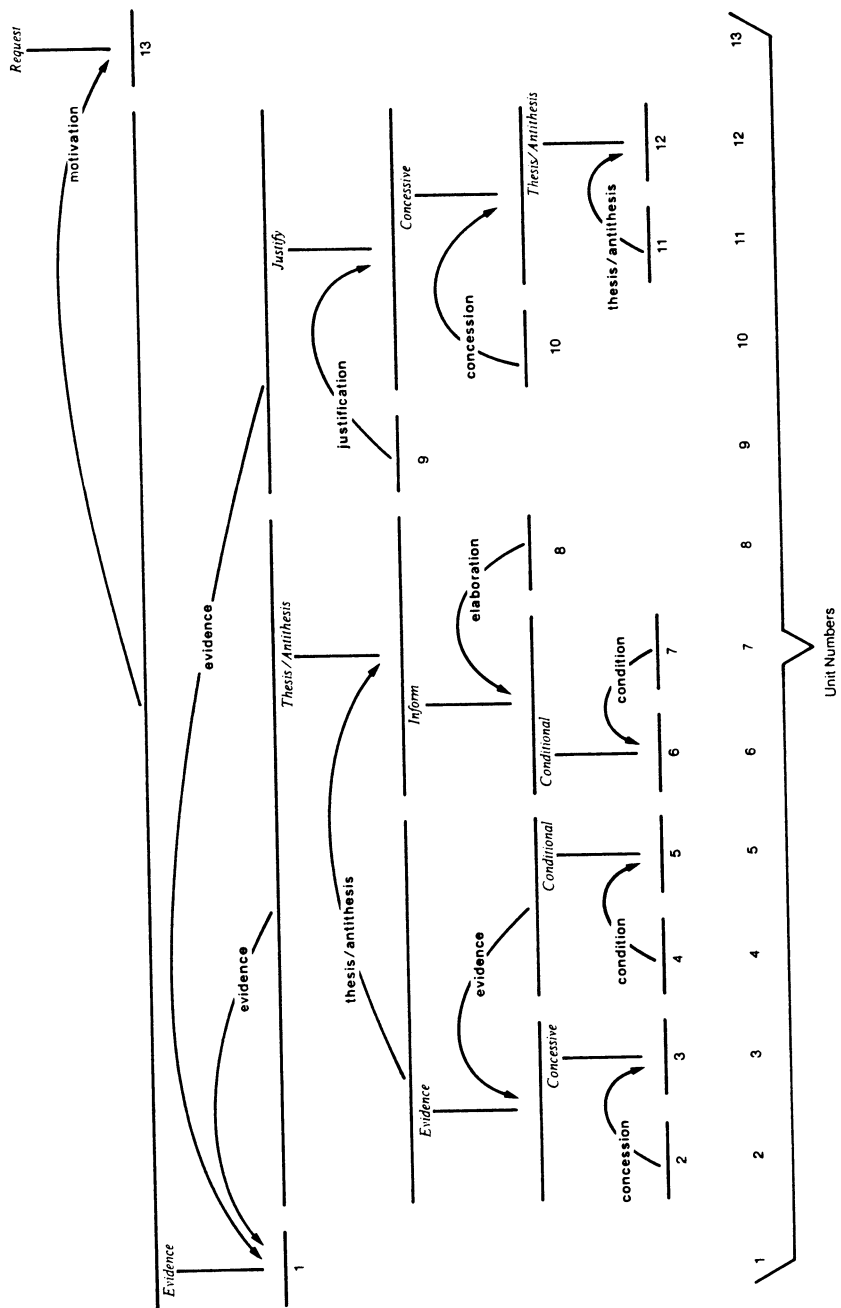


Figure 5: Full Rhetorical Structure of the Political Text

7. The nucleus and satellites do not necessarily correspond to a single uninterrupted text span.
8. The relation definition must be consistent with the spans of text related by the instantiation of the schema containing the relation.

It is possible for the conventions to apply to a text in more than one way, so that the text is rhetorically ambiguous.

A relation definition specifies three kinds of information:

1. A characterization of the nucleus.
2. A characterization of the satellite.
3. A characterization of what sorts of interactions between the conceptual span of the nucleus and the conceptual span of the satellite must be plausible.

To define, for example, the motivation relation, we would include at least the following.

1. The nucleus describes an action performable, but not yet performed, by the reader.
2. The satellite describes the action, the situation in which the action takes place, or the result of the action in ways that help the reader associate value assessments with the action.
3. The expected value assessments are positive, to lead the reader to want to perform the action.

The relational propositions do not arise independently of the relation definitions. Rather, finding that a relation definition holds is sufficient to establish the corresponding relational proposition. As readers recognize the functional relations of the parts, they are recognizing that the relation definitions hold. The content of the relational proposition is identified in this process. As a consequence, the definition scheme for RST requires no additional definitions in order to specify the relational proposition. In any particular case, the proposition can be derived from the way the relation definition fits.

We have found the relation definitions useful in predicting other facts about the text, such as the kinds of conjunctions that will appear in certain places. We have analyzed a large number of texts, including thousands of clauses, in this way. We are confident that we can perform this analysis, with fairly high reliability, for virtually any small, written, multisentence monologue in general American culture, using only about 25 schemas.

Note that these rhetorical schemas are defined in terms of the functions of segments of text. The evidence relation applies when one segment supports another as evidence. Solutionhood applies when we can see one segment as identifying a

problem and another as a partial solution to that problem. These are not criteria of form; as one might expect, the relationship of these function categories to form categories is quite loose. The rhetorical structure of text, in these terms, is composed of function-specific units. The structure does not express categories of knowledge or form as much as it expresses the roles of specific parts in relation to the whole text, especially the role of each satellite relative to one particular, immediate portion of the text, the corresponding nucleus.

### 3 RST as an Account of Relational Propositions

The key observation for the purposes of this paper is:

***For every relation of the rhetorical structure of a text, a corresponding relational proposition is asserted.***

For solutionhood relations, the discourse structure asserts a solutionhood proposition. For evidence relations it asserts an evidence proposition, and so forth. Readers attribute the assertions to the text because they recognize the functional relations of the parts.

Now we can explain why relational propositions are coherence-producing.

First, RST structures always have the connectivity of trees. The schema application conventions guarantee this, because when a span is decomposed, each of the parts is further decomposed separately.

If a portion of the text is to be connected to the whole without being a non-sequitur, some relation must be established. A relation is established through implicit assertion of a relational proposition. Since the relations form a tree, denial of any one relational proposition is sufficient to separate the structure into two parts, thus destroying connectedness, a key attribute of coherence.

Now we can also explain why relational propositions are always present in coherent multisentence texts. In regarding the text as a single whole, readers impute rhetorical structure to it, necessarily positing relations between the parts; the relations give rise to assertion of relational propositions.

We can also see how to create more precise specifications of relational propositions. They can be developed from the relation definitions of RST. RST tells what sorts of propositions can be relational, gives the conditions under which relational propositions arise, and tells how to alter a text or a situation so that the asserted relational proposition is changed. Rather than simply searching texts for potential relational propositions, we can search rhetorical structures for the necessary relational propositions.

## 4 Uses of Rhetorical Structure Theory

Rhetorical Structure Theory provides an attractive basis for explaining relational propositions, although some details need development.

In addition, RST satisfies some of the attributes identified in section 2, above, as desirable for a descriptive theory of text organization. It is comprehensive enough to apply to many different kinds of text; it is functional, in that it explains what various portions of a text do for the writer. And it is scale insensitive, applying to a wide range of sizes of units, from simple clauses up to whole magazine articles.

However, RST still lacks two desired attributes: It needs for more detailed expression of each part, and it would be useful to develop a constructive counterpart to the descriptions, a way to select schemas and plan texts.

In addition to these attributes, we recognize other opportunities for and benefits of RST.

1. It gives a partial account of the distribution of interclausal and intersentential conjunctions.
2. It leads to new observations of text phenomena, including some related to nuclei, such as the most-favorable-reader hypothesis.
3. The advantages of a recursive theory are obtained for text structure.

Beyond the phenomena identified above, RST appears to be useful in accounting for other kinds of discourse phenomena. We have found no boundary for its uses; it is like trying to delimit the uses of a grammar. We have identified the following as particularly attractive applications:

- Thematization and text development
- Distributions of tense selections in text
- Lexical selection
- Patterned shifts of hypotheticality, identifiability, or conditionality
- Patterns of use of conjunctions
- Purposeful clause combining
- Distribution of topicalization markers
- Text ordering (under way)
- Relating coherence to cohesive devices

## 5 Summary

The assertion of relational propositions is a hitherto unexplained phenomenon. Rhetorical Structure Theory provides a way to explain such assertions in terms of discourse structure. In addition to explaining relational propositions,



Rhetorical Structure Theory can be used to explain other text characteristics as well, and it provides a way to address a wide range of discourse phenomena.

## References

- [Mann 84] Mann, W. C., *Discourse Structures for Text Generation*, USC/Information Sciences Institute, Technical Report RR-84-127, February 1984. Also appeared in the proceedings of the 1984 Coling/ACL conference, July 1984.
- [Mann & Thompson 83] Mann, W. C., and S. A. Thompson, *Relational Propositions in Discourse*, USC/Information Sciences Institute, Technical Report RR-83-115, July 1983. To appear in *Discourse Processes*.

## WHEN SPEAKERS WRITE

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It has been recognized for some time that written and spoken English differ in important ways. It has even been suggested that the presence of a literary tradition can influence the development of a language as a whole, and that important differences between familiar European languages and more exotic 'preliterate' languages might be the result of the historical development of general literacy (Goody and Watt 1963, Ong 1982, Pawley and Syder 1983).

What happens to an 'exotic' language when it suddenly acquires a literary medium? Does the act of transferring language to paper affect linguistic structure immediately, or does literary style develop only over a long period of time?

Mohawk, an Iroquoian language spoken in Quebec, Ontario, and New York State, differs radically in structure from Indo-European languages. Until recently, the language was not generally written by its speakers. During the past 15 years, however, several communities have introduced Mohawk language classes into their schools. Speakers have been trained as teachers, an orthography has been established, and a number of people have devoted considerable effort to learning to write their language. The materials they have produced, essays, traditional narratives, personal anecdotes, and skits, provide excellent documentation of both Mohawk and the effect of the written medium on a previously unwritten, non-Indo-European language.

Although the Mohawk have not had a literary tradition of their own, they are far from naive in matters of linguistic style. Their oratorical skill in diplomatic and religious speeches was noted by European writers as early as the seventeenth century. Anyone who works with Mohawk speakers today cannot help but be impressed by their appreciation of linguistic virtuosity. Their awareness of style permeates all types of language, from formal oratory, to anecdotes, and even one-line rejoinders. The cultivation of style was a central part of Mohawk culture long before Mohawk was written by anyone.

All of those who have begun to write recently were already literate in English, although the amount of time typically spent by each in reading and writing English varies considerably. For this reason, their written materials directly illustrate the effect of the written medium on the structure of the language, rather than the effect of literacy on cognition.

## I. Spoken Mohawk

Probably the most striking characteristic of Mohawk is its polysynthesis. Mohawk speakers tend to pack considerably more information into single words than do speakers of Indo-European languages. This has a significant effect on discourse structure.

## A. Word Structure

There are three morphological types of words in Mohawk: particles, nouns, and verbs. Particles, by definition, have no internal morphological structure. They serve as deictics, numbers, conjunctions, evidentials, etc.\*

- |    |               |         |               |              |
|----|---------------|---------|---------------|--------------|
| 1) | <i>kí:ken</i> | 'this'  | <i>tánon'</i> | 'and'        |
|    | <i>áhsen</i>  | 'three' | <i>iá:ken</i> | 'it is said' |

Nouns have relatively simple internal structure, usually consisting of a pronominal prefix, a noun stem, and a nominal suffix.

- |    |                  |        |                            |
|----|------------------|--------|----------------------------|
| 2) | <i>ohwéntsa'</i> | 'land' | <i>o-hwents-a'</i>         |
|    |                  |        | NEUTER-land-NOMINAL.SUFFIX |

Verbs, in contrast, can exhibit a highly complex morphological structure. They contain obligatory pronominal prefixes referring to their agents and/or patients, a verb root, an aspect suffix, and a potentially large number of additional prefixes and suffixes. The verb below is typical.

- 3) *tenshonteristawéh:rate'*  
*t-en-s-hon-te-rist-a-wenrat-e'*  
 DUALIC-FUT-REPETITIVE-MPLag-SEMI.REFL-metal-Ø-go.over-PUNCTUAL  
 'they will cross back over the (railroad) track'

## B. The Predominance of Verbs

One of the most salient features distinguishing Mohawk from Indo-European discourse is its high proportion of verbs. The passage below was taken from an account of the adventures of some Mohawks who went away to work at a lumbercamp. One Saturday they all went into town. They stopped at a bar and enjoyed themselves until it was time to go home. On the way back, one fellow, known for his imitations of a priest, told his friends to kneel and pray. A policeman driving by noticed their strange behavior and strong breath. He arrested them and took them to jail, where they spent the night. The next morning in court, the judge asked the policeman what they were charged with. When the policeman replied that he had found them kneeling by the railroad tracks, praying, the judge, outraged, ordered the policeman to escort them back to camp immediately, with no punishment. Verbs below are marked with V.

- |    |                             |            |                              |
|----|-----------------------------|------------|------------------------------|
|    | V                           |            | V                            |
| 4) | <i>Iahshakioia'ténhawe'</i> | <i>tsi</i> | <i>iontatehnhotoónhkhwa'</i> |
|    | there he them body took     | to         | one door closes with it      |
|    | 'He took them all to jail,  |            |                              |

- |  |                             |             |                            |
|--|-----------------------------|-------------|----------------------------|
|  | V                           |             | V                          |
|  | <i>wahonwatihnhó:ton,</i>   | <i>thóh</i> | <i>ki'</i>                 |
|  | they them door closed       | there       | just                       |
|  | where they spent the night. |             | <i>iehonanon:werehkwe'</i> |
|  |                             |             | they overnighted there     |

*Tsi*      <sup>V</sup> *wa'ò:rhēn'ne'*,      *ó:nēn*      <sup>V</sup> *wa'thōnwatīia'tén:rehte'*  
at      it dawned      then      he them body judged  
The next day, they appeared before the judge.'

This predominance of verbs is related to several factors.

## 1. Pronominal prefixes

Because of their obligatory pronominal prefixes, morphological verbs can and often do stand alone as complete clauses in themselves. No separate nominals are necessary for grammaticality.

## 2. Morphological structure versus syntactic function

With only three types of words, particles, nouns, and verbs, Mohawk has fewer lexical categories than many other languages. Concepts expressed in Indo-European languages by adjectives and adverbs are usually expressed in Mohawk by verbs. Instead of building up complex noun phrases with adjective phrases, or verb phrases with adverbial phrases, speakers tend to modify nominals and predicates with separate clauses. The English modifier 'many' in the translation below, for example, corresponds to the Mohawk verb *-owanen* 'be large'.

5) <sup>V</sup> *Enhontonkwe'tarò:roke'* *kí:* *keh:tho;* <sup>V</sup> *ronakiohkwá:nen.*  
will they people gather this there they group large are  
'They would recruit many people.'

(*ron-akiohkw-owan-en* = MPlAg-group-large-STATIVE.) The adverb in the English translation below also corresponds to a Mohawk verb.

6)           <sup>V</sup>*Iosnó:re'*                 <sup>V</sup>*sahonhtén:ti'.*  
it is fast          back they went  
'They went home early.'

In addition to their functions as predicates and modifiers, verbs often serve as nominals. Note the term for 'jail' in 4).

The discrepancy between morphological type and syntactic function suggests that a more valid comparison of word types in English and Mohawk might be predicates:arguments, instead of verbs:nouns. The distinction between verbs functioning as nominals and those functioning as predicates or clauses is not always a clear one, since lexicalization can be a gradual process. The phrase below could be translated several ways.

7) *nó:nen*                      *oráhkwise'*  
at that time    it moon new is  
'when the moon is new' or 'during the new moon'

Even when conventionalized verbal nominals are counted as nominals,

however, the predicate:argument ratio in spoken Mohawk discourse is often as high as 5:1. Comparable figures in English are quite different, generally around 1:2 or 1:3, so that predicates are outnumbered by arguments several times over.

### 3. Noun incorporation

A third factor contributing to the difference in predicate: argument ratio is a mechanism known as noun incorporation. Many of the verbs cited above contain noun roots: *-ia't-* 'body', *-hnh-* 'door', *-onkwe't-* 'person', *-akiohkw-* 'group', etc.

Incorporation is a powerful stylistic option that speakers can exploit in a number of ways. It is used to form a single word for a single conceptual unit. Incorporated nouns lose their salience as separate arguments, serving instead to narrow the sense of the verb. In the first verb in 4) for example, *iahshakoia'ténhawe* 'he took them', the meaning of the verb root *-enhaw-* 'take' is semantically narrowed by the noun stem *-onkwe't-* 'person' to denote a type of taking involving human beings, more like 'accompany'.

Incorporation can also serve as a stylistic device for backgrounding less newsworthy nominals within discourse. The excerpt below is from a conversation. A just asked what B had for lunch.

- 8) B. *Sakatshó:ri'*      *nì:'i*  
           again I slurped    myself  
           'I had soup again, myself.'

- A. *Á:ke ki' nà:'a tsi nikanontarákon.*  
           oh    just guess    that    so it soup delicious is  
           'Oh, I bet it must have been delicious.'

B did not mention soup (*-nontar-*) overtly, but it was inferrable from her use of the verb *-atshori*, 'eat', used only with soup. This was sufficient for A to consider the soup an established entity and incorporate it into the verb *-akon* 'be delicious'.

### 4. The lexicon

Perhaps due to the large amount of information borne by verbs, Mohawk speakers use verbs to communicate many of the ideas conveyed by English speakers with nouns or with noun plus verb combinations. Consider the last line of the lumbercamp segment in 4). The speaker rendered this statement in Mohawk with two verbs, but in English with a single verb and two full noun phrases.

### 5. One piece of news at a time

A final factor in the the preponderance of verbs is related to a feature typical of spoken language. Clauses, or intonation units, do not typically consist of a verb plus a large set of arguments. Speakers tend to introduce only one piece of important new information at a time into an intonation unit. (See Chafe to appear.) The lines below constitute the opening of the lumbercamp narrative. Each line represents a separate intonation unit.

- 10) *Nè:ne wahón:nise'*,  
it is long ago

*ronhténkieskwe' kí: ronón:kwe,*  
they leave used to these people

*shientíhne iehonnéhtahkwe'.*  
to camp there would they go

*Rotiio'ténhsere'skwe'.*  
they work go used to

'A long time ago, people would go away to camp to work.'

The opening lines of a narrative must generally convey more new information than later ones, since it is necessary to situate the narrative in time and place and introduce the cast of characters. Once this is done, their identity can be assumed or referred to pronominally or deictically. In the lumbercamp narrative, for example, over 60% of the clauses contained predicates with no arguments at all. The remainder had only one argument each, 10% identifying the subject, 2% the direct object, 7% the place, and 5% the time. Such figures are characteristic of Mohawk spoken discourse in general, both narrative and conversation.

### C. Particles

After verbs, the most frequent types of words in discourse are particles. In fact, in all of the textual data cited so far, there is only one noun, *ronón:kwe* 'people'. In conversation, the incidence of particles is often even higher, to the point where many intonation units contain no verbs or nouns at all.

Translated into English, many particles appear to add little information. In fact, speakers typically find most Mohawk particles difficult to translate at all. A few of them are grammatical markers, like *sók* 'and then', or *tsi* 'as, to' above.

Some particles serve an evidential function. They permit the speaker to specify the source of knowledge, such as hearsay or inference, and the degree of commitment to its truth. In 8) above, the phrase *ki' nà:* 'a indicates that A did not taste the soup himself, and is making an inference. The particle *á:ke* roughly 'gee', adds intensity. A large number particles function stylistically to highlight pertinent information, or to background less important elements. The lumbercamp narrator had said that people would go away and work for several weeks or months in these camps. Then she introduced a new key character:

- 11) *Ne kati' á:re kí: shaià:ta, iaonkwe'táhsa' raià:tare'*  
the then again this one body silly person he body in  
'Among these people was one funny guy.'

The particles permit the speaker to link this new information with

the preceding, but highlight it at the same time.

Finally, several particles, in particular deictics like *kí:ken* 'this/these', *thí:ken* 'that/those', *thóh* 'there', *ó:nen* 'at this/that time', play a crucial role in regulating the flow of information. They are often used cataphorically or anaphorically to signal the place of an argument in a clause, without introducing heavy information into that intonation unit itself. The deictics *thóh* 'there' and *ó:nen* 'then' in 4) above connect the locative and temporal elements established in earlier intonation units with the following verbs. The use of the particle *kí:* 'these' in 5) above signals that more will be said about the people collected. Such particles serve an important function in regulating the flow of discourse, permitting the speaker time to collect thoughts and the listener time to assimilate them.

#### D. Pragmatic Word Order

Another crucial difference between Mohawk and Indo-European languages is the ordering of constituents. In languages like English, the order of constituents is basically determined by their syntactic role: Subject-Verb-Object. The basic order may be disturbed for pragmatic effect under certain circumstances, but the deviation is marked. In many polysynthetic languages however, syntactic function has no role in constituent ordering at all. Words are arranged according to their importance to the discourse as a whole. Those conveying the highest degree of information appear first, while successively more predictable, less central information tends to follow.

Such ordering can be seen in the sentences cited above. In 10), the first predicate 'leave' precedes its subject 'people'. It is the leaving that is most significant. A few sentences later, (11) above) the fool is introduced. This time the subject, the new character, is the most important part of the clause, so it precedes the predicate. All constituents are pragmatically ordered in Mohawk, regardless of their syntactic role or morphological type. When the narrator first set the scene for the lumbercamp story in 10) the locative 'to camp', crucial new information, appeared early in the clause. The verb 'they used to go there' was predictable from the preceding clause 'they used to go away', so it appeared late. At the end of story, however, the situation is different. The judge has just dismissed the charges against the lumberjacks. This time, the most important information is their return, so the predicate appears early. We could predict the goal, the lumbercamp, from context, so it appears late.

- |     |               | PREDICATE                                     | LOCATIVE           |
|-----|---------------|---|--------------------|
| 12) | <i>Sók ki</i> | <i>sahonwati'terónhna,</i>                    | <i>shientíhne.</i> |
|     | so then       | they took them back                           | to camp            |
|     |               | 'So they took them all the way back to camp.' |                    |

#### D. Clause Combining

Finally, a particularly salient feature of spoken Mohawk is

the way in which clauses are combined. The most frequent device is simple juxtaposition. Note the relations between the clauses below. In most cases, one simply follows another, sometimes with an intonation break, sometimes without. Although a coordinating conjunction *tánon* 'and' exists, it appears relatively rarely.

- 13) *Thó ki' tehonnenhtshó:ton*  
 there just they all self knee standing were  
 'As they were kneeling

*ronnatereh:naien karíhton e' rohonwì:sere'.*  
 they self song laying were it is cooked there he driving was  
 and praying, a cop came driving by.

*Wa'thá:ta'ne', wahonwatiié:na',*  
 he stopped he them grabbed  
 He stopped and arrested them.'

Speakers rarely embed clauses formally, so that complex nominals are unusual. Instead, additional information is often supplied by appositive clauses in succession. Compare the Mohawk below with the free English translation provided by the speaker.

- 14) *Shaià:ta iaonkwe'táhswa' raiia'tarákie'.*  
 one body one person silly he body along is  
 'That one guy, the funny person who

*Raweién:te iaontahona'ké:ren ratsihón'statsi.*  
 he knows how would he imitate he dark INTENSIVE is  
 knew how to do perfect imitations of a priest, was along.'

Spoken Mohawk is thus characterized by a high proportion of verbs, incorporation, frequent use of particles, pragmatically based constituent ordering, and clause combining by juxtaposition.

## II. Written Mohawk

The style found in texts written by Mohawk speakers differs in interesting ways from their usual oral style. Furthermore, it shows an intriguing evolution, from the first attempts produced by beginning writers, still devoting considerable attention to spelling, to later texts produced by more skillful writers.

### A. Initial efforts

All of the people who first began to write Mohawk were excellent Mohawk speakers, bilingual, and literate in English. Although all of their written texts were grammatical, many of their first essays seemed surprisingly 'unMohawk' in style. The text below, produced in a classroom setting, illustrates some of the radical stylistic differences induced by the literary mode. The free English translation was provided by the Mohawk writer.



- 15) *Karhá:kon nia'ákwe' thetèn:re ia'akwatshén:ri'*  
 woods in there we went yesterday there we found  
 'Yesterday we went into the bush and found

*tiokwí:róte' é:so onekwénhtara sewahió:wane',*  
 there it tree stands many red one it fruit large is  
 a tree with lots of red apples.

*Tsiohién:ton rakhtsi:'a tánon' khe'ken:'a*  
 later my older brother and my younger sibling  
 My big brother and younger sister

*wa'akwà:iako' sok istá tewà:ia wa'ontena'tarón:ni'.*  
 we fruit got then Mother it fruit in is she baked goods made  
 and I picked. Then Mother baked an apple pie.'

One of the first differences to strike even a casual observer is the structure of clauses. As mentioned earlier, most clauses in spontaneous spoken discourse consist of only a verb. The written text above contains nearly twice as many nominals as predicates.

The nominal constituents of these early written texts are generally both more frequent and more complex than those in spoken Mohawk. Normally, Mohawk speakers put each new piece of significant information in a separate clause. The nominal 'a tree with lots of red apples' above is radically different from normal spoken style. Most speakers would introduce the tree in one clause, note that it was an apple tree in another, say that there was a lot of fruit on it in a third, then comment on the color in a fourth.

In spoken Mohawk, overt conjunction is also relatively rare. Note the conjoined nominal 'my big brother and younger sister' in the apple-picking text, however. In spoken language, entities or persons are more often introduced into discourse one at a time, then referred to pronominally.

The unusual preponderance of separate nominals in written style is not limited to narrative. Written dialogue shows the same characteristic. The exchange below is taken from a play.

- 16) A. *Oh nontíé:ren tsi sha'tewahsirí:hen seshá:wi'*  
 why that blanket half back you carry  
 'Why have you brought half the blanket back?'

B. *Kí:ken sha'tewahsirí:hen sekhá:wi, enkatatién:hahse'.*  
 this blanket half back I carry will I self lay for  
 'I will save this half of the blanket which I have brought back'

The effect of the repetition of the nominal 'half a blanket' in Mohawk is similar to its effect in English, only stronger. A speaker would not normally repeat the noun phrase. The embedding of the verb 'which I have brought back' is also somewhat unusual.

The conjoined nominals found in early written narrative also appear in written dialogue. The passage below is from a teacher's

written rendition of typical classroom conversation.

- 17) *Há' ki wá:s seniión:ten sanòn:warore' tanon'*  
 OK go you hang your hat and  
 'Won't you go and hang your hat and

*satià:tawi tanon' seríhxi sá:wen teionrahtahkwané'ta's.*  
 your coat and you take off your rubbers  
 coat and take off your rubbers.'

Few speakers would spontaneously produce such language. A speaker would combine the constituents 'you hang up your hat and your coat' into a single word, perhaps *satstahsion:ko*, 'take off your things'. The use of the word *sá:wen* 'your, it belongs to you' as a prenominal possessive is also unusual. Separate possessive verbs are normally used only for explicit statements and questions (*Sá:wen ken?* 'Is it yours?') or emphasis. In spoken conversation, the request 'you take off your rubbers' would be a single word, *tesarahtahkonetáhko* 'you-self-foot-wear-layer-un'.

The use of incorporation in the early written texts is interesting. The apple-picking text does contain some incorporation.

- 18) 'it-tree-stands' —> '(standing) tree'  
 'one-it-fruit-large' —> 'apple'  
 'it-fruit-contains' —> 'pie',  
 'she-baked.goods-made' —> 'she baked'.

These are all lexicalized compounds, however. The normal way to say 'tree' or 'apple' or 'pie' or 'bake' is with a verb containing an incorporated noun. The writer has not incorporated for the purpose of backgrounding in discourse here. She has, rather, made an appropriate lexical choice. Stylistic incorporation is noticeably absent from much of the early written material.

A third difference between spoken Mohawk and these early written texts is the use of particles. Grammatical particles, such as *tánon'* 'and', *sók* 'and then', and *tsi* 'that, as', are common, but evidential and stylistic particles are rare. Apart from the conjunctions, the apple-picking text contains only one particle, and this one, *é:so*, functions as a modifier.

When deictic particles appear, they are not generally used as they are in spoken Mohawk, as anaphoric or cataphoric elements. Instead, they function more like their English counterparts, as determiners before nouns, like *thí:ken eksà:'a* 'that girl'.

A fourth major difference, apparent in most of the early written texts, is in the order of constituents. As noted above, in spontaneous spoken Mohawk, constituents are ordered according to their importance to the discourse, not their syntactic role. In the early written material, there is a tendency toward SVO order, even where this order conflicts with the pragmatic considerations. Finally, clauses are combined somewhat differently in these early texts than in spoken discourse. While clauses are most commonly

simply juxtaposed in spoken discourse, with falling intonation and pauses indicating major sentence-like breaks, clauses in this written material are more frequently combined with overt conjunctions, as in 15), 16), and 17) above.

The style of these early written texts thus differs in a number of ways from that of spoken Mohawk. The morphological structure is essentially the same, but the syntactic structure is often similar to that of written English. Separate nominal arguments outnumber predicates several times over. Nominal arguments are not only frequent, they are often compound, containing overt conjunctions, or complex, containing adjective-like modifiers. The absence of stylistic incorporation increases the resemblance to English. The elimination of evidential and other stylistic particles without equivalents in English is suggestive, as is the English-like use of the deictics and of emphatics like *sa:wen* 'you have'. The tendency toward SVO word order where pragmatically inappropriate shows the same influence. Finally, the prevalence of overt conjunction and embedding, grammatical but less frequent in spoken Mohawk, is reminiscent of English written style.

#### B. Later Written Mohawk

As some skilled writers continued their work, the time, concentration, and experience they ultimately brought to the task resulted in the emergence of a different style, one which took advantage of the luxury of time available to writers, but which was less tied to the specific influence of English.

The passage below illustrates a number of the features characteristic of this richer, polished style. Some Mohawk surveyors were surprised by a blizzard, and were stranded without food. Near starvation, they managed to shoot a bear, but when they went back to pick it up, they discovered that the snow had covered it up.

- 19) *Tewenhniserá:ke ronno'kwás ó:nen shihon'nikonhrò:ktha'*  
 two days number they dig then as their minds run out  
 'After two days of digging and no sight of the bear they

*ó:nen ni: sakonwaia'tatshén:ri' ne ohkwá:ri.*  
 then this again they body found the bear  
 were about to give when they finally found the bear.

*Wa'konwaiénsehre' sok wahati'wà:rarihte'. Tewenhniserá:ke*  
 they her skinned then they meat cooked two days number  
 They skinned him and cooked the meat. The first two days

*ohnekákeri khok wahatihneki:ra' thó ne' ó:nen*  
 broth only they drank there the then  
 they only drank the broth, then

*wahati'wà:rake', akwé: wahotinonhwákten sótsi' io'wahráre'sen*  
 they meat ate all they got sick too it meat fat is  
 they ate the meat. They eventually all became sick as the meat

*tanon' sotsi' karì:wes tsi náhe' tethonatskà:honhkwe'.*  
 and too it matter long that since they eating had  
 was too rich for them after not having eaten for so long.'

Even in this short segment, it is clear that the predominance of verbs is back. There are 13 verbs, of which 9 are predicates. (2 are objects and 2 indicate time.) There is only one noun.

The full use of incorporation has also been restored. Idiomatic incorporation is evident, as usual, in complex stems such as 'their minds ran out' → 'they gave up'. The treatment of the 'meat' is stylistic, however. Once the bear is under discussion, the meat, an identifiable entity, is incorporated into the verbs 'cook', 'eat', and 'be fat'. If the noun for meat represented new, salient, information, it would appear outside of the verb.

The use of particles is interesting. This passage contains 13. There are numerous grammatical particles (*ó:nen, sók, sotsi'*) as in the early written texts. There are relatively few evidential particles and deictics, again as in the early texts. Unlike the early writing, however, this more polished style contains a large number of stylistic particles functioning to foreground and background information, (*ní:*, etc.), as in spontaneous speech.

Finally, the use of word order for pragmatic purposes has been restored. Note that in the first sentence the verb 'find' precedes the direct object, the bear, since the finding is the most newsworthy, while the bear has already been introduced and is now old information. Later, however, another direct object, the broth, precedes its predicate 'drink', because the broth is new and important, while their eating habits have already been under discussion.

While most aspects of this more skillful writing reflect a return to the stylistic devices employed by good speakers, several characteristics do distinguish it from spoken Mohawk. Often more words are packed into clauses, and more clauses into sentences, than in the spoken language. This denser style can be seen in the passage below, the beginning of the surveying story.

- 20) 1893 *shiohserò:ten wahonwahtíhnha'ne' ne Hudson*  
           as it winter kind they them hired the  
       'The story I am about to tell happened in the year 1893.

*Bay Company rakhsótha tanon' áhsen nihotate'keñ:shen*  
           my grandfather and three they were siblings  
 My grandfather and his brothers were hired by the Hudson Bay

*nahón:ne' tehniíáhse nirihtì:sere's*  
 there should they all go two men they two steel drag  
 Company as Indian guides for the two surveyors

*nahshakotihahónnien tanon' ahshakotihsnié:non*  
 would they them road make for and would they them help  
 who were to chart the land

<i>nahatirihstì:sere'</i>	<i>kí:ken</i>	<i>onhwéntsase'.</i>
there would they all steel drag	this	it land new
in the Northwest Territory.'		

Written Mohawk clearly differs considerably from the spoken language. Since all of the Mohawk writers were already literate in English, an obvious question is whether these differences are due to the influence of the written style they already knew, or the result of the process of writing itself.

### III. Spoken and Written Language

The differences between written and spoken English stem from several factors. One is the historical emergence of prescriptive norms for written style, many based on Latin models. When we learn to write, for example, we learn not to split infinitives or end sentences with prepositions.

Others stem from the nature of the medium itself. (See, for example, Chafe 1982, 1985, Ong 1982, Tannen 1982.) Speakers speak directly to a seen audience, in a shared context, while writers write alone, often to an unknown audience. Spoken language is typically characterized by greater personal involvement of the speaker, showing more emphatic particles, personal reference and reports of the speaker's mental processes.

Spoken and written language are also produced under different temporal conditions. As Chafe 1985 notes, speakers must produce language 'on the fly', in nearly uninterrupted linear sequence. Writers, by contrast, may spend as long as they wish choosing just the right word or construction, pause anywhere, and revise and rearrange at will. Accordingly, spoken language typically contains more hesitations and hedges ('kind of'). Chafe suggests that writing frees idea units from the limitations of short-term memory, resulting not only in longer sentences, but also in different grammatical structure and discourse style. In English, he found 'a strong tendency for casual speakers to produce simple sequences of coordinated clauses, avoiding the more elaborate interclausal relations found in writing. Elaborate syntax evidently requires more processing effort than speakers can ordinarily devote to it.'

Beginning Mohawk writers, struggling with a new orthography, show both the influence of the English literary tradition and an adjustment to the medium. The increased use of nouns is primarily a result of English influence, as are the loss of discourse based noun incorporation, the demonstrative use of deictics, the unusual use of certain emphatics with English pseudo-equivalents, the frequency of overtly marked coordination, and the replacement of pragmatically based constituent order with English SVO. It is as if speakers have learned to alter certain features of linguistic structure when moving from spoken to written English, and have unconsciously transferred the shifts to writing in general.

Certain other characteristics of the early written material appear to be the result of the nature of the medium itself, however. Written Mohawk parallels written English in its absence

of evidential particles, but this lack probably reflects the decreased personal involvement of the writer in the communication. Written Mohawk also resembles written English in its absence of cataphoric particles, but this lack is probably due to the fact that writers need not fill the time they take to think.

Once writers have become more experienced with the medium, however, they take advantage of the luxury of time afforded writers to create a unique Mohawk style. Their texts show less English influence and a return to many of the stylistic devices employed by skillful speakers, such as elaborate morphology, incorporation, the abundant use of foregrounding and backgrounding particles, and pragmatic word order. Yet several other characteristics still distinguish their writing from spoken Mohawk. Evidential particles are still rare, presumably because of the separation of the writer from the audience. The cataphoric particles which provide speakers time to collect their thoughts are unnecessary. Overt grammatical markers like conjunctions are abundant however, perhaps because writers have the time to construct more intricate prose but cannot rely on intonation to signal its structure. The extra production time also permits denser packing of information. Verbs are associated with more arguments in each clause, and more clauses are overtly combined into sentences.

There is good evidence that the reduction in particles and the tighter packing of information are indeed a function of increased production time, rather than the influence of written English. One excellent Mohawk speaker, who does not read or write Mohawk at all, and rarely writes English, prefers to dictate texts to me sentence by sentence, rather than recounting them all at once into a tape recorder. She then records them, line by line, on tape. The result is an oral text created under the same circumstances of time as written texts. She takes as much time as she pleases in assembling each line, revising until she is satisfied, then I write down the final result. She is not involved in the writing process itself, however, so she is, in a sense, still producing language in an oral mode, rather than a written one. She never looks at my transcription, preferring to hear each line read back and dictate changes. Her spontaneous texts, recorded in a single sweep, are essentially like those of other skillful speakers in style. Her dictated texts, however, closely resemble the later polished written style of the other speakers.

The dictated texts are characterized by the use of elaborate morphological complexity as a stylistic device. The predominance of verbs is clear, and the speaker takes advantage of the extra time to produce intricate derived forms. She uses incorporation pervasively and skillfully for stylistic purposes. The use of pausing particles is significantly reduced in her dictated texts, just as it is in the polished texts of the experienced writers. Stylistic particles are abundant, however. Not surprisingly, word order is used for pragmatic rather than syntactic purposes, as in spontaneous spoken language and the polished writing. The tendency toward counter-pragmatic SVO order is completely absent.

In these dictated narratives, however, the primary method of combining clauses is by juxtaposition, as in other spoken language, rather than overt conjunction or embedding. Much of the work done by embedding in languages like English is already accomplished by other means in Mohawk, in particular, the verbal morphology, the stylistic particles, and the pragmatically determined word order. Furthermore, the dictated texts were designed to be spoken, so they were always accompanied by intonation that could provide cues to nuances of syntactic relationships unavailable from written texts.

#### IV. Conclusion

The act of writing can significantly affect language structure. When Mohawk speakers first write, their language is morphologically correct, but unusual in style, resembling in many ways the only other written tradition they know. As they master the medium, however, more skillful writers can take advantage of the added production time afforded by the writing process to develop a distinctly Mohawk literary style, in which a rich variety of the special techniques used by good speakers are fully exploited.

#### NOTE

\*I am grateful to the following Mohawk speakers and writers who contributed texts and discussion: Leatrice Beauvais, Jimmy Curotte, Pauline Delaronde, Josephine Horne, Annette Jacobs, Margaret Lazore and Joyce Sharrow. The orthography used here is that employed by the Mohawks. Obstruents are automatically voiced before sonorants. *i* is pronounced [y] before vowels. Nasalized vowels [ã] and [ũ] are spelled *en* and *on* respectively.

#### REFERENCES

- Chafe, Wallace. 1982. Integration and Involvement in Speaking, Writing, and Oral Literature. In Deborah Tannen, ed. 1982. --- to appear. Cognitive Constraints on Information Flow. In Russell Tomlin, ed. *Coherence and Grounding in Discourse*. Amsterdam: John Benjamins.
- and Jane Danielewicz. 1985. Properties of Spoken and Written Language. In Rosalind Horowitz and S.J. Samuels, eds. *Comprehending Oral and Written Language*. New York: Academic.
- Goody, Jack and Ian Watt. 1963. The Consequences of Literacy. In *Comparative Studies in Society and History* 5:304-345.
- Ong, Walter J. 1982. *Orality and Literacy*. London: Methuen.
- Pawley, Andrew and Frances Syder. 1983. Natural Selection in Syntax: Notes on Adaptive Variation and Change in Vernacular and Literary Grammar. *Journal of Pragmatics* 7.551-579.
- Tannen, Deborah, ed. 1982. *Spoken and Written Language: Exploring Orality and Literacy*. Norwood, New Jersey: Ablex.

## The directionality of agreement

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1. **Introduction.** Our understanding of the mechanism of agreement has increased markedly in the last few years, but one question remains which seems not to have been explicitly addressed so far. That question is whether there is any universal, inherent directionality to agreement rules. By 'directionality' I mean not left-to-right or right-to-left progression through surface strings, but rather what can be described as higher-to-lower or lower-to-higher movement in relational hierarchies and syntactic trees.

Higher-to-lower agreement in a relational hierarchy occurs when the controller of agreement is a higher-ranked relation than the target. An example of such agreement is (1).<sup>1</sup>

- (1) He-NOM was driving drunk-NOM

Here agreement in case is controlled by the subject, and the target is the lower-ranked predicate adjective.

Lower-to-higher agreement in a syntactic tree occurs when the head of a constituent agrees with a non-head member of the constituent; higher-to-lower agreement occurs when a non-head agrees with a head. (2) is a typical example of higher-to-lower agreement, where the modifying adjective agrees with the head noun in gender, number, and case.

- (2) green-NOMsgFEM house(FEM)-NOMsg

Describing the head as 'higher' than the non-head is consistent with the connotations of the word head; it has a more graphic basis in the dependency representation of grammatical relations, where heads are placed above their dependents (for examples see Tesnière 1966, Mel'čuk 1979).<sup>2</sup> Henceforth I will speak of higher-to-lower agreement as downwards agreement and lower-to-higher agreement as upwards agreement. This usage is fairly metaphorical, relying as it does on graphic traditions in the representation of trees and hierarchies and on the image of agreement as copying a category from one word onto another. It is also generalizing, as it equates (paradigmatic) relational hierarchies with (syntagmatic) tree structures. Against these faults, it has the advantage of emphasizing that the abstract question of directionality is one and the same issue, wherever it may arise.

The literature gives the impression that agreement ideally, even necessarily, goes in a single direction: from higher in a tree or hierarchy to lower, i.e. downwards. Explicit statements about the directionality of agreement are hard to find, primarily because the literature on agreement has been most concerned with



other questions -- for instance, the implications of agreement for constituent analysis, syntactic distance, resolution rules, and contexts of agreement failure. (Some representative recent contributions are: Aissen 1985, Borsley 1983, Bresnan 1982, Chomsky 1981:48ff., Corbett 1983a, 1983b, Marantz 1984:72-3, Pullum & Zwicky 1984, Sawaie 1984, Stucky 1983.)

I will use agreement to mean coincidence in grammatical categories, features, or feature values on two different words in a sentence, where one word has the category or feature for a principled reason and the other merely acquires it from the first. There are two kinds of principled reasons for the appearance of the category or feature on the first word. First, it can be lexically present, either inherently (for instance, gender in Russian, German, or French nouns) or due to the speaker's choice (number in nouns). Second, it can be syntactically determined, as when cases are assigned to nouns on the basis of government and their syntactic functions. This is a traditional view of agreement, and it seems to be consistent with the spirit of most ongoing theoretical work (see e.g. Anderson 1982:574-5, Bresnan 1982:310).

The coincidence of categories or features on the two words is crucial to the definition of agreement. The same feature or category must be present on both words. The definition of agreement is not met if the morphology of one word merely reflects the influence of another rather than sharing features with it. There are several types of morphological influence which do not meet the criteria for agreement. One is government, where a governing word dictates a category or feature for another, as when a Russian verb governs the accusative or dative or instrumental or other case on its object.<sup>3</sup> The governing word imposes the case but does not bear it: Russian transitive verbs, for instance, are not themselves in the accusative case.

Another type of non-agreeing morphological influence is found when one word points to the presence in the sentence of another word without sharing its features. For instance, some Iranian languages have a construction called izafet or ezafe, shown in (3):

- (3) Persian    ketāb-e    man  
                  book PTC    my  
                  'my book'    (Abaev et al. 1982:111)

The particle -e reflects the presence of a modifier to 'book', but neither indicates nor shares its categorial features.

A third type of non-agreeing morphological influence is found in a number of languages that display obligatory passivization or the like depending on the person or animacy configuration of the subject and object (for a recent contribution see Whistler 1985). Typically, the verb changes form when the patient outranks the agent in animacy. This is not agreement because the verb does not share animacy features with the nouns. (In fact, usually the nouns do not bear inherent lexical animacy categories at all; rather, their referents are simply ranked, on a sentence-by-sentence basis,

for relative position along a continuum. If a verb is active when man bites dog, passive when dog bites man, and active again when dog bites stick, then it is obviously not sharing some feature with a particular argument slot, but is simply responding to the relative ranking of the two arguments.)

A fourth type of non-agreeing morphological influence is sequence-of-tense rules, where (e.g. in English) a past-tense main verb causes a subordinate verb with past or future reference relative to the main verb to shift to the pluperfect or conditional respectively. This is not agreement because the main and subordinate verb do not share the same tense category.

Government and agreement, then, are not the same thing. But it is clear that they have something in common: both involve one word influencing the morphology of another. Furthermore, there are various respects in which they are, or appear to be, in complementary distribution. Thus Marantz 1984:72 equates them in an argument implicitly relying on their complementarity. My reason for not equating them is that the notion of one word influencing the morphology of another -- which is what they have in common, or what forms the frame of reference for the complementarity -- is a loose informal characterization, appropriate for introductions, topic sentences, and similar expository devices, but it is not a grammatical notion. Government and agreement, in contrast, are grammatical notions; and those grammatical notions are different things.

Despite the lack of explicit discussion on the question, the literature gives the impression that agreement is assumed to properly go downwards. One source of this impression is the fact that, for control of case agreement, the examples discussed in print do in fact illustrate downwards agreement. Another is that, for subject-verb agreement (which clearly goes upwards, from non-head to head of the clause), there is a distinct tendency to treat it as something other than agreement. The clearest example is Chomsky 1981:48ff., where subject-verb agreement is described as government of the subject's nominative case by the element INFL (the verbal inflection comprising tense and person-number). In treating agreement as government, this analysis in effect claims that it goes downward. The related account of Marantz 1984:72-3 claims complementarity between agreement and government, in that agreement goes upward while government goes downwards (these are not his terms), and thus maintains that both could be described as a single process along the lines proposed by Chomsky. In Marantz's approach, explicit recognition of upwards agreement is bought at the price of obliterating the government-agreement distinction; in Chomsky's, the upward character of agreement seems not to be recognized at all.

A different lumping of government and agreement comes from the American structuralist tradition. To describe languages with multiple verb-argument agreement, Boas (1911) used 'apposition' and Bloomfield (1962) used 'cross-reference', now the standard term. The reasons for this terminology have to do with the nature of government, not the nature of agreement: in the languages Boas and

Bloomfield were most concerned with, those using multiple agreement and no case marking, any NP's in the sentence are not governed by the verb but are rather in apposition to the gender-number-person markers on the verb. This terminological distinction, with its own consequent confusion of government and agreement, has had the effect of labeling many instances of conspicuous upwards agreement as something other than agreement.

The following sections discuss three major issues in the directionality of agreement: agreement between head and non-head in a constituent (section 2); agreement between two non-heads in a constituent (section 3); and the ranking of controllers, i.e. hierarchical principles determining the choice of controllers for agreement involving heads (section 4). The question of the directionality of agreement will be posed separately for each of these issues and for several constituent types.

2. Agreement involving heads is attested in many constituent types. In clauses it is represented by verb-argument agreement. An example of three-place verb-argument agreement is the Abkhaz sentence (4), where the verb agrees with the subject, direct object, and indirect object, with prefixes showing the person, number, and (for third person) gender of each:

- (4) Abkhaz    a- xàc'a a-ph<sup>o</sup>às a-š<sup>o</sup>q<sup>o</sup> 'ə Ø- lə - y - te - yt'  
               ART man    ART woman ART book it to-her he gave TNS  
               'The man gave the woman the book' (Hewitt 1979:36)

It is an apparent universal that, for finite verbs, verb-argument agreement goes only upwards; I know of no instances where arguments copy features from their finite verbs. For nonfinite verbs, however, we have a crucial minimal pair among Indo-European absolute constructions. The absolute construction is a participial clause carrying various circumstantial meanings (saliently, time and reason). The subject of the absolute clause and the participle are in the same case.<sup>4</sup> Examples (5) and (6) show Latin and Old Russian absolutes. In (5) the subject rēbus and the participle comparātis are in the ablative case. In (6) the subject Ondrěju and the participle učaščju, and the second participle prišedsju and its subject emu, are in the dative case.

- (5) Latin            omnibus rēbus            comparātis diem dicunt  
                       all-ABL things-ABL prepared-ABL day they-say  
                       'When everything is ready, they set a day' (BG I.vi.4)

- (6) Old Russian    Ondrěju učaščju            v Sinopii i prišedsju  
                       A.-DAT teaching-DAT in S.            & having-come-DAT

emu            v Korsun<sup>6</sup>, uvědě, jako is    Korsunja bliz<sup>6</sup> ust<sup>6</sup>e  
                   him-DAT in K.            learned that from K.            near mouth

Dněpr<sup>6</sup>skoe ...  
                   of Dniepr

'While Andrej was teaching in Sinopa, (and) when he came to Kherson he found out that the mouth of the Dniepr was not far from Kherson.' (PVL; PSRL I.7-8)

The absolute construction poses problems for comparative Indo-European syntax because the cases used in it differ from language to language. As is generally pointed out, the Latin ablative has various adverbial functions and its use in the absolute construction is consistent with the adverbial function of that construction. This amounts to a claim that the ablative is assigned to the participle, which is the head of the absolute clause, by the regular rules of the language. Then the ablative case on the subject must be due to agreement, and that agreement must be downwards, since it goes from (head) verb to (non-head) subject. In the Slavic languages, in contrast, the dative has no adverbial functions; it marks only possessors (in older Slavic), objects, subjects of nonfinities, and occasionally goals. It is the subject-of-nonfinite construction that is relevant to the dative absolute. (7) shows a modern Russian subject-of-nonfinite construction, the now-obsolescent dative subject of infinitive.

- (7) Russian byt' bede  
to-be misfortune-DAT  
'There's bound to be misfortune'

(7) is a complete sentence, with all the pragmatics of assertion. The infinitive is a predicate, and its subject is the dative bede. The use of the dative in old Slavic absolute constructions is motivated by its function as subject of nonfinite: since the participial predicate of the absolute clause is nonfinite, its subject appears in the dative. To use this analysis, we must assume that the dative is assigned to the absolute-clause subject, then copied onto the participle by agreement. Such agreement goes upwards, from subject to verb. Comparison of the Latin and Slavic absolute constructions, then, gives us a minimal pair showing that agreement can go in either direction in this kind of clause.

Agreement within NP's is common, with attributive adjectives in many languages displaying agreement in gender, number, and case. Such agreement is downwards, since the dependent modifier agrees with the head. (8) shows examples from Russian, where the various forms of 'green' take their gender, number, and case from the head nouns.

- (8) a. zelen-yj dom  
green-NOMsgMasc house(Masc)-NOMsg 'green house'
- b. zelen-uju masinu  
green-ACCsgFem car(Fem)-ACCsg 'green car'
- c. zelenomu ozeru  
green-DATsgNeut lake(Neut)-DATsg '(to a) green lake'

In similar fashion, the Bantu languages of Africa copy gender classes from head noun to all modifiers in the NP. Chechen and Ingush, languages of the north central Caucasus, have limited downwards agreement in gender in the few adjectives that can take gender prefixation. (9) shows the adjective *-oqqa* 'big', which agrees (J, V, and D identify the gender classes marked by those consonants), and *dika* 'good', which does not.

- |            |        |             |                 |
|------------|--------|-------------|-----------------|
| (9) Ingush | v-oqqa | vaša        |                 |
|            | V big  | brother (V) | 'older brother' |
|            | j-oqqa | jiša        |                 |
|            | J      | sister (J)  | 'older sister'  |
|            | d-oqqa | urs         |                 |
|            | D      | knife (D)   | 'big knife'     |
|            | dika   | vaša        | 'good brother'  |
|            | dika   | jiša        | 'good sister'   |
|            | dika   | urs         | 'good knife'    |

(9) shows that, in Chechen-Ingush, whether agreement occurs or not depends on which words are chosen.

Upwards agreement in NP's with adjective modifiers is presumably impossible, since adjectives have no inherent features that nouns could agree with. But in NP's with noun modifiers, Chechen-Ingush provides a minimal pair to (9), showing that upwards agreement is also possible in NP's (examples from Maciev 1961:169):

- |              |                 |        |               |
|--------------|-----------------|--------|---------------|
| (10) Chechen | t'ergan         | j-ŭhig |               |
|              | rope(J)-GEN     | J-tip  | 'end of rope' |
|              | lergan          | d-ŭhig |               |
|              | ear(D)-GEN      | D-tip  | 'earlobe'     |
|              | kuogan          | b-ŭhig |               |
|              | leg/foot(B)-GEN | B-tip  | 'toe(s)'      |

The word meaning 'end, point, tip' is one of very few nouns which happen to be able to vary their initial consonant. In (10), the gender prefix of the head noun agrees with the gender class of the modifying noun. This pattern is unusual, since it is rare for nouns to be able to change gender. But it is a crucial example, since it shows that in principle NP's can have upwards agreement, provided the right morphological conditions happen to be met. Comparison of (9) and (10) shows that agreement in NP's can go in either direction, and that its directionality is limited only by the chance collocation of words in the NP and the array of inflectional categories in the given language.

PP's also exhibit agreement in many languages, with the

adposition agreeing in person, number, and/or gender with its object. Examples are in (11).

- (11) a Navajo      tsin bi-yaadi  
                  tree 3 under  
                  'under a tree'                    (Young & Morgan 1980:258)
- b Abkhaz      a - jəyas a - q'nə  
                  Art river 3sg at  
                  'at the river'                    (Hewitt 1979:103)
- c Tzutujil ruu-majk                    jar aachi  
                  3sg because-of the man  
                  'by/because of the man'                    (Dayley 1981:216)

The Navajo postposition agrees with its object in person, and the Abkhaz postposition and Tzutujil preposition agree with their objects in person and number. Since adpositions are the heads of PP's, these examples all involve upwards agreement. There are no examples of downwards agreement in PP's, probably because adpositions do not bear inherent lexical categories such as gender, number, and person that their objects could pick up.

A phenomenon that may be relevant to agreement is case attraction between head noun and relative pronoun in classical Greek. In attraction, the head or relative pronoun acquires its case from the relative pronoun or head, respectively, rather than acquiring it through the regular marking of syntactic relations. (12)-(13) show that attraction could go in both directions.

- (12) Greek      prò tòn                    kakôn                    hōn                    oīda  
                  Prep Art-GENpl evil-GENpl which-GENpl I-know  
                  'instead of the evils which I know'

- (13) Greek      ēlegon                    hōti Lakedaimónioi hōn  
                  they-said that Lacedaemonians what-GENpl

deóntai pántōn                    peprāgotes                    eīen  
                  they-ask all-GENpl having-achieved were

'They said the Lacedaemonians had achieved all that they asked for'

In (12), the relative pronoun hōn is in the genitive plural by agreement with kakôn, not due to government by its verb oīda: oīda takes the accusative, not the genitive. In (13), the antecedent pántōn 'everything' is in the genitive due to agreement with the relative pronoun hōn (which is governed by a verb requiring the genitive); the genitive is not assigned by the verb prassō 'achieve', which governs the accusative. Thus attraction is bi-directional in principle; the direction actually used in a particular sentence depended on the array of cases in the construction: an

accusative was highly likely to acquire the case of the other word (Smyth 1920:567ff., the source of the above examples), regardless of whether it was antecedent or relative pronoun.

In summary, examples (4)-(13) show that agreement can go in either direction in most constituents, and goes only upwards in PP's and between finite verbs and their arguments. Where it can go in either direction, its actual realization is determined by the array of words in the constituent and inflectional categories in the language. The exclusively upwards direction in PP's and finite clauses could as well be due to the array of lexical categories available to adpositions and verbs as to some inherent restriction on the agreement rule. It is therefore safe to assume that agreement is in principle bidirectional, limited only by the inflectional categories available to the various parts of speech.

3. Agreement not involving heads, i.e. between two non-heads in a constituent, appears to regularly go downwards, with higher-ranked syntactic relations controlling it and lower-ranked ones acquiring their categories. A well-studied example is agreement of predicate nominals with their controllers; the controller is a governed relation, the predicate nominal either ungoverned or a lower-ranked governed relation.

- (14) Russian    ona                    lučše rabotaet golodnaja  
                  she-NsgFem best works       hungry-NsgFem  
                  'She works best (when she's) hungry'

- (15) Icelandic    Við kusum Höskuld skipstjóra  
                  we chose H.-Acc captain-Acc  
                  'We chose Höskuldur captain' (Andrews 1982:450)

The controllers, ona in (14) and Höskuld in (15), are respectively subject and object. The agreeing predicate adjective of (14) is a temporal adverbial, hence not governed by the verb; that of (15) is an object, but a kind of object ranked below the direct-object controller.

Russian predicate nominals provide especially strong evidence for downwards agreement.<sup>5</sup> Those that agree can be controlled only by governed nominals and some subcategorized ones, e.g. locations as in (16) and prepositional 'subjects' of possessives as in (17):

- (16) Russian    v Moskve daže opustevšej interesno žit'  
                  in M.-Loc even deserted-Loc interesting to-live  
                  'It's interesting to live in Moscow even (when it's) deserted'
- (17)                    u menja ešče molodogo byla interesnaja žizn'  
                  Prep me-Gen still young-Gen was interesting life  
                  'I had an interesting life (back when I was still) young'

while those with no agreement have almost no restrictions on their controllers, which can even be adnominal possessors:

- (18) Russian      Žizn' u    menja    { v detstve       } byla veselaja  
                 life   Prep me-GEN { in childhood     } was happy  
   { \*molodogo       }  
   young-GEN }

'My life as a child was happy'

In (18), the prepositional phrase can be controlled by the adnominal u menja 'my', but the agreeing adjective cannot. (17)-(18) show that agreement is subject to restrictions on controllers which follow a relational hierarchy.

Another example of agreement between non-heads is agreement of adverbs with one or another nominal in the same clause, as in Avar and other Northeast Caucasian languages. The adverb always agrees with the nominative agent or S/O.

- (19) Avar (Chadokolob dialect; Kibrik 1981:39)

- (a) Re-s sa - r dede - r-e řičal - gi r- ošun r-o'a  
she-Erg here-Pl Fa-Dat Pl apples(Pl)-Ptc Pl-buy Pl-Aux  
'She bought apples here for [her] father'
- (b) Re se dede - r-e řičal - gi r- ošun j-o'a  
she(II)-Nom here-II Fa-Dat Pl apples(Pl)-Ptc Pl-buy II-Aux  
id.

(19a) is ergative in form, and all agreeing words -- 'here', 'father', 'buy', and the auxiliary -- agree with the nominative S/O 'apples', taking the plural marker. (19b) is semi-antipassive in form, and 'father' and 'buy' agree with the nominative S/O 'apples', while 'here' and the auxiliary verb agree with the nominative subject 'she' (gender class II).

In summary, all examples in this section show downwards agreement, from a higher-ranked controller to a lower-ranked target.

4. **Ranking of controllers.** The ranking of controllers for agreement involving heads is downwards and involves several hierarchies: relational, morphological, animacy, and probably others. The relational hierarchy takes precedence in that there are many languages for which the relational hierarchy suffices to give an account of agreement. The relational hierarchy includes at least: subject > object(s) > others. This is a hierarchy of what Aissen (1985) calls 'primary agreement controllers'; at each step in the hierarchy, Aissen's category of secondary agreement controllers -- nominals bearing systematic syntactic connections to the primary controllers, and including for instance agents of passives -- can also come into play.

That subject outranks object is shown by verb agreement in





The main-clause subject is 'he', of the V (masculine) class as shown by the agreement in 'lived'. The equi-deleted zero subject of the subordinate clause must therefore also be of the V class. In (21a), the gender class of the zero subject triggers agreement in the subordinate verb 'being'. But in (21b), where the subordinate predicate nominal is a noun which carries its own gender class ('child', D class), the subordinate verb agrees with the predicate nominal. The two sentences are identical in structure; the only difference is that (21b) has a predicate noun, which carries lexical gender. They therefore prove that agreement can be either with the subject, as in (21a), or with the predicate noun, as in (21b).

In sentences like (20) and (21), the predicate nominal is an object of some kind governed by 'be'. Therefore these examples represent object-controlled agreement. They support the relational hierarchy in showing that object controllers are possible only under certain conditions. They support the morphological hierarchy in showing that the nominative case is an important facilitating condition for object agreement. (It should be noted, however, that in both (20) and (21) the syntactic relations of the subject and predicate nominal are not as clearcut as this discussion suggests. For Russian the decision as to what is subject and what is predicate in examples like (20) is not based on strictly syntactic criteria: see Nichols 1981:188, 49ff., Padučeva & Uspenskij 1979. In Chechen and Ingush the copula 'be' might be better analyzed as a clitic on the predicate nominal than as an independent verb governing the predicate nominal.)

**5. Conclusions.** (22) summarizes the directions of agreement of various types and at various levels.

(22) Directions of agreement

	Upwards	Downwards
<b>Agreement involving heads:</b>		
Clause:	Verb-argument agreement Slavic dative absolute	Latin ablative absolute
NP:	Chechen noun agreement	Ingush adjective agreement
PP:	Adpositional agreement	
<b>Agreement between non-heads:</b>		
		Russian predicate nominals Avar adverbs
<b>Ranking of controllers</b>		
		Relational hierarchy Morphological hierarchy Animacy hierarchy

The following conclusions can be drawn: (1) Agreement involving heads can go in either direction, sometimes within a single language or language family. (2) Constraints and language-specific choices on its directionality appear to be based on parts of speech and their language-specific properties, not on syntactic structure. (3) The array of categories and parts of speech, cross-linguistically, is such that in PP's and finite clauses, upwards agreement is the only possibility; while there is no constituent type in which agreement involving heads is necessarily downwards. (4) In contrast, agreement between non-heads can go only downwards. (5) The difference between agreement involving heads and that between non-heads is not based on parts of speech and language-specific categories, as is shown by Avar, Chechen-Ingush, other languages of the North Caucasus, and the Bantu languages, which use morphologically identical gender-class agreement for both types. (6) Ranking of controllers for agreement involving heads is exclusively downwards.

Why should there be this asymmetry between agreement involving heads and the other two kinds? Apparently it is because agreement between non-heads and the ranking of controllers both involve comparison and ranking of nominal relations. Not surprisingly, they follow the same downward principle attested elsewhere for control and accessibility hierarchies. But agreement involving heads entails no such comparison and ranking, and does not follow the downward principle. It is inherently bidirectional.

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### Footnotes

1 Abbreviations used in examples are the following: Cases: NOMinative, GENitive, etc.; numbers: sg = singular, pl = plural; genders: MASculine, FEMinine, NEUTer, and others explained at ex. (9); others: TNS = tense, PTC = particle, ART = article. In long examples, boldfacing is used on the words showing agreement. Terminology used in this paper is traditional wherever possible.

2     Grammarians of various theoretical persuasions are in almost unanimous accord as to what is the head of any given constituent: for the constituents to be discussed in this paper, the verb is head of the clause, the noun is head of a noun phrase, and the adposition is head of an adpositional phrase.

3     This pertains to morphological government only. The traditional understanding of government lumps morphological government with syntactic government -- the strict subcategorization of Chomsky 1965 -- where the governing word imposes not a morphological case but a syntactic relation on the governed word. All morphologically governed relations are syntactically governed; the converse is not true. In this paper government will be used of morphologically governed nominals only.

4     The absolute construction ordinarily has a subject different from that of the main clause. When the two subjects are the same, the nominative case is used on the 'absolute' clause, which is usually called a conjunct participial clause.

5     The following discussion is summarized from Nichols 1981:68ff.

### References

- Abaev, V. A., M. N. Bogoljubov, V. S. Rastorgueva, eds. 1982. *Osnovy iranskogo jazykoznanija*, 3: Novoiranskije jazyki. Moscow: Nauka.
- Aissen, Judith. 1985. A theory of agreement controllers. MS, UC Santa Cruz.
- Anderson, Stephen R. 1982. Where's morphology? LI 13:4.571-612.
- Andrews, Avery D. 1982. The representation of case in modern Icelandic. Bresnan ed. 1982:427-503.
- Boas, Franz. 1911. *Introduction to the Handbook of American Indian Languages*. Reprint: Washington, D.C.: Georgetown University Press.
- Bloomfield, Leonard. 1962. *The Menomini language*. New Haven-London: Yale University Press.
- Borsley, Robert D. 1983. A Welsh agreement process and the status of VP and S. Gazdar et al. 1983:57-74.
- Bresnan, Joan. 1982. Control and complementation. J. Bresnan, ed., *The Mental Representation of Grammatical Relations*, 282-390. Cambridge: MIT Press.
- Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge: MIT.
- . 1981. *Lectures on Government and Binding: The Pisa Lectures*. (Second revised edition, 1982.) Dordrecht-Cinnaminson: Foris.
- Corbett, Greville C. 1983a. *Hierarchies, Targets, and Controllers: Agreement Patterns in Slavic*. University Park: Pennsylvania State University Press.

- . 1983b. Resolution rules: Agreement in person, number, and gender. Gazdar et al. eds. 175-206.
- Davies, William D. 1981. Choctaw Clause Structure. Unpublished Ph.D. dissertation, University of California, San Diego.
- Dayley, Jon P. 1981. A Tzutujil Grammar. Unpublished Ph.D. dissertation, University of California, Berkeley.
- Dryer, Matthew S. 1984. Dative and antidative. Paper read at LSA Annual Meeting, Baltimore.
- Gazdar, Gerald, Ewan Klein, and Geoffrey K. Pullum, eds. 1983. Order, Concord, and Constituency. (Linguistic Models, 4.) Dordrecht: Foris.
- Hewitt, B. G. 1979. Abkhaz. (Lingua Descriptive Series, 2.) Amsterdam: North Holland.
- Hyman, Larry M., and Alessandro Duranti. 1982. On the object relation in Bantu. Paul J. Hopper and Sandra A. Thompson, eds., *Studies in Transitivity*, 217-39. (Syntax and Semantics 15.) New York: Academic Press.
- Kibrik, A. E. 1981. Materialy k tipologii ergativnosti, 20: Avarskij jazyk. Institut Russkogo Jazyka AN SSSR, Predvaritel'nye publikacii 141. Moscow.
- Maciev, A. G. 1961. Čečensko-russkij slovar'. Moscow: Gos. izd. inostrannyx i nacional'nyx slovarej.
- Marantz, Alec P. 1984. On the Nature of Grammatical Relations. (LI Monograph 10.) Cambridge: MIT Press.
- Mel'čuk, I. A. 1979. Studies in Dependency Syntax. (Linguistica Extransea: Studia, 2.) Ann Arbor: Karoma.
- Nichols, Johanna. 1981. Predicate Nominals: A Partial Surface Syntax of Russian. (UCPL 97.) Berkeley-LA: University of California Press.
- Padučeva, E. V., and V. A. Uspenskij. 1979. Podležaščee ili skazuemoe? (Semantičeskij kriterij različenija podležaščego i skazuemogo v binominativnyx predloženijax.) *Izvestija AN SSSR, Ser. lit. i jaz.* 38:4.349-60.
- Pullum, Geoffrey K., and Arnold M. Zwicky. 1984. Phonological resolution of syntactic feature conflict. Paper read at LSA annual meeting, Baltimore.
- Sawaie, Mohammed. 1984. Verb-subject concord in Arabic. Paper read at LSA annual meeting, Baltimore.
- Smyth, Herbert Weir. (1920)1956. Greek Grammar. Harvard UP.
- Stucky, Susan. 1983. Verb phrase constituency and linear order in Makua. Gazdar et al. eds. 75-94.
- Tesnière, Lucien. 1966. *Éléments de syntaxe structurale*. Paris: Klincksieck.
- Whistler, Kenneth W. 1985. Focus, perspective, and inverse person marking in Nootkan. J. Nichols and A. C. Woodbury, eds., *Grammar Inside and Outside the Clause: Some Views of Theory from the Field*, 227-65. Cambridge University Press.
- Young, Robert, and William Morgan. 1980. *The Navajo Language*. Albuquerque: University of New Mexico Press.

## A Rule's Progress: Reordering in Swiss German

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A number of years ago, Paul Kiparsky suggested that historical change can occur when the relative order of two rules in the synchronic grammar of a language changes. In other words, if rule A is ordered before rule B, and if some of the output of rule A is also subject to B, then the language would change if B moved to before A. To show that this kind of change really does happen, Kiparsky looked at two dialects of Swiss German. One was the dialect spoken in the Canton of Schaffhausen, which is located in the northeastern corner of Switzerland, and the other was spoken in the town of Kesswil, which is located to the east of Schaffhausen.

Kiparsky looked at two rules. One of them was a lowering rule as given below in 1a. A revised version<sup>1</sup> of the rule is given below in 1b.

$$\begin{array}{l}
 1a) \left[ \begin{array}{c} V \\ - \text{high} \\ + \text{back} \end{array} \right] \text{----} > [+ \text{low}] / \text{---} \left[ \begin{array}{c} + \text{cons.} \\ - \text{grave} \\ - \text{lat.} \end{array} \right] \\
 1b) \left[ \begin{array}{c} V \\ - \text{high} \\ + \text{back} \\ - \text{long} \end{array} \right] \text{----} > [+ \text{low}] / \text{---} \left[ \begin{array}{c} + \text{cons.} \\ + \text{cor.} \\ - \text{nas.} \\ - \text{lat.} \end{array} \right]
 \end{array}$$

The revised version of the rule eliminates long vowels from consideration and also eliminates *n* and *l* as possible lowering environments. The other rule Kiparsky considered was an umlaut rule, with environment unspecified, as given below in 2.

$$2) V \text{---} > [- \text{back}] / \dots \text{ (no environment specified)}^2$$

Kiparsky used rule ordering to account for the data given below in 3 and 4.

### 3) Schaffhausen

bogə 'arch'	bɔdə 'floor'
bögə 'arches'	bödə 'floors'

#### Sample derivation

	/bogə/ (plur.)	/bodə/ (sing.)	/bodə/ (plur.)
Umlaut	bögə	-----	bödə
Lowering	-----	bɔdə	-----

### 4) Kesswil

bogə 'arch'	bɔdə 'floor'
bögə 'arches'	bödə 'floors'

#### Sample derivation

	/bogə/ (plur.)	/bodə/ (sing.)	/bodə/ (plur.)
Lowering	-----	bɔdə	bɔdə
Umlaut	bögə	-----	bödə

As can be seen from the above data, in Schaffhausen umlaut must apply before

lowering to derive the examples given. In Kesswil, on the other hand, umlaut must apply after lowering to account for the above data. Since the lowering rule was added to the grammar long after the umlaut rule, Kiparsky concluded that, in Kesswil, the lowering rule must have been reordered so that it now comes before the umlaut rule. The ordering of the two rules found in Schaffhausen is the original order, and the order found in Kesswil is an innovation.

Since this analysis was proposed, it has been criticized on a number of counts. Numerous researchers<sup>3</sup> have suggested, for a variety of reasons, that the lowering rule has been lost in Kesswil and consequently couldn't be ordered with respect to umlaut at all. In this paper I argue that the lowering rule does exist in both Schaffhausen and Kesswil. I will then determine the form in which the original lowering rule was added to the two dialects. I will trace all the changes which have taken place in the two dialects which affect the rules in question in some way. Finally, I will argue that trying to determine whether or not reordering has occurred by examining just the two rules in question gives a distorted picture of the situation.

Some of the evidence which suggests that the lowering rule is still in operation in Kesswil is found in 5. These data<sup>4</sup>, examples of loan words borrowed into the dialect fairly recently, suggest that some lowering rule is being applied to the forms:

#### 5) Kesswil loan words

bɔrtrət	<i>Portrat</i>	'portrait'	kxatoliss	<i>katholisch</i>	'Catholic'
gɔrset	<i>Korsett</i>	'corset'	gomfiturə	<i>Fr.confiture</i>	'jam'
mɔdəl	<i>Model</i>	'model'	galop	<i>Galopp</i>	'gallop'
rɔdəl	<i>Rodel</i>	'toboggan'	bantoffəl	<i>Pantoffel</i>	'slipper'
pɔst	<i>Post</i>	'mail'	pokkə	<i>Pocken</i>	'pock mark'
lɔttəri	<i>Lotterie</i>	'lottery'	tokter	<i>Doktor</i>	'doctor'

The borrowed forms in the first column show that when the dialect borrows a word containing *o* in a lowering environment, the *o* is lowered to ɔ. The forms in the fourth column, on the other hand, offer evidence that when the dialect borrows a form containing *o* in a non-lowering environment, the *o* remains unlowered. The grammar must apply a rule to these forms which lowers *o* in the appropriate contexts. These borrowed words suggest that some form of the lowering rule is indeed operating synchronically in Kesswil.

The forms given below in 6 are examples of loan words found in Schaffhausen.

#### 6) Schaffhausen loan words

mɔdəl	<i>Model</i>	'model'	toplət	<i>doppelt</i>	'double'
rɔdəl	<i>Rodel</i>	'toboggan'	xopf	<i>Kopf</i>	'head'
mɔst	<i>Most</i>	'must (of wine)'	glokkə	<i>Glocke</i>	'bell'
pfɔst	<i>Pfost</i>	'post, stake'	tokkə	<i>Dogge</i>	'mastiff'
pɔst	<i>Post</i>	'mail'	tokxter	<i>Doktor</i>	'doctor'

As is the case in Kesswil, *o* is lowered when it occurs in the expected environments. These forms suggest that the lowering rule also still operates in Schaffhausen. The borrowed forms found in both of these dialects suggest that the lowering rule has not yet been lost.

A situation potentially damaging to this analysis is present in Kesswil. In this dialect, *u* is lowered to *o* in the same environments in which *o* is lowered to ɔ. As a result, forms such as [tɔrn] 'tower', which are derived from an underlying /turn/ are found side-by-side in the language with [tɔrn] 'thorn' derived from underlying /torn/.

The fact that both [o] and [ɔ] are found in the same environments could result in rule opacity; if a rule is not recoverable synchronically, it becomes opaque and unlearnable. The presence of the forms [torn] 'tower' and [tɔrn] 'thorn', as a fact isolated from the rest of the language, would indeed cause opacity. Data from the language as a whole, however, offer a way of recovering synchronically the underlying forms of the words in question. Those data are the forms resulting from umlaut.

In Kesswil, umlaut regularly relates back vowels to their corresponding front vowels; *o* invariably umlauts to *ö*, *ɔ* invariably umlauts to *ȳ*, and so on. This regularity is violated by those forms which contain *o* as a result of lowering *u*. In these cases<sup>5</sup>, the umlauted vowel is *ü*. Alternations such as *tsondel/tsünd* 'fire/to ignite', *pont/püntöl* 'bunch/small bunch', *šots/šüts* 'shoot of water/shoots', and *nots/nüts* 'use/make use of' are common in the dialect. With the majority of those forms containing phonetic *o* which has resulted from lowered *u*, the umlaut is *ü*. In contrast, those forms containing phonetic *o* which results from an underlying *o* invariably umlaut to *ö*. The umlauted forms thus offer a way to distinguish phonetic *o* from phonemic *o*. The simplest analysis of the situation, and the one which reflects historical reality, is to posit an underlying *u* which umlauts in the normal fashion and which is lowered in the appropriate environment. Since examples such as [torn] 'tower' are now treated as underlyingly containing *u* rather than *o*, they do not cause opacity. Both the rule lowering *u* and the rule lowering *o* are recoverable. Consequently, the original lowering rule has not been lost in Kesswil.

The data thus support the contention that some lowering rule is present both in Schaffhausen and in Kesswil. The forms of the two lowering rules, however, are not identical; furthermore, neither of the two rules is identical with the rule originally added to the language. This fact is not surprising. It would be a gross oversimplification to imagine that everything in the two dialects in question remained static except for the relative order of lowering and umlaut. In actuality, although both dialects contain the descendant of the original lowering rule, both dialects have expanded the rule in a number of ways. After establishing the form of the rule which was originally added to the language, I shall discuss these various changes in some detail. By doing so I intend to shed some light both on the question of rule reordering and on the problem of language change in general.

A great deal of evidence suggests that the original rule had the form seen below in 7.

7)  $o \rightarrow \text{---} \rightarrow \text{ɔ} / \text{---} r$

Some of the evidence for this claim was presented in Robinson (1976)<sup>6</sup>. Robinson noticed that, with respect to the lowering rule, the Canton of Schaffhausen seemed to be divided into two parts. In one part, the subdialect Kiparsky had discussed, the lowering rule completely follows the umlaut rule. In the other part of the Canton, the lowering rule seems to be split. The data upon which Robinson based his observation is presented in 8.

#### 8) Schaffhausen

bɔdə	'floor'	tɔrn	'thorn'
bödə	'floors'	tȳrn	'thorns'
trɔttə	'sidewalk'	xɔrb	'basket'
trötti	'little sidewalk'	xȳrbli	'little baskets'



gɔttə	'godmother'	fɔrə	'Scots pine'
götti	'godfather'	föris	'wood from Scots pine'

**Order of rules:**

1. Umlaut
2. Lowering

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1. Lowering
2. Umlaut

As the data show, when lowering occurs before *r*, it precedes umlaut. When lowering occurs before other coronals, it follows umlaut. Robinson suggests that the correct analysis of the situation is to assume that the original lowering rule lowered *o* only before *r*. He suggests that the lowering in other environments is the result of expansion, and that the mechanism by which expansion occurs is the addition of a new rule at the end of the phonological component of the grammar. He posits a sequence of events in which the dialect first acquired a rule lowering *o* before *r*, secondly reordered the rule so that it applied before umlaut, and finally expanded the rule by adding the new environments as a new rule at the end of the phonological component of the grammar. As further evidence that the original rule lowered *o* only before *r*, Robinson examined data from other nearby dialect areas. He found that, although a number of other dialects have some rule lowering *o*, the only environment found in all the dialects which consistently causes lowering is *r*.

Robinson's analysis of the situation seems reasonable; furthermore, evidence found in Kesswil supports his claims. As mentioned earlier, Kesswil has a rule lowering *u* to *o* before *r* and coronals; these lowered forms umlaut to *ü* rather than to *ö*. The situation, however, is somewhat more complex than it would seem at first blush, for the form of the unlauded vowel actually depends upon the environment which caused the lowering. Contrast the examples of lowered *u* given in 9 with those given earlier in the paper:

**9) Kesswil**

storm *Sturm* 'storm'  
 störm 'to storm'

worm *Wurm* 'worm'  
 wörm 'worms'

xorts *kurz* 'short'  
 xörts 'to shorten'

When *u* is lowered before *r*, its umlaut is *ö*; when *u* is lowered before other coronals, its umlaut is *ü*, as was the case in the examples discussed earlier. When *u* is lowered before *r*, lowering precedes umlaut; when *u* is lowered before other coronals, lowering follows umlaut. The rule lowering *u* must thus be split into two parts; more importantly, it must be split down exactly the same lines as the rule in Schaffhausen is split. It would stretch the bounds of credibility to suggest that coincidence accounts for this similarity; instead, I suggest the following sequence of events.

The first change was that the language acquired a rule lowering *o* before *r*. After the rule was acquired, Kesswil and Schaffhausen split. Following the split, Kesswil innovated in a number of ways. First, the lowering rule moved so that it was ordered before the umlaut rule. At this point, the rule expanded in two directions. One of the expansions added a rule lowering *u* to *o* before *r*, which was added to the language at the end of the phonological component of the grammar. The other expansion added a rule lowering *o* to *ɔ* before coronals. This rule was also added at the end of the phonological component. After these expansions, the new rule lowering *o* before coronals was reordered so that it occurred before umlaut and collapsed with the original lowering rule. Next, the rule lowering *u* was also reordered so that it applied before umlaut. It could not be collapsed with the original lowering rule since the two rules now applied in

different environments; the rule lowering *u* still applied only before *r* but the rule lowering *o* applied before both *r* and other coronals. Finally, the rule lowering *u* expanded. A new rule lowering *u* before other coronals was added to the grammar at the end of the phonological component. At this point, the rule lowering *u* was split, with part of the rule applying before umlaut and part of the rule applying after umlaut. This describes the state of affairs found in Kesswil.

A similar sequence of events took place in Schaffhausen. In part of the Canton of Schaffhausen, a number of other changes took place as well. In seven villages<sup>7</sup> in the Canton, a morphological rule has been added to the grammar which lowers *o* to  $\text{ɔ}$  in the past participles of the strong verb classes II, IIIb, and IV<sup>8</sup>. Some examples of this are given in 10.

#### 10) Schaffhausen past participles

Class II	Class IIIb	Class IV
kst $\text{ɔ}$ bə <i>gestoben</i> 'have scattered'	kw $\text{ɔ}$ rffə <i>geworfen</i> 'have thrown'	kst $\text{ɔ}$ xxə <i>gestochen</i> 'have pierced'
kr $\text{ɔ}$ xxə <i>gerochen</i> 'have smelled'	kh $\text{ɔ}$ lffə <i>geholfen</i> 'have helped'	kfl $\text{ɔ}$ xtə <i>geflochten</i> 'have braided'

In these morphological environments, *o* is thus lowered before non-coronals as well. The situation found in these villages is similar to that found in a nearby dialect area, the town of Toggenburg in the Canton of St. Gallen. In Toggenburg, *o* is routinely lowered when it occurs in past participles of the strong verb classes mentioned above; some examples are *kl $\text{ɔ}$ gə* 'have lied', *kw $\text{ɔ}$ rffə* 'have thrown', and *kf $\text{ɔ}$ xtə* 'have fought'. These examples indicate that a morphological rule has been added to the dialects spoken in this area.

In two of the seven villages which have acquired this morphological lowering rule, the rule has lost its morphological marking so that labials and velars in general have become lowering environments as well as *r* and coronals. Forms such as *s $\text{ɔ}$ ppə* 'to stuff', *h $\text{ɔ}$ gər* 'hump', *ɔffə* 'open', and *j $\text{ɔ}$ xxə* 'yoke' show *o* lowered in these environments. The original lowering rule has thus been expanded further in these parts of the Canton of Schaffhausen. It is interesting to note that these seven villages are precisely those villages which do not contain the split rule Robinson described; the villages make up the area in which the lowering rule has remained entirely after the umlaut rule. Their behavior suggests that these villages comprise a dialect area which should be treated separately from the rest of the Canton.

The following sequence of events summarizes the changes which have affected the lowering rule in Schaffhausen. After Schaffhausen split from Kesswil, the Canton itself split into two parts. In one area, the dialect region discussed by Robinson, the rule lowering *o* before *r* was reordered to apply before umlaut. After the rule was reordered, it expanded to include other coronals as a lowering environment. The new environments were again added to the grammar at the end of the phonological component; the rule was thus split. In the other part of the Canton, the area originally described by Kiparsky, the rule was not reordered. It also expanded to include coronals as a lowering environment; since the original rule still applied after umlaut, the new environments could be collapsed with the old. The dialect, along with the nearby dialect of Toggenburg, also acquired a morphological rule which lowered *o* in certain past participles. In two of the villages the rule lost its morphological marking and was collapsed with the lowering rule.

At this point a summary of the main points of the paper so far is in order.

### Summary

- 1) A lowering rule is present synchronically both in Schaffhausen and in Kesswil.
- 2) Neither of the dialects has a rule identical with the rule originally added.
- 3) The original rule lowered *o* to *ɔ* only before *r*.
- 4) The rule has undergone a number of expansions and changes in all of the dialect areas discussed.
- 5) One of these changes was reordering.

I draw a number of general conclusions from this. One conclusion is that Kiparsky's original example of rule reordering still stands. The reordering did not take place in exactly the fashion he described, but nevertheless reordering must have occurred. As the data presented in this paper show, the lowering rule must have been reordered at some point. Kiparsky's original point, that historical change can take place in this manner, remains valid.

Another conclusion is that a generative account of historical change such as this can account for a mass of confusing data in a systematic way. The analysis proposed in this paper systematically accounts for all the data by making two assumptions; one is that phonological rules are ordered, and the other is that rules expand in the manner described by Robinson. It is difficult to imagine an alternative analysis which could account for all the data without making these assumptions.

The most important conclusion I draw from this analysis is that any account which tries to describe historical change must be as detailed and messy as the data require. Whether the analysis is presented in a generative framework or in any other framework, an account of linguistic change must be as complex and detailed as any account of synchronic data. It would be foolish to treat historical change as something somehow neater than synchronic data; both have proven to require complex and detailed analyses. Looking just at lowering and umlaut, as Kiparsky did in this case, offers an artificially elegant and dangerously skewed account of what has happened these dialects. The account presented in this paper is admittedly a little messy, but this messiness is due to the fact that one part of a language cannot be isolated from the rest of the language; rules interact with one another in complicated ways, and any changes to these rules must of necessity have complicated repercussions. If this analysis is messy, it is because in all probability historical change is similarly messy. It is generally accepted that any account of synchronic phenomena must exhaustively account for all the data; an account of historical change must do no less.

### Endnotes

1) This version of the rule was given in Robinson (1976). This formulation of the rule is more accurate and is formulated in more common terminology; when I refer to 'the lowering rule' it is to this version that I refer.

2) Of course, umlaut is not the only source of rounded front vowels in these dialects. As Moses (1982) points out, in both Schaffhausen and Kesswil, front unrounded vowels have sometimes become rounded in the presence of a following labial consonant. She cites such as examples as *tröffə* 'treffen' and *ɔlf* 'elf'. Moses cites these examples to show that the rounded front vowels are phonemic in the language. This fact, of course, presents no problem to Kiparsky's analysis; the morpho-phonemic rule of umlaut is not lost just because it, too results in rounded front vowels.

3) Researchers such as Moses (1982), Hooper (1976), and Bynon (1977) have all argued that the Swiss German case is not an example of reordering. Hooper and Moses

in particular argue that the lowering rule has been lost in Kesswil, although each arrives at her conclusion for different reasons. As is apparent, I do not agree with their conclusions.

4) Unless otherwise specified, throughout the paper the modern German forms will be given in italics along with the Schaffhausen and Kesswil forms.

5) This generalization is true with the exception of forms in which *u* is lowered before *r*, which are discussed later in this paper, and with the exception of a small number of diminutive forms.

6) In addition to the Swiss German case discussed here, Robinson considers other cases which support his claim that rule expansion behaves like rule addition; new environments are added in the form of new rules. In this paper I treat rule expansion in the same way.

7) The seven villages in question are Buchberg, Buchthalen, Rudlingen, Trasadingen, Dorflingen, Osterfingen, and Wilchingen. It is interesting to note that these villages are those which lie the farthest away from Kesswil. As mentioned in the paper, they are also the only areas in Schaffhausen which have never reordered the lowering rule at all.

8) Strong verb classes II, IIIb, and IV are those classes in which, in Old High German, vowel alternation in the root resulted in an *o* in the past participle.

### Bibliography

Bynon, T. (1977) *Historical Linguistics*, Cambridge University Press, Cambridge.

Enderlin, F. (1911) *Die Mundart von Kesswil im Oberthurgau* in *Beiträge zur schweizer-deutschen Grammatik* 5, Huber, Frauenfeld.

Hooper, J. (1976) *An Introduction to Natural Generative Phonology*, Academic Press, New York.

Kiparsky, P. (1968) "Linguistic Universals and Linguistics Change" in *Universals in Linguistic Theory*, E. Bach and R. T. Harms, eds., Holt, Rinehart, and Winston, New York.

Moses, J. (1982) "The Swiss German Case of Vowel Lowering and Umlaut: Rule reordering or Restructuring" in *CLS Proceedings of the Eighteenth Regional Meeting*:367-376.

Robinson, O. (1976) "A 'Scattered' rule in Swiss German" in *Language* 52:148-162.

Wanner, G. (1941) *Die Mundarten des Kantons Schaffhausen* in *Beiträge zur schweizer-deutschen Grammatik* 20, Huber, Frauenfeld.

Wiget, W. (1919) *Die Laute der Toggenburger Mundarten* in *Beiträge zur Schweizer-deutschen Grammatik* 9, Huber, Frauenfeld.

Linguistic variation as a function of ritual structure  
in the Afro-Baptist church  
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Several recent studies in the use of oral poetics have drawn attention to the sermonic speech of American black preachers in the fundamentalist church. Vaughn-Cooke accounts for this attention, stating that "the preaching style is considered one of the most important speaking styles used by blacks, and . . . it is considered one of the most unique styles in the United States."<sup>1</sup> Because of this focus on the climactic speech of black sermons, however, the use of poetic language outside of the sermon, viz., in the prayers, has gone almost unreported, leaving the impression that "prayer speech" is inconsequential, or that it is the same as ordinary conversation. This paper proposes that prayer speech, too, is poetic and worthy of attention and that the interplay of linguistic and musical variation defines the parameters of the Afro-Baptist ritual structure, which is not written but orally preserved. In this paper the term "Afro-Baptist" applies to the church founded at the close of the 18th century when American slavery was at its peak and West Africans were still arriving in North America; the church which has remained in the political and economic control of black Americans; that church whose clergy and members are predominantly working-class and whose preacher is not seminary-trained; and, finally, the church whose doctrine is fundamentalist, i.e., literally interpreting Biblical Scripture.

In order to appreciate prayer speech a review of studies in sermonic speech is helpful. Rosenberg studied the use of formulaic repetition and syntactic parallels as metrical devices that create the rhythm in the sermons necessary for the climax. Using Lord's and Perry's analysis of the metrical formula in Yugoslavian guslar oral texts as his model, he found that black preachers increase the number of metrical formulas and parallels in order to create an emotional buildup leading to climax. The climax is sustained through the repetition of these devices, leading Rosenberg to conclude that "rousing the spirit of God is a principle aim of these sermons and rhythm achieves that end."<sup>2</sup> Vaughn-Cooke studied vowel lengthening and intonational changes occurring during the sermonic climax, reporting that during the climax all vowels within sentences receive fourth degree stress with no vowel being "more exaggerated in length than the other vowels."<sup>3</sup> She also states that the terminal-falling intonational contours of normal speech in American English change to non-falling during sermonic climax. Like Rosenberg, she mentions the rhythmic quality of the sermons adding to mention the "chanted" aspect

of black sermons, suggesting that such chanted speech has its origin in West African styles of recitation. In view of this paper her most interesting statement is that Black Vernacular English (BVE) lexicon increases during the build-up to the climax because "black preaching requires the use of Black language, and . . . trained Blacks who speak the language of their congregation."<sup>4</sup>

In line with Vaughn-Cooke's idea of establishing rapport through the use of the vernacular is Wright's study that found that black preachers use the vernacular as a communicative tool during the sermon for enhancing not only rapport but also esteem as accomplished performers before an audience. Wright found that effective preachers manipulated BVE features so that these were far more frequent during the sermon's climax than in their normal speech. The reason for this phenomenon of the inflated vernacular is to draw the identities of preacher and congregation closer by "putting in the mouth of God the language of the people."<sup>5</sup>

Gumperz has also studied the preaching style from a communicative perspective, unveiling the performance strategies that black preachers use for effective delivery. While he reports that linguistic and prosodic changes occur over the course of the sermon, his most insightful contributions to this study are his delineations of the sermon's structure based on linguistic and prosodic variation and his assertion that the Afro-American religious ritual originated in West Africa. The structure Gumperz assigns to the sermons is a division into three sequential segments: invocation, transition, and climax. He goes on to suggest that the ritual, itself, of which the sermon is but a part, is also structured linguistically: "each stage in the development of the rite is signalled through an artful interplay of rhythm, vocal style, and content."<sup>6</sup> Although Gumperz does not stipulate a ritual structure, he nevertheless states that

Ultimately these performance styles have their origin in West African possession rites, such as can be found among the Yoruba or the Akan.<sup>7</sup>

The Afro-Baptist ritual centers around the moment of possession trance in which congregants become overwhelmed by the "Holy Ghost." Although possession trance is not constitutive of all African religions, it is an integral element in the West African religions. Therefore, that trance is present in the Afro-Baptist worship should not be surprising. Because of this focus on trance, the Afro-Baptist ritual structure centers around this important event, having the stages: pre-trance, trance, and post-trance. As in West Africa, the ability to experience trance for Afro-Baptists in this country is a gift. "It is a mark of distinction to be possessed by a spirit." <sup>8</sup>

The linguistic variation that occurs with each stage, in conjunction with the variation of musical style, operates to denote these ritual parameters.

Considering each stage in reverse order, the post-trance ends the ritual after the sermon. Congregants call this stage the "Benediction," which consists of a final congregational song and prayer by the preacher. The Benediction usually lasts no longer than five minutes. The trance stage, known as the "Service," is the most thoroughly reported, being that stage that encompasses the sermon. In addition to containing the sermon, the Service begins with reading of a Scriptural verse, followed by choir singing, the sermon, and a final solo or choir song. Just as sermonic speech has been noted for its rhythmicity, the trance songs are enjoyed for their prominent rhythms, having a moderate to fast tempo. Another musical parallel to the preaching style is the performative nature of the choir or soloist: just as the preacher is expected to arouse the Spirit, the performers of trance songs are judged by their virtuosity in inducing trance, which church members call "shouting" or "getting happy." Equally important as the singers' ability is that of the musicians who, together with choir, soloist, and preacher conspire to bring about the trance: the moment of possession lies in the hands of accomplished performers. The songs of this stage, because of their performative and aesthetic qualities, are the recorded music that has entered the American gospel idiom to become a force in shaping that musical genre while also being a form of popular entertainment. These are the songs that Mahalia Jackson and other noted black gospel singers have popularized outside of the black church by means of the media. Nearly all of these songs are of modern composition, having been written since the 1920's by blacks. If earlier hymns or spirituals appear in the Service, they must be rearranged according to current musical styles.

The pre-trance stage is less known in the literature. It is the stage preceding the Service, which congregants call "Devotion," that contrasts so sharply with the Service. In their paper the Wileys criticize studies of the black church for ignoring the plaintive sound in black worship while favoring to report the more ecstatic features. For instance, the Wileys encounter melancholic music which they explain as a product of "the Black experience in this country" and that "appears to be a meaningful form of expression for much of Black America."<sup>9</sup> Although this "melancholy" is not the expression of despair, their paper is significant for mentioning another aspect of the Afro-Baptist ritual. Whereas the sermon is the focal point of the Service, the speech event of pre-trance is the Devotion prayer. Unlike the Service where the preacher is the main speaker, the Devotion has a number of speakers who are mainly deacons.

The Devotion which begins the ritual, in turn, begins with a prayer followed by congregational singing that resembles chanting. Prayer and song may alternate ad infinitum until the preacher enters the sanctuary, signalling that prayers should stop and the Service begin. However, the alternating prayers and singing may stop by their own inertia, signalling to the preacher that Devotion has ended and the Service may begin: it is not the appearance of the preacher so much as the sound of prayer-speech and song that determines the timing of events.

The Wileys attribute this melancholy in part to the pleading nature of the prayers. In her analysis of the oral prayer tradition, Jones-Jackson shows that the spontaneous black prayer is more than a form of begging the Almighty. Although she gathered her data from the Gullah church, her analysis and conclusions are applicable to Afro-Baptist practices on the mainland. She found features in prayer-speech that are similar to those of the sermon: a chanted and rhythmic delivery style. Through repetitious rhetorical devices of epanaphora, transplacement, and alliteration rhythm is created in the prayers. An example from my data which illustrates Jones-Jackson's definition of epanaphora as the repetition of line-initial words is

"I come to you in the humblest manner that I  
know how,  
I come, Lord Jesus, because I'm standing in  
the need of prayer,

I come tonight, O God."

Transplacement, or the transfer of formulaic expression from line-initial to mid- or line-final position, is

"Heavenly Father, I know You have been with me  
Heavenly Father,  
Because You have brought me, Heavenly Father,  
from a mighty long way."

Alliteration surfaces in the line:

"Heavenly Spirit, Heavenly Dove"

Those features of prayer differing from sermon are structural, functional, and, most noticeably, linguistic. In terms of structure Jones-Jackson divides the prayers into four segments, whereas the sermons contain three stages. The function of the sermons, besides inductive of trance, is to instruct, while the prayers offer thanks and make appeals. In terms of linguistic style prayer speech is "expected to be elevated and elaborate while retaining certain syntactic and phonological features characteristic of the community."<sup>10</sup> In Gullah prayers the Creole markers of tense and aspect, bin, de, don, present in conversation, are absent in prayer. For the Gullah speaker, as we shall see for the BVE speaker, vernacular features are deflated in prayer speech, while sermonic speech is vernacularly



inflated.

Prayer speech is not only distinct from normal and sermon language in the usage of the vernacular, but prayer texts, which are transmitted orally, are resilient to rapid change, as two prayer texts from around 1930 attest: 1930's

Once more and agin, your weak servant is  
knee-bent and body-bowed, my heart beneath  
my knees and my knees in some lonesome valley  
crying for mercy 11

1984:

Heavenly Father, it is once more and again,  
your weak servant has been allowed in your house

The Jordan River continues to be a symbol of death:  
1930's:

Then Lord, Lord, make that crossin' over Jordan  
an easy one for me. 12

1984:

Tell Jordan to be calm, Heavenly Father,  
Cross my soul on over

Since some of the archaic, formulaic expressions found in prayer speech are directly from the Scriptures virtually intact as written, Jones-Jackson states that accomplished prayers have "heard and stored" in memory these formulas around which an effective prayer is created. Another text-source were the verses of 18th and 19th century hymns and the refrains of white plain-folk spirituals that slaves heard during the Great Revivals of the frontier, these camp-meetings taking place during the 18th and 19th centuries. The white clergy, however, was responsible for instilling both standard and Biblical forms in 18th and 19th century slave speech as an attempt to teach blacks how to communicate with the slave owner. Blassingame writes that

Because of the lessons they learned in  
the churches, Biblical language would re-  
sonate in nineteenth century black speech  
and writing. This was, perhaps, the Southern  
churches greatest legacy to the slave. 13

Of course, the folk source from black people themselves created new formulas by combining or infusing American verse with West African maxims. The composite of all of these text-sources, along with spontaneous speech, accounts for the anomolous speech variety of the Devotion. Although the sermons may contain Scripturally-derived formulas, these are not phrased in a deflated vernacular.

The Devotion is not only a storehouse of archaic speech, it is also a repository of antiquated musical forms. Unlike the more contemporary songs of the Service, pre-trance music has 18th and 19th century origins. One source of these songs is Isaac Watts, whose hymns dominated early American hymnody. Afro-Baptists today perform these hymns, which they call "Dr. Watts hymns," somewhat

like white Protestants did nearly two centuries ago: a capella, in long-meter, and "lined," a practice of having a song leader speak/read the line of verse so that the congregation can sing/chant it. Long since that time, however, most white denominations have instituted musical instruments, choirs, hymnbooks, and varied meters to improve their music. The Afro-Baptist way of singing these hymns, however, is quite unlike that of earlier white Americans. While the verses are sung as written in the hymnal, the original melodies have been discarded for a pentatonic chant with the characteristic diminished III and VII intervals of Afro-American music. An identical melodic line concatenates the lined verses, sung in slow, long-meter, thus having a dirge-like effect. Full of plaintiveness, the Devotion songs can only be heard during pre-trance; they are not recorded for public consumption.

The survival of anomolous speech and music, while appearing to be imitations of earlier Western custom, can only be explained as a function of a religious ritual that has been retained in the Americas from West African tradition. Cross-cultural comparison of Afro-American rituals in the New World reveals a pattern of two opposing paradigms: the esoteric and the vernacular. The esoteric category always precedes the vernacular in which trance is located. The Gullah "ring shout" ritual, for example, begins with a formal "prayer meeting" consisting of Scripture-reading, prayers, and long-meter hymns lined by an elder deacon. When this formal, solemn opening is concluded, participants push back their benches, form a circle and begin the shuffle in a ring as a band of singers off to the side sing fervently the spirituals while ring members become possessed. In the Jamaican Pukkumina Revivalist cult the esoteric consists of Bible-reading and a capella hymn-singing only to be followed by "ring shouting" as "Earth" and "Heaven" bound powers possess its participants to the accompaniment of drums. In the Jamaican Cumina cult, in which Yoruban orishas seize devotees, the esoteric consists of solemn prayers and bilah songs sung in Jamaican English. The following trance songs and invocations to the deities are rendered in myal, a mixed-speech of Jamaican Creole and Yoruban clichés. This dichotomous pattern also exists in Catholic-influenced areas of the Caribbean, suggesting that this pattern is not simply a result of Protestant/African syncretism. In the annual Trinidadian Shango ritual the esoteric consists of traditional Catholic prayers and verses of lesser known prayers to particular Catholic saints lined by a prayer leader for the audience. As in Cumina, there is no drumming until the vernacular, containing the trance and prayers in creole. In the annual Haitian Vodun ritual the esoteric paradigm contains recitations of Catholic prayers in an approximation of Standard Haitian French, while baptized

Catholics in attendance use their rosaries. The vernacular paradigm contains drumming and summons to the loa in Haitian Creole.

My data of linguistic variation, collected in Central Texas in 1984 from three Afro-Baptist laymen, and Wright's data, collected from five black preachers in Washington, D.C. in 1976 illustrate how the Afro-Baptist ritual fits the paradigmatic pattern of Afro-American ritual. Wright contrasts the frequency of the BVE variables in the preachers' normal, conversational speech with those variables in their sermonic speech during the climax. The variables he studied are: word-final in/in; multiple negatives, the absence of third person singular verbal -z, and copula deletion. His findings are in Table 1:

Table 1

	normal speech	sermonic speech
-in/-in	26%	73%
mult. neg.	11%	58%
abs. 3 <sup>o</sup> sg. -z	11%	60%
cop. deletion	13%	66%

From his data, one can see that the sermonic vernacular is clearly distinct from that of conversation, the former being approximately four times as non-standard as the latter. I compared these same four BVE features in addition to the absences of auxiliary 'have', possessive -z, and plural -z--all BVE features--and found the converse results of Wright's data, as Table 2 shows:

Table 2

	normal speech	prayer speech
-in/-in	79%	58%
mult. neg.	50%	48%
abs. 3 <sup>o</sup> sg. -z	75%	50%
cop. deletion	32%	3%
abs./aux	40%	7%
abs./ poss.-z	50%	0%
abs/ plur.-z	7%	6%
TOTAL variation:	48%	25%

I found that prayer speech has nearly one-half the vernacular features of normal speech, illustrating the disparity between it, on one hand, and normal and sermonic varieties on the other. The two paradigms, then, for Afro-American ritual can be said to contain these features. In the esoteric we find: an approximation of European/American speech forms; a capella singing; long-metered or slow songs of European/American origin; lined songs sung in unison. In the vernacular we have: an inflation of the vernacular, or creole forms; instrumental accompaniment; moderate to fast tempo songs of black folk origin; solo, band, or choir singing.

Basing his analysis on rites of passage in Ndembu society, Victor Turner concluded that the initiation ritual

is the principle cultural vehicle for transmitting traditional knowledge while "cleansing" the initiate psychologically in preparation of his future status. The traditional knowledge of any society, states Turner, is "absolutely sacrosanct. . .the ultimate mysteries." The code used for this transmission is secretive language, usually in the form of riddles, at least for the Ndembu. The cleansing process involves depersonalizing the initiate of his former social identity before bestowing on him a new one. In order to accomplish this task, the initiate is supended in an ambiguous limbo during which former knowledge is gradually supplanted by esoteric wisdom. Anomolous speech and music act as catalysts in this transformation process.

In Bahian candomblé, a Yoruban-derived cult in Brazil, riddles and chanted prayers transmit sacred knowledge while disorienting initiates. Twice daily the spiritual leader, or "petite mère," lines out the esoteric ingolosi prayer to novices who chant the responses in unison. In Nigerian Yoruba and Dahomean Vodun religions riddles and chants are also the communicative and mood-inducing devices. In all three cultures the chants are lined, a capella, long-metered, and melodically concatenated, thus exhuming a plaintive quality that distinguishes these chants from the popular musical genres. The Dahomean initiation chants are so untypically Dahomean that, upon hearing them performed, Verger remarked that "rien n'est aussi peu «nègre» que cette musique-là"--nothing is so less black than that music.<sup>14</sup>

Rouget explains the dichotomous use and non-use of musical instrumentation in African and African-derived possession rituals as a product of necessity: the drummer, if possessed by a power, can no longer play--he must behave as the deity commands. Therefore, specific duties are assigned to musicians and devotees. The latter become mediums for possessing powers, while the former, who cannot perform both tasks simultaneously, provide the music needed to invoke the spirits. But during the initiation period initiates chant their own songs as a means of sustaining the ambience of listlessness. Because most drummers are not themselves devotees, they do not know the secret music; thus they play the more popularly known rhythms.

Now that parallels of anomolous language and music use become apparent between West African and Afro-American ritual, the question remains as to how the esoteric paradigm, essential to transforming an ordinary citizen into a vessel of the gods, is transferred to the New World. The conditions of mixing tribes and outlawing lengthy gatherings of slaves on plantations would seem to preclude rites of passage, which usually span months or years in West Africa. The studies of the Herskovitses in New

World Negro societies led them to conclude that when focal cultural values are endangered and "resistance is futile, the psychological resilience . . . of reinterpretation comes into play."<sup>15</sup> Blacks in the Americas selected those features of the initiation that resembled features in the religious practices of their captors. They infused these European/American forms, however, with African meaning. The Herskovitses explain this exchange thusly:

For with the stripping of the ancestral traditions in the New World, those facets of religious organization that in Africa pertained to the tribal dieties . . . have . . . been transferred to the domain of the established denominations. 16

Blacks assumed the practices of a new, strange religion as their basis for a new esoteric paradigm.

While this exchange of West African anomolous language and music for Christian forms accounts for the strange retentions in the Afro-Baptist Devotion, the problem still remains of depositing the paradigm in ritual form. The Rev. Charles C. Jones, an influential and major advocate of plantation missions for Christianizing the slave, stipulated the religious ritual outline that should be followed for plantation prayer meetings:

- i. Opening (hymn & prayer)
- ii. Scripture
- iii Singing (hymn)
- iv Sermon or Lesson
- v Close (prayer & hymn)

Slaves imbedded the rites of initiation quite neatly into the Opening of the ritual structure already provided by a slave-owning clergy. Segments ii through iv became the Service with the Sermon as the focal point of trance. The Close and Benediction remained identical. The newly placed initiation rites could now be reënacted as often as the plantation meeting was called, or, more significantly, as the clandestine religious gatherings took place. If only as a drastically abbreviated reinterpretation, the West African initiation rite survived.

Whereas sociolinguists, heretofore, have considered region, history, and socio-economic differences as major factors in linguistic variation, ritualized affect is also a factor of that variation. Within the Central Texas Afro-Baptist church, where members have shared a homogenous community since Emancipation and where almost all members belong to the working class, the change of mood--as regulated by the ritual--determines their stylistic shifts of the vernacular.

## FOOTNOTES

- 1 A.F. Vaughn-Cooke, Black preaching style, p. 28
- 2 B. Rosenberg, Art of the American Folk Preacher, p.33
- 3 A.F. Vaughn-Cooke, *ibid.*, p.35
- 4 *ibid.*, p.37
- 5 R.L. Wright, Language standards and communicative style in the black church, p.142
- 6 J.J. Gumperz, Ethnic style in political rhetoric, p.189
- 7 *ibid.*, loc. cit.
- 8 G.E. Simpson, Black Religions in the New World, p.131
- 9 E.C. & R.L. Wiley, The plaintive sound, p.5
- 10 P. Jones-Jackson, The oral prayer tradition in Gullah, p.26
- 11 Z.N. Hurston, The fiery chariot, p.6
- 12 C.S. Carmer, Stars Fell On Alabama, p.25
- 13 J.W. Blassingame, The Slave Community, p.98
- 14 G. Rouget, La Musique et la Transe, p.99
- 15 M.J. & F.S. Herskovits, Life in a Trinidad Village, intro.
- 16 *ibid.*, p.304
- 17 C.C. Jones, The Religious Instruction of Negroes in the United States, p.28
- 18 I am greatly indebted to Rev. Leroy Davis, Deacons Michael Butler, Simon Sims, and Matthew Sims for their cooperation in the collection of data.

## REFERENCES CITED

- |                   |                  |   |
|-------------------|------------------|---|
| Blassingame, J.   | 1979             | The Slave Community. N.Y.: Oxford   |
| Carmer, C.S.      | 1934             | Stars Fell on Alabama   |
| Gumperz, J.J.     | 1982             | "Ethnic style in political rhetoric" in Discourse Strategies.                         |
| Herskovits, M.J.  | 1964             | Life in a Trinidad Village  |
| Hurston, Z.N.     | 1934             | "The fiery chariot". N.Y.: Schomberg  |
| Jones, C.C.       | 1842             | The Religious Instruction of the Negroes in the United States. Savannah: Thomas Purse |
| Jones-Jackson, P. | [in publication] | "The oral prayer in Gullah" in Gullah: An Endangered Language                         |
| Rosenberg, B.     | 1970             | The Art of the American Folk Preacher.  |
| Rouget, G.        | 1980             | La Musique et la Transe. Paris: Gallimard   |
| Simpson, G.E.     | 1974             | Black Religions in the New World N.Y.: Columbia Univ. Press                           |

- Turner, V.            1965    "Betwixt and between: the liminal period in rites of passage" in Reader in Comparative Religions, 3rd ed., Lessa & Vogt, ed.s
- Vaughn-Cooke, A. 1972    "The black preaching style: historical development and characteristics" in Languages & Linguistic Working Papers, 5, D.C.: Georgetown
- Wiley, E.C.            1984    "The plaintive sound: the rhetoric of despair in black churches in Arkansas" in Journal of Communicative Studies, v.II, n.2, 5-10.
- Wright, R.L.          1976    "Language standards and communicative style in the black church." Diss. Austin: Univ. of Texas

# Agents, Instruments and Predication Theory\*

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0. Towards the end of his classic paper on case grammar, Fillmore (1968) suggested that there may be dependencies which obtain directly between deep 'case' roles not mediated by the (meaning of the) main predicate of the clause in which they appear. As an example, Fillmore suggested that the occurrence of benefactives is primarily dependent on whether or not there is an agent in the clause. Fillmore did not empirically defend this and the sentences in (1) suggest that the strongest version of this putative dependency would be untenable. However, a weak version which states that benefactives can appear if, but not only if, an agent is present seems quite plausible, in view of the sentences in (2).

- 1.a. The sun shines for rich and poor alike.
- b. The parachute wouldn't open for Reginald.
- 2.a. Mary danced for Susan.
- b. Mary watched the ducks for Susan.

Fillmore brought this matter up in a section in which he was questioning the wisdom of employing phrase structure rules in his base component. Instead, he speculated, it might be more illuminating to posit a generative device which first placed subcategorized cases into a predicate's frame and then added other cases compatible with the subcategorized cases. This idea brings to mind a metarule like that in (3) which would seem to pretty much allow one the best of both worlds (the orderliness of PS rules, plus the correct dependency statement).

3.  $P \rightarrow V...A... \Rightarrow P \rightarrow V...A...B...$

Remote from Fillmore's concerns in time and perspective, Williams (1981) has proposed a view of predicate-argument structure in which every predicate has whatever number of "internal" arguments plus zero or, more usually, one "external" argument. I have neither the space to discuss nor disposition to adopt all the details of Williams' theory, but the following points are noteworthy. First, the 'internal-external' dichotomy is an allusion to the placement of the argument in an X-bar constrained syntactic tree; internal arguments are dominated by the maximal projection of their predicate while external arguments c-command the maximal projection of their predicate. Second, the list of predication maximal projections includes, but is not on Williams' account limited to, NP, VP, AP and, most important for this paper, PP. (Note that VP is  $v_{max}$  on this account.) Finally, and very importantly, one predicate's external argument can simultaneously be an internal or external argument of some other predicate in the clause. Several of the system's uses and complexities can be seen in (4), where the



underlined and indexed Mary<sub>i</sub>'s are the external arguments of the various bracketed and co-indexed predicationals XPs.

- 4.a. Mary<sub>i</sub> [likes Susan]<sub>i</sub>
- b. Mary<sub>i</sub> has become [a terrific dancer]<sub>i</sub>
- c. Susan considers Mary<sub>i</sub> [fun to be with]<sub>i</sub>
- d. Susan found Mary<sub>i</sub> [on the beach]<sub>i</sub>

In this paper I will adopt both Fillmore's and Williams' ideas in somewhat revised form and apply them to the much cited agent-instrument dependency. I will then compare my analysis with analyses from Fillmore (1968), Lakoff (1968) and Bresnan (1982). I will then close with some speculations on how the instrumental use of with compares and contrasts with other uses, offering a tentative but hopefully plausible direction for lexical semantic research.

# 1. The Agent-Instrument Dependency Analyzed

The sentences in (5) show a familiar pattern. Briefly put, when an instrumental with-phrase occurs in a simple active sentence, the subject NP must be construed as an agent, even if the main verb allows nonagent subjects.

- 5.a. Mary broke the window.
- b. Mary broke the window with a chisel.
- c. The hammer broke the window.
- d. \*The hammer broke the window with a chisel.

This pattern has inspired some elaborate theorizing on the organization of grammar, some of which I will critique below. I believe, however, that there is an extremely simple semantic basis for the dependency. First, instruments are instruments only when someone is using them as such. Second, the only entities to which one attributes the capability of using something as an instrument are those entities to which one is willing to attribute the capability of volitionally affecting and controlling objects in their environment in general. Animates have this capability, inanimates do not. Therefore, (5b) contains no anomaly, whereas (5d) perversely suggests that the hammer is volitionally controlling the chisel.

Note that on this account of what it means to be an instrument, the subject of (6) is not necessarily an instrument. If the rock simply dislodges from a cliff, falls on the windshield and breaks it, the rock is not an instrument. I believe that this is the correct view to take and such a view was taken in Chafe (1970).

# 6. The rock broke the windshield.

But consider (5) again. Even on the view that instrumenthood presupposes a user of the instrument, the contrast between (5c) and (5d) is unaccounted for unless we state a syntactic dependency rule to the effect that it is the clausal subject which must be construed as the operator of the instrument. Otherwise, one might allow (5d)

a reading in which both the hammer and chisel are being instrumentally employed by an unmentioned agent. But such a reading is clearly unavailable.

The relevant dependency can be trivially enough expressed in Williams' framework. Let us simply claim that with is an ordinary preposition (not a "case" or "role" marker) and like most (perhaps all) prepositions, it takes both an external and internal argument. Semantically, with denotes an OPERATOR:INSTRUMENT relation between its arguments. Syntactically, let us for the moment simply stipulate that its external argument is the (active) subject. Thus we get the predication structures as in (7).

- 7.a. Mary<sub>i</sub> broke the window [with a chisel]<sub>i</sub>
- b. ?The hammer broke the window [with a chisel]<sub>i</sub>

Now, real world knowledge evaluates (7). Sentence (7a) is blameless, but since (7b) pushes the hammer into an implausible role as operator of the instrument, it is semantically deviant (not ungrammatical). So (7b) (=5d)) is ruled out broadly for the same reason as the sentences in (8). Jellyfish can presumably manipulate their environment volitionally, but they can't operate chopsticks. Humans are the preëminent operators of instruments, but forces like the wind are beyond even our control. Hence, both sentences are semantically implausible.

- 8.a. ?The jellyfish<sub>i</sub> ate the plankton [with chopsticks]<sub>i</sub>
- b. ?Mary<sub>i</sub> shook the tree [with the wind]<sub>i</sub>

At this point, our predication rule successfully links the clausal subject to the instrument phrase, but merely by pure stipulation. Why don't instrument phrases get linked to direct objects or any random NP? Here I believe a Fillmorean conditioning factor may be involved. Consider (9).

- 9.a. Mary<sub>i</sub> ran [into the room]<sub>i</sub>
- b. Susan pushed Mary<sub>i</sub> [into the room]<sub>i</sub>

Directional phrases are generally associated with intransitive subjects and transitive objects. Why? As a subtype of locative phrases, they take external arguments which in Gruberian (1976) terms play the semantic role THEME. Quite generally, though not without exception (cf. Jackendoff (1972)), semantic themes are intransitive subjects and transitive objects. Let us therefore suppose that when a predication XP whose external argument plays semantic role R occurs in a clause, its external argument will be that argument which plays the most R-like role with respect to the main predicate. Hence, the themes of the predication XPs are the themes of the main verbs in (9). But now consider (10).

- 10.a. Reginald<sub>i</sub> walks [with a cane]<sub>i</sub>
- b. Reginald<sub>i</sub> smashed the poodle [with a hammer]<sub>i</sub>

Operators of instruments are agents; indeed, strongly so. Now generally it is only subjects which are construed as agents, or which at least have their agenthood in question. For instance, while Susan is not necessarily acting agentively in either of the sentences in the famous pair in (11), only (11b) seems to invite the speculation that there are certain fine deeds that Susan performs to Mary's pleasure.

- 11.a. Mary likes Susan.
- b. Susan pleases Mary.

Now consider the sentences in (12). The subject of watch does not affect the object, but is strongly volitional and in this sense highly agentive. The subject of see is equally non-affecting and not even necessarily volitional. Nevertheless, seeing is a controllable act in the sense that one can generally abstain from seeing when one wants to. The subject of fear, however, is not even in this much control of the situation. Interestingly, it is just in the case of such total lack of control that the adjunction of an instrument phrase is utterly impossible.

- 12.a. Mary watched Susan with a telescope.
- b. Mary saw Susan with a telescope.
- c. \*Mary feared Susan with NP. (pick any NP)

I suggest therefore that since the external argument of an instrument phrase is an agent, it will be the clausal subject since it is subjects which are agents if anything is. But the actual subject must in fact be at least weakly agentive with respect to the action as a whole for this argument sharing principle to apply at all, hence (12c) is hopeless. (This account is most consistent with the views of those who want to posit not monolithic semantic roles, but parameters and degrees of membership for the various roles (cf. Lakoff (1977), Delancey (1984)). But it is worth emphasizing that it is specifically a "yes" value on the parameter of controllability that governs the distribution of instrumental phrases.)

It may seem now that I have undercut my own analysis of the pattern in (5). Hammers cannot control their actions, so cannot be even weakly agentive in this sense. So why not simply rule out (5d) as a case where argument sharing cannot apply? There are both technical and formal reasons not to take this step.

On the technical side, it is not the capabilities of the referents of subject NPs, but the controllability of the action denoted by the VP which is in question. Note that the referent of the subject of (12c) is human, hence eminently capable of controlling an instrument. So the wretchedness of (12c) cannot be pinned on the subject's agentive potential, for it is quite high. Rather it is the uncontrollability of "action" denoted by the VP which precludes the presence of an instrumental phrase. Conversely, breaking things is in principle controllable action, hence VPs headed by break can in principle support instrumental phrases. It is only after the adjunction of the instrumental phrase that the sentence is deemed

semantically deviant. The two sorts of ill-formities are quite distinct.

Empirically, only the specification of a direct OPERATOR:INSTRUMENT relation could explain the funniness of (8). It would therefore be unparsimonious not to extend the analysis to (5d). There may be differences in degree of plausibility among these sentences, but not in kind of unacceptability. Furthermore, consider (13). This sentence cannot mean that Mary agentively tossed the bottle and that it broke when it happened to land on a rock. Rather, Mary must be acting agentively with respect to the rock in any scene describable with (13). So the direct relation must be upheld.

13. Mary broke the bottle with a rock.

So I suggest that we meet Fillmore's suggestion on the distribution of additional arguments in this case part way. The sentences in (12) show that instruments can be added to participant frames only if the main predicate allows an at least weakly agentive argument. But instruments do not come for free. Rather, they come as internal arguments of a secondary predicate with whose external argument must be strongly agentive with respect to the instrumental act. Hence, some instances of adding an instrument will give rise to semantically bizarre OPERATOR:INSTRUMENT pairings even if the original participant frame was semantically above reproach. Thus, a Fillmorean conditioning rule augmented by a Williamsesque conception of argument sharing leads to a simple and semantically natural explanation of both (5d) and (12c).

## 2. Previous Analyses

Fillmore's (1968) early version of case grammar offered a considerably different account of (5). Verbs of the break class were given case frames like that in (14), hence could surface as in (15).

14. [\_\_\_ (A) + (I) + 0]

- 15.a. The glass broke. (O)
- b. The hammer broke the glass. (I+O)
- c. Mary broke the glass. (A+O)
- d. Mary broke the glass with a hammer. (A+I+O)

An important step in the mapping from deep case frames to surface structures was the subject selection process which followed the principle in (16).

- 16. If there is an A, it becomes subject; otherwise, if there is an I, it becomes subject; otherwise, O becomes subject.

Now we can make a clever deduction. Let us agree that the with-phrase in (5d) is an instrumental phrase. Note that it is not subject. Hence, someone must have beaten it out in the competition for attaining subjecthood. According to (16), only agents beat out in-

struments, so the hammer must be an agent. But hammers can't be agents, so the sentence is ill-formed.

This analysis leans on the hammer in (5c) and (15b) being analyzed as an instrument. This I reject (see above), thus I reject the analysis. More importantly, this analysis does not generalize to the anomalies in (8). Consider (8b). If natural forces are analyzed as instruments, the sentence should be fine. If they are not, natural forces must somehow be prevented from co-occurring with agents. If they are analyzed as agents, then (8b) could be ruled out by a no-more-than-one-agent-per-clause condition. But then they should co-occur unproblematically with instruments, but they don't. So this route would be both unparsimonious and empirically inadequate. If natural forces are given some third case role, they would still have to be barred from co-occurring with either agents or instruments by some other means of even more dubious motivation. On my account, natural forces cannot volitionally control their environment, nor can they easily be controlled. Hence they are semantically implausible members of either slot in the direct OPERATOR: INSTRUMENT relation.

Consider, too, the sentences in (17). Sentences (a) and (b) show a familiar alternation (see Fillmore (1977) and Richardson <sup>BLS</sup> (1983)). But something has gone awry between (c) and (d). However one analyzes the alternation in the argument structure of verbs like bang, it appears that a case grammarian would have to stipulate that when an instrument phrase appears, the subject must be an agent and not merely a force. But this would amount to an admission that the agent-instrument dependency is a direct one. Once this is recognized anywhere, one ought to state it outright and invoke it everywhere.

- 17.a. Mary banged the can against the wall.
- b. Mary banged the wall with the can.
- c. The wind banged the can against the wall.
- d. ?The wind banged the wall with the can.

A different explanation of (5) was offered in Lakoff (1968). Like the one I'm pushing, Lakoff's analysis involves positing a direct relationship between clausal subjects and the objects of instrumental phrases. Specifically, Lakoff proposed that the sentences in (18) have similar and perhaps identical biclausal remote structures.

- 18.a. Mary cut the bagel with the knife.
- b. Mary used the knife to cut the bagel.

Lakoff studiously avoids specifying either the remote structures or derivational rules needed for (18), so his proposal is down one round to the explicit and minimalist syntactic analysis offered here. The bout could be evened if Lakoff's proposal sheds semantic light on the agent-instrument dependency where I've been less than illuminating. In fact, however, Lakoff's proposal has severe semantic demerits.

First and quite disastrous, sentence (18b) and sentences in general of that form fail to entail that the actions denoted by the infinitival VPs were indeed accomplished, as seen in (19) vs. (20). Second and equally fatal, sentences of the form in (18b) do, but sentences of the form in (18a) do not, entail that the action denoted by the infinitival VP bzw. matrix finite VP was the subject's intention, as seen in (21) vs. (22) (read (21) as nonconsecutive actions).

- 19.a. Mary used the knife to cut the bagel, but it was too blunt.
- b. Mary used the pole to touch the ceiling, but it was too short.
- 20.a.??Mary cut the bagel with the knife, but it was too blunt.
- b.??Mary touched the ceiling with the pole, but it was too short.
- 21.a.??Mary used the knife to cut the bagel when her hand slipped.
- b.??Mary used the pole to touch the ceiling while swinging it overhead.
- 22.a. Mary cut the bagel with the knife when her hand slipped.
- b. Mary touched the ceiling with the pole while swinging it overhead.

Lakoff tried to head off the problems of (21) vs. (22) when he suggested that sentences like those in (22) involved an "intuitively related" but distinct sense of with. But with, of course, had nothing to do with it. The same sentences stripped of their instrumental phrases exhibit the same sort of volitional-nonvolitional contrast, as do all sorts of sentences completely remote from the problems at hand, as seen in (23). (Note, by the way, that (22) is further evidence that while the subjects must be strongly agentive with respect to the instrumental act, they need not be even volitional with respect to the end-result of the action denoted by the VP, as mentioned above concerning see.)

- 23.a. Mary cut the bagel (so it fit the toaster/when her hand slipped).
- b. Mary touched the ceiling (to prove she could/despite leaning over).
- c. Mary thought about Susan (obsessively/when she noticed the scarf).
- d. Mary rolled down the hill (for sport/when she tripped).

The source of Lakoff's troubles is easy to locate. Infinitival VPs chomsky-adjoined to finite VPs are read as objectives and objectives are necessarily intended but not necessarily accomplished, as seen in (24). Matrix finite VPs are asserted as facts, though they needn't have been intended, as shown above. So Lakoff's proposal obscures as much as it illuminates concerning the semantics of instruments.

- 24.a. Mary left to spite her friends, but nobody missed her.

- b. Mary kissed Susan to put off Bill, but it only excited him more.
- c. Mary went to the store to buy oranges, but they were sold out.

Finally, Bresnan (1982) cited facts not unlike those in (5) as evidence for a valency increasing lexical rule of the form in (25). Bresnan does not bother to show why patterns like (5) support lexical rules like (25). Rather, she cites Bresnan (unpublished) as containing the answers. So there is no reason at this point to take Bresnan's "analysis" as anything more than a mysterious promissory note.

- 25. If P is an n-place predicate, there is an n+1-place predicate P-WITH whose n+1st argument is thematically an instrument.

Bresnan's other bit of "evidence" for (25) is equally mysterious. As noted in Lakoff (1968), sentences containing more than one instrumental with-phrase are generally infelicitous. Bresnan seems to believe that (25) predicts this. But, as I read it, it is a recursive rule which would in fact predict exactly the opposite. Furthermore, according to Levin (1982), rules akin to (25) are responsible for the occurrence of benefactive and comitative phrases. These phrase types, however, do "stack", as seen in (26). Also, some speakers (including me as well as Jim McCawley who gave me the datum) accept (27). So it is totally unclear what (25) gets you that a recursive phrase structure rule couldn't accomplish. The only possibility would be that ruling out the co-occurrence of instrumental phrases with fear-class verbs might be better stated lexically than syntactically, though (25) itself mispredicts here, too. Pending further word from Bresnan, her proposal buys one nothing.

- 26.a. Did you have dinner with Alice?
- b. Yes, I had dinner with Alice with her goddam boyfriend.
- c. Would you carry groceries for Alice?
- d. I would carry anything for anyone for you, darling.

- 27. Ken broke the window with a pebble with his new slingshot.

### 3. Why with?

There is one respect in which I'm unhappy with my analysis as presented so far. There has been movement in recent times to analyze prepositions not as markers of specific relations but as more general things which get involved in principled polysemies or which might even be univocal markers of macroroles. Fillmore (1977), for instance, suggests that the with's in both the sentences in (28) mark a patientlike object in motion which is not, in Fillmore's terms, "in perspective" in the clause. Hence, the fact that only one of these with's is instrumental is no embarrassment to the later

theory.

- 28.a. Mary broke the glass with a rock.
- b. Mary filled the glass with beer.

I'm very sympathetic to Fillmore's reorientation, but this particular analysis won't do. Neither the instrument in (29a) nor whatever it is in (29b) is in motion. Furthermore, this analysis does not generalize to the use of with in (30), nor to comitatives.

- 29.a. Mary watched Susan with a telescope.
- b. Mary kept the jar filled with coins.
- 30.a. Mary impressed Susan with her kindness.
- b. Mary surprised Susan with her aggressiveness.

If there is a single most plausible *gesamtbedeutung* to pin on with, it is 'x and y are associated', where x and y are the external and internal arguments of with on my account. But this, of course, is ludicrously vague.

I do not have a full account to offer, nor the space to give all the pieces of an account I could now offer, but I have some ideas on (28)-(30). First consider (30). The internal argument denotes a property of the external argument (Mary). This is reminiscent, I would claim, to the relations in (31), which Fillmore (1968) tried to defuse as counterexamples to the agent-instrument dependency. Notice that sentences in both (30) and (31) can be paraphrased via a possessive construction as in (32).

- 31.a. The car rammed the fence with its fender.
- b. The ship scraped the bottom with its keel.
- 32.a. Mary's kindness impressed Susan.
- b. The ship's keel scraped the bottom.

Fillmore proposed a sort of possessor ascension account of (30)-(32), which I won't discuss except to note that it appears to violate Ross's left-branch constraint (cf. Ross (1967)). (See also Croft (this volume) for arguments against syntactic accounts of possessor ascension). However, one could plausibly say that both the possessive constructions in (31) and the with-constructions in (30)-(31) semantically specify WHOLE:PART relations, where properties are taken as abstract parts of individuals. If we can claim, then, that any WHOLE:PART relation can appear as a with-construction, then these examples are indeed not counterexamples to the agent-instrument dependency, just as Fillmore had originally claimed.

Now I believe that the instrumental use of with can be to some degree explained as an extension of this meaning. Let us say that if no 'objective' WHOLE:PART relation obtains between with's arguments, then one must reconstrue the two separate objects as a complex whole, such that the referent of the external argument is whole-defining and the referent of the internal argument is partlike. I



believe an agent using an instrument is a plausible candidate for such a complex participant and surely, so construed, it is the agent who is whole-defining and the instrument which is partlike. I offer no further motivation here except to note that an agent using his hands, i.e. a part of him/herself, is not cognitively distant from an agent using a wrench, i.e. a separate object that acts as an extension of the agent temporarily.

Finally, let us claim that it is the jar and not Mary which is the external argument of with in sentences like (29b). All such sentences would specify something like CONTAINER:CONTENTS relations between the arguments of with. If I were to look upon a container and its contents as a complex whole, I'm pretty sure that I would view the container as whole-defining and its contents as partlike. This extension in particular needs further examination, but here I merely express my intriguedness.

None of this extends well to comitatives, and I believe the proper strategy is to handle comitatives first as akin to asymmetric co-ordination and then extend this mere pragmatic asymmetry to the objective semantic asymmetries of WHOLE:PART relations. Another problem is how to constrain such associative reasoning to allow in both OPERATOR:INSTRUMENT and CONTAINER:CONTENTS relations without flooding the scene with other rationalizable but in fact unattested relations. Only future research will show whether this is tenable.

#### Note

\*Thanks to the Linguistic Circle of Chicago for hearing me out on a proto-version of this many moons ago. Thanks also to those who attended my Wednesday Seminar talk immediately pre-BLS. Thanks especially to the Chicago Linguistic Society, its officers Bill Eilfort, Karen Peterson and Paul Kroeber, and especially supreme co-ordinator Suzanne Isaacson for scrounging me up a travel grant that enabled me to attend BLS without completely bankrupting myself. Hats off to BLS for an interesting and comfortable stay. If despite all this intellectual, spiritual and material aid I've still goofed some things up, you all know who's responsible.

#### References

- Bresnan, J. (1982) "Polyadicity." in J. Bresnan (ed.) The Mental Representation of Grammatical Relations. MIT Press: Cambridge, MA.
- Chafe, W. (1970) Meaning and the Structure of Language. Univ. of Chicago Press: Chicago.
- Delancey, S. (1984) "Notes on Agentivity." Studies in Language 8.2.
- Fillmore, C. (1968) "The Case for Case." in E. Bach and R. Harms (eds.) Universals in Linguistic Theory. Holt, Rinehart and Winston: New York.
- (1977) "The Case for Case Reopened." in P. Cole and J. Sadock (eds.) Syntax and Semantics 8: Grammatical Relations. Academic Press: New York.
- Gruber, J. (1976) Lexical Structures in Syntax and Semantics. Else-

- vier-North Holland: Amsterdam.
- Jackendoff, R. (1972) Semantic Interpretation in Generative Grammar. MIT Press: Cambridge, MA.
- Lakoff, G. (1968) "Instrumental Adverbs and the Concept of Deep Structure." Foundations of Language 4.
- (1977) "Linguistic Gestalts." CLS 13.
- Levin, L. (1982) "Sluicing: A Lexical Interpretation Procedure." in J. Bresnan (ed.) The Mental Representation of Grammatical Relations. MIT Press: Cambridge, MA.
- Richardson, J. (1983) "Smash Bang." BLS 9.
- Ross, J. (1967) "Constraints on Variables in Syntax." MIT doctoral dissertation.
- Williams, E. (1981) "Argument Structure and Morphology." Linguistic Review 1.

FROM TONAL TO ACCENTUAL: FUZHOU TONE SANDHI REVISITED  
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This paper investigates the tone sandhi phenomenon of Fuzhou, a Northern Min dialect spoken in South Eastern China. Some fairly extensive analyses on this topic are presented in Yip (1980) and Wright (1983). They propose a number of standard tone rules, such as insertion, deletion, and spreading to derive the surface tone patterns from underlying forms, but do not provide justification for these rules. This paper suggests that insertion or deletion rules in Fuzhou apply in conformity with a surface constraint that allows at most one high peak in a given domain. This constraint functions as a filter, and language specific adjustments can be implemented to derive the exact output for any given variant of the Fuzhou dialect. The lack of surface violations, among all types of tone sandhi patterns, and across all reported sub-dialects, strongly supports the validity of such a constraint.

This paper concludes that the constraint reflects the evolution of Fuzhou from a tone language to an accentual language. Fuzhou is a typical Asian tone language at the phonemic level. Each syllable is associated with one of several contrasting tone melodies: H (high), L (low), LH (rising), HL (falling) and so on. Tone segments H and L, the building blocks that make up tone melodies, are equally significant. After the application of tone sandhi rules and the constraint, tonal contrast is drastically reduced at the surface level, and the tone segment H is given more prominence than the segment L. These are the characteristics shared by many accentual languages.

## 1. TONAL INVENTORY OF FUZHOU

Fuzhou has seven "citation" tone melodies: tone melodies that are elicited when syllables/morphemes are pronounced in isolation: [44], [52], [22], [12], [242], [13], and [4]. The numerals 1 through 5 represent five levels of pitch height, from low to high. Underlining indicates "Checked Tones", tone melodies with co-occurring final obstruents and shorter duration. They exhibit aberrant tone sandhi patterns in many Chinese dialects. I will not discuss problems related to Fuzhou checked tones. Interested readers are referred to Yip (1980) and Wright (1983) for details.

I assume phonemic representations of Fuzhou tone melodies as stated in (1). Because the surface [13] participates in tone sandhi rules in different ways (see Table I), it is better to analyse it by two different underlying representations LH and L, the former co-occur with final -h, and the latter with -k. Therefore, I assume that there are eight underlying tone melodies in Fuzhou.

- (1) [44]: H      [52]: HL      [4]: HL      [12]: LH      [22]: L  
[242]: LHL      [13] (-h): LH      [13] (-k): L

## 2. DISYLLABIC TONE SANDHI

In Fuzhou, as in many Min dialects, the last tone melody of a given domain  $\alpha$  maintains the underlying value, and all the rest undergo tone changes, as shown in (2).

$$\begin{array}{rcl}
 (2) & [T_1 \ T_2 \ \dots \ T_n]_{\alpha} & T : \text{underlying tone} \\
 & \downarrow \quad \downarrow & T' : \text{sandhi tone.} \\
 & T'_1 \ T'_2 \ \dots &
 \end{array}$$

Disyllabic or trisyllabic lexical items are within the tone sandhi domain of Fuzhou. Some non-lexical forms also undergo tone sandhi, under specific syntactic conditions (Chan 1980) and/or prosodic conditions (Wright 1983).

Some of the Min dialects, such as Amoy, have context-free rules. Then each underlying tone has only one surface realization at sandhi position. Fuzhou, however, has context-sensitive rules, and each underlying tone may correspond to more than one surface value. For example, a high tone remains high when it precedes another high tone, but changes to a falling tone when the following tone is low. A low tone remains low in front of a high tone, but changes to a rising tone when preceding another low tone.

In disyllabic tone sandhi, the eight tones in Fuzhou are grouped into classes. Interestingly, they exhibit different classifications as context tones and as input tones. As context tones, [44], [52] and [4] form one class, while [22], [13], [242], and [13] form another class. A high tone [44], for example, remains high when it precedes [44], [52], or [4], but changes to a falling tone when it precedes [22], [13], [242], or [13]. As input tones, [44], [13], [242], and [13] (-h) form one class, [52] and [4] form another class, while [22] and [13] (-k) form the third class. For example, [44], [13], [242], and [13] (-h) all change to falling tones when the following tone starts with L. [52] and [4] change to low tones, and [22] and [13] (-k) change to rising tones in the same environment.

Yip (1980) made the following generalization of these tonal classifications. The initial tone segment determines the grouping of context, or domain-final tone melodies. [44], [52], and [4] all start with H, and [22], [13], [242] and [13] all start with L. However, the last tone segment is the common denominator of the grouping of input, or non-final tone melodies. [44], [13], [242], and [13] (-h), represented as H, LH, LHL, and LH respectively, end in H, with the exception of LHL. [22] and [13] (-k), represented as L and L respectively, end in L. Falling tones HL and HL form a separate class. LHL fits into its class by a simplification rule that drops the final L. This rule should apply quite early in the derivation. In later sections, this rule is assumed to have applied before all tone rules under discussion.

Since the non-initial tone segments of the context tones, or the domain final tone segments, do not affect the major tone sandhi rules, and in a few places where they seem to play a role, we

TABLE I

Disyllabic Tone Sandhi of 3 Fuzhou Dialects

1. Yip

2nd $\sigma$ 1st $\sigma$	H H(L) <u>H(L)</u>	L L(H) L(HL) <u>L</u> <u>L(H)</u>
H LH LHL <u>LH</u>	1 H	4 HL
HL <u>HL</u>	2 H	5 L
L <u>L</u>	3 L	6 LH

2. Chen & Norman

2nd $\sigma$ 1st $\sigma$	H H(L) <u>H(L)</u>	L L(H) L(HL) <u>L</u> <u>L(H)</u>
H LH LHL <u>LH</u>	1 H	4 HL
HL <u>HL</u>	2a H	5 L
L <u>L</u>	3 L	6 LH

3. Wright

2nd $\sigma$ 1st $\sigma$	H H(L) <u>H(L)</u>	L L(H) L(HL) <u>L</u> <u>L(H)</u>
H LH LHL <u>LH</u>	1 H	4 HL
HL <u>HL</u>	2a L	5 L
	2b H	
L <u>L</u>	3 L	6a LH

can simply refer to the existence or absence of the extra tone segments without specifying their values, I consider these segments extramelodic and enclose them in parentheses.

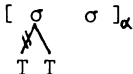
Tone classes as described above are a very important aspect in Fuzhou tone sandhi, and such a classification is found in all sub-dialects discussed in literature. Disyllabic tone sandhi patterns in three sub-dialects of Fuzhou are given in Table I to illustrate this point. The conditioning tone segments are set in bold face, and the extramelodic elements are in parentheses. In each chart, underlying tones of the first syllable, namely, the input tones, are listed at the left. The underlying tones of the second syllable, or the context, are on the top line. The boxes in the center give the sandhi form of the first syllable. The tone value of the second syllable remains unchanged, and is not given in the boxes.

Comparing the three charts in Table I, one finds invariant sandhi forms in most cases, namely, the forms in box 1, 3, 4, and 5, which are also set in bold face. These changes, restated in (3) below, demonstrate a common process: Initial Tone Segment Deletion (ITD), as given in (4a). This rule has the same function as Yip's T Deletion and Wright's Mora Deletion. The form in box 4 requires the further modification rule Low Spread, given in (4b), where a low tone spreads leftwards and changes a preceding high tone into a falling tone. In the following rules, "x" is a variable representing H, L, or null.

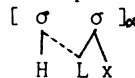
(3)

xH Hx	<del>ITD</del>	H Hx	(box 1)
xL Hx	<del>-----</del>	L Hx	(box 3)
xH Lx	<del>-----</del>	H Lx	(box 4)
HL Lx	<del>-----</del>	L Lx	(box 5)

(4) (a) ITD



(b) Low Spread



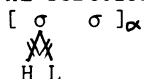
In Yip's data, a HL tone at sandhi position assumes the value of the following tone segment. She correctly captures this phenomenon by positing a HL Deletion Rule, dropping a non-final falling tone, and allows tone segments to spread leftward to a toneless syllable later in the derivation. HL Deletion is stated in (5a). This rule should be ordered before ITD, or ITD will always destroy the environment of HL Deletion.

If this rule is correct, then the L tone in box 5 will be derived by HL Deletion and tone spread, instead of by ITD. I assume this approach, and will show later that such a rule is indispensable in trisyllabic tone sandhi.

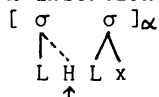
One more rule is required to account for Yip's data. In box 6, there is a H on the surface without a possible source in the

underlying forms. So a H Insertion Rule (Yip's L Dissimilation) is necessary. It is stated in (5b).

(5) (a) HL Deletion



(b) H Insertion



More specific rules are required to derive forms in dialects (2) and (3) in Table I, from Chen & Norman and Wright respectively. To distinguish sandhi forms in box (2a) and (2b) in both dialects, one may restrict the environment of HL Deletion. To derive forms in box (6a) and (6b) of Wright's data, one may define the H insertion rule differently so that a H tone may be inserted at various positions. I will not explore the details here, but turn to the discussion of the motivation of the aforementioned rules.

### 3. THE HIGH PEAK CONSTRAINT

Some of the rules discussed above, or rules with similar functions, have been proposed in various articles (Yip 1980, Wright 1983). Yip does not discuss the motivation of her rules. Wright suggests that ITD (her Mora Deletion) occurs at weak position as a result of syllable reduction. Aside from this, there is no explanation of other insertion and deletion rules (Wright proposed several more rules than those discussed above). Many rules are written with very specific environments as if the larger context were not relevant. However, if we take a look at the sandhi output, it is apparent that tone sandhi in Fuzhou does not occur at random. All the output forms, without exception, contain at most one high peak, not considering the extramelodic elements. So I propose the High Peak Constraint (HPC) to account for this. All the melody-changing rules, ITD, HL Deletion, and H Insertion, function to eliminate an extra high peak, or to create one where there is none. Sustaining H or L is permitted, so is an overall rising falling pattern. But a falling-rising pattern, or any pattern containing it, is ruled out.

ITD and HL Deletion greatly simplify the tonal contour of the first syllable. All contour tones are eliminated since there is at most one tone segment left behind in a tone melody. H Insertion is the only rule that brings in complexity in pitch contour. It creates a high peak among sequences of underlying low tones. Notice that this is the only environment in the underlying forms that lacks a high peak. What the tone sandhi rule achieves is just such a high peak. This shows that having a high peak in a word or a compound, the usual domain of disyllabic and trisyllabic tone sandhi, is the preferred prosodic structure in Fuzhou.

One may argue that box 5 presents a counterexample to the above statement, where a HL tone is changed to a L when followed by a L, creating a sequence of L's that lacks a high peak.

However, if we adopt the analysis of HL Deletion, then we can see that, after the HL Deletion, there is only one L tone segment left in the entire tone sandhi domain. Therefore, H Insertion will not apply. It requires two L tone segments in the structural description.

Tone spread may create a contour tone later in the derivation, but the tonal contour can only change in the direction specified by the following tone segment. For example, Low Spread can only create a falling tone, not a rising tone, because the following tone segment is low. In other words, spreading rules can only modify the existing overall melody, but cannot bring in drastic changes. These types of rules are more phonetically oriented, and are likely to be ordered after all phonological rules, or the melody-changing rules, such as H Insertion, HL Deletion, and ITD. This is another reason why a high peak will not be created among sequence of "phonetic" L's resulting from Low Spread.

In Fuzhou tone sandhi, the non-initial tone segments of the final tone melody are always considered extramelodic, as indicated by the parentheses in the top lines of Table I. Their values do not affect tone sandhi rules, and are not counted in the HPC. Tones with initial L tones, L, LH, LHL, and the corresponding checked tones, all induce the same sandhi output. The HPC is blind to the extra H peak to the left of the initial L in exactly the same way. It treats word final LH, LHL, and LH just as L or L. It is not a coincidence that what is extramelodic to tone sandhi rules is also extramelodic to the HPC. In fact, tone sandhi rules and the HPC are dependent on each other. The HPC defines a general direction that gives the permissible output, but leaves room for possible variations, as exemplified by different surface forms in the three sub-dialects. Tone sandhi rules may be very specific, but should satisfy the general constraint.

The position of the high peak, if any, correlates with the directionality of tone sandhi described in (2). Since the entire Min family shows right-prominent tone sandhi rules, that is, the rightmost tone melody maintains its underlying value, and the rest change, it is not surprising to find that Fuzhou maintains the rightmost high peak, and levels off any preceding peaks.

#### 4. TRISYLLABIC TONE SANDHI

The major works on trisyllabic tone sandhi are Chen and Norman (1965), and Wright (1983). Most of the data discussed are trisyllabic compounds.

When a trisyllabic compound participates in the trisyllabic tone sandhi rules, its internal syntactic structure, left branching or right branching, has no effect on the tone sandhi output. For example, [[H HL] LHL] and [H [HL LHL]] both give rise to [HL L LHL].



- (6) (a) ku[H]-i[HL] iɛɲ[LHL] → ku[HL]-i[L] iɛɲ[LHL]  
           orphan          hall          orphanage  
       (b) k'iɲ[H] yɲ[HL]-ei[LHL] → k'iɲ[HL] yɲ[L]-ei[LHL]  
           very          easy          very easy

This phenomenon strongly favors non-cyclical application of tone sandhi rules, regardless of how trisyllabic tone sandhi rules are given.

Chen & Norman's description, paraphrased in (7), is linguistically insufficient not only because it requires cyclical application, but also for the unmotivated conditions introduced.

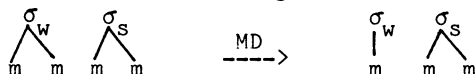
- (7) In a trisyllabic sequence  $\sigma_1\sigma_2\sigma_3$ ,  $\sigma_3$  remains unchanged.  
       If  $\sigma_2 \neq \text{HL}$ , then  $\sigma_1 \rightarrow \text{L}$ ,  $\sigma_2$  is derived by 2-TS.  
       If  $\sigma_2 = \text{HL}$ , and  $\sigma_1 = \text{L}$ , then  $\sigma_1 \rightarrow \text{LH}$ .  
       If  $\sigma_2 = \text{HL}$ , and  $\sigma_1 \neq \text{HL}$ , but  $\sigma_3 = \text{HL}$ , then  $\sigma_2 \rightarrow \text{H}$ .  
       Otherwise, apply 2-TS cyclically, from R→L, namely,  
        $[\sigma_1 [\sigma_2 \sigma_3]]$  regardless of the syntactic bracketing.

I would say this is needlessly complicated and totally ad hoc. One would look for something more general.

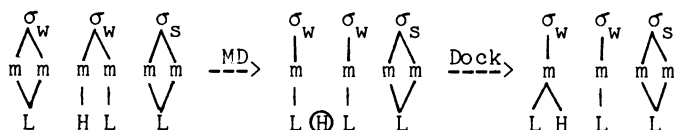
It should be noted that, even with these detailed rules, Chen & Norman haven't covered all the sandhi output. One obvious exception is H H H → H H H. According to (7),  $\sigma_1$  should be L.

Wright (1983) suggests the right direction. She attempts to relate trisyllabic tone sandhi rules to the disyllabic ones, and tries to derive trisyllabic tone sandhi forms by non-cyclical application. In general, she argues that all syllables contain two morae underlyingly, and all non-final syllables in a tone sandhi domain are weak positions, and therefore lose one mora and the associated tone segment. The deleted tone segment becomes a floating tone, and may "dock" to another tone segment in later derivation. Wright's Mora Deletion Rule (MD) and one sample derivation are given below.

- (8) (a) Mora Deletion (Wright 1983)



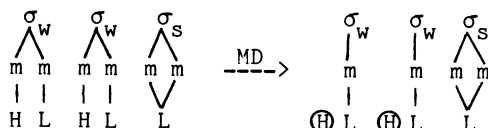
- (b) L HL L → LH L L



Wright has several problems with the above rules. For example, the Docking rule seems to be unpredictable, and there are many unexpected initial low tones. She is forced to adopt many unmotivated restrictions that weaken her analysis.

To derive (9), Wright constrains her Docking rule to apply when there is a preceding floating  $\oplus$  in the tonal sequence, as a contrast to (8b). The sequence \*LH L L is expected if the Docking rule were to apply.

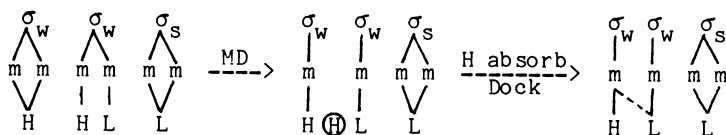
(9) HL HL L  $\rightarrow$  L L L



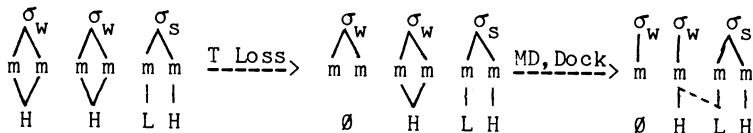
To account for some unexpected initial low tones, Wright posits a Tone Loss Rule that deletes an initial tone melody under two conditions: when the following tone segment is associated with two morae, or when it is low. The rule is given in (10), and (11) shows why the number of association lines needs to be specified in the structural description. The underlying initial H shows up on the surface in (11a), but not in (11b) and (11c). Wright suggests that Tone Loss deletes the initial H in (11b) and (11c), and the toneless syllable is realized as L by universal convention.

(10)  $T \rightarrow \emptyset / \_ \left\{ \begin{array}{c} \vee \\ T_w \\ L_w \end{array} \right\}$

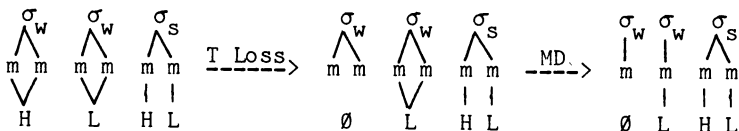
(11) (a) H HL L  $\rightarrow$  HL L L



(b) H H LH  $\rightarrow$  L HL LH



(c) H L HL  $\rightarrow$  L L HL



Yip's HL Deletion can avoid the problem raised by the Docking Rule, and several other rules in Wright (1983) which are not discussed in this paper. The HPC explains why initial tones tend to be low. There is no need to adopt complicated devices as Wright suggests.

In the following, I will give derivations of trisyllabic tone patterns, based on the disyllabic rules discussed in section 2, namely, HL Deletion, ITD, H Insertion, and Low Spread.

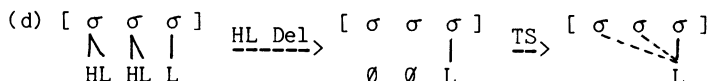
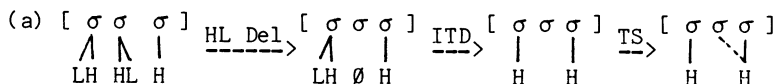
The rule ordering also follows what is required by disyllabic tone sandhi: HL Deletion precedes ITD. It is assumed that the melody-changing rules, HL Deletion, ITD, and H Insertion, which are more phonologically oriented, should apply before the spreading rules, which are more phonetic. The HPC modifies the output of all melody-changing rules, and eliminates any extra high peak to the left. It must apply after all the melody-changing rules. Since the HPC also changes the melody, I order it before spreading rules.

The forms in (12) are derived from ITD (which may apply vacuously). LHL is simplified to LH before ITD applies. No other rules are applicable to these forms.

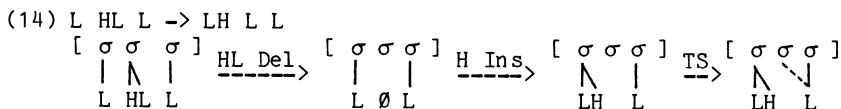
- (12) (a) H H H  $\rightarrow$  H H H      (b) L L H H  $\rightarrow$  L H H  
 (c) L H L HL  $\rightarrow$  H H HL      (d) L H H  $\rightarrow$  L H H  
 (e) L H HL  $\rightarrow$  L H HL      (f) L L H HL  $\rightarrow$  L H HL

The following forms are derived from HL Deletion, ITD, and Tone Spread.

- (13) (a) L H L H  $\rightarrow$  H H H      (b) H L L H  $\rightarrow$  H H H  
 (c) L L L HL  $\rightarrow$  L H HL      (d) H L L L  $\rightarrow$  L L L

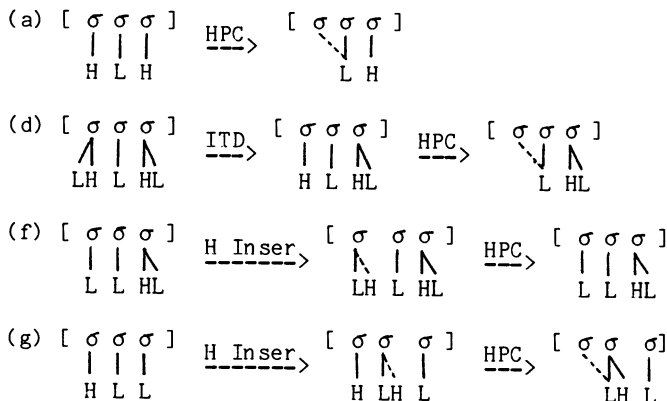


(14) is derived by HL Deletion, H Insertion, and Tone Spread.



In the following forms, the melody-changing rules apply first, and the result contains two high peaks. The HPC removes the first one, and gives the expected output.

- (15) (a) H L H  $\rightarrow$  L L H      (b) H L HL  $\rightarrow$  L L HL  
 (c) LH L H  $\rightarrow$  L L H      (d) LH L HL  $\rightarrow$  L L HL  
 (e) L L H  $\rightarrow$  L L H      (f) L L HL  $\rightarrow$  L L HL  
 (g) H L L  $\rightarrow$  L LH L      (h) L L L  $\rightarrow$  L LH L



Given a random combination of Fuzhou underlying tones, there are numerous cases where we find two, even three high peaks in the trisyllabic domain. After applying tone sandhi rules, the number of high peaks will be reduced, due to the nature of tone sandhi rules, but not eliminated. Without the HPC, it is logical to expect some falling-rising patterns or its variations. However, no tone sandhi output in any sub-dialect of Fuzhou, as reported in Chen & Norman (1965) and Wright (1983), contains two high peaks (extramelodic elements excluded). This strongly suggests that the HPC is a filter rather than a rule: it does not allow any violation.

From another perspective, we might expect to find variations within the range of the HPC, were it a filter rather than a rule. This is exactly the case. There are often found free variations corresponding to the same tonal input. These forms may be affected by style, speed of speech, and social factors.

In trisyllabic tone patterns, there are several forms that show unexpected initial L's, and the replacement of H's cannot be attributed to violation of the HPC. Many of the low tones can be resolved by restricting the spreading of a high tone. That is, only H's in the final syllable, or the strong position, can spread leftwards, and H's in the medial position do not spread. All the forms in (16) involve a deleted HL tone. It usually assumes the value of a following tone segment, but in (16) a L tone surfaces. If the medial H does not spread, then the initial toneless syllable will receive a default L. This phenomenon suggests that a medial H tone is less prominent than a final H, and that a L tone is unmarked while a H tone is marked. This correlates nicely with the HPC, which gives prominence to the rightmost H.

- (16) (a) HL H H → L H H  
 (b) HL H HL → L H HL  
 (c) HL H L → L HL L

## 5. CONCLUSION

In this paper I suggest that Fuzhou tone sandhi rules are subject to a very general constraint that allows at most one high peak, the rightmost of the potential ones, in a tone sandhi domain. This tendency is especially clear in trisyllabic tone sandhi, considered unmotivated and exceptional in (7). Under my analysis, disyllabic and trisyllabic tone sandhi are treated in exactly the same way.

The constraint (HPC) functions as a filter. On the one hand, it places restrictions on possible output, and there is no violation. On the other hand, it allows variations, and those do occur.

The proposed constraint has interesting consequences for a tone language. First, it drastically reduces tonal contrasts on the surface. Second, it reinterprets tonal segments H and L, two meaning-differentiating elements, and gives more prominence to H. Third, it requires non-local rules to operate. In my analysis, high tones are eliminated in the presence of a distant high tone. This is very similar to a rule of accent shift, but deviates from usual tone rules, where tone changes are conditioned by neighboring tones. All these are characteristics of accentual languages, and Fuzhou acquires them through the application of tone sandhi rules. It seems that Fuzhou is evolving from a tone language to an accentual language.

In a tone language, tones differentiate meaning. One may ask whether the loss of tone would cause communication problems, and if so, whether it is possible to have large-scale tonal neutralization rules as proposed in this paper. My guess is that this reduction is possible under the following condition. Fuzhou, as many other Chinese dialects, has gone through a long process of disyllabification, and has built up many disyllabic or trisyllabic lexical items. The function load of tones is therefore reduced (though the tone may still be distinctive), and at this stage, tonal neutralization is made possible.

Fuzhou provides an interesting area of study. Further research will lead to better understanding of the relation of tone and accent, and of the interaction between the typological change of syllable structure and of tonal structure.

## REFERENCES

- Chan, M. 1980. Syntax and phonology interface: the case of tone sandhi in the Fuzhou dialect of Chinese. Ms. University of Washington.
- Chen, L. and Norman, J. 1965. An introduction to the Foochow dialect. San Francisco State College.
- Wright, M. S. 1983. A metrical approach to tone sandhi in Chinese dialects. Ph.D. dissertation, U Mass. Reproduced by Graduate Linguistics Student Association, U Mass.
- Yip, M. 1980. The tonal phonology of Chinese. Ph.D. dissertation, MIT.

# The History of the Prepositional Passive in English

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Active sentences occurring with a single prepositional phrase (PP) have been attested with great frequency in all stages of English. Some of these active sentences can be related to passive transforms in which the active prepositional object appears as the passive subject, e.g. 'He is laughed at.' These passive transforms have been given the term 'pseudo-passives' by Chomsky and 'prepositional passives' by Lightfoot.<sup>1</sup> Lightfoot claims that prepositional passives are one of three types of passive innovations that occurred in English simultaneously between 1450 and 1500 and follow from the loss in the grammar of abstract Oblique case.<sup>2</sup> That is, sentences such as

- (1) SU + Vi + Pr + NPdat

became eligible to undergo the transformational passive, which moves a post-verbal NP, because their post-verbal NPs were no longer base-assigned Oblique case and the intransitive verb (Vi) + preposition (Pr) was reanalyzed as a transitive verb (Vt). Thus some prepositional objects in Type 1 sentences were reanalyzed as direct objects.<sup>3</sup> However, since in Lightfoot's theory accusative case is not base-assigned, we should expect to find a transformational passive operating in OE to derive passives from sentences such as the following:

- (2) SU + Vi + Pr + NPacc.

Many sentences in OE fitting the structural description in (2) are adduced in Visser on pages 394-396.

In this paper I will show first that, contrary to Lightfoot's prediction, there is little evidence for passive counterparts to sentences with the structural description in (2); secondly, that prepositional passives are not 15th century innovations but rather occur as early as 1300; thirdly, that the history of prepositional passives can be systematically related to the pragmatic properties of a semantically and pragmatically-based model of Transitivity; and fourthly, that correspondence with such a Transitive Prototype accounts for sentences like 'He was laughed at' while sentences like 'The tree was painted under' are excluded.<sup>4</sup>

Type 2 sentences having an accusative (i.e. non-Oblique) complement to Vi + Pr were plentiful in OE.<sup>5</sup> Examples are:

- (3) Bleow he on hi.  
Vi Pr A  
'He breathed into them.'
- (4) ic clype to þe, drihten.  
Vi Pr O  
'I call to you, Lord.'

- (5) Hig hrymab to me and ic gehire hira hream.

Vi Pr O

'They cry out to me and I hear their alarm.

- (6) þa ongan hine eft langian on his cyððe.

Vi Pr A

'Then he began again to grieve for his kin.

- (7) þa syrrwde Herodias ymbe hine.

Vi Pr A

'Then Herod laid traps for him.

The object pronoun in (3) is clearly in the accusative case. In (4) and (5) þe and me are marked 'O' for Objective since at this period in OE the second and first person dative pronouns had already replaced their accusative forms. The noun 'kin' is in the citation form in (6) and the third person accusative pronoun appears in (7). On Lightfoot's analysis, each of these accusative objects of prepositions in OE and all others like them are theoretically subject to being reanalyzed as direct objects since they are not Oblique and since the Vi + Pr in each case can be reanalyzed as transitive. Yet prepositional passive counterparts to (3)-(7) such as:

- (3') They were breathed into.

- (4') Lord, you are called to.

- (5') I was cried out to and I heard their alarm.

- (6') His kin were grieved for.

- (7') He was laid traps for.

are not attested in OE. For early ME, only one instance of a prepositional passive with an accusative-governing preposition is given in Visser (p.2123):

- (8) þe mycle spire is ronnen aboute.

aux PP Pr

'The great spire is run around.'

While the infrequency of occurrence of accusative prepositional passives in OE and ME texts might not accurately reflect the frequency of occurrence of this construction in the spoken language of that time, Lightfoot's analysis forces him to include constructions of this type in OE and ME. That not one OE example of this type of prepositional passive is adduced as a counterpart to the many corresponding active sentences which meet the structural description of the transformational passive suggests that such prepositional passives did not exist in OE and early ME for other reasons. These reasons emerge as the history of Type 1 sentences is elucidated.

In OE active sentences PPs could appear pre- or post-verbally. The following orders of PP, V and SU are attested in Visser (pp. 394-396): (SU) PP (SU) V (SU) and (SU) V (SU) PP (\*SU). (SU) indicates attested (and (\*SU) indicates non-attested) positions of the SU relative to pre- and post-verbal PPs. This distribution applies to PPs with full (nominal) NPs which could be either dative or accusatively marked. With full NPs the Pr precedes its object. When the object of the preposition (more accurately the





where durch ('through') and umbe ('about') both accusative-governing prepositions, are pied-piped. Because of the restrictions on paet in OE (i.e. it can only occur with accusative-governing prepositions), instances of pied-piping with this particular relativizer are rare. The most frequently used relative pronoun pe ('who,' 'which,' 'that') and paer ('where') were never preceded by the Pr; rather in these relative clause types, the Pr was always pre-verbal. The same is true for comparative clauses introduced by swa which were precursors of relative clauses introduced by as. Pied-piping could occur with the less frequently used 'which,' 'what,' 'whom,' and 'whose.' These cases together with the infrequent cases of pied-piped paet constitute the limited productivity of pied-piping in OE. When in late OE (about 1150) paet became neutral regarding gender, number and case, it became like indeclinable pe and was no longer accompanied by its Pr at the beginning of the relative clause. Shortly afterwards in early ME paet replaced pe altogether to become the most frequently used relative pronoun. It is clear from these facts concerning relative pronouns and the restricted occurrence of pied-piping that Prs in relative clauses in OE were predominantly pre-verbal.

In some late OE texts a change in the position of the Pr in relative clauses became noticeable, as the following three examples from Gaaf (ibid., p.7) show:

- (15) þa aeteowde me aefter þaem wege þe is aer com on, betwioh  
V Pr  
ða þeostro swa beorht scinende steorra.  
'Then appeared to me along the way that I earlier came on,  
amid the darkness such a bright shining star.'
- (16) se oþer had is, þe se forma sprecað to.  
V Pr  
'The second rank is which the first addressed.'
- (17) eac swilce þa gewaede þe he bewunden waes mid waeron swa  
PP aux Pr  
ansunde swylce hi eall niwe waeron.  
'Also, the clothes that he was wrapped with were as  
perfect as if they all were new.'

Visser (p.397) gives one more such example:

- (18) baet sindon da usic feohtad on.  
Pr  
'Those are the ones who fight against us.'

The above four examples from late OE prose texts illustrate the beginnings of a syntactic change that was crucial to the development of prepositional passives, i.e. preposition-stranding in relative clauses. The OE pre-verbal Pr in early ME (by about the middle of the 13th century) is invariably found after the verb in relative clause constructions.

Such a thorough-going change from pre-verbal to post-verbal position for the Pr in relative clauses requires an explanation; a plausible one is available. Recall that the only OE environment that conditioned the V + Pr order was an active sentence with

Pro(dat) + V (and sometimes, though very rarely, Pro(acc) + V). Since dative pronouns always index animate NPs, we can say that animate pre-verbal objects condition post-verbal placement of the Pr. In the examples with relative clauses, however, (15)-(18) above, the 57 ME examples in Gaaf (*ibid.*, pp.7-9) and the 16 ME examples in Visser (p.400), the pre-verbal NPs are all subjects of active clauses (example (17) instantiates the only passive relative clause). In the 57 examples adduced in Gaaf (representing a collection of 200), all but five of the subjects in the relative clauses are animate, the vast majority being personal pronouns. In the Visser set the only full NP is animate; the rest are all personal pronouns. On the basis of the above data representing early ME and ME relative clauses with stranded prepositions, we can conclude that the environment that conditioned post-verbal Pr placement generalized in late OE from 'animate pre-verbal (Pro) object' to 'animate pre-verbal NP' to 'pre-verbal NP.' Such a change in the conditioning factor for producing V + Pr everywhere in relative clauses except when pied-piping optionally applies is well-motivated by both OE and ME facts.

Now that productive prep-stranding in ME relative clauses has been documented, it is necessary to show how these and another clause type bear on the development of prepositional passives. The next logical step is to look for stranded Prs in relative clauses with passive verb forms. The following ME sentences are from Gaaf (*ibid.*, pp.10-11):

- (19) Blessed be tre þat rigtfulnes is don by.  
aux PP Pr  
 'Blessed the tree that rightfulness is done by.'
- (20) þei shewed me a boke þat my boke was examynde by.  
aux PP Pr  
 'They showed me a book that my book was examined by.'
- (21) hir friends that she is ruled by, desireth of me XX marke.  
aux PP Pr  
 'Her friends that she is ruled by want 20 marks from me.'
- (22) to beg is ... to ... ask bi side þe titel of worldly dede,  
 sum þing to be releuid by.  
aux PP Pr  
 'To beg is to ask (for) besides the title of worldly deed something to be relieved by.'
- (23) mete and drynke þat he was costomed to [be] byfore norissched by.  
aux PP Pr  
 'Meat and drink, that he was accustomed before to be nourished by.'



By analogy with these co-existing passive relative clauses with stranded by, it was a short step to prepositional passives.

In summary, the development of prepositional passives being proposed here is as follows:

active sentences (Vi)

- (24) I him laughed at. OE  
           Pro-D     Vi     Pr
- (25) I came onto the way. OE  
           Vi     Pr     NP

relative clauses (Vi)

- (26) Him that I (Pr) laughed at. late OE  
  
 (27) Way that I (Pr) came onto. late OE  


relative clauses (Vt)

- (28) Friends that ruled her.                      early ME  
                                Vt         DO  
(29) Friends that she was ruled by.                      early ME  
                                aux       PPT Pr

## reanalysis

- (30) I him laughed at. early ME  
Vi/Vt
- (31) Him that I laughed at. early ME  
Vi/Vt
- (32) I came onto the way. early ME  
Vi/Vt
- (33) The way that I came onto. early ME  
Vi/Vt

## prepositional passive

- (34) He was laughed at. early ME (some)  
           aux       Ppt
- (35) The way was come upon. (increases)  
           aux       Ppt

A necessary step in the reanalysis of Vi + Pr into Vt was the change that came in late OE in the rule that produced post-verbal Pr placement. With this single change of word order, the variety of possible positions for the Pr in a clause was reduced to one productive position.<sup>7</sup> Not until all prepositions could appear after the verb with great regularity could some Vi + Pr be considered as a syntactic unit comparable to a transitive verb. On this analysis, then, we would not expect OE constructions like (2), SU + Vi + Pr + NPacc, to be reanalyzed as transitive (as a theory that does not base-assign Oblique to accusatively marked NPs would allow, i.e. NPacc would be subject to 'move-NP') due to the fact that post-verbal position for PPs with accusative objects was just one of several possible positions for such PPs.

The first attested instances of the prepositional passive occur c.1225. Of the 11 citations listed in Gaaf (1930, pp.19-20), five overlap with the 28 examples in Visser (p.2123). The following are only some taken from Visser to illustrate this early ME innovation:

- (36) c.1225 Heo shal beo ... leafdiluker leoten of ...  
'She shall be regarded as ladylike.'
- (37) c.1300 þis maiden ... feled al so bi her þi, þat sche  
was yleyen bi.  
'This maiden felt also by her thigh that she was  
lain by.'
- (38) c.1303 þe vessel ... þat Goddes temple was seruede with-alles.  
'The vessel ... that the temple of God was served with.'
- (39) c.1338 Waltere was smyten porgh wiþ a lance.  
'Walter was smitten through with a lance.'
- (40) c.1340 children -- unarrayde, unkepide, and noght tente to  
as þam aughte for to be.  
'Children -- undressed, unkempt and not tended to  
as to them ought for to be.'
- (41) c.1360 how it may ... be comen to.  
'How it may ... be come to.'
- (42) c.1370 criste and his colage mygt not be dispensid wiþ.  
'Christ and his [following] may not be dispensed with.'
- (43) c.1370 he was tormentid and after he was spit upon.  
'He was tormented and after he was spit upon.'
- (44) c.1370 tribulacion ne shuld not fro his course with  
grutching be þoght on.  
'Tribulation should not from his course with  
grudging be thought on.'

The above examples provide clear evidence that this innovation was well-attested prior to the 15th century. Examples for the period 1400-1500 are plentiful in Visser (p.2124) and the prepositional passive has remained productive in English since ME.

It remains to be shown how prepositional passives can be associated with the semantic and pragmatic properties of the Transitive Prototype and why such sentences as '\*The tree was painted under' are ungrammatical.<sup>8</sup> To accomplish these final goals it is necessary to construct active counterparts to some prepositional passives and to analyze their semantic and pragmatic properties. For (39)-(44) above, the counterparts in the active voice below may be proposed:

- (39') SU smote through Walter with a lance.  
(40') SU did not tend to the children.  
(41') SU came to it.  
(42') SU dispensed with Christ.  
(43') SU spit upon him.  
(44') SU thought on tribulation with grudging.

The identity of the SUs for the above cannot be known because an agent by-phrase does not occur in any of the examples for prepositional passives. Yet, by looking at the verbs involved with these constructions, the SUs are clearly agents who have control over the action expressed in the verbs. If human agents, then these SUs are also animate. Whether or not they are definite cannot be determined. In general, we can say that the SUs of the active counterparts of a sample of prepositional passives have the semantic properties of

the prototypical transitive subject, +control/-affected, and the +animate pragmatic property of the prototypical transitive subject. Four of the objects in the active sentences are animate; two are inanimate. The animate objects are entities affected by the actions expressed in their respective prepositional verb phrases and thus are assigned the semantic property of +affected. The inanimate objects are only weakly or indirectly affected by the actions expressed in their verbs. Here it will be argued that they are analogous to the prototypical DO in that they are metaphorically affected and they will also be assigned the semantic property of +affected and, since they are inanimate, the semantic property of -control. The objects in this sample, then, have the prototypical semantic property of +affected and in two cases have the prototypical pragmatic property of being less animate in relation to their SUs. On the basis of this small sample of active counterparts to prepositional passives, we may conclude that they tend to correspond with the Prototype of Transitivity, that their V + Pr phrases are comparable to transitive verbs and that their affected objects are analogous to direct objects. This correspondence does not impede the application of Passive to such active construction types. However, it should also be pointed out that the correspondence itself also does not motivate the application of Passive. That point will be addressed below. At this time, it will be argued that a lack of correspondence between Type 1 active sentences and the Transitive Prototype will impede Passive. That is, if the objects are not +affected, metaphorically or otherwise, then Passive will not apply to such Type 1 sentences. For sentences like 'he painted under the tree,' and 'She decided on the boat,' where 'tree' and 'boat' are not the +affected entities painted or chosen but merely locative adverbials, passive counterparts will not exist.

As to what actually motivates the application of Passive to Type 1 sentences with PPs that correspond to the Transitive Prototype, it will be argued that two forces operate. One is to eliminate SUs which are not prototypical by avoiding constructions in which they appear. The second, a corollary to the first, is a tendency to topicalize NPs which are prototypical as SUs. Gaaf (*ibid.*, p.19) has noted that in all the instances of prepositional passives adduced in his research "the agent is an individual that cannot or need not be specified, or some one whom the speaker or writer does not wish to be identified." The application of Passive is a most, if not the most, effective means of removing agents from active clauses. For Type 1 sentences corresponding to the Prototype of Transitivity, agent-removal is one possible motivator for the application of Passive. As for grammaticalizing agent-like NPs (animate prepositional objects in Type 1 sentences) to SUs of prepositional passives, it is recalled that four of the six objects in the sample active set (39'), (40'), (42'), (43'), are animate. Upon examining all the data available for early and mature ME occurrences of prepositional passives, it is clear that the sample set is representative of the data. For the period from 1225 to 1500, Visser and Gaaf adduce 104 examples of the prepositional passive. Of these, 79 of the SUs are personal pronouns (the great

majority) or full NPs that are animate. For the data available for the first 200 years of the existence of prepositional passives, 78% of the subjects in these constructions possess the prototypical pragmatic properties of +animate and +definite. Type 1 sentences having animate (prepositional) objects, therefore, are very likely candidates to be related to passive transforms.

In summary, it has been shown that the notion of animacy is relevant to the history of the prepositional passive in English. The original placement of prepositions after their verbs was related to the condition of pre-verbal animate objects, a condition which was generalized to include all animate pre-verbal NPs in relative clauses. Furthermore, the fact that objects that can be complements to many Vi + Pr are animate makes them likely to be promoted to subjects in passive sentences. It has also been shown that correspondence of Type 1 sentences to the Transitive Prototype facilitates but does not necessarily motivate the application of Passive while a lack of correspondence of Type 1 sentences with the Prototype impedes Passive.

### Notes

1. See Chomsky's Aspects of the Theory of Syntax (1965, p.142) and Lightfoot's Principles of Diachronic Syntax (1979, p.276).
2. A general discussion and critique of Lightfoot (1979), (1980), is found in section 1.4.1 of Thornburg (1984).
3. Many Type 1 (and other) constructions cannot occur as passives, e.g.
  - a. \*He was suggested to that he leave.
  - b. \*The tree was painted under.
  - c. \*Nixon was written a book about.
 Lightfoot (ibid., p.278, fn.2) offers a complex account for how these can be ruled out. A simpler means of excluding the Type 1-related sentence, (b), will be given subsequent to the data analysis.
4. Lieber (1979) predicts the possibility of the existence of prepositional passives from a theory in which the object of a Pr is not base-assigned Oblique. However, her theory also wrongly predicts passive counterparts for accusative (non-base-assigned) objects of Prs.
5. Examples and citations are in Visser (p.395).
6. It could be argued that to, big, on and beforan in (9)-(12) are to be analyzed as separable prefixes rather than post-verbal adpositions. Indeed, in OE as in present-day German, there were many verbs with adverbial prefixes, e.g. bigstandan ('to stand by'), onlocian ('to look at') purhsecan ('to break through'), etc. However, as Gaaf (1930, p.13) points out: "In Old English it is sometimes difficult to decide whether a preposition (or adverb) and a verb form a compound or not. It seems that Anglo-Saxon scribes, too, felt some uncertainty on this point; if the printed texts are to be trusted, they vacillated between writing ingan and in gan, etc. ... utgan [and] gan ut." Gaaf also argues that variants such as bigstandan and stand bi(g) acquired semantic distinctions such that the former

retained its intransitive meaning 'to stand near' and the latter developed a more transitive meaning 'to stand near in order to assist.' Thus, in some instances verbs with adverbial prefixes assumed different meanings between separated and unseparated variants. Moreover, some of the formerly inseparable adverbials were homophonous with prepositions. Sentences (9)-(12) are to be compared to (3)-(7) in which to, on and ymbe occur in PPs governing accusatively-marked objects. In (9)-(12), however, the position of to, on, big and beforan relative to the dative pronouns is in clear contrast to that of on, to and ymbe in (3)-(7); whereas the latter are in post-verbal PPs, the former are post-verbal and sentence-final.

7. Excluding, of course, the comparatively infrequent and optional instances of pied-piping.
8. The Prototype of Transitivity is fully presented in Thornburg (1984). The properties referred to below do not represent binary values but rather relative 'degrees of.'

### References

- Chomsky, N. 1965. Aspects of the theory of syntax. Cambridge, Mass.: The M.I.T. Press.
- Gaaf, W. van der. 1930. The passive of a verb accompanied by a preposition. English studies. 12.1-24.
- Lieber, R. 1979. The English passive: an argument for historical rule stability. Linguistic inquiry. 10.667-688.
- Lightfoot, D. 1979. Principles of diachronic syntax. Cambridge: Cambridge University Press.
- Lightfoot, D. 1980. The history of NP movement. Glot-lexical grammar. 255-284.
- Thornburg, L. 1984. Syntactic reanalysis in early English. Unpublished Ph.D. dissertation, Department of Linguistics, University of Southern California, Los Angeles.
- Visser, F. 1963-1973. An historical syntax of the English language. Leiden: E.J. Brill.

# EN-PREFIXATION AND THE SYNTACTIC DOMAIN OF ZERO DERIVATION

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The goal of this study is to develop a local transformational analysis of the en-prefixed verbs, some of which are exemplified below:

- (1)a. imprison NP, encode NP, enlist NP, enchain NP, entomb NP, embalm NP, encircle NP, entrain NP, entrench NP, encompass NP, enthrone NP, etc.
- b. endanger NP, empower NP, enrage NP, enact NP
- c. encourage NP to VP, entitle NP to VP, enable NP to VP
- d. enlighten NP, enliven NP
- e. embitter NP, enrich NP, ensure NP

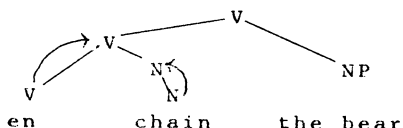
These verbs have merited attention in a wide range of recent morphological studies (Lieber 1980, Williams 1981, Selkirk 1982, Moortgat 1981, Namiki 1982, Strong-Jensen 1982) due to an apparent exceptional property which they typify. It is widely acknowledged in morphology that the category-changing element in words is usually found in a suffixal position. Williams 1981 puts this observation into a principled form as the Righthand Head Rule:

- (2) **The Righthand Head Rule** (Williams 1981):

In morphology, we define the head of a morphologically complex word to be the righthand member of that word.

The Lefthand Head Analysis of the en-prefixed verbs acknowledges that the verbs violate (2). The category-changing element in the en-prefixed verbs is the prefix, a lefthand element. So it is proposed that the prefix en- is the head of word. Since the word is a verb its head must carry a verbal feature. Lieber 1980 associates these verbs with the following structure, where the arrows indicate feature percolation:

- (3)



The Lefthand Head Analysis of the en-prefixed verbs poses two immediate problems. First, it should extend to the verbs in (4), since on the surface imprison seems



like overcloud:

(4) overcloud NP, outfox NP, uproot NP, underman NP, inflame NP

But such an extension leads to the undesirable conclusion that over, out, under and in in (4) are English verbs. Secondly, it leads to a contradiction in categorizing the suffix -en. In verbs like widen in (5) -en is on the right, hence by (2) a head of word.

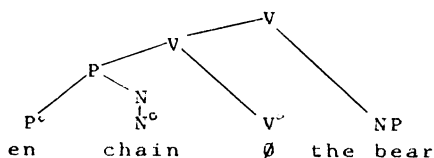
(5) widen NP, threaten NP, blacken NP

But if in (3) the prefix en- is the head of word, it is difficult to find a position - and a category - for the suffix in these verbs which are prefixed and suffixed by en at the same time:

(6) enlighten NP, enliven NP

In what follows, I argue against the Lefthand Head Analysis of the en-prefixed verbs, and against the structure in (3). Instead, I propose a Zero-Head Analysis with a structure as in (7):

(7)



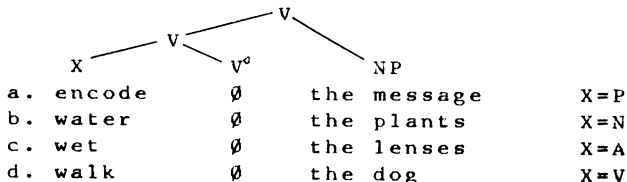
Notation:  $X^{\circ}$ =head; X=nonmax, nonhead;  
 $X^{max}$ =maximal projection

In (7) the suffix is a head. In English, this position may be realized either as  $\emptyset$ , or as -en. Thus my analysis encompasses all the verbs in (1), the suffixed verbs in (5) and (6) as well as other zero-derived verbs such as those in (8):

(8) to walk  $\emptyset$  a dog, to water  $\emptyset$  the plants, to wet  $\emptyset$  the lenses

(7) and (8) provide evidence that the prehead position may be filled by a full range of lexical categories: P, A, N, and V, and that the structure in (7) is a particular instantiation of a more general structure in (9):

(9)



In (7) and (9a) the X is realized as a nonmaximal prepositional phrase. The prefix en- heads this phrase and forms a constituent with the following adjective or noun, which is a complement of P. The prefix en- is therefore a member of the category P[1]. In particular it is a positional allomorph of the English transitive preposition in. Below in (10) I give a list of properties which en- shares with in:

( 10 )

- A. It can always be pronounced /iN/, and often has been spelled "in" (Marchand 1969, OED).
- B. It is unstressed.
- C. It doesn't undergo Lateral Deletion:  
enlighten/\*ellighiten; enrage/\*errage;  
\*inluminate/illuminate
- D. It doesn't undergo Stress Shifting Nominalization:

$$\text{insert}_V^1 \rightarrow \text{insert}_N^2; \quad \text{import}_V^1 \rightarrow \text{import}_N^2;$$
$$\text{encode}_V^1 \rightarrow * \text{encode}_N^2; \quad \text{enslave}_V^1 \rightarrow * \text{enslave}_N^2$$

- E. It is directional.
- F. It assigns Goal when governed by a causative V.
- G. French and Spanish have both the preposition en and a prefix en-. Polish, Russian have neither.

In the Zero-Head Analysis of the en-prefixed verbs it is not a coincidence that to imprison the priests means "to put the priests in prison" and that to embitter Mary means "to make Mary bitter." The preposition in under a causative verb is directional and assigns Goal. And so does the prefix.

The contrasts in (10C-D) suggest that the prefix en- is not a level 1 prefix of the Level Morphology and Lexical Morphology (Siegel 1972, Allen 1978, Kiparsky 1982, 1983, Pesetsky 1985). If it were at level 1, it should undergo both Lateral Deletion and Stress Shifting Nominalization, since level 1 is the domain where such rules apply. The fact that the prefix doesn't trigger stress changes itself gives more evidence that it is not at level 1. But at the same time some other criteria justify its classification as a level 1 prefix. First,

it takes non-words:

(11) enchant, encumber, endorse, engage

Second, it is never outside of any other prefix, in fact it occurs inside dis-:

(12) disembark, disembody

The prefix dis- itself takes non-words:

(13) disinter, disguise, disdain

It also occasionally allows the Stress Shifting Nominalization: my likes and dislikes or triggers the shift itself: locate/dislocate. The criteria which Level Morphology uses for classification of English affixes into levels lead to a contradiction in the case of the prefix en-, and possibly indicate the necessity of a feature Latinate, if the prefix is to remain level 1.

I use the notion "prefix" or "the prefix en-" only for convenience in discussion. Neither term is a category in this system (cf. Walinska 1982, 1983b, 1984). I claim that the element en- in the prefixal position of the words in (1) is a P which shares a lexical entry with the P in, as shown below[2][3]:

(14) in, P, \_\_\_ NP; {danger, title, bitter, able,  
rich...}

It is argued in Jackendoff 1977 and Emonds 1985 that P's take a full range of lexical categories. The preposition in subcategorizes for NP, as well as for a list of Roots which are N or A. In Walinska 1983b and in work in progress I argue that the Universal Grammar contains a very important principle which assures that Roots preserve their categorial identity not only syntactically (this is secured by the projection principle of Chomsky 1981) but also paradigmatically, i.e. a Root may not be listed in the Lexicon twice, with different category labels.

(15) **Root Identity:** If a Root R belongs to a lexical category  $C^1$ , it may not belong to a category  $C^k$ , where  $k \neq 1$ .

This principle among other things allows the Root names in (14) to act as category labels.

In (7) the  $V^0$  position realized as  $\emptyset$  or en is crucially not a head of word but a head of  $VP^{m_{1k}}$ ,

therefore a verb itself. As a verbal head, it is unique, it has a uniform argument structure and a uniform theta grid. On the grounds of its uniqueness as a head we exclude the following agglutinations of stems and affixes, where the two final elements are heads of  $X^{\max}$ :

- (16) \*enchain  $\emptyset$  en; \*beaut ify en; \*throw en;  
\*moral iz ify

The head  $V^{\circ}$  subcategorizes a projection of N and a projection of P or A, typically of causatives:

- (17)  $V^{\circ}$ , \_\_\_\_ N  $\begin{Bmatrix} P \\ A \end{Bmatrix}$

The subcategorization frame in (17) gives additional evidence that the prefix en-, which heads an argument of V, is a P. The theta grid of  $V^{\circ}$  is given in (18), and the details of theta role assignment [4] in (19):

- (18)  $V^{\circ}$ , \_\_\_\_ AGENT, THEME,  $\begin{Bmatrix} \text{GOAL} \\ \text{PREDICATE} \end{Bmatrix}$

- (19)a. im prison  $\emptyset$  him    b. em bitter  $\emptyset$  the actor  
P    GOAL    V    THEME            P    PRED.    V    THEME

In (19a) the zero  $V^{\circ}$  assigns THEME directly to the object NP. It assigns GOAL indirectly, through the direct theta-role assigner P. (cf. Emonds 1985, ch.1 on the notion direct assignment of theta roles). [5] Similarly in (19b), where the preposition is a copula P, very much like the copulas as and into discussed in detail in Emonds 1982.

The final argument for the head status of  $V^{\circ}$  in (7) is its position in  $X^{\max}$ . I assume that the position of heads of  $X^{\max}$  is given in English by the Head Placement Principle of Emonds:

- (20) **Head Placement Principle** (Emonds 1985, ch.1):  
All and only maximal categories follow the head of X . ENGLISH.

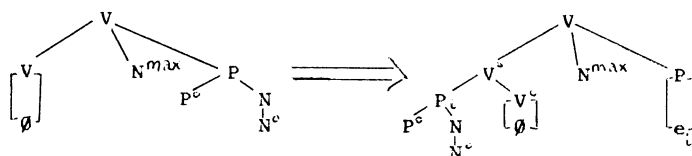
By this principle, taking the direction of the government in English to be from left to right (Stowell 1983), all phrases on the governed side of  $X^{\max}$  are maximal, and all phrases on the governing side of  $X^{\max}$  are non-maximal. The structure in (7) is in accord with the HPP.

On the assumption that the HPP applies in d-structure, taken in Walinska 1983a, the structure in (7) is a d-structure, and is identical with its

s-structure. In this paper I will take a different stand with respect to HPP. I will not require that it applies at d-structure. This will allow me to develop a local transformational analysis of the en-prefixed verbs, and a theory of local rules for morphological structures, developing the theory of local rules in the sense of Emonds 1976, 1985. The basic ingredients of this analysis are shown in (21):

## (21) The Local Transformational Analysis

(i)



```
(ii) Move @, local.  @ ≠ max
```

Since @ in (21) is nonmaximal, it must move locally by a principle proposed in Fiengo 1980. I will also assume that the Head Movement Constraint (Travis 1984), which requires that an  $X^0$  may only move to Y which properly governs it, does apply in (21i). HPP of the English parameter is crucial to assume that the P phrase will move to the left of V, and not to its right.

I will refer to the move @ in (21) as the rule (21). I do not assume that the rule (21) must leave a trace.[6] Throughout the paper I will use the symbol 'e' for purposes of discussion.

The occurrence of discontinuous dependencies in a structure is a typical argument for a transformational analysis.

- (22)a. He was imprisoned { \*into a prison }  
          { \*into a Citadel }  
      b. His experience ennobled the actor { \*noble }  
  { \*bitter }
- (23)a. Encircle the answers { \*around }  
                                { \*in }  
      b. We insured the property { \*in }  
                                      { \*up }
- (24) (\*en)inflame; (\*out)enrage; (\*en)update;  
     (\*en)bestow

(22-23) show that the Goal argument realized as a maximal PP or a "particle," i.e. an intransitive P, may not occur in the argument structure of the en-prefixed verbs.[7] Our analysis offers an explanation of this phenomenon, which is entirely regular with all the verbs listed in (1). If the P phrase adjoined to V head is

coindexed with an empty category in PP position, another argument may not occur in that position, by the Theta Criterion of Chomsky 1981, which disallows an assignment of the same theta role to two arguments. The same principle excludes cooccurrence of two directional prepositional prefixes in (24). Level Morphology is unable to explain the complementary distributions in (23) because no level orderings are violated there.

So far arguments were given that @ of rule (21) is a P, and a Goal argument. The purpose of the next section is to assure that @ must be an argument, in principle.

### Argument domain as a domain of local rules

Lobeck (1984) proposes that local rules in the sense of Emonds are restricted to elements within the argument domain of a head:

#### (25) Argument domain (Lobeck 1984)

X is in the domain of Y iff X gets a theta role from Y.

Since I claim that the rule (21) is local, it is important to see if her proposal stops the rule from overgenerating in a useful way.

Lobeck uses the notion "argument domain" to explain contrasts involving "leaner to," as in extraposed clauses and purpose clauses: to may lean even when it is outside the government domain of a head, iff it heads an argument of that head. There is strong evidence that the notion "argument domain" also plays a part in delimiting the domain of zero derivation. Even though the preposition in occurs as a head of PP adjuncts, of prepositional subjects, of non-argument locations, of adjectival adjuncts, and of complements of embedded Vs, which are shown respectively in (26-30), in may never be adjoined to the zero head from this position, as is shown in the starred (39) sentences.

- (26) a. He often managed to get his folks in (a) rage.  
 b. He often managed to enrage<sub>i</sub> his folks e<sub>i</sub>.  
 c. He often managed to make good music, when in (a) rage.  
 d. \*He often managed to enrage<sub>i</sub> good music, e<sub>i</sub>.

- (27) a. In prison may not be a good place to complain.  
 b. \*It<sub>i</sub> may not imprison<sub>i</sub> a good place to complain.

- (28) a. Back in the cell, he was put in chains.  
 b. Back in the cell, he was enchain<sub>i</sub>ed e<sub>i</sub>.

- c. The prisoner had his dinner in chains.
- d. \*The prisoner enchain<sub>i</sub>ed his dinner e<sub>j</sub>.

- (29)a. She made the actor bitter.
  - b. She embitter<sub>i</sub>ed the actor e<sub>j</sub>.
  - c. She made the actor, bitter.
  - d. \*She embitter<sub>i</sub>ed the actor, e<sub>j</sub>.
- (30)a. She let him turn her into a slave.
  - b. She let him enslave<sub>i</sub> her e<sub>j</sub>.
  - c. \*She enslave<sub>i</sub>d him turn her e<sub>j</sub>.

While Lobeck argues for the notion "argument domain" based on sentences where an argument is outside the government domain, in (27-29) we find non-arguments which are in the structural domain of government, but because they are not assigned a theta role, they fall outside the argument domain, and therefore the rule (21) gives ungrammatical results. In (27) the dummy nonagreemental *be* does not assign a theta role to the subject. In (28c) the location PP is not an argument of *have dinner*, while it is an argument of *put* in (28a). In (29a) the role of object predicate is assigned by the verb. But the adjectival adjunct in (29c) does not receive a theta role from the verb.

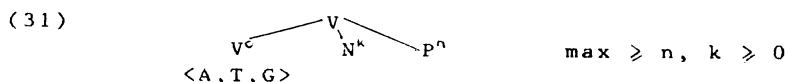
The move towards a non-structural definition of the argument domain, which underlies Lobeck's study as well as the theoretical proposals of Travis 1984, is particularly useful in distinguishing the intrinsic vs. nonintrinsic locations, such as those in (28), where there are no independent reasons for structural differentiation of PPs in (28a) and (28c).

The independently needed notion of the argument domain allows for the simple statement of the rule (21) as move @, local.

### Zero-derivation as a derived insertion

In my analysis of zero-derivation of examples like *imprison* I hypothesize that the local transformation (21) falls together with other types of insertion in lexical head positions. Many properties of this rule will therefore follow as properties of insertion. First of all, the fact that the rule (21) is a transformation will no longer be surprising: in Chomsky (1965) the definition of an insertion rule has the features of a local transformation (cf. Chomsky 1965, ch.2, note 18).

Take again the d-structure to which the rule (21) optionally applies:

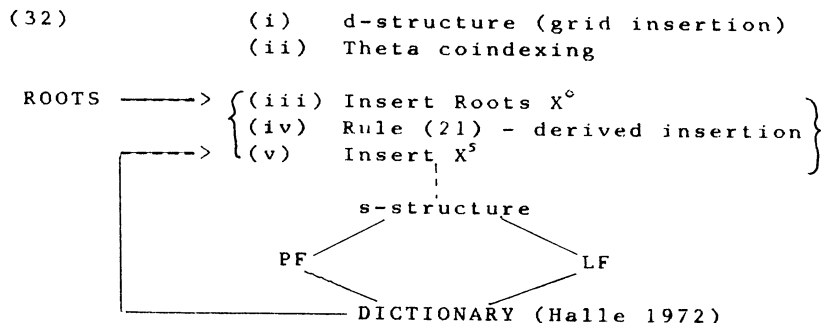


The head  $V^c$  is not a lexical item in (31), but a complex symbol which consists of the category symbol  $V^c$  and the canonical causative theta grid. It is this abstract grid which imposes a particular argument structure of the subtree in (31). While abstract grids may assign theta roles to arguments, they may not select the features of their heads, the selection being reserved to lexical roots, which, unlike the complex symbol in (31), have access to non-linguistic information. After the theta role assignment by the abstract grid the elements bearing the thematic indices will be identified as arguments of the head.

This system provides two options for the lexical insertion in (31). First option is an insertion of all verbal roots which match the abstract grid, such as put, throw, make, take, etc.[8] This option is conceivably universal. The second option, i.e. the derived insertion, is plausibly language-particular. Under this option, the insertion transformation does not replace (or fill in) the complex symbol but adjoins designated material next to it. An insertion of an argument into a head position would violate  $X'$  theory. Furthermore, in many languages, the zero-head position may be filled later by phonological affixes, cf. English -en.

There are several very strong arguments that zero-derivation is indeed a derived insertion.

A. As a lexical insertion, it must occur before any rule which requires lexical government for application, and in fact it is the "first rule" in any syntactic derivation. The schema in (32) places zero-derivation in the larger context of the grammatical system:



In (32) the rules (iii-v) are ordered conjunctively.  $X^s$  is a lexical projection whose strict



subcategorization is marked as idiosyncratic. The Dictionary in the sense of Halle (1972) has access to non-linguistic, pragmatic information and to the subparameters of English. Any kind of lexicalization is taken care of by the Dictionary.[9]

If (21) is the first word formation rule to apply, and if such local rules adjoin material to the head node of a lexical projection the prediction will be that no lexical material will ever interfere between the zero-head and the P-phrase. Cooccurrence of zero-derivation with compounding (33), the Native Reanalysis (34), and various other prefixation processes confirms this prediction:

- (33)a. child enslaving
- b. \*enslave childing
- (34)a. overshadowed her partner
- b. \*shadowovered her partner
- (35)a. misencoded the message
- b. \*enmiscoded the message
- (36)a. reenacted the law
- b. \*enreacted the law
- (37)a. overendangers the survival of the whale
- b. \*enoverdangers the survival of the whale
- (38)a. disembodied the soul
- b. \*endisbodied the soul

B. If Root insertion provides the material for the arguments of zero-heads, we will also predict why the reduced argument is always a fullfledged Root, and never a stem. In this system, the words below will never be derived by (21)[10]:

- (39) enchant NP, encumber NP, endorse NP, engage NP
- (40) irrigate NP, illuminate NP

C. If the P constituent is moved from a syntactic position, more precisely from a position on the governed side of VP, it is explained why the head - complement order of the elements within the P phrase is from the left to right, i.e. the unmarked order of English (cf. Stowell 1983). If the operation which generates the en-prefixed verbs were an operation on lexical entries, it would be difficult to explain why the en-X string is a phrasal projection at all, and why this projection follows the unmarked order of phrases on the governed side. Surely we don't want the Lexicon to be burdened with providing the order of constituents (cf. Travis 1984).[11]

D. Perhaps the strongest argument that (20) is indeed a derived insertion may be found in the fact that

the rule is non-iterative.[12] While compounding allows iteration, and, quite clearly, causative structures make more than one argument available to the rule, never are two arguments moved to the left to the zero-head:

- (41) He much too often { \*fatherenrages  
                                  { enrages his father }  
(42) The lecture always { \*studentenlightens  
                                  { enlightens the students }  
(43) Have you { \*plantwatered today?  
                                  { watered the plants today? }

#### The application of derived insertion, the HPP, and the Case Filter

In what follows I will argue that while the derived insertion of a P phrase moves along the whole nonmaximal constituent P-X, the rule (21) may mention as its target only the node on the adjacent periphery.

#### (44) Adjacent periphery

A node W is on an adjacent periphery of a phrasal node Z iff W is the highest phonological material on the governing side of Z, and Z is in the argument domain of a head.

[ ... [  
      Z     W

In English, where the government is from left to right, the governing side of a phrase is the left side. In the phrase [<sub>P</sub> [<sub>N</sub> [<sub>N'</sub> it is only P, and not N, which may be mentioned by the rule. What may be carried along with the P head is decided by the Case Filter in (45) and the HPP, which in (46) I propose to be a residue of the Case Filter.

- (45) Case Filter: \*NP     Chomsky (1981)  
                  -CASE

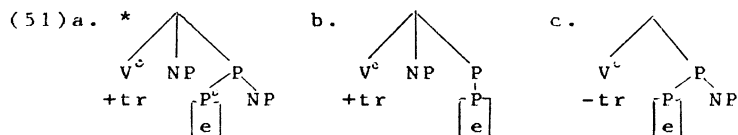
(46) HPP=(20) is a residue of the Case Filter

As the (a) sentences in (47-50) show, some heads which are on the list of the complements which appear with the reduced preposition in are transitive, and require the presence of a complement. This subcategorization requirement is preserved after the insertion, as the (b) sentences show, at the same time providing more evidence for the existence of discontinuous dependencies in the en-prefixed structures - between the moved heads and their complements:

- (47)a. able to study  
 b. enable<sub>i</sub>d her e<sub>i</sub> to study  
 (48)a. have courage to say no  
 b. encourage<sub>i</sub>d me e<sub>i</sub> to say no  
 (49)a. give you title to make the decision  
 b. entitle<sub>i</sub>d you e<sub>i</sub> to make the decision  
 (50)a. a tomb in the pyramid  
 b. entomb<sub>i</sub>ed the Pharaoh e<sub>i</sub> in the pyramid

The combination of the HPP and the Case Filter allows that rule (21) to leave behind any maximal category except for NPs in the position where they cannot get Case. The complements left behind in (47-50) are VPs and PPs and do not require Case.

(51) exemplifies the predications made by the Case Filter:



In (51a) the verb is transitive. The P reanalyzes from a position which is not adjacent to the verb. The NP will therefore lack a case assigner and the structure will be rendered ungrammatical. But in (51b) a movement of an intransitive P from a position nonadjacent to V should be fine. (52) below shows that structures such as (51b) are possible in English:

- (52)a. They up<sub>i</sub>ped my salary e<sub>i</sub>.  
 b. They down<sub>i</sub>ed their weapons e<sub>i</sub>.  
 c. They back<sub>i</sub>ed their car e<sub>i</sub>.

The structure (51a) is represented below as (53a-b), and as predicted it is ungrammatical:

- (53)a. \*They in<sub>i</sub>ned him e<sub>i</sub> the prison.  
 b. \*They in<sub>i</sub>ned him e<sub>i</sub> prison  
 c. They imprison<sub>i</sub>ed him e<sub>i</sub>.

But (53b) is not ruled out by the Case Filter, because the Case Filter refers only to maximal, i.e. specified NPs.[13] The sentence is ruled out by the HPP, which disallows nonmaximal categories on the governed side of a phrase. Therefore, (53c), i.e. movement of a nonmaximal N projection along with the P head, is the only possibility in the grammar of English.

The structures (53a-b) are not ungrammatical because reanalysis of P is not an option of the

parameter. The reanalyzing structure in (51c) is illustrated in (54) with the prefix over.

- (54)a. The house over<sub>i</sub> looks e<sub>i</sub> the bay.  
 b. The cliff over<sub>i</sub> hangs e<sub>i</sub> the shore.  
 c. He over<sub>i</sub> sees e<sub>i</sub> my work.

The Native Reanalysis also occurs with the prepositional prefixes be- and under-. It is studied in detail in a chapter of my dissertation in progress. Basically, it is proposed there that the phrase such as to overlook the bay is related to the phrase to look over the bay. Crucially, it is not the verb, but the prefix, which selects the object NP, which thematically is a Location, not a Theme. These verbs occur in English only with intransitive verbs, exactly what (51) predicts.

- (55)a. throw the ball over the fence  
 b. \*over<sub>i</sub> throw the ball e<sub>i</sub> the fence  
 (56)a. grow cucumbers over the hill  
 b. \*over<sub>i</sub> grow cucumbers e<sub>i</sub> the hill

Even though a verb may select a preposition over, as the (a) sentences of (55-56) show, the preposition may not be moved from this position, because the result of this analysis would be an ungrammatical structure (51a), instantiated in the (b) sentences of (55-56). (57-58) below give evidence that English doesn't allow P doubling as its case strategy:

- (57)a. The house overlooks (\*over) the hill.  
 b. The cliff overhangs (\*over) the shore.  
 (58)a. \*to overgrow cucumbers (over) the hill  
 b. \*to overthrow the ball (over) the fence

As far as the projection of phrases on the ungoverned side of the phrase, the combination of the Case Filter and the HPP again makes correct predictions, and not only for the en-prefixed verbs, but also for other morphological structures of English. If case is assigned under government (Chomsky 1981, Stowell 1981), and if case government is from left to right in English (cf. Koopman 1984 for the notion "direction of case and theta role assignment") then maximal NPs left of the head will not get case. So only nonmaximal NPs may be found to the left of the head in all lexical projections in English.

Keyser and Roeper 1984 stipulate that word formation rules operate on minimal projections, while syntactic frame rules operate on maximal projections. This restriction on rule types explains in their theory

the following contrasts:

- (59) a. the driver of that green car  
b. \*that green car driver
- (60) a. He drives that  $\emptyset$ .  
b. \*a that  $\emptyset$  driver.

But if case is assigned under government, the maximal NPs on the governing side are ungoverned, and will not get case.

That it is Case Theory which is involved in these morphological structures is also evidenced by the contrasts below, where the case-marked pronoun of the reflexive phrase is ungrammatical on the governing side:

- (61) a. { The cell's self-destruction  
b. { The cell's destruction of itself } has not  
c. { \*The cell's itself destruction } yet been  
explained.
- (62) a. { John's self-admiration  
b. { John's admiration of himself } is unlimited.  
c. { \*John's himself admiration }

But again the Case Filter must be supplemented by the HPP to make predictions about maximal phrases other than NPs. Thus, Case Theory alone will not exclude maximal PPs left of the head:

- (63)a. My window {looks right over} the neighbor's  
           b.            \*rightoverlooks                               backyard.  
 (64)a. They put the guy straight in prison.  
           b. \*They straightimprisoned him.

The ungrammatical (b) sentences are excluded by the HPP filter.

If the Case Filter and the HPP are operative principles in the grammar of English, Keyser's and Roeper's stipulation about properties of word formation rules is not necessary. In the modular approach to phrase structure advocated for in Stowell 1981, Koopman 1984, and Travis 1984, Case Filter and a principle of X' syntax such as the HPP parameter provide a logical extension of the Phrase Structure model of morphology developed in Selkirk 1982.

### Some apparent counterexamples

One of the predictions of this analysis is that Goal arguments will never be found with the en-prefixed verbs. But consider the verbs in (65):

(65) imprint, implant, import

These verbs do occur with Goal arguments:

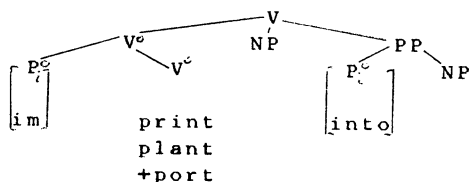
- (66)a. 1374. Ymagynacions of sensible things enpreynted into sowles...  
 b. 1578. The optic sinew is implanted into the middle of the eye.

Should the string im print be analyzed as P-N? In the sentence from Chaucer, the meaning is not that of putting the imaginations in print, but rather pressing them into souls. That the stems of the verbs in (66) are verbal is further confirmed in their conjunction with a causative, impossible with the en-prefixed verbs:

- (67)a. 1605. ...which God hath put and implanted in all creature.  
 b. \*They put and imprisoned him.

We have thus two syntactic tests that the verbs in (65) differ from those in (1). They represent a P doubling structure given below, where a head  $P^c$  is adjoined left to a verb Root (or stem):

(68) The Latinate Subparameter of English:



But if this structure is at all available in English, it is not available in English syntax, because the Native English parameter does not allow P doubling, as was shown with the reanalysis of over (see (57-58)). Doubling is a structure characteristic of the Latinate subparameter of English, and therefore, if the verbs in (65) are given any structure at all, it happens in the Latinate part of the Dictionary. There is nothing in principle wrong with the structure in (68). As a matter of fact, even though it happens to be part of the English Dictionary, it is not at all a marked structure universally. It is one of the aspect forming structures in Polish and other Slavic languages. [14]

The verbs in (65) offer yet another contrast with the en-prefixed verbs - they allow the Stress Shifting Nominalization, impossible with the en-prefixed verbs,

cf. (69) vs. (70-71):

(69)  $[[[im^1[print^2]_V]_V \emptyset]_N \quad [[im^1[plant^2]_V]_V \emptyset]_N$   
 $[[im^1[port^2]_V]_V \emptyset]_N$

(70)  $*[[[imprison^2]_P \emptyset]_V \emptyset]_N \quad *[[[enact^2]_P \emptyset]_V \emptyset]_N$   
 $*[[[enrich^2]_P \emptyset]_V \emptyset]_N$

(71)  $*[[[enlight^2]_P en]_V \emptyset]_N$

The Latinate Zero Nominalization attaches to unsuffixed verbal roots, so (69) is fine. But in (70-71) there is a functioning verbal suffix, therefore the structure for Zero Nominalization is not met. It is argued in Walinska 1982 that while zero suffixes may attach to morphologically complex structures, they may never follow category determining suffixes. In effect, they may only follow Roots. This constraint may be thought of as a universal. The contrast in (69-71) provide additional evidence that there is a zero-suffix in (70).

In conclusion, English speakers may well form their representations of the contrasts between the English parameter and its Latinate subparameter on the basis of syntactic, not merely phonological evidence.

## Conclusion

In this study I have argued for an analysis of the en-prefixed verbs which involves a substantial amount of theoretical abstraction. I propose that "move @" may apply in syntax even in cases where @ is not a maximal projection of a category. Our insistence on application of some nonproductive local rules in syntax claims that the rules not only may follow syntactic constraints, but must do so. I do not a priori model the notion of syntactic rule on the wh-movement of English, and I principally do not expect full productivity of rules which make crucial reference to lexical heads.

Considering the Roots involved in the syntactic derivation of the en-prefixed verbs, there remains no doubt that the derivation is native. Historical evidence confirms that the rule was once fully productive in its domain.[15] In present-day English, it is restricted to several dozen verbs, and the number shrinks, giving way to fully productive movement of N.

The analysis given here, in which the prefix is a positional allomorph of the directional preposition in,

predicts this steady loss of the syntactic importance of "move @", local, @=P. The directional usage of in in present-day English is considerably restricted in comparison to previous stages. Moreover, the prefixal allomorph in is burdened with a device which makes the learning of the rule considerably more difficult: as I proposed in (14), the allomorph subcategorizes not only for a category, but also for a list of Roots. Such a list restriction appears also with the -en realization of the verbal head position (cf. Malkiel 1978). In contrast to these two phonologically expressed affixes, the English verbal head phonologically realized as zero does not carry a list of Roots. Therefore the unsuffixed alternative is taken for more and more Roots (trap NP vs. entrap NP).

That the native prefix en-, as opposed to the Latinate prefix in in inflammable, irrigate, and illuminated, functions as a directional preposition may be also evidenced by the fact that only the latter may be semantically confused with the negative in. Many dictionaries discuss inflammable as a tricky word, because it should mean "not flammable" but in fact means quite the opposite. But an enacted law is never confused with an inactive law, and when someone was imprisoned for five years the speakers know he was in, not out. The native participles enacted or imprisoned are never analyzed as [en[acted]], or [im[prisoned]], while inflammable is.

In effect of this analysis of the en-prefixed verbs the class of English prepositions was augmented with one more member - a nonproductive prefixal alternant of the transitive preposition in, i.e. the prefix en-. While the occurrence of this prefix is lexically restricted, there exists overwhelming evidence that neither semantic lexicalization nor limited productivity is necessarily correlated with violations of syntactic principles. An inclusion of morphological structures to the syntactic theory provides a greater insight into the former, and the latter.

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#### Notes

1. The argumentation that the prefix en- is a member of the category P, which is central to this paper, goes hand-in-hand with Emonds' 1972 argumentation that particles are (intransitive) prepositions. Essentially, Emonds argues that "particle" is not a grammatical category, but "preposition" is. The claim here, and in Walinska (1982) is that prefix is not an X-bar category, but a preposition is. The etymology of the terms "prefix" and "particle" is quite indicative of a theoretical shortcoming.
2. This elegant solution to the messy problem is due to J. Emonds (pc).
3. Very much like in the be/by alternation, where be- takes side, cause, low, while by takes Nmax.
4. Parts of words were treated as arguments to abstract causative and inchoative operators in Lakoff (1963, 1970). One central idea here is thus nothing new, though there exist major formal differences between Lakoff's original proposal and the one developed here and my work in progress. This is to be expected taking into account the development of the X-bar theory, the theory of semantic roles, abstract case, local rules, etc. Of importance for the proposal in this paper is acknowledgement of syntactically simple monomorphemic causatives. Thus the zero-head position in this theory encompasses two operators used by Lakoff - the causative and the inchoative. There is strong syntactic and psychological evidence for existence of such syntactically monomorphemic, but semantically complex operators. cf. Emonds 1985, Clark 1978.
5. In Emonds 1985, ch.1 "direct assignment of a theta role" is to a sister.
6. The extremely interesting question of whether there is a trace left in the en-prefixed structures and what are its properties goes beyond the limits of this paper. It will be discussed in my dissertation.
7. Kiparsky 1983 uses a similar test of productivity of zero-derivation with instrumentals. The data in (22-24) again confirm that en- is not a level 1 prefix.
8. This matching may be understood as the ability of a

lexical Root to select semantically the arguments under the complex symbol.

9. The Dictionary will list enjoy NP with its sense of "have NP." It will provide the split selection and subcategorization for insure, ensure, and assure, etc.

10. This system thus makes it possible to synchronically separate some borrowings, which entered the English system through the Dictionary, from derivable structures. This may be achieved only if the lexical material to be moved is inserted into syntactic argument positions - such positions are never headed by non-words.

11. The unavailability of phrasal projections in the Lexicon will furthermore exclude the derivation of en-verbs by the Lexical Redundancy Rule proposed for conversion by Lieber 1980.

12. The non-iterativity of zero-derivation may be explained in another way, if the position adjacent to zero-head is an operator position, sort of lexical Comp. I take this view in my dissertation.

13. Pesetsky's 1982 study of genitive/accusative alternation in Russian clearly shows that assignment of case is dependent on the properties of the spec(N).

14. Following Anderson (1982), one might say that the Slavic aspectual structures are formed in the syntax because they are syntactically relevant, thus inflectional. In my view the notion of syntactic relevancy is much broader than the one discussed by Anderson and encompasses many traditionally derivational and not fully productive structures. The syntactic execution of derivational structures is possible because my theory excludes the category-changing rule as a possible or necessary rule of grammar. cf. Walinska 1984.

15. Strong-Jensen (1982) argues that en- is semi-productive in present-day English, quoting such neologisms from Marchand as: embus (1915), envision (1921), emplane (1923). She adds entrain (1982). She also argues that en- is a level 2 affix of the basis of its failure to undergo Lateral Deletion.

## Bibliography

- Allen, M. 1978. Morphological Investigations. Ph.D. Dissertation, MIT.
- Anderson, S.R. 1982. Where's Morphology? LI 13:4.571-612.
- Baltin, M. 1982. A Landing Site Theory of Movement Rules. LI 13:1.
- Chomsky, N. 1965. Aspects of the Theory of Syntax. MIT Press.
- , 1981. Lectures on Government and Binding. Foris.
- Clark, E. 1978. Discovering What Words Can Do. Papers from the Parasession on the Lexicon: 34-57. GLS, Chicago.
- Clark, E. and H.H. Clark. 1979. When Nouns Surface as Verbs. Language 55.
- Culicover, P.W. and W.K. Wilkins. 1984. Locality in Linguistic Theory. Academic Press.
- Dowty, P. 1979. Word Meaning and Montague Grammar. D. Reidel.
- Emonds, J. 1972. Evidence That Indirect Object Movement is a Structure Preserving Rule. Foundations of Language 8.546-561.
- , 1976. A Transformational Approach to English Syntax. Academic Press.
- , 1982. The Prepositional Copula AS. Linguistic Analysis 8.
- , 1985. A Unified Theory of Syntactic Categories. Foris.
- Fiengo, R. 1980. Surface Structure. The Interface of Autonomous Components. Harvard University Press.
- Halle, M. 1972. Prolegomena to a Theory of Word Formation. LI 3:1.3-16.
- Jackendoff, R. 1977. X-Bar Syntax: a Study of Phrase Structure. LI Monograph No. 2.
- Keyser, S.J. and T. Roeper. 1984. On the Middle and Ergative Construction in English. LI 15:3.
- Kiparsky, P. 1982. Word Formation and the Lexicon. In F. Ingeman (ed.), Proceedings of the 1982 Midamerica Linguistic Conference.
- , 1983. Lexical Morphology and Phonology. In I.-S. Yang (ed.), Linguistics in the Morning Calm. Seoul, Hanshin.
- Koopman, H. 1984. The Syntax of Verbs. Foris.
- Lakoff, G. 1970 (1965). Irregularity in Syntax. Holt, Reinhart and Winston.
- Lieber, R. 1980. On the Organization of the Lexicon. Ph.D. Dissertation, MIT.
- Lobeck, A. 1984. Evidence for the Notion of Argument Domain. LSA talk.

- Malkiel, Y. 1978. In J. Greenberg (ed.), *Universals of Human Language*, Vol 3. Stanford University Press.
- Marchand, H. 1969. *The Categories and Types of Present-Day English Word Formation*. Minchen, C.H. Beck.
- Moortgat, M. 1981. Subcategorization and the Notion 'Lexical Head'. In S. Daalder et al (eds.), *Linguistics in the Netherlands*. Amsterdam, North Holland.
- Namiki, T. 1982. *The Notion 'Head of Word' and Core and Periphery Word Formation*. *Studies in English Linguistics*, Vol 10.
- Oxford English Dictionary.
- Pesetsky, D. 1982. *Paths and Categories*. Ph.D. Dissertation, MIT.
- . 1985. Morphology and Logical Form. LI 16.
- Randall, J.A. 1983. Lexical Approach to Causatives. *Journal of Linguistic Research* 2:3.
- Rose, J.H. 1973. Principled Limitations on Productivity in Denominal Verbs. *Foundations of Language* 10.509-26.
- Selkirk, E. 1982. *The Syntax of Words*. LI Monograph No. 7.
- Siegel, D. 1974. *Topics in English Morphology*. In M.J. Stein (ed.), NLS 8. University of Massachusetts.
- Strong-Jensen, M. 1982. *Morphological Head and Constraints on Word Structure*. Ms. University of Ottawa.
- Stowell, T. 1981. *The Origins of Phrase Structure*. Ph.D. Dissertation, MIT.
- . 1983. *The Direction of Government*. WCCFL 2.
- Travis, L. 1984. *Parameters and Effects of Word Order Variation*. Ph.D. Dissertation, MIT.
- Walinska deHackbeil, H. 1982. *Morphosyntactic Restrictions on Noun-Verb Conversion in English*. University of Washington Working Papers 7.
- . 1983a. *X-Bar Categories in Morphology*. Papers from the Parasession on the Interface of Phonology, Morphology, and Syntax. CLS, Chicago.
- . 1983b. *Lexical Properties of Lexical Items*. Ms. University of Washington.
- . 1984. *On Two Types of Derived Nominals*. Papers from the Parasession on Lexical Semantics. CLS, Chicago.
- Williams, E. 1981. On the Notion 'Lexically Related' and the Head of Word. LI 12.245-274.

# OBJECTS IN SERBO-CROATIAN

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The aim of this paper is to characterize the class of object grammatical arguments in Serbo-Croatian.<sup>1</sup> The analysis will be presented in the framework of Lexical Functional Grammar, henceforth LFG (cf. Kaplan and Bresnan 1982), and the exposition is organized as follows: part 1 deals with the case-marking of objects, part 2 explores the phrasal positions which object NP's can assume, and part 3 focuses on broader implications of this analysis for the grammar of Serbo-Croatian.

## 1. Case-marking of objects

I will first focus on the case-marking of objects in Serbo-Croatian. We can say that in principle any second argument of a dyadic predicate is a potential object, assuming that objects may have lexically governed or irregular case. To illustrate this point, consider cases listed in (1) - (4).

- (1) *Policija je uhapsila Pavla.*  
 Police(NOM) Aux arrested Pavle(ACC)
- (2) *Petar pomaže Mariji*  
 Petar(NOM) helps Marija(DAT)
- (3) *Petar se boji Marije.*  
 Petar(NOM) fears Marija(GEN)
- (4) *Petar upravlja tom firmom*  
 Petar(NOM) manages that firm(INS)

The verb *uhapsiti* 'arrest' in (1) has an accusative second argument, in (2) the verb *pomagati* 'help' has a dative argument, *bojati se* 'fear' in (3) has a genitive second argument, and *upravljati* 'manage' in (4) takes an instrumental second argument. I will argue here that only the verbs in (1) and (3), i.e. 'arrest' and 'fear' are transitive. Or, more generally, that objects occur either in the accusative or the genitive, but not in the instrumental or the dative, as summarized in (5):

- (5)
- |     |     |     |     |     |
|-----|-----|-----|-----|-----|
|     | ACC | GEN | DAT | INS |
| OBJ | ✓   | ✓   | —   | —   |

The argument will be based on the applicability of lexical rules, the only productive component in an LFG grammar. In particular, it will be assumed that certain lexical rules are sensitive to the transitivity of input lexical forms. A classical case is the personal

passive, which operates solely on transitive lexical forms. However, passive may not be a highly reliable test for transitivity, since it may be restricted in certain languages to a subset of objects with regular case-marking. Thus, assuming that passivization can sometimes be blocked by irregular case-marking, we may find verbs with second arguments in an oblique case which do not passivize, and yet have no conclusive argument concerning their transitivity.

This is exactly the situation we find in Serbo-Croatian. Verbs like *uhapsiti* 'arrest', illustrated in (1), are fairly uncontroversial: the second argument of 'arrest' is in the accusative case and, as shown in (6), it readily passivizes.

- (6) Pavle je uhapsen.  
Pavle(NOM) is arrested

But, since none of the verbs listed in (2) - (4) pass this test of transitivity, as shown in (7) - (9), further evidence is needed to decide whether they are transitive or not.

- (7) \*Marija je pomognuta.  
Marija(NOM) is helped

- (8) \*Marija je bojana.  
Marija(NOM) is feared

- (9) \*Firma je upravljana.  
Firm(NOM) is managed

The next test to be applied is the ability of a lexical form to undergo a rule like Impersonalization. In a sense, this is a negative test, since Impersonalization will be blocked by the presence of OBJ. In other words, a transitive lexical form will fail to undergo this rule. The effect of this lexical rule is to "eliminate" the subject and introduce the morpheme *se*, which I analyze as an impersonal subject.<sup>2</sup> The rule of Impersonalization can be stated as in (10):

(10) **Impersonalization**

(\*SUBJ PRED) = 'one'

(\*SUBJ NUM) = SING

(\*SUBJ PERS) = 3

(\*SUBJ GEND) = NEUT

$\neg$ (\*OBJ)

This rule says that *se* acts as an impersonal subject in third person singular form; and

$\neg(\uparrow\text{OBJ})$  captures the fact that it operates only on intransitive forms. Thus, a verb like *polaziti* 'leave', which is intransitive, can undergo this rule, as shown in (11). But this is not the case with the transitive verb *uhapsiti* 'arrest', hence the ill-formedness of (12b).

- (11) a. Petar polazi u pet.  
Peter leaves at five

- b. Polazi se u pet.  
Leaves SE at five  
'One leaves at five.'

- (12) a. Policija je uhapsila Pavla.  
Police(NOM) Aux arrested Pavle(ACC)

- b. \*Uhapsilo se Pavla.  
arrested SE Pavle(ACC)

(13) - (15) show how Impersonalization operates on the remaining lexical forms listed in (1) - (4). *Bojati se* 'fear' in (13), whose second argument is in the genitive case, fails to undergo Impersonalization, as shown by the ill-formedness of (13b). But *pomagati* 'help' and *upravljati* 'manage' readily undergo this rule, i.e. behave like intransitives.

- (13) a. Petar se boji Marije.  
Petar(NOM) fears Marija(GEN)

- b. \*Bojalo se Marije.  
(One) feared Marija(GEN)

- (14) a. Petar pomaže Mariji.  
Petar(NOM) helps Marija(DAT)

- b. Pomagalo se Mariji.  
(One) helped Marija(DAT)

- (15) a. Petar upravlja tom firmom vrlo dobro.  
Petar(NOM) manages that firm(INS) very well

- b. Tom firmom se upravlja vrlo dobro.  
That firm(INS) SE manage very well

The evidence we have suggests that verbs like *uhapsiti* 'arrest' with accusative second arguments subcategorize for objects, since they pass both tests for transitivity; and that those verbs whose second arguments are in the dative or instrumental, and which fail both tests for transitivity, subcategorize for oblique arguments. The relevant lexical forms are listed in (16) - (18):

- (16) *uhapsiti* V (†PRED) = 'arrest <(†SUBJ) (†OBJ)>'  
 (17) *pomagati* V (†PRED) = 'help <(†SUBJ) (†OBL<sub>DAT</sub>)>'  
 (18) *upravljati* V (†PRED) = 'manage <(†SUBJ) (†OBL<sub>INS</sub>)>'

It remains to be resolved, however, what would present an adequate analysis of a verb like *bojati se* 'fear' with a genitive argument. In the case of Passive it patterns with intransitive lexical forms, and in the case of Impersonalization with transitive lexical forms. The remarks made earlier about the nature of Passivization in languages with extensive case-marking are relevant here. I will assume that arguments which carry irregular case exhibit the so-called case preservation property, as proposed in Zaenen and Maling (1983), and that this property will affect their ability to passivize.<sup>3</sup> In other words, given the fact that *bojati se* 'fear' fails to undergo Impersonalization, I will maintain that it patterns with transitives but does not passivize because of the irregular case feature on the OBJ argument.<sup>4</sup> The lexical form for *bojati se* 'fear' is given in (19):

- (19) *bojati se* V (†PRED) = 'fear<(†SUBJ) (†OBJ)>  
 (†OBJ CASE) = GEN

I propose, then, to analyze as object any second argument of a dyadic predicate<sup>5</sup> whose case is either accusative or genitive.<sup>6</sup> This claim is based on the applicability of the Impersonalization rule and its restrictedness to intransitive contexts. The relevant facts are summarized in (20):

(20)	Impersonalization	
	does apply	doesn't apply
'arrest'		✓
'help'	✓	
'fear'		✓
'manage'	✓	

I will now show that the proposed analysis is supported by another area of Serbo-Croatian grammar. The question to be addressed next is the phrasal positions of OBJ grammatical arguments.

## 2. C-structure positions of objects

Both accusatives and genitives can occur either in clitic or in non-clitic form, and I will propose a set of c-structure rules which will account for regularities governing cliticization.

The order of major constituents is generally free in Serbo-Croatian. Thus, grammatical arguments, including objects, are freely ordered with respect to the verb. The constituent structure rules in (21), where AUX dominates the clitic constituents, capture some of these facts.<sup>7</sup>



- (21)  $S \rightarrow X \text{ AUX } X^*$   
 where  $X = \text{NP, V'}$

Assign  $(\uparrow G) = \downarrow$  to NP, where  $G = \text{SUBJ, OBJ, or OBL}$

Assign  $\uparrow = \downarrow$  to  $V'$

Clitics, however, occupy a fixed position, so-called second sentential position, and appear in strictly ordered sequences. Before providing a rule which expands the AUX, I need to address certain issues concerning internal ordering of clitics. It is traditionally assumed (e.g., Maretić 1931, Browne 1974) that table (22) captures the positions available within the clitic complex: Slot I contains the interrogative particle *li*. Slot II contains the auxiliary forms; those listed here are forms of the auxiliary *biti* 'be', whose third person singular occupies slot VI. The forms of the other auxiliary, *hteti* 'want', occupy only slot II. Slot III contains dative clitics, and slots IV and V contain genitive and accusative clitics, respectively.

- (22)

I	II	III	IV	V	VI
interrogative particle	auxiliary	dative	genitive	accusative	auxiliary
li	1sg sam 2sg si	mi ti mu	me te ga	me te ga	3sg je
	1pl smo 2pl ste 3pl su	joj nam vam im	je nas vas ih	je nas vas ih se	

Given this analysis of the clitic complex, it appears that cliticization is governed entirely by case. Thus, dative NP's should cliticize into slot III, genitive NP's into slot IV, and accusative NP's into slot V, regardless of the function they perform. In what follows I will argue against this analysis by pointing to certain wrong predictions that it makes. The position I will argue for is that cliticization is governed by grammatical function.

The analysis presented in (22) predicts that in the case of triadic predicates like *dati* 'give', with an accusative object and a dative, or *osloboditi* 'free', with an accusative object and a genitive, one could cliticize either the accusative or the non-accusative argument, or both.

However, while this is true of *dati* it is not true of *osloboditi*. The dative and the accusative cliticize independently, as shown in (23) which exhibits the cliticization possibilities of *dati*; but in (24) the cliticization facts do not match the predictions of table

(22). Table (22) allows simultaneous cliticization of a genitive and an accusative. This is falsified by the ill-formedness of (24b). Next, table (22) predicts that either the genitive or the accusative could cliticize. Note, however, that this is possible in the case of an accusative but not a genitive, as shown by the ill-formedness of (24d).

- (23) a. Petar je dao Mariji poklon.  
 Petar(NOM) Aux gave Marija(DAT) present(ACC)
- b. Petar joj ga je dao.  
 Petar(NOM) her(Cl-DAT)it(Cl-ACC) Aux gave
- c. Petar joj je dao poklon.  
 Petar(NOM) her(Cl-DAT) Aux gave present(ACC)
- d. Petar ga je dao Mariji.  
 Petar it(Cl-ACC) Aux gave Marija(DAT)
- (24) a. Petar će Mariju osloboditi straha.  
 Petar(NOM) Aux Marija(ACC) will-free of-fear(GEN)
- b. \*Petar će ga je osloboditi.  
 Petar Aux of-it(Cl-gen) her(Cl-ACC) will-free
- c. Petar će je osloboditi straha.  
 Petar Aux her(Cl-ACC) will-free of-fear(GEN)
- d. \*Petar će ga osloboditi Mariju.  
 Petar(NOM) Aux of-it(Cl-gen) will-free Marija(ACC)

These facts may suggest that genitive NP's never cliticize. However, those genitives that we analyze as objects do cliticize, as shown in (25).

- (25) a. Petar se boji Marije.  
 Petar se fears of-Marija(GEN Sg)
- b. Petar je se boji.  
 Petar of-her(Cl) se fears

The analysis presented in (22) leaves all these facts unexplained. But if we recall the characterization of objects offered earlier (second arguments in the accusative or genitive case), we can see that it is precisely those arguments that cliticize in (24c) and (25). Note, furthermore, that the elements in IV and V, i.e. the genitive and accusative clitics, are identical in form (if one disregards the clitic *se*, which will be dealt with in a moment). This, together with the cliticization facts in (23), (24), and (25), strongly suggests that there may be only one clitic position for genitives and accusatives, which is associated solely with the object grammatical function. Thus, I will propose here a revised clitic ordering, as shown in table (26):

**(26) Revised clitic complex**

I	II	III	IV	V
interrogative particle	auxiliary	dative	genitive/ accusative	auxiliary/se
li	sam	mi	me	je
	si	ti	te	se
	etc.	etc.	etc.	

In the revised version of the clitic complex (26), slots IV and V are collapsed, and *se* shares a slot with the auxiliary form *je*. Furthermore, the genitive/accusative slot IV will be associated with the object function while slot three will be occupied by (dative) obliques. Thus, this analysis accounts for an apparent gap in the system: that genitive obliques do not cliticize. This leads me to propose that in Serbo-Croatian cliticization is governed not by case but by grammatical function.

A few remarks are in order concerning the clitic *se*. The traditional analysis presented in table (22) rests on the assumption that *se* patterns with the accusative clitics and lists it in slot V. By moving *se* into the final slot of the revised clitic complex (26) I have tacitly questioned this assumption and will now provide arguments for doing so.<sup>8</sup>

But let me first briefly summarize evidence presented in support of the claim that *se* is an accusative, i.e. object clitic (cf. Browne 1974, Ivic 1962, 1967). First, it has been argued that all accusative (i.e. object) pronouns have clitic and non-clitic forms, and that in this respect *se* makes no exception. Thus, according to table (27), each full accusative form has a corresponding clitic form.<sup>9</sup>

**(27) Accusative (object) pronominal forms**

full forms	clitic forms
mene	me
tebe	te
njega	ga
nju	je
nas	nas
vas	vas
njih	ih
sebe	se

Next, it has been claimed that members of each pair listed in (27), including *sebe* and *se*, present alternant forms which are in complementary distribution, as illustrated in (28) and (29).<sup>10</sup>

(28)	a.	Petar	brani	mene.
		Petar	defends	me
	b.	Petar	me	brani.
		Petar	me(Cl)	defends

- (29) a.    Petar            brani            sebe.  
          Petar            defends          himself
- b.    Petar            se                brani.  
          Petar            himself(Cl)    defends

The first claim rests on a potentially misleading assumption: that morphological similarity ought to be paralleled by syntactic similarity. But if we allow that this need not necessarily be so, we can offer an alternative explanation for the complementarity of clitic and non-clitic pronouns in (28) and (29). Grimshaw (1982) has argued that French reflexives are markers of intransitivity. Indeed, there is good evidence internal to Serbo-Croatian that a similar case can be made for the Serbo-Croatian reflexive *se*. I can provide two arguments that *se* does not pattern syntactically with *sebe*. The first one, based on the comparative construction, is presented in (30):

- (30) a. Petar    je branio    mene    uspešnije nego Anu.  
          Petar(NOM) Aux defended me(ACC) better    than Ana(ACC)
- b. Petar    me            je branio    uspešnije nego Anu.  
          Petar(NOM) me(Cl-ACC) Aux defended better    than Ana(ACC)
- c. Petar je branio    sebe    uspešnije nego Anu.  
          Petar AUX defended himself better    than Ana(ACC)
- d. \*Petar se branio    uspešnije nego Anu.  
          Petar SE defended better    than Ana(ACC)

While *sebe* does pattern with the accusative pronouns *mene* and *me*, *se* does not, as shown by the ill-formedness of (30d). In other words, it appears that *se* has an intransitivizing effect on the lexical form in which it occurs. If so, we expect that lexical forms with this intransitivizing, reflexive *se* undergo the Impersonalization rule, a fairly reliable transitivity test for Serbo-Croatian, and this is exactly what happens, as shown in (31d). Note that the presence of object NP's *mene*, *me*, and *sebe*, blocks Impersonalization, hence the ill-formedness of (31 a,b,c).

- (31) a. \*Branilo se mene.  
          Defended SE me
- b. \*Branilo me se.  
          Defended me SE
- c. \*Branilo se sebe.  
          Defended SE oneself

- d. Branilo se.  
 Defended SE  
 'One defended oneself.'

In order to account for these data, I will postulate two distinct lexical forms for the verb *braniti* (cf. (32a) and (32b)), one transitive and one intransitive, and relate them by the lexical rule of Reflexivization listed in (33), which has an intransitivizing effect.<sup>11</sup>

(32) a. *braniti* V ( $\uparrow$ PRED) = 'defend <( $\uparrow$ SUBJ)( $\uparrow$ OBJ)>'

b. *braniti* V ( $\uparrow$ PRED) = 'defend <( $\uparrow$ SUBJ)  $\emptyset$  >'  
 $\neg(\uparrow$ OBJ)

(33) **Reflexivization**<sup>12</sup>

( $\uparrow$ OBJ)  $\rightarrow \emptyset$

$\neg(\uparrow$ OBJ)

This analysis is further supported by the fact that there is independent motivation for having *se* in the same clitic slot as *je*. As illustrated in (34), *se* and *je* cannot cooccur.

(34) a. \*Petar se je branio.  
 Petar(NOM) himself Aux defended(3,Sg,M)

b. Petar se branio.  
 Petar(NOM) himself defended(3,Sg,M)

Note, however, that the constraint exemplified in (34) happens to be a pure idiosyncrasy: if an auxiliary other than *je* appears in a sentence it freely cooccurs with *se*, as is the case with the auxiliary *su* in (35):

(35) Petar i Marko su se branili.  
 Petar and Marko(NOM) Aux themselves defended(3,Pl,M)

I can now propose an AUX c-structure rule which provides the five slots of the revised clitic complex (26). Rule (36) has five clitic positions; and CL<sub>4</sub>, a position for genitive and accusative clitics, has a single annotation ( $\uparrow$ OBJ)=|.

$$(36) \text{ AUX } \rightarrow (\text{CL}_1) \quad (\text{CL}_2) \quad (\text{CL}_3) \quad (\text{CL}_4) \quad (\text{CL}_5)$$

$$\quad \uparrow=\downarrow \quad \uparrow=\downarrow \quad (\uparrow\text{OBJL})\downarrow (\uparrow\text{OBJ})\downarrow \quad \uparrow=\downarrow$$

### 3. Closing remarks

To sum up, I have made two claims regarding the characteristics of object grammatical arguments in Serbo-Croatian. First, objects occur either in the genitive or in the accusative case. Next, while non-clitic object NP's do not occupy a fixed phrasal position, objects in clitic form occupy a single clitic position regardless of their case-marking.

A test case for this analysis will be a phenomenon in Serbo-Croatian grammar comparable to *ne*-cliticization in Italian (cf. Belletti and Rizzi 1981, Perlmutter 1983). Specifically, cliticization from phrases like *mnogo ljudi* 'many people' is permitted in some but not all cases. I will first briefly sketch an analysis of these phrases, and then attempt to account for the cliticization pattern.

Phrases like *mnogo ljudi* 'many people', where *mnogo* is an undeclinable form and *ljudi* occurs in the genitive case, will be generated here by the c-structure rule in (37). *Mnogo* will be assigned to Q, and *ljudi* to N.

$$(37) \text{ NP } \rightarrow (\text{QP}) \quad (\text{N}')$$

$$\quad (\uparrow \text{SPEC})=\downarrow \quad \uparrow=\downarrow$$

The genitive of the noun *ljudi* 'people' is the so-called partitive genitive, restricted to mass and plural nouns. I will assume that partitive genitive affix assigns semantic case, and has the following lexical entry:

$$(38) \text{ -i AFF } (\uparrow \text{PRED}) = \text{'of} < (\uparrow \text{PART}) >'$$

$$\quad (\uparrow \text{PART CASE}) = \text{GEN}$$

$$\quad \neg (\uparrow \text{PART COUNT}) = + \mid (\uparrow \text{PART NUM}) = \text{PL}$$

The f-structure of *mnogo ljudi* 'many people' is given in (39), with *ljudi* 'people' performing the partitive (PART) function.<sup>13</sup>

$$(39) \left[ \begin{array}{l} \text{PRED} \quad \text{'of} < (\text{PART}) > ' \\ \text{PART} \left[ \begin{array}{l} \text{PRED} \quad \text{'ljudi'} \\ \text{CASE} \quad \text{GEN} \\ \text{NUM} \quad \text{PL} \end{array} \right] \\ \text{SPEC} \left[ \text{PRED} \quad \text{'mnogo'} \right] \end{array} \right]$$

Note that the *mnogo* phrase can function as subject, object, or adjunct, as shown in (40a), (40b), and (40c), respectively. The phrase *ljudi* 'people' in (40a) and (40b) and the

phrase *godina* 'years' in (40c) are in the genitive.

- (40) a. Petar poznaje *mnogo ljudi*.  
 Petar(NOM) knows many of-people(GEN)
- b. *Mnogo ljudi* poznaje Petra.  
 Many of-people(GEN) know Petar(ACC)
- c. Petar je živeo u Njujorku *mnogo godina*.  
 Petar(NOM) AUX lived in New York many of-years(GEN)

If partitive genitive is semantic case, as I propose, genitive clitic pronouns should also have corresponding partitive forms. However, our analysis predicts that only (40a) should have a cliticized version, and that is exactly what happens:

- (41) a. Petar ih poznaje mnogo.  
 Petar(NOM) of-them(CI-GEN) knows many
- b. \*Petra ih poznaje mnogo.  
 Petar(ACC) of-them(CI-GEN) know many
- c. \*Petar ih je živeo u Njujorku mnogo.  
 Petar(NOM) of-them(CI-GEN) Aux lived in New York many

(41a) shows that cliticization is possible from (40a), where the *mnogo* phrase acts as object. But it is not possible from (40b), where it acts as subject or from (40c), where it acts as time adjunct, as shown by the ill-formedness of (41b) and (41c). If cliticization were governed by case, we would expect to have cliticized versions of all three sentences in (40).

Note that no stipulation was needed to account for the cliticization pattern in (41). That is to say, I did not have to stipulate either that Serbo-Croatian objects are definable in abstract configurational terms, i.e. that they are  $[NP]_{VP}$ , which would be a necessary assumption of an analysis along the lines of Belletti and Rizzi (1981); or that cliticization from a *mnogo* phrase is possible only when it is an object, a proposal that would follow from Perlmutter (1983). The analysis of Serbo-Croatian data presented here is based on the assumption that cliticization from a *mnogo* phrase is governed by independently motivated constraints on cliticization. Furthermore, if stated in terms of grammatical functions, those constraints prove to be fairly simple and general. Thus, the ill-formedness of (41b) and (41c) follows from an independent fact that genitive NP's can cliticize only if they are objects<sup>14</sup>

## Notes

<sup>1</sup>Serbo-Croatian has a full-fledged case system, with nouns marked for the nominative (NOM), genitive (GEN), dative (DAT), accusative (ACC), instrumental (INS) and locative (LOC) case. In addition, Serbo-Croatian has a relatively free word order; although it is generally assumed that it is an SVO language, major sentential constituents can in fact appear in practically any mutual order. Another important fact about Serbo-Croatian is the occurrence of clitic elements in the second sentential position, where "second sentential" means either after a first word or after a first constituent.

<sup>2</sup>Compare Rizzi's (1982) analysis of Italian impersonal *si* which makes a similar claim.

<sup>3</sup>Verbs with irregularly case-marked objects passivize in Icelandic (cf. Zaenen and Maling 1983), but the subject of the passive form retains the case-marking of the object in the corresponding active form. Interestingly, this correlates with an independent fact, that Icelandic generally allows oblique case-marking on subjects. Although I have no further evidence for this position, it seems reasonable to assume that this type of passivization may be directly correlated with the availability of oblique case-marking for subjects. Note also that Serbo-Croatian subjects appear only in the nominative case.

<sup>4</sup>Russian also has a class of verbs with with second arguments in the genitive case which can be thought of as irregularly case-marked objects. Butorin (1966) and Timberlake (1977) report that this class of verbs shows a marked tendency to appear with the accusative, a regular case-marking for objects in Russian.

<sup>5</sup>Predicates with more than two arguments appear to take only accusative objects.

<sup>6</sup>The analysis of Serbo-Croatian objects proposed in Ivic (1967) makes claims similar to mine about the case-marking of objects.

<sup>7</sup>As mentioned in note 1, clitics can appear either after a first word or after a first constituent. The rules in (21) capture only the latter case.

<sup>8</sup>Note that we would not be able to generate sentences like (25b) with the *se* occupying slot IV of the revised clitic complex.

<sup>9</sup>For example, Browne (1974, p.38) describes *se* as "the enclitic accusative of the reflexive pronoun".

<sup>10</sup>Ivic (1962, 1967) maintains that in this use *se* is a combinatorial variant of *sebe*. Likewise, Browne (1974) introduces a feature [+/- Full], which distinguishes between the full and cliticized forms of the personal pronouns. In particular, he assumes a parallelism between *mene* and *sebe*, both [+ Full], and between *me* and *se*, which are both [-Full].

<sup>11</sup>The clitic *se* acts both as an impersonal subject and as a marker of lexical reflexives. This can be captured by the following lexical entry:

*se* CL (( $\uparrow$ SUBJ PRED) = 'one')  
 $\neg$ ( $\uparrow$ OBJ)

The optional PRED feature will appear with impersonal forms, where *se* is an



argument, but not with reflexives, where it is an intransitivity marker. Note, however, that the *se* form occurring with the verb *bojati se* 'fear' is compatible with OBJ arguments (cf. the lexical form in (19)) and thus appears to be a different morpheme. My guess would be that its effect is to constrain the case feature on the OBJ, since verbs which take genitive objects invariably cooccur with *se* (for example, *kloniti se* 'keep away from', *setiti se* 'remember', *dokopati se* 'grab upon', *stideti se* 'be ashamed').

<sup>12</sup>Grimshaw also included into the formulation of this rule an operation on predicate argument structure, whereby one argument is bound to another. This part of the rule is expressed as follows:

pred < .. x .. y ..> --> pred < .. x .. x .. >

<sup>13</sup>An advantage of this analysis is that it brings out a parallel with genitive objects, which alternate with accusatives on a fairly regular basis. They, too, are constrained to mass or plural nouns, and can be analyzed as cases of partitive genitive, the only difference being that they lack the SPEC constituent:

(i) a. Petar je kupio groždje/groždja  
       Petar(NOM) Aux bought grapes(ACC,SG)/(GEN,SG)

b. Petar je kupio jabuke/jabuka  
       Petar(NOM) Aux bought apples(ACC,PL)/(GEN,PL)

<sup>14</sup>I would like to thank Joan Bresnan for many useful suggestions about the material in this paper. Of great help have been comments on earlier versions by Joan Bresnan, Masayo Iida, Megumi Kameyama, Peter Sells, Elizabeth Traugott, and Annie Zaenen. And thanks go to Peter Sells for helping me to get the paper into its present form.

## References

- Belletti, A. and Rizzi, L. 1981 The syntax of 'ne': some theoretical implications. *The Linguistic Review* 1. 117 - 154.
- Butorin, D.I. 1966 Ob osobih slučajih upotrebljenja vinitel'nogo prjamogo ob'jekta v sovremennom ruskom literaturnom jazyke. Kačevskaja, K.A. and Gorbačevič, K.S. eds. 1966 *Normy sovremennogo ruskogo literaturnogo slovoupotrebljenja*. Moscow-Leningrad: Nauka.
- Browne, W. 1974 On the problem of enclitic placement in Serbo-Croatian. In Brecht, R.D. and Chvany, C.V. eds. 1974 *Slavic Transformational Syntax*. Ann Arbor, Michigan: Michigan Slavic Materials.
- Grimshaw, J. 1982 On the lexical representation of Romance reflexive clitics. In Bresnan, J. ed. 1982 *The Mental Representation of Grammatical Relations*. Cambridge, Mass.: MIT Press.
- Ivić, M. 1962 Jedan problem slovenske sintagmatike osvetljen transformacionom metodom. *Juznoslovenski filolog* 25. 137 - 151.
- Ivić, M. 1967 Types of direct object in Serbocroatian. In *To Honor Roman Jakobson. Essays on the Occasion of his Seventieth Birthday*. Mouton: The Hague.
- Kaplan, R. and Bresnan, J. 1982 Lexical-functional grammar: a formal system for grammatical representation. In Bresnan, J. ed. 1982 *The Mental Representation of Grammatical Relations*. Cambridge, Mass.: MIT Press.
- Maretić, T. 1931. *Gramatika i stilistika hrvatskog ili srpskoga književnog jezika*. Zagreb.
- Perlmutter, D. 1983 Personal vs. impersonal constructions. *Natural Language and Linguistic Theory* 1. 141 - 201.
- Rizzi, L. 1982 A restructuring rule. In Rizzi, L. 1982 *Issues in Italian Syntax*. Dordrecht: Foris Publications.
- Timberlake, A. 1977 Reanalysis and actualization in syntactic change. In Li, C.N. ed. *Mechanisms of Syntactic Change*. Austin: University of Texas Press.
- Zaenen, A. and J. Maling 1983 Passive and oblique case. In Levin, L., Rappaport, M. and Zaenen, A. eds. 1983 *Papers in Lexical-Functional Grammar*. Bloomington, Indiana: Indiana University Linguistics Club.

# How to describe inflection\*

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1. *An overview.* The aim of this paper is to sketch a framework for describing systems of inflectional morphology. In so doing I shall be making many implicit claims about the nature of language - not merely about a convenient formalism for stating generalizations and listing idiosyncratic facts - but the focus of my presentation here will be simply to show how the framework can be applied to some reasonably complex arrays of inflectional forms.

My intellectual debts in this enterprise are considerable. First, to the work of Peter Matthews (1965, 1972), Stephen Anderson (1977, 1982), Rich Janda (1983), and others who have resuscitated process morphology within modern approaches to formal grammar. Second, to Andrew Carstairs (1981, 1983), Wolfgang Wurzel (to appear), Fred Karlsson (to appear), and other writers who have stressed that paradigms are not mere arrays of forms, but have internal organization of considerable interest. Third, to Paul Kiparsky (1982a, b) and other proponents of 'lexical' morphology and phonology, whose work (along with Anderson's) raises urgent questions about the relationships among syntax, inflectional morphology, derivational morphology, phonology, and the lexicon.

My focus is on what have been called, by various writers, *rules of allomorphy* or *morpholexical rules*, insofar as they concern inflectional morphology. Since the terminology in these matters is somewhat confused, with different writers using these two technical terms in distinct ways, I have opted for the term *realization rules* to refer to principles describing when and how morphosyntactic features are realized as morphological processes. These principles belong in a morphological component [1], which follows a syntactic component, in which (among other things) morphosyntactic features are located within syntactic structures, and precedes a phonological component, in which (among other things) some morphophonemic alternations are accounted for by rules altering phonological representations.

There are, I claim, two types of realization rules. First there are rules of *exponence*, describing how certain combinations of morphosyntactic features are realized, in the context of certain other bundles, as morphophonological operations. The following principle of English is a typical rule of exponence: In the context of [CAT:verb], [VFORM:past] is realized by the suffixation of /d/. Then there are rules of *referral*, stipulating that certain combinations of features have the same realization as certain others. The following principle of English is a typical rule of referral: In the context of [CAT:verb], [VFORM:pastprt] has the same realization as [VFORM:past].

All realization rules are treated as expressing *defaults*, which are automatically overridden by more specific rules (and these in turn by still more specific rules, and so on). [2]

The framework distinguishes *features*, such as CASE and PERSON, from *clusters of values* that features can take, such as direct versus oblique case, or second versus nonsecond person. And it permits reference to *feature clusters*, such as CASE-GENDER-NUMBER.

Finally, I assume not only a set of realization rules, but also an ordered set of (abstract) *slots* for inflectional material. Any particular rule supplies material for a specified slot or slots, and several distinct rules can supply material for the same slot. The ordering of a rule with respect to others is then governed by the ordering of slots.

The main features of the framework can now be listed: (a) rules of referral, as well as rules of exponence; (b) extensive use of default settings; (c) a distinction between features, value clusters, and feature clusters; and (d) a conceptual separation of rules and slots. In the remainder of this paper I will develop these proposals in some detail, concentrating on (a) and (b) and illustrating the proposals with a description of a substantial portion of the declensional system of standard German.

2. *Fundamental assumptions and conventions.* I presuppose some analysis of the units of syntax and morphology (constituent types, word classes, base classes) as combinations of feature values, or as *bundles*, as I shall call them. For the moment I make the simplifying assumption that a bundle is simply an (unordered) set of (ordered) pairs, each pair associating to some feature one of its values (or, in some cases, a disjunction of several of its values).

Typographical conventions: names of features are in upper case (GEND); names of values are in lower case (fem); a disjunction of values is indicated by a slash between the value names (nom/acc); a pairing of feature and value is indicated by appending the value name to the feature name, with a colon separating them (GEND:fem); names of pairs are combined by means of a separating comma and space (GEND:fem, CASE:nom/acc); and names of bundles have flanking square brackets ([GEND:fem, CASE:nom/acc]).

It is often convenient to refer to linguistic forms by means of the values that are realized in them – for instance, to refer to forms in which the values CASE:nom, GEND:fem, and NUM:sg are realized as being in (or of) the nom fem sg, or simply as being nom fem sg.

The primary tool in describing inflectional systems is the rule of exponence, the function of which is to realize some bundle, in the context of some other bundle, as a morphophonological operation or operations. [3]

In German, for instance, the bundle [CASE:nom, GEND:masc, NUM:sg], in the context of the feature values picking out the 'strong' declension of determiners and adjectives (which I will suppose for the moment is the bundle [CAT:det/adj, CLASS:str]), is realized by the suffixation of *-er* to a base, as in *dies-er Mann* 'this man' and *ein alt-er Mann* 'an old man'.

3. *Syncretism.* I begin the main exposition with the observation (stressed by Carstairs) that syncretism is very common in inflectional paradigms. Consider the 'weak' declension paradigm for German adjectives, given in Table I. Although there are four values for CASE (nom, acc, gen, dat), three for GEND (masc, neut, fem), and two for NUM (sg, pl), making a total of 24 distinct bundles involving these three features, there are only two distinct forms in the paradigm, *-e* and *-en*.

	MASC-SG	NEUT-SG	FEM-SG	PLURAL
NOM	-e	-e	-e	-en
ACC	-en	-e	-e	-en
GEN	-en	-en	-en	-en
DAT	-en	-en	-en	-en

Table I. Weak adjective endings.

There is both systematic syncretism and accidental syncretism. [4] Consider the German weak declension. Any pl form has the suffix *-en*. So does any gen form. So does any dat form. These syncretisms are systematic, general, regular. On the other hand, the appearance of the suffix *-en* on weak adjective forms in the acc masc sg is an isolated anomaly, not relatable to the appearance of *-en* elsewhere. Nom sg forms have the suffix *-e*, and so do acc sg forms for genders other than the masc.

Saying there is systematic syncretism is saying there are generalizations about whole classes of forms; a paradigm is not merely a list. Classes of forms can then be picked out in a rule by mentioning a bundle in which some values are unspecified or disjunctive. For the German weak declension, we want to say that nom masc sg, nom neut sg, and nom fem sg forms should be picked out as a class and not individually. This could be achieved by having a rule mention the bundle [CASE:nom, NUM:sg]. The rule would then pick out these three combinations and none of the other 21.

4. *Defaults*. To some such generalizations there are classes of exceptions. The rules of exponence can be stated quite generally, but are to be understood as describing defaults.

The appearance of *-en* in the acc masc sg of the weak declension is an exception to a generalization that [CASE:nom/acc, NUM:sg] is realized by the suffixation of *-e*. Rather than abandoning or limiting the generalization, we can preserve it as a statement of a default realization. Thus far we have two rules of exponence:

- (1) In the context of [CAT:adj, CLASS:wk], [CASE:acc, GEND:masc, NUM:sg] is realized by suffixation of /en/.
- (2) In the context of [CAT:adj, CLASS:wk], [CASE:nom/acc, NUM:sg] is realized by suffixation of /e/.

Now the appearance of *-en* everywhere else - in the gen and dat sg and throughout the pl - can be stated as the general default, exceptions to which are described by rule (2):

- (3) In the context of [CAT:adj, CLASS:wk], any bundle of CASE, GEND, and NUM values is realized by suffixation of /en/.

5. *Rule interaction*. The natural principle of rule interaction - a version of Proper Inclusion Precedence or 'elsewhere' application - holds in such cases: the more particular

rule overrides the more general.

By this principle, rule (1) overrides rule (2), because the bundle [CAT:adj, CLASS:wk, CASE:acc, GEND:masc, NUM:sg] is more specific than the bundle [CAT:adj, CLASS:wk, CASE:acc/nom, NUM:sg]. And rule (2) overrides rule (3), because the bundle [CAT:adj, CLASS:wk, CASE:acc/nom, NUM:sg] is more specific than the bundle [CAT:adj, CLASS:wk].

6. *Value clusters.* A representation for the 'internal structure' of features like CASE, GEND, PERS, NUM, CLASS, VFORM, etc. is not necessarily a tree in which each natural class of values falls under a single node, or a chart in which all such classes make contiguous regions. Paradigms are neither trees nor charts.

For any given feature, the clusters of its values that function together in grammars can always be represented in terms of binary features. But achieving such a representation might take as many binary features as there are values. I conclude that we need some direct method for referring to *value clusters*. Indeed, I have already allowed for reference to any stipulated disjunction of values.

On occasion it may be convenient to have names for particular value clusters, such as nom/acc for CASE in German. Certainly some of these value clusters are made available by universal grammar; Jakobson seems to have assumed that they all are, but here I leave the matter open.

In person systems in general, the three persons form grammatically significant classes in all three logically possible ways: PERS:1/2, PERS:1/3, and PERS:2/3 (see Zwicky 1977). The second of these (which does not appear as a contiguous region in the traditional chart presentation of verb paradigms) plays a prominent role in German grammar, since 1 pl and 3 pl forms are always identical (with suffix *-en*), though they are always distinct from the 2 pl (with *-t*), and the default is for 1 sg and 3 sg forms to be identical (with various exponents, depending on the context), though they are always distinct from the 2 sg (with *-st*). No tree or chart representation makes all three of the groupings 1/2, 1/3, 2/3.

One three-valued feature by itself makes none of these groupings. Binary features make groupings, but it takes three binary features to get all three of the value clusters for PERS. Nothing is gained by this move. I will continue to use the three-valued feature PERS and to refer to these value clusters disjunctively.

In the German case system, the four cases have been grouped (by Bierwisch 1967) into two orthogonal binary sets, 'direct' nom/acc versus 'oblique' gen/dat, and 'subject' nom/gen versus 'object' acc/dat. The first distinction has already appeared in my discussion of weak adjective declension; see rule (2), which mentions CASE:nom/acc. CASE:gen/dat plays a role in strong adjective declension, as we shall see. It is convenient to have names to refer to the two (complementary) value clusters nom/acc and gen/dat; I will use Dir and Obl. Rule (2) can then be restated as follows:

(2') In the context of [CAT:adj, CLASS:wk], [CASE:Dir, NUM:sg] is realized by suffixation of /e/.

(In general, names of value clusters will have initial capitalization, so that they are typographically distinct from names of features and names of values.)

Among the value clusters I shall have occasion to refer to are two for the feature CAT. To see the need for the first, consider the fact that the suffix *-en* as the exponent of the acc masc sg is not restricted to the weak declension of adjectives; the strong declension of adjectives has the same exponent for this bundle, and so do all declinable determiners (nouns do not, in general). The specification CLASS:wk in rule (1) should be eliminated, so that the rule applies to both strong and weak declensions. And the specification CAT:adj should be replaced by CAT:adj/det, so that the rule applies to determiners as well as adjectives. CAT:adj/det must also be mentioned in the rule of exponence, (4), for the masc nom sg in the strong declension (rule (2')) will override (4) in the weak). I will use the name Adj1 ('adjectival') for the value cluster adj/det:

- (1') In the context of [CAT:Adj1], [CASE:acc, GEND:masc, NUM:sg] is realized by suffixation of /en/.
- (4) In the context of [CAT:Adj1], [CASE:nom, GEND:masc, NUM:sg] is realized by the suffixation of /er/.

Next, I shall want to refer to the value cluster noun/adj/det, which picks out the full set of categories subject to declension, and in particular to weak declension. There is a small class of masculine nouns, such as *Hirt* 'stag', with *-en* in the gen/dat and the pl, just like adjectives in the weak declension; most nouns can be treated as CLASS:str, but these should be CLASS:wk. I must postpone stating the actual rules. Here I merely record the name Noun1 for the value cluster noun/adj/det.

7. *VCRs and FVDs*. There are general principles governing the distribution of feature values in bundles, whatever the exponents of these values might be. These are of at least two types, *value cooccurrence restrictions* (VCRs) and *feature value defaults* (FVDs); see Gazdar and Pullum 1982 on feature cooccurrence restrictions and feature coefficient defaults. VCRs are implicational generalizations about feature values in bundles. FVDs express default assignments of values for features, usually in the context of specified values for other features.

I do not have the space to develop a theory of VCRs and FVDs here, although one VCR, (18), will play a role in the analysis of German I am developing here. The extent to which the content of VCRs and FVDs is universal is again a question of some interest, but not one I shall pursue here.

8. *Bare bases*. Bare (uninflected) bases are not uncommon, and such materially 'unmarked' forms are typically associated with bundles that are 'unmarked' in the sense of the Prague School and Greenberg.

The simplest treatment of such forms is to assume that they have been unaffected by any rule. Bare bases are then the ultimate defaults; they are what's left when nothing happens.

Most German nouns have only a few forms with overt exponents of their feature values. The standard feminine noun, for

instance, has no exponents at all in the singular, and the suffix *-en* throughout the plural; *Frau* 'woman', plural *Frauen*, is typical. The standard neuter noun has distinct suffixed forms in the oblique cases of the singular (*-(e)s* in the gen sg, *-(e)* in the dat sg), but the base in the direct cases: neut nom/acc sg *Buch*, gen *Buchs*, dat *Buch(e)*.

I assume that the base forms here result from the nonapplicability of any rule of exponence. A form like *Frau* or *Mann* is what is left when rules of exponence like the following do not apply.

- (5) In the context of [CAT:noun], [CASE:gen, GEND:neut, NUM:sg] is realized by the suffixation of /es/.  
 (6) In the context of [CAT:noun], [CASE:dat, GEND:neut, NUM:sg] is realized by the suffixation of /e/.

On this account, nom/acc/gen/dat sg *Frau* results from the fact that rules (5) and (6) do not affect fem nouns; and nom/acc neut sg *Buch* results from the fact that these rules affect only gen/dat, not nom/acc, nouns.

I do not reject the possibility that some zero formations are stipulated by rule. I am, however, assuming that the normal source for zero formations is the absence of any rule providing an exponent for certain bundles.

9. *Rules of referral.* There are generalizations referring the selection of exponents for one bundle to those for another (in some context); these rules of referral may have exceptions (may describe defaults), and if so they are overridden by the rules describing the exceptions.

	MASC-SG	NEUT-SG	FEM-SG	PLURAL
NOM	-er	-es	-e	-e
ACC	-en	-es	-e	-e
GEN	-en	-en	-er	-er
DAT	-em	-em	-er	-en

Table II. Strong adjective endings.

Consider in this light the strong declension of adjectives, summarized in Table II. Look at the acc sg forms. As in the weak declension, the masc has *-en*; rule (1') already predicts this. The neut has *-es*, the fem *-e*, and these suffixes are respectively identical to the nom neut sg and the nom fem sg; in addition the acc pl and nom pl both have *-e*. Each of these identities could be described by a rule of exponence covering two forms, but such a description would treat the nom/acc neut sg identity and the nom/acc fem sg identity as unrelated. Rather, we should want to say that there is a nom/acc identity, period.

The formal identity of nominative and accusative extends to strong-declension (which is to say, nearly all) nouns, where it holds even for masculines. The nom/acc sg form of these nouns is



their base form, with no suffix (masc nom sg *dieser Mann*, acc nom sg *diesen Mann*); the nom/acc pl form of these nouns is simply their plural form (nom/acc pl *diese Männer*).

Finally, the formal identity of nom and acc extends to a subtype of the strong declension for determiners, exhibited by determiners like *mein* 'my'. Here the nom/acc fem sg and the nom/acc pl have -e, just as for determiners like *dieser*, but the nom/acc neut sg have the base form (as does the nom masc sg): sg *mein Buch* versus *dieses Buch*, but pl *meine Bücher* and *diese Bücher*.

The nom/acc identity thus holds for all strong nouns. The question is now how the identity is to be stated. As I pointed out above, if we insist (as, for example, Bierwisch does in his analysis of German declension) that formal identities are to be described by rules of exponence, however general, then we are stuck with a separate rule for each exponent, and generalizations are missed. We need to say directly that two different bundles have the same realization, whatever that is.

But in order to do this we must specify how one of these bundles is realized. It is not enough to say that two things are the same, without saying what either of them is. In the case at hand, we must specify either the nom sg, or the acc sg, or sometimes one and sometimes the other.

There are in fact two sorts of indications that one category should be taken as primary in such situations. The first is the existence of clearly exceptional formations, like the -en of the masc acc sg in German. In some sense, this form 'ought to' have the -er, -e, or zero of the nom sg. The second indication comes from zero exponents, where I have claimed that in the normal situation the absence of an exponent results from the failure of any rule to supply an exponent. The zero in the nom masc/neut sg of *ein*-words is a case in point. The fact that -en appears in the acc masc sg and zero in the nom masc sg means that the acc cannot be taken as primary, for then the nom masc sg would also get -en. Instead, the nom must be taken as primary:

- (7) In the context of [CAT:Nounal], [CASE:acc] has the same realization as [CASE:nom].

The rule of referral in (7) mentions both context value (CAT:noun/adj/det and CLASS:str) and realized values (CASE:acc), and specifies a set of referral values (CASE:nom). The rule is applied as follows: Given a bundle *B* containing both the mentioned context values and the mentioned realized values, construct a new bundle *B'* by substituting the referral values for whatever values these features have in *B* (here, substitute the value nom for acc), and then realize *B'*. The effect of (7) then depends on rules of exponence for nominatives; in particular, it depends on the existence of the two following rules of exponence, and the absence of any rules affecting nom sg nouns.

- (8) In the context of [CAT:Adjal], [CASE:nom, GEND:neut, NUM:sg] is realized by the suffixation of /es/.

- (9) In the context of [CAT:Adjal], [CASE:nom, GEND:fem, NUM:sg] is realized by the suffixation of /e/.

Now consider the full set of case forms for masc and neut sg *ein*-words. The acc masc sg has, of course, *-en* (by rule (1')); the acc neut sg is the base form, by virtue of the rule of referral (7) and the absence of any rule of exponence covering the nom neut sg. For the remaining three cases, the masc and neut forms are identical: the nom is the base form, the gen has *-es*, and the dat has *-em*. A rule of referral is called for, and the base form of the acc neut sg (versus the *-en* of the corresponding masc form) indicates that the neuter paradigm is the primary one.

In fact, a rule referring masc sg forms to the corresponding neut sg ones operates for all strong nouns, not just for determiners like *ein* and *kein*. Determiners like *der* and *dieser* are subject to the rule, though it is visible only in the gen and dat (*-es* and *em*, as for *ein*-words); rule (4), for the nom masc sg, and rule (1'), for the acc masc sg, override any rule referring masc forms to neut ones. The strong declension of adjectives is subject to the rule, though again it is visible only in the gen and dat (*-en* and *-em*, respectively); rules (4) and (1') override any rule of referral again. Finally, the strong declension of nouns shows the rule in all four cases: the nom/acc masc/neut sg has the base form, the gen masc/neut sg has *-(e)s* (via rule (5)), and the dat masc/neut sg has *-(e)* (via rule (6)).

I have now argued for one new rule of referral, (10), and mentioned three further rules of exponence: (11), specifying *-es* in the gen neut sg of determiners; (12), specifying *-em* in the dat neut sg of adjectives and determiners; and (13), specifying *-en* in the gen neut sg of adjectives. Rule (3) for weak adjectives will override any of these rules, so that (10)-(13) actually apply only to bundles containing CLASS:str.

- (10) In the context of [CAT:Noun], [GEND:masc, NUM:sg] has the same realization as [GEND:neut].
- (11) In the context of [CAT:det], [CASE:gen, GEND:neut, NUM:sg] is realized by the suffixation of /es/.
- (12) In the context of [CAT:Adj], [CASE:dat, GEND:neut, NUM:sg] is realized by the suffixation of /em/.
- (13) In the context of [CAT:adj], [CASE:gen, GEND:neut, NUM:sg] is realized by the suffixation of /en/.

For determiners and adjectives, what remains to be described are a pair of fem forms and all the pl forms. The first is straightforward: *-er* realizes the gen/dat fem sg:

- (14) In the context of [CAT:Adj], [CASE:Obl, GEND:fem, NUM:sg] is realized by the suffixation of /er/.

In the pl, the pattern of forms is identical to those in the fem sg (nom/acc *-e*, gen/dat *-er*), with the exception that the dat pl is always *-en* (rather than *-er* as in the fem sg). By the same reasoning that led us to take nom, rather than acc forms as primary above, we select the fem sg forms as primary here, referring the pl forms to them; this is the rule of referral in (16). The dat pl is exceptional and needs its own rule of exponence, (15). Both (15) and (16) apply to nouns as well as adjectives and determiners, though this will not be obvious until the discussion of slots in section 14.

- (15) In the context of [CAT:Nounal], [CASE:dat, NUM:pl] is realized by the suffixation of /en/.
- (16) In the context of [CAT:Nounal], [NUM:pl] has the same realization as [GEND:fem, NUM:sg].

10. *More on rule interaction.* When two (or more) rules of referral are applicable to the same form, and neither overrides the other, they can be viewed as applying simultaneously. Obviously, rules of referral will feed the rules of exponence they refer to.

In the data presented so far, there are two occasions where two rules of referral are applicable to the same form: in the acc pl of strong adjectives and determiners, where both rule (7) and rule (16) apply; and in the masc acc sg of strong nouns, where both rule (7) and rule (10) apply. The joint effect of rules (7) and (16) is to refer the acc pl to the nom fem sg, and the joint effect of rules (7) and (10) is to refer the masc acc sg to the neut nom sg.

Both referrals are correct. Referring the acc pl of strong adjectives and determiners to the nom fem sg means that the rules of referral feed rule (9), which realizes the nom fem sg of adjectivals as -e; this is right for the acc pl. Referring the masc acc sg of strong nouns to the neut nom sg means that no rule of exponence will be available, and the unaltered base results; this is right for the masc acc sg.

11. *Rule features.* Individual bases can exceptionally fail to undergo a rule (of exponence or referral). I will assume that for each rule there is a feature RULE!#N, where # is the name of the rule. Each rule-feature takes the values yes and no, and the default value for all rule-features is yes. A base that exceptionally fails to undergo a rule is lexically specified as RULE!#N:no. The consequence of failing to undergo a rule is the appearance of the base form.

This proposal allows us to treat the *ein*-word determiners (*ein*, *mein*, *kein*, *unser*, etc.) just like other determiners in almost every respect. Their only peculiarity is that they fail to undergo rule (8), the rule of exponence for nom neut sg adjectivals. As a result, the nom neut sg has the base form. So does the acc neut sg, which is referred to the nom neut sg by rule (7). And so does the nom masc sg, which is referred to the nom neut sg by rule (10). All this is achieved simply by saying that each *ein*-word is specified RULE!(8):no in the lexicon of German. Indeed, we might say that the class of *ein*-words is definable as the set of German lexical items specified [CAT:det, RULE!(8):no].

I am now in a position to describe the weak declension of masculine nouns like *Hirt*. These have the base form in the nom sg, -en elsewhere. Most of their declension can be referred directly to the weak adjective declension:

- (17) In the context of [CAT:noun, CLASS:wk], any bundle of CASE, GEND, and NUM values has the same realization as [CAT:adj].

Rule (17) overrides all the rules that mention only CAT:noun or CAT:Nounal, without mentioning a value for CLASS: rules (5), (6), (7), (10), (15), (16). It correctly refers the acc sg to the

acc sg for weak-declension adjectives, which has *-en* by rule (1'). It correctly refers the gen/dat sg and all pl forms to the corresponding weak-declension adjective forms, which have *-en* by rule (3). However, as it stands, it incorrectly refers the nom sg to the corresponding weak-declension adjective form, which is *-e* by rule (2'). This can be corrected by a general statement (a VCR, in fact) that weak-declension nouns do not undergo rule (2'):

(18) If a bundle contains CAT:noun and CLASS:wk, it also contains RULE!(2'):no.

12. *Feature clusters.* The system of rules presented thus far describes nearly all the declensional forms of German [5]. The realization rules for bundles of CASE, GEND, and NUM values are summarized in Table III; blank cells in the table can be filled with any values for the feature in question, and '>>' stands for the referral relationship.

Rule	CAT	CLASS	CASE	GEND	NUM	Realization
====	===	=====	=====	=====	=====	=====
(1')	Adjal		acc	masc	sg	suffix /en/
(2')	adj	wk	Dir		sg	suffix /e/
(3)	adj	wk				suffix /en/
(4)	Adjal		nom	masc	sg	suffix /er/
(5)	noun		gen	neut	sg	suffix /es/
(6)	noun		dat	neut	sg	suffix /e/
(7)	Nounal		acc			>> CASE:nom
(8)	Adjal		nom	neut	sg	suffix /es/
(9)	Adjal		nom	fem	sg	suffix /e/
(10)	Nounal			masc	sg	>> GEND:neut
(11)	det		gen	neut	sg	suffix /es/
(12)	Adjal		dat	neut	sg	suffix /em/
(13)	adj		gen	neut	sg	suffix /en/
(14)	Adjal		Obl	fem	sg	suffix /er/
(15)	Nounal		dat		pl	suffix /en/
(16)	Nounal				pl	>> GEND:fem, NUM:sg
(17)	noun	wk				>> CAT:adj

Table III. Realization rules.

Each of the rules in Table III provides a realization for certain bundles involving the feature cluster CASE-GEN-*NUM*. The rules express generalizations by mentioning value clusters (like *Dir* in (2')), including the special case in which a rule mentions the universal set *U* of values for some feature (as when (2') mentions *U* for the feature *GEN*). Feature clusters can be thought of as ordered *n*-tuples of features - *<CASE, GEN, NUM>*, for instance - and the bundles to which a particular rule applies can be thought of as a set of ordered *n*-tuples of feature values, subsumed under a formula for that rule - *<Dir, U, sg>* for (2'). A more precise version of (2') would then be

(2'') In the context of [*CAT:adj, CLASS:wk*], *<Dir, U, sg>* in *<CASE, GEN, NUM>* is realized by the suffixation of /e/.

In section 14 below I return to the role that feature clusters play in realization rules.

13. *Realization of bases*. There are also, of course, rules of realization for bases, which must be assumed to feed rules of referral and exponence. We can assume that each base has an index distinguishing it from all others, so that a rule of realization for a base can be thought of as a rule of exponence for the index associated with that base.

Suppose that the index of the German definite article *der* is 15, that of the indefinite article *ein* is 16, and that of the demonstrative *dieser* is 17. Then German has rules of exponence like the following:

- (19) [*INDEX:15*] is realized as /d/.
- (20) [*INDEX:16*] is realized as /ayn/.
- (21) [*INDEX:17*] is realized as /di:z/.

Base indices can figure in rules describing exceptional realizations for either bundles or bases. That is, individual bases can condition idiosyncratic realizations for particular inflectional categories (the English noun base *ox*, for instance, conditions the idiosyncratic plural affix *-en*), and individual bases can have idiosyncratic realizations conditioned by particular inflectional categories (the English verb base *say*, for example, has an idiosyncratic realization in the present third singular, and *do* has an idiosyncratic realization in the past).

Some rules of realization for bases describe suppletion. They can be thought of as rules (of exponence or referral) which mention both an index and a bundle. They describe exceptions to rules (of exponence or referral) not mentioning an index, and so override the latter.

According to the rules above, the definite article should have several forms *de*, all based on the nom fem sg, and corresponding to forms like *diese* and *jene*. But in fact these forms are all *die*. Similarly, according to the rules above, the definite article should have a neut nom/acc sg *des*, corresponding to forms like *dieses* and *jenes*. But in fact these forms are *das*, distinct from the masc/neut gen sg *des*, which is the regular product of rule (11). *Die* is an exception to rule (9), *das* to rule (8).

- (22) [INDEX:15, CASE:nom, GEND:fem, NUM:sg] is realized as /di:/.  
 (23) [INDEX:15, CASE:nom, GEND:neut, NUM:sg] is realized as /das/.

14. *Slots.* Most languages with inflectional morphology have affixes occurring in several different positions with respect to bases and to one another, and some of these languages also exhibit ordering of morphological processes like reduplication and infixation. I will maintain here - though I don't have the space to defend the assertion - that both linear precedence of inflectional affixes and ordered application of inflectional rules are instances of the same abstract entity, namely the (stipulated, language-particular) ordering of abstract slots for inflectional material.

Returning to the relatively simple situation in German, I can point out at least three reasons for saying that the inflectional suffixes in that language are positioned in slots.

First, there is the fact that the rules of exponence in Table III, all of them referring to the feature cluster CASE-GEND-NUM, describe exponents that are *mutually exclusive* with one another. These rules of exponence, taken together, fill a single slot (which carries marks of <CASE, GEND, NUM>).

Second, there are the 'indeclinable' nouns of German, exemplified by the neuter *Auto* 'car'. The normal indeclinable noun does not, in fact, lack inflection completely. Instead, it can bear a suffix marking plurality, usually -s; the plural of *das Auto* is *die Autos* - though this noun has *den Autos* in the dat pl rather than *den Auton*, *den Autons*, or *den Autosen*. What we want to say about the indeclinable nouns is that they are subject to certain realization rules, namely those realizing [NUM:pl], but are not subject to any of the realization rules in Table III, which realize various bundle triples in <CASE, GEN, NUM>. This can be done by saying that the indeclinables have a slot for NUM but lack one for CASE-GEND-NUM.

Third, there are many declinable nouns for which *both* the NUM slot and the CASE-GEND-NUM slot can get filled, in the dat pl. For the neuter *Buch*, the NUM slot is filled by suffixation of -er with concomitant umlaut of the base: *die Büch-er*. The CASE-GEND-NUM slot is filled by an -n alternant of the dat pl suffix -en supplied by rule (20): *den Büch-er-n*. Note that the NUM slot is ordered before the CASE-GEND-NUM slot.

Even from this rather uncomplicated situation it should be clear that the feature clusters associated with different slots can overlap. In German, in fact, the feature cluster associated with the first slot (NUM) is a proper part of the feature cluster associated with the second (CASE-GEND-NUM). Quite correctly, I believe, nothing in my proposals would require that a given feature be realized in only one slot, or that a given slot realize only one feature.

15. *Final remarks.* Much more needs to be said about the details of the framework I have been sketching. I have said almost nothing about non-affixal inflectional morphology. The treatment of agreement features must be somewhat more elaborate than I have made out here, to accommodate (for example) instances in which agreement features of subject, direct object, indirect object, and so on must be distinguished (as in Algonquian, Abkhaz, and other languages familiar from the literature) and instances in which inherent features of a constituent must be distinguished

from those it bears by virtue of agreement, as when the inherent features of a possessor NP must be distinguished from the agreement features originating with the possessed NP. The formalization is incomplete and not fully explicit. [6] And I have said nothing whatsoever about a constellation of evidential issues, among them: how to decide whether certain facts call for a rule of referral rather than a rule of exponence; how to choose one rule of exponence over plausible alternatives that cut a paradigm up in different ways; when to assign material to the same slot and when to different slots; and whether such questions can be answered entirely on the basis of a presentation of the paradigms in a language, or whether (as seems virtually certain) some types of 'external evidence' must be appealed to.

Despite all these loose ends, I do hope to have given something of the flavor of the proposals and some reasons for exploring the possibilities of the framework.

### Notes

- \*The bulk of this paper was written during the summer of 1984 at the Center for the Study of Language and Information, Stanford University; I am indebted to the System Development Foundation for its financial support during this period. The final draft was completed during winter quarter 1985 at the Syntax Research Center, University of California at Santa Cruz; I am indebted to the Ohio State University for its financial support during this period and to UCSC for its hospitality. My thanks to those who encouraged me in this work and to those who gave me their comments and criticisms - especially Rich Janda, Paul Kay, Bill Ladusaw, George Lakoff, Joel Nevis, Geoff Pullum, Jerry Sadock, Ivan Sag, and Hans Uszkoreit.
1. Or in the lexicon, as Jensen and Stong-Jensen (1984) have argued in response to Anderson 1982; this issue is not my concern here.
  2. I do not rule out the possibility that individual rules can also have subrules stipulated as standing in a disjunctive relation to one another. Anderson (1977) proposed such stipulated disjunction for the Algonquian person prefixes on transitive verbs, which have one shape if either subject or object is second person, otherwise another shape if either subject or object is first person, otherwise a third shape. These facts can be described without stipulation - in the formalism developed below, the first shape realizes PERS:2, the second realizes PERS:1/2, and the third realizes any value of PERS - but I am not prepared at the moment to defend either of these analyses over the other.
  3. How is inflection different from (special) cliticization? Since cliticization cannot 'see into' hosts, the only morphophonological operation available for it is affixation (and possibly circumfixation, wrapping material around the base). In the case of inflection, affixation is available, but so is infixation (wrapping the base around material), simulfixation, reduplication, subtraction, consonant gradation, vowel gradation, etc.

How are inflection and cliticization different from word

- formation (derivation and compounding)? Rules for the former are purely realizational, while the rules of word formation involve, in addition to morphophonological operations, principles of semantic interpretation and two types of morphosyntactic conditions: input conditions, on the base(s) to which a rule applies; and output conditions, specifying the category and morphosyntactic features of the word formed by the rule.
4. Williams (1981) seems to have denied this, maintaining that there is only systematic syncretism; but see Joseph and Wallace (1984) for a rebuttal.
  5. I will not treat the traditional strong declension of nouns in this paper. For indeclinable nouns, see section 14. The mixed adjective declension can be treated as a subtype of the weak declension, in which the realization of [CASE:Dir, NUM:sg] is referred to [CLASS:str], although other analyses (not involving referral) could also be defended.
  6. My aim in formalization in this paper is clarity, not completeness or any envisaged computational implementation. Nor do I intend the framework as an incipient processing model (for production or for parsing); I am merely trying to state, in an insightful fashion, what seem to me to be real generalizations about the arrays of inflectional forms in German (and English). The framework lends itself fairly naturally to some of these enterprises, however, and I have no reason to try to dissuade people from exploring it in production terms or (via theorem-proving techniques in a suitable computer language, such as Prolog) as part of a recognition or parsing scheme.

#### References

- Anderson, Stephen R. 1977. On the formal description of inflection. *CLS* 13.15-44.
- Anderson, Stephen R. 1982. Where's morphology? *Ling* 13.4.571-612.
- Bierwisch, Manfred. 1967. Syntactic features in morphology: General problems of so-called pronominal inflection in German. To Honor Roman Jakobson I. 239-70. The Hague: Mouton.
- Carstairs, Andrew. 1981. Notes on affixes, clitics, and paradigms. Bloomington IN: IULC.
- Carstairs, Andrew. 1983. Paradigm economy. *JL* 19.115-25.
- Gazdar, Gerald and Geoffrey K. Pullum. 1982. Generalized Phrase Structure Grammar: A theoretical synopsis. Bloomington IN: IULC.
- Janda, Richard D. 1983. 'Morphemes' aren't something that grows on trees: Morphology as more the phonology than the syntax of words. In Richardson et al. 1983, 79-95.



- Jensen, John T. and Margaret Stong-Jensen. 1984. Morphology is in the lexicon! *LingI* 15.3.474-98.
- Joseph, Brian D. and Rex E. Wallace. 1984. Lexical relatedness, head of a word and the misanalysis of Latin. *OSU WPL* 29.30-49.
- Karlssoon, Fred. To appear. Paradigms and word forms. In *Papers from the Conference on Natural Morphology, Poznań 1983*.
- Kiparsky, Paul. 1982a. From cyclic phonology to lexical phonology. In van der Hulst and Smith 1982, 131-75.
- Kiparsky, Paul. 1982b. Lexical morphology and phonology. In *Linguistic Society of Korea 1982*, 3-91.
- Linguistic Society of Korea (ed.). 1982. *Linguistics in the morning calm: Selected papers from SICOL-1981*. Seoul: Hanshin.
- Matthews, Peter H. 1965. The inflectional component of a Word-and-Paradigm grammar. *JL* 1.2.139-71.
- Matthews, Peter H. 1972. *Inflectional morphology: A theoretical study based on aspects of Latin verb conjugation*. Cambridge: Cambridge Univ. Press.
- Richardson, John F., Mitchell Marks, and Amy Chukerman (eds.). 1983. *Papers from the parasession on the interplay of phonology, morphology, and syntax*. Chicago: CLS.
- van der Hulst, Harry and Norval Smith (eds.). 1982. *The structure of phonological representations (Part I)*. Dordrecht: Foris.
- Williams, Edwin S. 1981. On the notions 'lexically related' and 'head of a word'. *LingI* 12.2.245-74.
- Wurzel, Wolfgang U. To appear. Flexionsmorphologie und Natürlichkeit. *Studia Grammatica*.
- Zwicky, Arnold M. 1977. Hierarchies of person. *CLS* 13.714-33.

## Grammar and Memory

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The search for lost time announced in the title of Proust's A la Recherche du Temps Perdu is at the same time, as Deleuze (1964) reminds us, a research into it. That that research is to be thought of as analogous to scientific research is one of Proust's great themes--the "artist . . . in his own sphere . . . studying laws, conducting experiments, making discoveries which are as delicate as those of science." (The Past Recaptured, 1971, p. 142) Proust includes in what might yield those laws to the researching writer the laws of language itself, and specifically those governing the use of tense. In his essay "A propos du 'style' de Flaubert" (1920), it is to tense and aspect that Proust directs the major part of his attention, subjecting Flaubert's tenses to what he calls a "clear analysis" (p. 84). The result is the discovery of a "grammatical beauty" which he attributes in part to "the manner of applying certain rules of syntax." (p. 74) This importance accorded verb tense should hardly be surprising in a writer the title of whose great work contains the word temps, which in French can mean either time or tense. So for Proust, the novelist's search for lost time includes a research into past tense--for it is the tenses of the past which he rightly sees as central to the novel.

Proust concentrates on Flaubert's "recurrent series of imperfects," (p. 84), imperfects which have two distinct uses. One is specific to narrative--"cet éternel imparfait" (p. 77) which for the French reader has always been the first grammatical sign of what Proust calls "style indirect" and what Bally (1912) had already christened the "style indirect libre"--the style which I call, after Jespersen (1924), "represented speech and thought."<sup>1</sup> For as Proust himself observes, "this imperfect serves to narrate not only people's words but their whole lives." (p. 78) I have already analyzed the imperfect of represented speech and thought and its English counterparts, the simple past and the past progressive, as tenses cotermporal with the moment which I qualify as that of "consciousness" and which I notate NOW. (Cf. Banfield, 1982, Chapter 2) NOW, which designates the present and future time deictics, specifies a moment which in narrative fiction is not necessarily that of the present tense, classically defined as the moment of the speech act. Some examples of this past cotermporal with NOW (where the latter is made explicit by the presence of time deictics) are given in (1).

- (1) Tout était tranquille maintenant. (Flaubert, L'Education Sentimentale, cited in Proust, 1920, p. 77)  
Il faisait déjà nuit maintenant . . . (Proust, A la Recherche du Temps Perdu, Pléiade I, p. 1036)  
 She would not say of any one in the world now that they were this or were that." (Virginia Woolf, Mrs Dalloway, Harcourt, p. 11)  
Today she did not want him. (D. H. Lawrence, The First Lady

In French, the special role of the imperfect in written narrative emerges by way of contrast with the passé simple or narrative past. But the grammar of French only makes explicit a division between the past tenses of narrative, which, I have argued (Banfield, 1982), linguistically defines the novel. The sentence containing a past cotermporal with NOW forms one side of that division; the narrative past (in French, the passé simple; in English, either the simple past or the past progressive) forms the other. It can have no NOW, as Benveniste (1966) points out for the specific case of the passé simple. Sentences in the passé simple are normally interpreted as narrating a series of events which took place one after the other; they indicate "la succession des faits," as Sensine puts it (1926, 1966, p. 23), as is illustrated in (2)

- (2) Puis sa mère mourut, ses soeurs se dispersèrent, un fermier la recueillit, et l'employa toute petite à garder les vaches dans la campagne. (Flaubert, "Un Cœur Simple," Pléiade, p. 592)  
[Then her mother died, her sisters went their separate ways, a farmer took her in, and employed her, little as she was, to tend the cows in the fields.]

The essential characteristic of the passé simple is to recount, to give an account, to tell a tale, in other words, to count, to tally, to sum up. It "tells time," establishing for events a linear order, that of the integers. For this reason, there is no privileged moment, no NOW with respect to which other moments are placed. Its role is objectivizing--enumerating discrete entities which are past events.

By contrast, the past cotermporal with NOW is an experiential past, that lived moment which is re-presented in a now-in-the-past. A series of verbs in one of the tenses realizing a now-in-the-past like the imperfects in (3) are normally interpreted as referring to events more or less simultaneous, existing within the same here and now. (I force this reading by a translation using past progressives.)

- (3) Des gens arrivaient hors d'haleine; des barriques, des câbles, des corbeilles de linges gênaient la circulation; les matelots ne répondaient à personne; on se heurtait; les colis montaient entre les deux tambours, et le tapage s'absorbait dans le bruissement de la vapeur, qui, s'échappant par des plaques de tôle, enveloppait tout d'une nuée blanchâtre, tandis que la cloche, à l'avant, tintait sans discontinuer. (Flaubert, L'Education Sentimentale, Oeuvres I, Pléiade, p. 33)  
[People were arriving out of breath; casks, ropes, baskets of laundry were blocking the traffic; the sailors were answering to no one; every one was colliding; packages were piling up between the two paddlewheels, and the uproar was blotted out in the humming of the steam which, escaping through the boilerplates, was shrouding everything in a whitish cloud, while the bell, in the

bow, was clanging incessantly.]

But there is another use of the imperfect which plays a crucial role in narration, the habitual, which Thibaudet (1920) mentions in his response to Proust on Flaubert. And it is that flaubertian use of the imperfect which Proust parodies in the pastiche of Bouvard et Pécuchet in Les Plaisirs et Les Jours.

Genette (1972) has demonstrated the special importance the habitual assumes in Proust the novelist. But it is Proust the theorist of the novel who implicitly raises the question of the habitual for a linguistic definition of the novel. The answer to this question is dependent on an analysis of the habitual which would allow it to find its place in the schema of narrative tenses composed of the narrative past and the past cotemporal with NOW.

This schema, which treats the narrative past as that tense which counts past events, points the direction for investigation. It suggests the cooccurrence of this past and the temporal adverbs specifying "the number of times" an event has occurred, such as the numerals themselves. Indeed, one finds sentences like those in (4). (I confine myself to the passé simple, since it is unambiguously a narrative past.)

- (4) Je revis, du reste, sa femme cinq fois.

[Moreover, I saw his wife five more times.]

Mais une fois, au moment où je remontais par l'ascenseur, le lift me dit que . . . (A la Recherche du Temps Perdu, Pléiade II, p. 1025)

[But once, at the precise moment I was taking the elevator up, the operator said to me that . . .]

The not very surprising cooccurrence of the passé simple with numerals indicating the number of times an event took place allows us to isolate, by contrast, the peculiar distributional features of the habitual. For we immediately observe that neither the imperfect with an habitual reading nor its English counterparts habitual would and used to can appear with numerals. This is no doubt apparent to traditional grammarians when it is a question of a single time. Sensine, for instance, says of a passage in the passé simple that the verbs indicate a series of actions which have taken place once only, whereas the same passage in the imperfect adds the notion of repetition or habit. (1926, 1966, p. 24) Thus, to make explicit Sensine's claim, the sentence in (5) should be unacceptable with the habitual reading, and such is indeed the case.

- (5) \*Mais une fois, le lift me disait que . . .

\*But once the elevator operator would (used to) tell me that . . .

The traditional distinction Sensine here articulates is between a tense which designates a single event and one which indicates a set of repeated actions. But it is already clear from (4) that the passé

simple can refer to more than one event, if that is stipulated by an appropriate quantifier. What is not anticipated in Sensine's analysis is that the same does not hold for the habitual: although indicating repeated action, it cannot occur with a numeral counting these repetitions, as (6) illustrates.

(6) \*Je voyais sa femme cinq fois.

\*Five times (on five occasions) I would (used to) see his wife.

The habitual appears, rather, with another class of temporal adverbs or prepositional phrases containing quantifiers, one whose characteristic role is to quantify the repetitions while keeping the number of times non-specific. Sensine puts it in the following terms: "The imperfect expresses states of indeterminate duration; it corresponds to the words habitually, often, already or at the same time," (1926, 1966, p. 24) Some examples of the adverbs cooccurring with the habitual are given in (7). The English translations of the French are examples in their own right.

- (7) Souvent, quand M. de Cambremer m'interpellait de la gare, je venais avec Albertine . . . (RTP, II, p. 1097)  
Often, when M. de Cambremer would question me from the station, I would have Albertine with me.  
Pendant ces retours, (comme à l'aller), je disais à Albertine de vêtir . . . (RTP, II, p. 1100)  
During these return trips (as on the trip out), I would (used to) tell Albertine to get dressed.  
 A Hermonville montait quelquefois M. de Chevregny . . . (RTP, II, p. 1086)  
 At Hermonville sometimes M. de Chevregny used to get on.  
Chaque fois que M. de Charlus regardait Jupien, il s'arrangeait pour que son regard fût accompagné d'une parole . . . (II, p. 605)  
Every time M. de Charlus would look at Jupien, he would arrange it so his look was accompanied by a word.  
 Il passait ses journées et soirées avec elle. (III, p. 1017)  
 He used to spend his days and nights with her.

Other adverbs of this type which may appear with the habitual are in French tous les jours, toujours, de temps en temps, maintes fois, presque jamais, habituellement et rarement and, in English, time and (time) again, many a time, from time to time, every (other) day, repeatedly, rarely, seldom. Apart from manner adverbs such as often and habitually, many of these adverbials contain quantifiers such as many and all. In addition, time adverbs such as the days of the week or the months of the year occur with the habitual either in the plural ("Saturdays") or in the generic form ("Saturday we would. . .")<sup>2</sup>

At this point, a refinement in our notion of "number of times" is required. In general, in uses of tense where the action designated by the verb occurs more than once, there are two possible referents of the iterated action. Either the action designated by the verb may

be iterated on a single occasion or the occasions may be repeated. In fact, this difference is the basis of the distinction between iterativity and habituality, as Comrie (1976) points out.

In some discussions of habituality, it is assumed that habituality is essentially the same as iterativity, i.e., the repetition of a situation, the successive occurrence of several instances of the given situation. . . . If a situation is repeated a limited number of times, then all of these instances of the situation can be viewed as a single situation, albeit with internal structure, and referred to by a perfective form. Imagine, for instance, a scene where a lecturer stands up, coughs five times, and then goes on to deliver his lecture. In English, this could be described as follows: the lecturer stood up, coughed five times, and said . . . It would not be possible to use the specifically habitual form with *used to*, i.e., not *\*the lecturer stood up, used to cough five times, and said . . .* In French, similarly, one could express this by using the perfective Past Definite [*passé simple*] throughout: le conférencier se leva, toussa cinq fois, et dit . . . (p. 27)

In the example Comrie constructs, the action of coughing is repeated or iterated five times, but upon a single occasion; for this reason, the habitual form is inappropriate and the numeral possible. But a refinement of Comrie's claims is required. The sentence he marks as unacceptable is so only because all the verbs are not in the habitual; with the habitual throughout, the sentence becomes acceptable.

(8) The lecturer used to stand up, cough five times and say. . .

This is because a reading is possible whereby the action quantified by five times is understood as iterated five times upon some unspecified number of occasions, i.e., each time the occasion recurs. For this reason, a sentence like (8) containing a numeral can occur with the type of time adverb appearing with the habitual as well, as in (9).

(9) Habitually (occasionally) the lecturer used to (would) stand up and cough five times before beginning.

The appropriate formulation of the distinction is not that between limited and unlimited repetitions but between those which are numberable and those which are not. What is excluded is a temporal adverb containing a numeral which specifies the number of occasions upon which an event has occurred together with an habitual form of the verb, as in (10).

(10) \*On four occasions (four times) the lecturer used to (would) cough five times.

What holds for the numerals holds likewise for true dates, for

dates count the number of times. One finds (11a) with the habitual past, but not (11b).

- (11) a. {Every Christmas } they used to (would) always have turkey.  
       Each December 25th }  
       A Noël (le 25 décembre), ils avaient toujours une dinde.  
   b. \*July 29, 1870, August 3, 1914, and May 12, 1940, Germany  
       used to (would) always attack France.  
       \*Le 29 juillet, 1870, le 3 août, 1914, et le 12 mai, 1940,  
       L'Allemagne attaquait la France. [with habitual reading]

What underlies distinctions like Sensine's once/habitually (1926, 1966, p. 24) and Genette's singulary/iterative (1972, p. 145) is the idea that the distinction between singular and plural applies to verbs as well as nouns. Fiengo (1974) elaborates this notion, making the further distinction between "count" verbs and "mass" verbs, by analogy with the two kinds of plural nouns.

Fiengo's "mass verbs" are statives, verbs referring to mental states such as know, love, like, resemble and so on. If the habitual is a plural tense, one using "count verbs," it should then not appear with statives. This is indeed the case with English would, as in (12).

- (12) \*John would often know algebra.  
       \*From time to time Mary would resemble her father.

But this allows us to further distinguish between English would and used to, for used to may mark a verb as referring to an habitual state or a repeated series of events; would, on the other hand, may mark the verb as only referring to a series. Hence one finds (13), although not (12) above.

- (13) John used to (\*would) know algebra.  
       Mary used to (\*would) resemble her father.

Thus, an analysis like that of Vendler (1967), where "Habits . . . are also states" (p. 108), will have to be revised in favor of one which divides habituality between states and repeated occasions. This division would coincide with Fiengo's between "mass verbs" and "count verbs." The category of mass verbs would correspond to that of states, as Fiengo argues, and would include the generic present, as in "he swims well" and habitual used to in the reading which it does not share with habitual would, as illustrated in (14).

- (14) \*There often would be a tree there.  
       There (\*often) used to be a tree there.

The category of count verbs would correspond precisely to that reading of the habitual modifiable by the class of time adverbials quantifying repeated occasions, regardless of whether the tense of the verb is past or present, i.e., it would also include sentences like "he swims often." This division is represented by the chart in (15).

(15)	Habituality
<u>Mass verbs (states)</u>	<u>Count verbs (repeated occasions)</u>
<u>used to</u> (in reading not shared with <u>would</u> )	<u>used to, would</u> (modifiable by time adverbials quantifying occasions, but not by numerals)
generic present (modifiable by qualifier such as <u>well</u> )	habitual present (modifiable by quantifying time adverbials)

It follows that the essential property of the habitual of repeated occasions is its plurality. This plurality is built into the habitual --the habitual reading does not have to be made explicit by temporal adverbs. By contrast, other past tenses may receive an habitual reading only with an appropriate temporal adverb, as in (16).

- (16) Il y eut des jours où il travailla sans manger.  
 There were days when he worked without eating.  
 Longtemps, je me suis couché de bonne heure.  
 For a long time I've gone to bed early.

But if habitual verbs of repeated action are to be considered plural verbs, that is, in the traditional terminology adopted by Fiengo, as "count verbs," referring to discrete events which are repeatable, this plurality cannot be taken as meaning that these repeated events are counted, that their exact number can be specified. Our analysis requires a distinction between two senses in which a set is countable (as opposed to counted). In the first sense, a set is countable if it is composed of discrete entities which are distinguishable and capable of being treated as duplications of one another at some abstract level. This is the sense underlying the notion of plurality as applied to "count nouns." But this sense of countable in no way entails the second, in which "countable" means that an exact number can be given.

The confusion arises from the extension of the traditional term "count" to verbs as well as nouns, a confusion which the term plural (as opposed to "mass") verbs and nouns avoids. The question raised is what is the relation between the two senses in which a set is "countable" or plural. The answer to this question lies in the very relation between the quantifiers, including the plural, and the numerals. For we have already observed that the distribution of temporal adverbs "quantifying"--as opposed to qualifying--verbs follows that division between quantifiers and numerals: all the quantifiers except the numerals (including those dates which have unique reference and hence count) may appear with the habitual, but the numerals may appear only with the simple past or passé simple.

Now this distinction observable in the distribution of verb tenses and temporal adverbs containing quantifiers and numerals is one which has already been made to account for the distribution of quantifiers and numerals as they quantify nouns. Jackendoff (1977, pp. 126ff.) treats the numerals with what he calls the "semi-numerals" (dozen, a hundred) and group nouns (group, gallon, bunch, number, lot, score, hundreds, thousands, millions, couple) as nouns, and much, many,



several, few (negative)<sup>4</sup> and little (negative) as true quantifiers.

Semantically, what unifies the quantifiers, in contradistinction to the numerals, is the fact that they quantify inexactly. Indeed, one might say that quantification, as opposed to counting, is inexact. Moreover, quantifying is independent of counting, in the sense that one can never set up a system precisely relating certain quantifiers to certain numerals. The quantifiers establish various ranges of possibilities going from few to many, some to all or indeed none, which, it can be established from other syntactic data, is not not one, i.e., the negation of a numeral, but not any, the negation of a quantifier, and for the temporal adverbs, from seldom to often, from never, as the negation of ever, to always, from rarely to frequently. But one can never deduce a number from a quantifier. In one case, all can mean, in absolute terms, less than some, in another case.

The linguistic evidence suggests that in some sense language cannot count; it can only distinguish between singular and a quantifiable plurality.<sup>5</sup> This is reflected in the fact that the amount of research and speculation in linguistics and logic on quantifiers is not matched by any work of comparable extent for the numerals. The behavior of any one numeral appears to be the same as that of any other, except for one and perhaps two (see fn. 5), the other numerals belonging to an extra-linguistic system; the same could not be said of the class of true quantifiers.

The distinction between quantification and counting explains not only the difference between (many) boys and twenty boys, but that between il nageait souvent or he used to swim often and il nagea vingt fois or he swam twenty times. Thus, in the system of narrative tenses, we have a narrative past which counts or re-counts and an habitual past which quantifies past events. The first may count in two ways: it places discrete events one after the other, assigning them a place in a linear ordering captured by notions like "earlier than" or "later than" and it also optionally may specify for one event in a series on how many occasions it was repeated. This time or past which is re-told is not a remembered past. It is the past, whether once experienced or not, become history, translated into calendar time. It recounts a past which is an objective knowledge, a knowledge by description, to use Russell's distinction, and not a knowledge by acquaintance.

What is the place of the quantification of the past in narrative? It is the oeuvre of Proust which suggests an answer. If the passé simple recounts the past, the habitual remembers it. It is, to be precise, the tense of what Proust calls "voluntary memory," the memory he calls "uniforme" (*Pléiade*, III, p. 869), because it recalls an uncounted succession of repeated events. Memory recalls a lived past which the rememberer has an acquaintance with, as opposed to the impersonal past of the passé simple. The essence of voluntary memory is the recalling of a countless plurality of events which, as remembered, are converted into duplicates, repetitions, one of the other, and hence no one of them has a date or a numbered place in the series.

This means that in the common notion of remembering when or how many times what is being invoked is not strictly speaking memory but a second order act departing from memory; in other words, this question of the confessor is inappropriately posed to the habitual repeater's memory. To remember when and how many times, to count, is to perform another operation upon the data of memory, comparing them with other data; it requires an inference, a deduction. One knows one has done something more than once, habitually, time and time again, or even rarely, but in order to determine how many times and when, one must put one's memories, by nature without a date and without an exact number, in relation with other facts established by other means than by memory--by consulting datebooks, calendars, newspapers, diaries and subjecting this data to calculations. The Bergsonian formula which helped shape Proust's thinking on time and memory is to "introduce an order into what is successive" (Bergson, 1889, 1960, p. 102).<sup>6</sup> In other words, what is remembered is then re-counted, the two linguistic operations contributing to constitute narrative.

But, as is well known, these two operations are for Proust not sufficient to constitute a novel, to "recapture the past." That involves that other memory which Proust calls "involuntary." With involuntary memory the past is returned to us by chance--a chance whose conditions are created, Proust explains, "when I found myself torn from my habits" (The Past Recaptured, p. 128), when, for instance, "My mother suggested that, contrary to my habits, I have some tea" (RTP, I, p. 44). And what returns is "the moment"--the single moment (PR, p. 131).

If voluntary memory has a grammatical representation, can we assume that involuntary memory does? Making that assumption will, indeed, allow us to place that other narrative tense, the past cotemporal with NOW, within a revised schema which adopts the Proustian theory of memory, which is one foundation for the Proustian theory of the novel. For the past cotemporal with NOW is always a singular tense referring to that singular occasion represented by NOW. But once this hypothesis is entertained, then the grammatical account of this literary tense provides independent support for Proust's own account. For all Proust's attempts to define involuntary memory stress the cotemporality of two moments, one past and one present: "the moment to which I was transported seemed to me to be the present moment" (The Past Recaptured, p. 131); "I experienced them [the happy impressions caused by remembering involuntarily] at the present moment and at the same time in the context of a distant moment, so that the past was made to encroach upon the present and I was made to doubt whether I was in the one or the other." (p. 133)

We now have the following division of labor within narrative fiction: the narrative past, of which the passé simple is one realization, recounts the past; the habitual past remembers it; and the past cotemporal with NOW re-presents it, in the sense that it makes a past moment here and now again. It is in this sense that it recaptures the past. The first relates narrative fiction to history; the last two divide up the personal realm of memory. Such was the conclusion of Thibaudet (1920),

in his answer to Proust on Flaubert: "Perhaps it is the aspect of things and persons, as they imposed themselves upon Flaubert which required the use of the imperfect, because the imperfect expresses the past, in relation either to the present or to an habitual nature --, two conditions which are brought back together when we go back into our past 'in search of lost time.'" [à la recherche du temps perdu]. (p. 430) Finally, it is that grammatical analysis which Proust defends to Thibaudet which vindicates Proust's claim that it is art alone which makes it possible to recapture the past, to represent "a fragment of time in the pure state" (The Past Recaptured, pp. 133-4), which then becomes "a minute freed from the order of time" (p. 134). For it is precisely that Flaubertian imperfect Proust qualifies as "eternal" which unites a moment of the past with a NOW. For whereas the habitual occurs in the spoken language and the passé simple can appear in historical writing as well as in the novel, the past cotermporal with NOW occurs only in the language of the novel. To write a sentence which "represents" the past, which "recaptures" it, is already to write a novel.

#### Notes

<sup>1</sup>See Banfield (1982), Chapter 2.

<sup>2</sup>A numeral may appear with the habitual, as long as it does not specify the exact number of times the event took place in the past; thus, one finds:

Regulièrement, trois fois par semaine, les voyageurs qui stationnaient dans les salles d'attente ou sur le quai de Doncières-Ouest voyaient passer ce gros homme aux cheveux gris, aux moustaches noires, les rouges d'un fard qui se remarque moins à la fin de la saison que l'été, . . . (RTP, Pléiade II, p. 1037).

In the sentence above, trois fois par semaine qualifies régulièrement, but either adverbial could appear alone with the habitual. The point is that trois fois par semaine specifies the nature of the regularity, but in no way indicates how many times in the past M. de Charlus was seen by travellers at Doncières-Ouest.

<sup>3</sup>The claim holds only for the tenses of narrative.

<sup>4</sup>It should be noted that in Jackendoff's system a few, "because of its indefinite article, can be identified as a semi-numeral, hence, a noun" (p. 130), while few is analyzed as a true quantifier. Thus, one would predict that few could appear with the habitual past, but not a few. Now this is precisely the distribution one finds, as is shown below.

a. Few times would we ever miss the matinee. We used to (would) miss the matinee very few times.

b. A few times we missed (\*would miss, \*used to miss) the matinee.

<sup>5</sup>There is some evidence that language can count up to two. Many

languages, including Old English, know a dual number. In Latin, unum and duum are declined, but not the other numerals. Note that both, which can be considered the dual number of all, does not appear with the habitual:

Both times we took (\*would take, \*used to take) the shortcut.

<sup>6</sup>In Bergson, "succession" is distinguished from an ordering, a counting; it is the flow of duration which is not broken up into counted units: as to "the successive moments of our conscious life," "the oscillations of the pendulum break it up, so to speak, into parts external to one another." (1889, 1960, p. 109)

#### References

- Banfield, Ann. 1982. Unspeakable Sentences. London: Routledge & Kegan Paul.
- Bergson, Henri. 1889, 1960. Time and Free Will. New York: Harper & Row.
- Comrie, Bernard. 1976. Aspect. Cambridge: Cambridge University Press.
- Deleuze, Gilles. 1964. Proust et les Signes. Paris: Presses Universitaires de France.
- Fiengo, Robert. 1974. Semantic Conditions on Surface Structure, MIT Doctoral Dissertation.
- Genette, Gérard. 1972. Figures III. Paris: Seuil.
- Jackendoff, Ray. 1977. X Syntax: A Study of Phrase Structure. Cambridge, Mass.: MIT Press.
- Proust, Marcel. 1920. "A propos du 'style' de Flaubert." Nouvelle Revue Française, 14, no. 1, pp. 72-90.
- Sensine, Henri. 1926, 1966. L'Emploi des Temps en Français. Paris: Payot.
- Thibaudet, Albert. 1920. "Réflexions sur la Littérature: lettre à M. Marcel Proust." Nouvelle Revue Française, pp. 426-437.
- Vendler, Zeno. 1967. "Verbs and Times," in Linguistics and Philosophy, Ithaca: Cornell University Press, pp. 97-121.

#### Texts

- Flaubert, Gustave. Oeuvres, II. Paris: Gallimard, Bibliothèque de la Pléiade, 1952.
- Lawrence, D. H. The First Lady Chatterley. Harmondsworth: Penguin, 1978.
- Proust, Marcel. A la Recherche du Temps Perdu, I, II, III. Paris: Gallimard, Bibliothèque de la Pléiade, 1954.
- Proust, Marcel. The Past Recaptured, The Remembrance of Things Past. Translated by Andreas Mayor. New York: Random House, 1971.
- Woolf, Virginia. Mrs Dalloway. New York and London: Harcourt Brace Jovanovich, 1925, 1953.

Syllable Weight in Some Australian Languages<sup>\*</sup>  
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One of the most prominent conclusions that emerges from recent work on stress and syllable structure is that the properties of a syllable's onset seemingly do not in any way affect its weight. That is, when stress placement is sensitive to syllable weight, then stress will be attracted either to a syllable with a branching nucleus or to one with a branching rime, independently of the properties of the onset. This observation has been incorporated into some recent theories of the syllable. For example, Hyman (1984) proposes a universal onset-creation rule as the first rule of the phonology. This onset-creation rule, which precedes rules of stress assignment, absorbs the syllable-initial consonant into a weight unit with the following vowel, thus making the consonant unavailable for playing a role in stress assignment and predicting that onset-sensitive stress rules should not occur. However, Davis (1982) has pointed out the occurrence of onset-sensitive stress rules in a few languages. More recently, Everett & Everett (1984) point out that, in the Amazonian language, Pirahã, properties of both the onset and the nucleus affect syllable weight. Specifically, in Pirahã, stress is placed on the rightmost heaviest of the last three syllables in a word. Now, if syllable weight, as reflected by the nucleus, is identical in any two of the last three syllables, then a syllable with a voiceless consonant in the onset receives stress. Some examples from Everett & Everett are given in (1):

- (1) Pirahã data (Stressed syllables are underlined; tones are not indicated)

- a. bii sai 'red'
- b. kai bai 'monkey'
- c. pa hai bii (proper name)
- d. ?i bao sai 'her cloth'

Based on such Pirahã data, in which syllable onsets play some role in stress placement, Everett & Everett propose that stress rules can be constructed on syllable projections, in addition to being constructed on the rime and nucleus projections.

In this paper I present additional evidence from two Australian languages, Western Aranda and Madimadi, that provide support for Everett and Everett's proposal that stress can refer to syllable projections. In these two languages the onset plays a role in determining syllable weight. I begin by presenting a metrical analysis for each one of these languages that involves syllable projections. I then consider and reject a possible alternative analysis of these languages based on a nucleus projection. Consequently, my analysis supports the contention that

stress can be constructed on syllable projections, rather than only on rime or nucleus projections. Finally, I will conclude by suggesting some possible implications that these languages might have for a theory of syllable structure.

First, I will consider Western Aranda, an Arandic language spoken in Central Australia. The sound system of the language has been described in detail by Strehlow (1942). In Western Aranda, the onset is crucial in determining stress placement in words of more than two syllables. Strehlow (1942:299-301) gives the following statement of stress for Western Aranda:

If a trisyllabic word begins with a consonant, the stress falls on the first syllable... If a trisyllabic word begins with a vowel, the stress falls on the second syllable... If a word of four syllables begins with a consonant, the main stress falls on the first syllable. Usually there is a weak secondary stress on the third syllable... If a word of four syllables begins with a vowel, the stress falls on the second syllable... If a word of five syllables begins with a consonant, the main stress falls on the first syllable, and a weak secondary stress is usually placed on the third syllable or on the fourth... If a word of five syllables begins with a vowel, the main stress normally falls on the second syllable, and a weak secondary stress is placed on the fourth syllable.

Or more simply put, the Western Aranda stress rule for trisyllabic words or longer is that primary stress falls on the first syllable containing an onset. Secondary stress is usually on every other syllable after the one with main stress.<sup>1</sup> Final syllables never receive any stress; they are extrametrical. As a result of the final syllable being extrametrical, main stress falls on the first syllable of all bisyllabic words. There are virtually no exceptions. Some data illustrating these stress facts are shown below:

(2) Consonant initial words of three or more syllables

- a. tükura 'ulcer'
- b. kútuŋùla 'ceremonial assistant'
- c. wóratàra (place name)

(3) Vowel initial words of three or more syllables

- a. ergúma 'to seize'
- b. artjánama 'to run'
- c. utnádawàra (place name)

(4) Bisyllabic words

- a. káma 'to cut'
- b. ílba 'ear'
- c. wúma 'to hear'

I propose the following metrical analysis of Western Aranda stress that is based on syllable projections (and assumes a rime constituent):

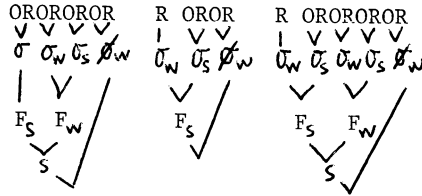
(5) Analysis of Western Aranda Stress

- a. Projection: Project syllables.
- b. Extrametricality: Mark final syllables extra-metrical.
- c. Main Stress: At the left edge of the word form a binary, right-dominant foot (on the syllable projection).
- d. Stress Alternation: Form binary, quantity-insensitive, right-dominant feet going left-to-right.
- e. Other Rules: Apply stray syllable adjunction and construct a left-dominant word tree.

The application of these rules is illustrated in (6):

(6)	a. kutuṁpula	b. erguma	c. utnadawara
	 OROROROR √ √ √ √ σ σ σ σ	V      R OROR   √ √ σ σ σ	V       R OROROROR   √ √ √ √ σ σ σ σ σ
Syllable Projection (5a)	OROROROR √ √ √ √ σ σ σ σ	R OROR   √ √ σ σ σ	R OROROROR   √ √ √ √ σ σ σ σ σ
Extrametri- cality (5b)	OROROROR √ √ √ √ σ σ σ <del>σ</del>	R OROR   √ √ σ σ <del>σ</del>	R OROROROR   √ √ √ √ σ σ σ σ <del>σ</del>
Stress Rule (5c)	OROROROR √ √ √ √ σ σ σ <del>σ</del>   F	R OROR   √ √ σ <sub>w</sub> σ <sub>s</sub> <del>σ</del> √ F	R OROROROR   √ √ √ √ σ <sub>w</sub> σ <sub>s</sub> σ σ <del>σ</del> √ F
Stress Alternation (5d)	OROROROR √ √ √ √ σ σ <sub>w</sub> σ <sub>s</sub> <del>σ</del>   √ F F	Does Not Apply	R OROROROR   √ √ √ √ σ <sub>w</sub> σ <sub>s</sub> σ <sub>w</sub> σ <sub>s</sub> <del>σ</del> √ √ F F

Other Rules  
(5e)



In (6a), (6b), and (6c), the words are illustrated with their syllable structure (though I have not indicated the CV or X-tier). First, syllables are projected. After syllables are projected, it can be known whether the syllable branches into an onset and a rime, as in the first syllable of (6a) for example, or, whether the syllable just branches into a rime (as in the first syllable of (6b) or the first syllable in (6c)). Note that internal branching of the rime cannot be relevant, for this would violate the principle of metrical locality as proposed by Hammond (1982). Next, final syllables are made extrametrical. Subsequently, main stress (5c) is determined by the creation of a binary right-dominant foot from the left edge of the word on the syllable projection. In (6a), this creates a binary foot over the first syllable since that syllable has two branches. In (6b), though, the first syllable has only one branch, hence, it is the weak part of a right-dominant binary foot formed with the following syllable. The example in (6c) is similar. The first syllable has only one branch, and thus, it is the weak part of a w-s foot. Stress alternation and the other rules apply to produce the final output illustrated at the bottom of (6).

Essentially, the analysis proposed here using syllable projections is a way to capture the fact that the onset consonant plays a role in stress placement.

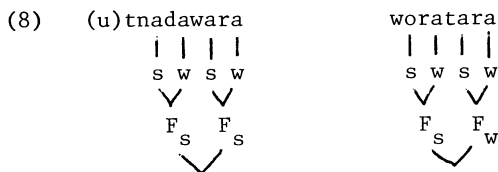
There is, however, an alternative analysis which does not rely on syllable projections. This analysis incorporates word-initial vowel-extrametricality, with stress being constructed on nucleus projections. If vowels of vowel initial words were marked extrametrical then the Western Aranda stress rule could be formulated as in (7):

#### (7) Alternative Analysis of Western Aranda Stress

- Mark word initial vowels extrametrical
- Form binary left-dominant quantity-insensitive feet on the nucleus projection from the left edge of the word
- Form a left dominant word tree

Two examples are given below:





Notice that in this analysis final vowels must still be extrametrical since words like túkura and artjánama do not have final stress as would be predicted by the alternating stress pattern. Now, if final vowels are extrametrical and initial vowels are supposed to be extrametrical, then it is relevant to reconsider what happens in bisyllabic words that begin with a vowel. In such words, as we see from (4), stress is always on the initial syllable, not on the final one. Thus, this provides strong evidence that the initial vowel cannot be extrametrical after all; rather, the onset does play a role in syllable weight and this is captured by (5), in which stress is assigned on the basis of syllable projections in Western Aranda.

Another language in which the properties of an onset consonant can affect syllable weight is Madimadi, an Australian language of New South Wales described by Hercus (1969). He gives (p.152) the following statement of primary stress for Madimadi:

All single consonants other than labials and velars,...  
whenever they began the second syllable, attracted the  
main stress into the second syllable.

We can use the feature [coronal], in the sense of Halle & Clements (1983), to define the relevant natural class. The other consonants, besides labials and velars, in Madimadi, are dental, alveolar, palatal, and retroflex, which are all [+coronal].<sup>2</sup> Data illustrating the Madimadi stress pattern are given in (9):

(9) Madimadi stress<sup>3</sup>

- a. Words with [-coronal] onsets in the second syllable

wíjumiŋin 'pupil' (of the eye)  
búkumanàma 'kangaroo'

- b. Words with [+coronal] onsets in the second syllable

wiθíwaθ^ 'to come back'  
guleθuwaθ^ 'to hate'

- c. Bisyllabic words

bín^ 'to go out'

bÉrEr 'a swamp'

The words in (9c) show that bisyllabic words are normally stressed on the first syllable regardless of the second syllable's onset consonant; hence, final syllables are (usually) extrametrical. While the stress pattern in (9) can be captured in an SPE-type notation -- eg.,  $V \rightarrow [+stress] / \#C (V \ C) \text{ --- } [+cor] \text{ --- } it$

is not obvious how to capture it in standard metrical theory. Nonetheless, I propose the following metrical analysis for stress in Madimadi that first makes reference to the nucleus projection:

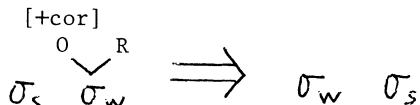
(10) Madimadi Stress Rule (on the nucleus projection)

- a. Mark the final nucleus extrametrical
- b. Going from left-to-right construct binary, quantity-insensitive left dominant feet

The application of (10) is shown in the first part of (13).

A rule of stress readjustment, that must make reference to the syllable projection, subsequently applies after (10) reversing the s-w order of the two syllables in a foot in which the weak syllable node dominates an onset that is [+coronal]. The rule is formulated in (11):

(11) Stress Readjustment (on the syllable projection)



Percolation is used to move up<sup>4</sup> the feature [+coronal] from the consonant onto the onset node.

Besides (10) and (11), the two rules in (12) also apply:

(12) Other rules:

- a. Stray Syllable Adjunction
- b. Construct a left dominant word tree<sup>5</sup>

Some derivations are given in (13):

(13)	a. wíŋumìŋin	b. búkumanàma	c. guléθuwaθΛ
Rules	wíŋumìŋin	bukumanàma	guleθuwaθΛ
(10a) &	s w s	s w s (w)	s (w) s w
(10b)	✓ 	✓ 	✓ 
(11)	OROROR(OR)	OROROR O R(OR)	OR O R OROR(OR)
	✓ σ <sub>s</sub> σ <sub>w</sub> σ <sub>s</sub>	✓ σ <sub>s</sub> σ <sub>w</sub> σ <sub>w</sub> σ <sub>s</sub>	✓ σ <sub>w</sub> σ <sub>s</sub> σ <sub>s</sub> σ <sub>w</sub>
	✓ 	✓ 	✓ 
(12)	OROROROR	OROROROROR	OROROROROR
	✓ σ <sub>s</sub> σ <sub>w</sub> σ <sub>s</sub> σ <sub>w</sub>	✓ σ <sub>s</sub> σ <sub>w</sub> σ <sub>w</sub> σ <sub>s</sub> σ <sub>w</sub>	✓ σ <sub>w</sub> σ <sub>s</sub> σ <sub>s</sub> σ <sub>w</sub> σ <sub>s</sub>
	✓ 	✓ 	✓ 
	F <sub>s</sub> F <sub>w</sub>	F <sub>s</sub> F <sub>w</sub>	F <sub>s</sub> F <sub>w</sub>
	✓ 	✓ 	✓ 
	S	S	S

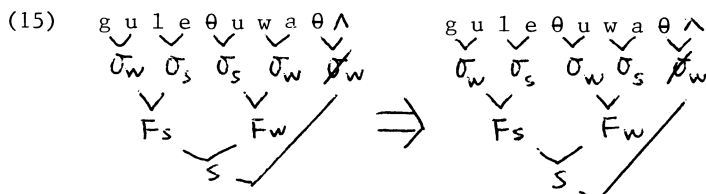
First, in (13a), (13b), and (13c), the words are shown with their foot structure after the Madimadi stress rule ((10a) and (10b)) has applied. Subsequently, stress readjustment (11), which is triggered by a coronal onset in a weak syllable, applies. (The weak nodes that are to undergo stress readjustment are circled in (13b) and (13c)). It switches the s-w marking on these feet to w-s. Finally the other rules, in (12), apply to produce the output shown in the bottom of (13).

Specifically, the examples in (13a) and (13b) show that the first foot is still labelled sw if there is no [+cor] consonant in the onset of the second syllable after (11) has applied. The example (13c) shows that the first foot is readjusted to ws if there is a [+cor] consonant in the onset of the second syllable. In (13b), the second foot has been relabelled ws. The readjustment rule has applied since a [+coronal] onset appears in the originally weak syllable of that foot. Now the output for the derivation shown in (13c) would have main stress on the second syllable and secondary stress on the third syllable (guléθuwaθΛ). Notice, though, that this output (as shown in (13c)) is incorrect. The correct form is guléθuwaθΛ. However, the form in (13c) contains a stress clash. The second and third syllable clash since they are both strong. This clash is resolved by the clash-resolution rule in (14):

$$(14) \text{ Clash-Resolution Rule}^6$$

$$\begin{array}{ccc} \sigma_w & \sigma_s & \sigma_s & \sigma_w \\ \swarrow & \searrow & \swarrow & \searrow \\ F_s & & F_w & \end{array} \Rightarrow \begin{array}{ccc} \sigma_w & \sigma_s & \sigma_w & \sigma_s \\ \swarrow & \searrow & \swarrow & \searrow \\ F_s & & F_w & \end{array}$$

Thus, after the clash-resolution rule applies, (13c) is changed to the following tree structure:



The rules given in (10) through (12) plus the clash-resolution rule covers the bulk of the Madimadi data. Only a small percentage of the words from Hercus (1969) are exceptional, and most of these involve words that fail to undergo stress readjustment. These words would have to be marked as such in the lexicon.<sup>7</sup>

Even if some of the details of my analysis turns out to be incorrect, a correct analysis would at least have to refer at some point to syllable projections. It is possible, though, to come up with analyses of the Madimadi data that do not make reference to syllable projections. One possibility is to mark the first syllable extrametrical if the second one begins with a [+cor] consonant; then, stress is constructed on the nucleus projection by binary left-dominant feet from the beginning of the word. However, such a use of extrametricality is unconstrained in that it refers to nonperipheral elements (i.e., the make-up of the second syllable), and also, this would be unable to explain words like *búkumanàma* in which (secondary) stress is on the syllable that has a [+cor] onset.<sup>8</sup> Consequently, the role of the onset in determining stress placement in Madimadi, as in Western Aranda is decisive. Thus, stress placement in these languages provides strong support for the proposal of Everett & Everett (1984) that stress can make reference to syllable projections.

One implication that emerges from these two Australian languages is that the onset consonant can play a role in syllable weight. This conclusion is contrary to what is predicted by many, but not all, current theories of syllable structure. Second, Hyman (1984) has proposed his onset-creation rule as a universal. However, in Western Aranda (and in other Arandic languages as well), the onset creation rule does not always apply. Making reference to Hyman's theory of syllable weight, we would be forced to postulate that, in Western Aranda, the onset, by itself, can form the first weight-unit of a syllable, while the nucleus and the coda together would form a second weight-unit of the syllable.

Finally, it should be mentioned that the existence of languages in which the onset plays a role in syllable weight is not incompatible with the recent theory of syllable structure put forth by Vennemann (1984). He argues that the nature of syllable structure in a language is dependent upon various phonological

processes in that language. For example, if stress in a language is sensitive to the make-up of the nucleus and the coda then syllables in such a language would have a rime constituent. If, on the other hand, stress is sensitive to the syllable's onset (as in Western Aranda and Madimadi), then syllables in such languages would have a constituent that comprises the onset and the nucleus. And, in languages where stress is not at all sensitive to syllable weight, syllables would have a flat structure. Thus, data from Western Aranda and Madimadi are not incompatible with a perspective (like that of Vennemann's) that recognizes different syllable types rather than one universal syllable structure.

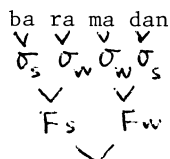
In summary, I have presented a metrical analysis for each of two Australian languages in which the onset affects syllable weight, and have argued that optimal analyses of these languages supports the contention of Everett & Everett (1984) that stress can refer to syllable projections, in addition to nucleus and rime projections. Finally, I very briefly considered some of the implications that these languages might have for theories of syllable structure, although, undoubtedly, some phonologists will argue that the relative scarcity of languages with onset-sensitive stress rules militates against their importance for theories of syllable structure. Such languages, however, cannot be ignored altogether.

### Notes

\*I thank Dick Demers, Rich Janda, Dick Oehrle, and Deirdre Wheeler for their comments and support. All errors are my own responsibility.

1. This is often not the case with compound words, stress on compounds reflects the stress of the individual words in isolation.
2. Halle & Clements' use of [+coronal] includes palatal consonants. The feature [-grave] can also be used.
3. Three words of Hercus's (1969) vocabulary list have second syllables that begin with a vowel and stress on that syllable. I treat these as exceptions.
4. Madimadi has no onset clusters, so the possibility that the feature [+coronal] percolates back down to other members of the onset does not arise.
5. Given this analysis no secondary stress should occur before the syllable with primary stress. Hercus, however, marks secondary stress on the initial syllables of words that have main stress on the second syllable (i.e., words with coronal onsets in the second syllable). In my analysis, I assume that the initial secondary stress in such words is due to a low level (post-lexical) initial downbeat rule.
6. The clash resolution rule can be stated in terms of the metrical grid, but, I will not pursue a grid analysis here.

7. For example, báramadàn 'policeman' has stress on the first syllable, and thus, the first foot does not undergo stress re-adjustment. This would have to be marked as such in the lexicon. Note, also, that in the tree structure for báramadàn, below, the final syllable is an exception to extrametricality, and hence, stress readjustment has applied to the second foot.



8. Another possibility is that all intervocalic [-cor] consonants syllabify with the preceding vowel (thus creating a heavy syllable), while [+cor] consonants syllabify with the following vowel. If such were the case, stress would be constructed on a rime projection with a quantity-sensitive right-dominant foot. However, Hercus (1969) gives no evidence for this syllabification, and besides syllables with branching rimes in Madimadi do not necessarily attract stress (e.g., winbálv 'whereabouts').

### References

- Davis, S. (1982) "On the Internal Organization of Syllable Constituents". In T. Larson (ed.) Coyote Papers: Working Papers in Linguistics from A-Z v.3, Department of Linguistics, University of Arizona, 3-22.
- Everett, D. & K. Everett (1984) "On the Relevance of Syllable Onsets to Stress Placement", LI 15:705-711.
- Halle, M. & G. Clements (1983) Problem Book in Phonology, MIT Press, Cambridge Mass.
- Hammond, M. (1982) "Foot Domain Rules and Metrical Locality", WCCFL 1:207-218.
- Hayes, B. (1981) A Metrical Theory of Stress Rules, IULC, Bloomington.
- Hercus, L. (1969) The Languages of Victoria: A Late Survey, Part I & II, Australian Institute of Aboriginal Studies, Canberra.
- Hyman, L. (1984) "On the Weightlessness of Syllable Onsets", BLS 10:1-14.
- Strehlow, T.G.H. (1942) "Arandic Phonetics", Oceania VII:255-302.
- Vennemann, T. (1984) "The Rule Dependence of Syllable Structure". Paper presented at the Fifth International Phonology Meeting, June 25-28, Eisenstadt, Austria.

SYLLABLE WEIGHT, SLOPPY PHONEMES, AND  
CHANNELS IN PIRAHÃ DISCOURSE

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0 Introduction

The purpose of this paper is to document the importance of prosodies in establishing distinct channels (cf., *inter alia*, Hymes (1977)) of discourse in Pirahã, an Amazon language isolate. We argue that the notion of discourse channel partially explains certain sui generis features of Pirahã syllable (o) weight and phonemic variation, namely, the relevance of the syllable onset to stress placement and sloppy phoneme effect (described below).

Our discussion is organized as follows. First, we state the basic rule of stress placement in Pirahã, showing its interaction with syllable weight and foot construction. The uniqueness of this system is underscored and addressed by additional evidence that stress placement is in fact a phonological rule rather than more phonetic prominence. Next, examples of "free" variation among voiceless consonants are given (sloppy phonemes). This is followed by a description of the types, use, and importance of distinct channels of Pirahã discourse and speculation as to the possible influence of these channels on Pirahã low level phonology.

1 Syllable weight and stress placement

Pirahã syllable weight, as shown in (1) (where C= voiceless consonant and G= voiced consonant):

(1) CVV > GVV > VV > CV GV (    = 'is heavier than' )

The rule of stress placement is stated as in (2):

(2) Primary stress placement: Stress the rightmost token of the heaviest syllable type within the final three syllables of the word.

The interesting features of (1) and (2) are the number of syllable types recognized and the contribution of the onset to determining syllable weight (cf. Everett and Everett (1984a, 1984b) for further discussion). Both components of the Pirahã stress rule are unique in being undocumented in any other language and predicted to be nonexistent by current multi-linear models of phonology. Examples of rule (2) are found in (3) - (14) (cf. also Everett and Everett (1984)):

Last three syllables only ( ' = stress )

(3) pòò 'gáí hì áí 'banana'  
CVV GVV CV VV

4 3 2 1

Rightmost token

(4) pàó hòà 'hàì 'anaconda'  
CVV CVV CVV

3 2 1

CVV vs GVV

(5)a. bíí 'sàì 'red'

b. 'kàí bàì 'species of monkey'

CVV vs VV

(6)a. ?í 'sìì hò áì 'liquid fuel'

- CV CVV CV VV  
 4 3 2 1  
 b. kò sò lɿ gəl 'təl 'eyebrow'  
 CV CV VV GVV CVV  
 5 4 3 2 1
- CVV vs. CV  
 (7)a. ʔò gɿ ál 'proper name'  
 CVV GV VV  
 3 2 1  
 b. ʔò gɿ ál 'big'  
 CV GV VV  
 3 2 1
- CVV vs. GV  
 (8)a. ʔàà gɿ 'coati mundi'  
 CVV GV  
 2 1  
 b. gə 'hlo 'airplane'  
 GV CVV  
 2 1
- GVV vs. VV  
 (9)a. 'gəò lɿ 'proper name'  
 GVV VV  
 2 1  
 b. hò àà 'gəl 'kind of fruit'  
 CV VV GVV  
 3 2 1
- GVV vs. CV  
 (10)a. ʔɿ 'gəó 'back'  
 CV GVV  
 2 1  
 b. 'gəl hɿ 'that'  
 GVV CV  
 2 1
- GVV vs. GV  
 (11)a. bə 'gəl 'breast'  
 GV GVV  
 2 1
- VV vs. CV  
 (12)a. pɿ 'əl 'also  
 CV VV  
 2 1  
 b. hò 'əl pɿ 'species of fish'  
 CV VV CV  
 3 2 1
- VV vs. GV  
 (13)a. ʔà 'əl bɿ 'thin'  
 CV VV GV  
 3 2 1  
 b. sɿ gə 'lɿ 'fuls'  
 CV GV VV  
 3 2 1
- (14)a. 'ʔà bə gɿ 'toucan'  
 CV GV GV  
 3 2 1



- b. ?à bà 'pà 'proper name'  
 CV GV CV  
 3 2 1

(15) supports the claim that tone is irrelevant to stress placement:

- (15)a. 'ʔào ól 'foreigner'  
 CVV VV

- b. 'ʔào ól 'ear'  
 CVV VV

- c. 'ʔào ól 'skin'  
 CVV VV

- d. 'ʔào ól 'kind of fruit'  
 CVV VV

- e. 'ʔào ól 'Brazil nut shell'  
 CVV VV

Further evidence that Pirahã stress is a rule governed phenomenon rather than mere phonetic prominence comes from certain extrametrical morphemes, tone shifts produced by resyllabification and stress movement, and native speaker corrections. Consider first the examples of extrametricality in (16) and (17):

- (16)a. kòhòlblf - hàl 'proper name'  
 species of fish - nominalizer

- b.\* kò hòl blf 'hàl  
 CV CVV GVV CVV

- c. kò'hòlblf[hàl  
 4 3 2 1

According to rule (2), we expect (16a) to be stressed as in (16b) when in fact it is stressed as in (16c). Moreover, were stress merely relative prominence, it would seem more likely to hear blf as the "stressed" syllable due to its distinctive voicing and tonal pattern. Another apparently puzzling example is found in (17):

- (17)a. ?òlbbòlblf - sàl 'species of fish'  
 species of fish - nominalizer

- b.\* ?òl bðl blf 'sàl  
 CVV GVV GVV CVV

- c. ?òl'bb)'blf[sàl  
 4 3 2 1

Again, rule (2) apparently makes the wrong prediction. As the rightmost token of the heaviest syllable type in (17), CVV, should be stressed. In fact, the stress is perceived on blf. The relative prominence hypothesis is likewise called into question since there is no obvious reason why the sequence blf should be more prominent here and less prominent in (16) where it is also in penultimate position.

Our understanding of (16) and (17) is that the nominalizers -hàl and -sàl are extrametrical (or alternatively, that their affixation follows rule (2)) and thus not subject to

rule (2). In spite of their inability to bear stress, however, these syllables nevertheless are relevant to the constraint on rule (2) prohibiting stress assignment more than three syllables leftward from the end of the word. Thus, the heaviest of the final three syllables in (16) turns out to be hoi. In (17), the heaviest of the last three syllables excepting sa is bi. In both cases rule (2) and not relative prominence makes the correct prediction.

As further evidence that Pirahã stress is rule governed consider the phenomenon of high tone shift, as in (18) (cf. Everett (to appear) for more examples):

- (18)a. sɪ'toɪ + 'hɔɪ → sɪ'to'hɔɪ  
'egg' 'two' 'a few eggs'  
b. sɪ'toɪ + ?ɔgàbà'gàɪ → sɪ'toɔgàbà'gàɪ  
'egg' 'want' '(someone) wants a few eggs'

After certain morphophonological processes, (18a) and (18b) are resyllabified as shown to the right of the arrows. Rule (2) correctly predicts the stress of both examples ((18b) has two occurrences of primary stress due to its morphological composition). Interestingly, high tone on a (lexically) stressed syllable shifts, following resyllabification, to the new stressed syllable in (18a). In (18b), however, high tone continues in the original syllable even though this results in a three tone sequence on two vowels, since stress continues on that syllable. Although we have no idea why high tone should follow stress in this way, the fact that (2) correctly predicts stress placement in these examples suggests that the tone shift is produced by a rule governed phenomenon and that tone itself is not relevant to stress placement (cf. also (15) above), contrary to what a relative prominence hypothesis would seem to predict. (1)

A final evidence that Pirahã's unique stress pattern is rule governed comes from native speaker corrections. In many of the above examples (and others), the present author was corrected on various occasions by a number of speakers, as in (19):

- (19) Author: 'pàóhðàhàɪ 'anaconda'  
Pirahã: 'pàóhðàhàɪ hɪàbà, pàóhðà' hàɪ  
negative (very strong stress)

'Not anaconda, anaconda.'

Such facts then lead us to conclude that stress in Pirahã is indeed rule governed, a learned feature of Pirahã phonology. We now consider a second sui generis aspect of Pirahã phonology, the sloppy phoneme effect.

## 2 Sloppy Phonemes

Consider the following alternations:

- (20)a. tɪ pɪàɪ ~ kɪ pɪàɪ ~ kɪ kɪàɪ ~ pɪ pɪàɪ ~ ?ɪ ?ɪàɪ, etc.  
I also  
'Me too'  
b. ?àpàpàɪ ~ kàpàpàɪ ~ pàpàpàɪ ~ ?à?à?àɪ, etc.  
'head'  
c. ?ɪsɪhðàɪ ~ kɪhɪhðàɪ ~ pɪhɪhðàɪ, etc.

'liquid fuel'

Although subject to idiolectal variation, examples such as in (20) are observed frequently. (2) Due to the fact that the first example in each series of (20a-c) is more frequent intra- and inter-idiolectally, we consider these to be the basic forms. The fact that there are such basic forms leads us to conclude that this effect results from weak (rather than non) specification of point of articulation features at the segment level, as in (21) (where ( ) indicates weak specification):

(21) [ +cons  
-cont  
(point of articulation) ]

Interestingly, this segmental variation exists in spite of the fact that Pirahã's segmental inventory is the smallest yet documented: /p/, /t/, /h/, /s/, /b/, /g/, /i/, /a/, /o/ (with k appearing as variant of other segments, cf. above). In what follows, we suggest that the notion of channels in Pirahã may offer some insight into the relationship between contrast at the segmental and prosodic levels.

### 3 Channels

By channel we mean (roughly) the medium used to carry the message from the source (speaker) to the receiver (hearer) (cf. Bell (1976); Hymes (1977)).

Thus, consonants and vowels, orthographic symbols, gestures, color coded plastic figures, etc. may serve as channels to carry all or a portion of the message (e.g., different intonations often communicate different emotional states while sequences of consonants and vowels carry propositional content (cf. Ladd (1978) for a survey of proposals on this subject).

What we want to begin with here then is the unoriginal, uncontroversial claim that the greater the communicative dependence on a particular channel, the greater the number of contrastive features needed for that channel. Of course, contrast may be attained at any level either paradigmatically or syntagmatically. So, for example, by making its words longer (greater syntagmatic contrast) Pirahã can partially compensate for its small phonemic inventory (reduced paradigmatic contrast). A logical correlate of this is that the less the communicative dependence placed on a particular channel, the fewer the number of contrastive features needed by that channel. Note, however, that this is a much weaker type of implication than the previous one. So a reduction in need of contrast does not require a reduction in number of contrastive features in the same way that increased need of contrast requires an increase in number of contrastive features (whether positions or position fillers). We return to this directly. First, however, we need to describe certain channels of Pirahã discourse (actually, it might be more appropriate to consider the individual "channels" described below as distinct manifestations of the single prosodic channel, each manifestation's use determined by context.

#### 3.1 Hum Speech

Consider first the phenomenon of hum speech. This channel (or manifestation) is used primarily in home and village situations, e.g. mother-child conversation, communal eating, etc. In general, wherever close, emotional and physical proximity is recognized by the interlocutors the speaker commonly hums although (s)he may also produce a nasalized, slightly laryngealized low vowel, /a/. The humming or low vowel is then used as a carrier for the tone, intonation, timing, syllable patterns, and stress of a particular utterance (paragraph, sentence, phrase, word or entire discourse). Such humming is used by all members of the community although it is much more frequent between mothers and children. In fact, mothers hum to their children (to approximately six-nine years of age) much more than they "talk" to them. It should not be supposed, however, that hum speech is a truncated, lexically simplified type of "baby talk." We have observed mothers explain such things as our kitchen utensils, medical items, and National Geographic photos in great detail to their children. Also, hum speech is the most common channel used for scolding (infants or adults). Hum speech, like other channels is commonly used for making parenthetical comments or joking (especially when they wish to exclude the present author from the conversation!) When asked to "translate" what they said, these individuals provide detailed paraphrases of their utterances which are in no way restricted as to meaning, mood, etc. Perhaps correlated with the high frequency of hum speech between mother and child is the fact that the sloppy phoneme effect is even greater in children's speech, involving voiced as well as voiceless consonants. Moreover, it is clear that Pirahã children control the prosodic features of a given lexical item or utterance before its (basic) segmental manifestation.

### 3.2 Yell Speech

Yell speech is used to communicate between households during rainstorms, with hunters or fishers departing or arriving via the river or jungle (covering distances of up to a mile), and on other occasions when the speaker wishes to communicate at a distance. Like hum speech, yell speech is used by both men and women. Yell speech, unsurprisingly, is not generally used to communicate sensitive or personal information. A woman might yell, for example, to her husband to hurry back with some food but not to say that she is afraid for him or wishes he would not go (messages which are frequently communicated via hum speech). In yell speech, a vowel quality such as /a/ (lightly nasalized, not laryngealized) is used, often beginning at a pitch several steps above normal speech and rising to a falsetto. Once again, though, this channel is fully productive. A concrete example is found in (22) (translated from an actual text):

(22) Speaker A (villager on river bank): 'Hey, ko (abbreviated personal name), what did you kill today?'

Speaker B (returning hunter in canoe, approximately one mile out, barely visible): 'I killed a whole tapir. It's so heavy my canoe's about to sink.'

(Speaker A jumps up and down happily, calling for the village women to get firewood for cooking.)

Speaker B (again): 'I was just lying. I only have two pirana in here.'

Speaker A and other villagers start laughing. Speaker A turns to openmouthed, confounded linguist to explain what has just transpired.

### 3.3 Whistle Speech

Whistle speech, unlike hum speech and yell speech is only used by men. In this respect and others it is very similar to the phenomenon of the same name described for Mazateco by Cowan (1948). Boys frequently whistle to each other in the village when they are pretending to be hunting or warring. Men generally whistle in the jungle, (often varying whistling with an extremely high falsetto vowel quality). Phonetically, Pirahã whistling is interesting in that it is ingressive. Men often whistle when many of them are together. We suspect that in these cases there are some modifications of the syntax and lexicon as well, and that whistle speech may also serve as a private masculine code. Thus, men at times are reluctant to translate whistle speech utterances for me, grinning or ignoring our requests that they do so (requests which we drop immediately, depending on the reaction).

As with other channels, there are no apparent limits as to the quantity, complexity, or kind of information transmitted via whistling.

### 3.4 Discussion

The question we come to then is what, if any, relationship exists between the existence and frequency of nonsegmental prosodic channels in Pirahã, the large number of syllable types or weights, and the unique amount of free variation at the segment level? Perhaps the only relationship between these phenomena is their occurrence in a single language. Yet, this seems unlikely. For example, consider the sentence in (23) and its (rough) prosodic representation in (24):

- (23) kàp'lìgà báaxáí xísìgíhíí xàhòl-sàí  
 money good meat buy -nominalizer  
 'Money's good for buying food.'

- (24)

The very crude representation in (24) is adequate to show the high number of prosodic contrastive features in Pirahã. This would seem to meet the requirement noted earlier that the greater the communicative dependence placed on a particular channel, the greater the need for contrastive features in that channel. Of course, we cannot claim that such contrast renders the prosodic channels as unambiguous as "normal" speech but certainly Pirahã prosodies are rich enough to eliminate much of the ambiguity that would arise in many languages.

Although it is too early to attempt to draw any sort of causal connection between the importance and use of prosodic channels, weak specification of features at the segmental level, and syllable weight, the facts are nonetheless quite suggestive.

It is worth comparing these facts about Pirahã channels with apparently similar systems in other languages. In such cases, e.g. Mazateco (Cowan (ibid)), in which whistle speech or some other channel is fully as productive as the Pirahã prosodic channel(s), it is common to encounter a very complex segmental system as well. Note, however, that this does not conflict with our claim that a relationship exists between communicative dependence placed on a particular channel and contrastive features of that channel. In these languages, syllabic contrasts are often as great or greater than Pirahã (cf. Rensch (1978) on ballistic vs. controlled syllables in Chinantec). That they also maintain a complex segmental channel is not therefore a problem for a functional explanation of the prosodic contrasts.

On the other hand, it might be asserted that the role of channels or the emphasis placed on them is a question entirely separate from their existence. So simply because languages A and B possess channels (1) - (3) does not therefore imply that both accord each channel an equal role. A may emphasize channel (2) and B channel (1). Determining such things as which channel a culture emphasizes (or in fact the very position of language itself in the cultural hierarchy) is a question for the anthropologist - but one whose answer may very well have implications for the linguist. In this sense, one might reasonably investigate the hypothesis that prosodic channels in Pirahã play a more central role in the culture relative to the segmental channel than in languages/cultures such as Mazateco, Chinantec, etc., thus accounting perhaps for the existence of sloppy phoneme effect in Pirahã and its absence in these other groups.

#### Conclusion

In this paper, we documented two unique aspects of Pirahã phonology, namely, five way contrast in syllable types relevant to stress placement based on the contribution of the onset to syllable weight and the sloppy phoneme effect, an interesting type of segmental variation resulting from weakly specified values of point of articulation features. We suggested that these phenomena may have a functional explanation based on the role of prosodic channels (hum speech, yell speech, and whistle speech) in Pirahã discourse. We also noted that any attempt at a functional understanding of these phenomena implies a rigorous study of Pirahã culture.

Some caution must be taken of course to guard against confusing an association of mere coexistence in the same system with a causal relationship. It may well turn out that channels in Pirahã discourse have no relationship to complexity or variation at the segmental level at all. It might even be that establishing such a relationship is beyond the scope of science.

In such a case, we will be brought back to studying individual systems without relating them via any notion as grand as communicative function, viewing languages as biologists view the distinction between deciduous and evergreen trees: two genetically determined ways of dealing with winter, the same function, via radically different forms.

# Notes

We thank the Pirahã for their patience and friendship to us over the years and express our hope that their territorial problems be soon resolved. Thanks also to Jay Keyser, Alan Prince, Donca Steriade, Moira Yip, and audiences at MIT and Harvard for their questions and criticisms. The writing of this paper was supported in part by a postdoctoral fellowship from the American Council of Learned Societies and Grant BNS - 8405996 from the National Science Foundation. For a more detailed description of Pirahã grammar, cf. Everett (to appear). The orthography used here is straightforward except that x = /ʔ/; ˊ = /high tone/ and ˋ = /low tone/. Stress, as used here refers to intensity/loudness.

1. This evidence is clearly suggestive rather than conclusive. It becomes significant in adding to the cumulative effect of stronger evidence such as (16) and (17).

2. There are individuals such as kòhòlɓlɪhàl, my primary language teacher and the village headman, who rarely produce such alternations and, when they do, generally use k as the neutral form for all voiceless noncontinuants, allowing s and h to vary only preceding /i/. There are others, however, such as koxòl and xahòòògɪl who produce such variations in almost every utterance. In all idiolects k tends to vary with other voiceless noncontinuants much more frequently in singing.

## References

- Bell, A. and J. Hooper. eds. 1978. Syllables and Segments, Amsterdam: North Holland.
- Bell, R.T. 1976. Sociolinguistics, New York: St. Martin's Press.
- Brend, R. ed. 1975. Studies in Tone and Intonation, New York: S. Karger.
- Cowan, G. 1978 [1948]. "Mazateco Whistle Speech," In R. Brend, Ed.
- Everett, D. to appear. "Pirahã," In D. Derbyshire and G. Pullum, eds. Handbook of Amazon Languages, The Hague: Mouton.
- Everett, D. and K. Everett. 1984a. "Syllable Onsets and Stress Placement in Pirahã," In Proceedings of the West Coast Conference on Formal Linguistics, Vol. III, Stanford: Stanford University Linguistics Association.
- Everett, D. and K. Everett. 1984b. "On the Relevance of Syllable Onsets to Stress Placement," Linguistic Inquiry 15:4, 705-712.
- Hymes, D. 1977. Foundations in Sociolinguistics, Philadelphia: University of Pennsylvania Press.
- Ladd, R. 1978. The Structure of Intonational Meaning, Bloomington: Indiana University Press.
- Rensch, C. 1978. "Ballistic vs Controlled Syllables in Chinantec," In A. Bell and J. Hooper, eds.

## Main Stress and Parallel Metrical Planes\*

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## 0. The Directionality-Dominance Hypothesis

In this paper I demonstrate that the position of main stress can be predicted in a large number of cases from the distribution of secondaries. That is, once a string of secondaries has been assigned to a span, it is possible to predict which will be elevated to primary.

The basic generalization to be defended is that if secondary stresses are assigned iteratively, then the first one assigned is elevated to primary. In terms of the metrical theory of stress,<sup>1</sup> left-to-right foot construction dictates a left-dominant word tree, and right-to-left foot construction dictates a right-dominant word tree. This generalization is given below.

## (1) Directionality-Dominance Hypothesis (DDH)

The origin of iterative foot construction uniquely determines word tree dominance.

The following analyses of Lenakel nouns (Lynch, 1974, 1978) and Pintupi (Hansen & Hansen, 1969) show how the DDH limits the range of possible analyses in metrical theory.

## 1. Lenakel

The data in (2) exemplify the basic nominal stress pattern of Lenakel.<sup>2</sup>

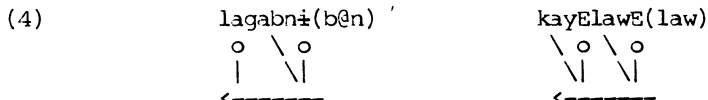
- |     |                 |                  |
|-----|-----------------|------------------|
| (2) | n am            | 'fish'           |
|     | sg fish         |                  |
|     | kOLEy           | 'sweet potato'   |
|     | kavEvaw         | 'hat'            |
|     | l agabnib@n     | 'in the morning' |
|     | in morning      |                  |
|     | kayElaw Elaw    | 'kind of dance'  |
|     | dance redup     |                  |
|     | lE dubPlug alug | 'in the lungs'   |
|     | in lungs redup  |                  |



Ignoring for the moment the distinction between primary and secondary, the stressed syllables are assigned from the right edge of the word. That is, even-numbered syllables are stressed counting from the right. In metrical terms:

- (3) a. Make the final syllable extrametrical.
- b. Build right-dominant binary feet from right to left.

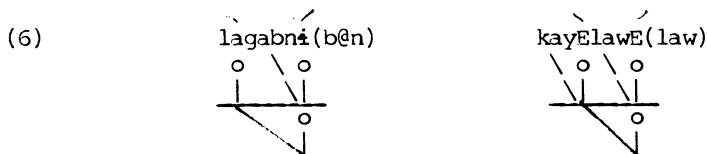
This produces the following partial derivations.



Since the right edge of the word is the origin of foot construction, the DDH predicts that the rightmost stress will be elevated to primary. That is, the word tree is right-dominant. This is borne out in (2). The primary is always the last stress. Therefore the full analysis of the data in (2) is as in (5), where (5c) is redundant.

- (5) a. Make the final syllable extrametrical.
- b. Build right-dominant binary feet from right to left.
- c. Build a right-dominant word tree.

This produces the representations in (6) for the partial derivations in (4).



Concluding this section on Lenakel nouns, we see that assigning stress from the right requires a right-dominant word tree. Other languages that work this way include English (Hayes, 1981) and Modern Hebrew (Bolzky, 1982).

## 2. Pintupi

What about systems that assign stress from the left? The DDH predicts that such languages will put the primary on the left. This relationship is borne out in the following data from Pintupi, a Pama-Nyungan language of Australia.

- (7)
- |   |   |
|---|---|
| pa <sup>ˈ</sup> na  | 'earth'                                 |
| tyu <sup>ˈ</sup> taya   | 'many'                                  |
| ma <sup>ˈ</sup> la <sup>ˈ</sup> wana  | 'through (from) behind'                 |
| pu <sup>ˈ</sup> li <sup>ˈ</sup> ka <sup>ˈ</sup> latju   | 'we (sat) on the hill'                  |
| tja <sup>ˈ</sup> mu <sup>ˈ</sup> li <sup>ˈ</sup> pa <sup>ˈ</sup> tju <sup>ˈ</sup> ŋku               | 'our relation'                          |
| ti <sup>ˈ</sup> li <sup>ˈ</sup> ri <sup>ˈ</sup> ŋu <sup>ˈ</sup> la <sup>ˈ</sup> pa <sup>ˈ</sup> tju | 'the fire for our<br>benefit flared up' |

Here, odd-numbered syllables counting from the left are stressed. The final syllable is never stressed. In metrical terms:

- (8)
- Make the final syllable extrametrical.
  - Build left-dominant binary feet left to right.

The partial analysis in (8) invokes the DDH, which dictates a left-dominant word tree. The full analysis with the redundant word tree rule is given in (9) and some examples in (10).

- (9)
- Make the final syllable extrametrical.
  - Build left-dominant binary feet left to right.
  - Build a left-dominant word tree.

- (10)
- |  |  |
|--|--|
|  |  |
|--|--|

Pintupi is a mirror-image of Lenakel nouns, showing the symmetrical nature of the DDH. Other languages that work like Pintupi include Tunica (Hammond, 1984a) and Southern Paiute (Hayes, 1981).

### 3. Some Apparent Counterexamples

Pintupi and Lenakel exemplify only part of the typology of stress systems, and it is worthwhile to see how far the DDH goes toward the goal of completely eliminating the parameter of word tree dominance in metrical theory by trying it on other kinds of systems. The cases that remain are given in (11).

- (11)
- unbounded foot construction
  - noniterative foot construction
  - bidirectional foot construction

In this section, I argue that the cases in (11a) are outside the domain of the DDH; the cases of (11b) trivially satisfy the DDH; and (11c) follows naturally from the DDH.

### 3.1 Unbounded Feet: Koya

Consider first unbounded foot construction. Hayes (1981) uses this in his account of Koya (Tyler, 1969). The following data exemplify the basic pattern. All long vowels and the first vowel, long or short, are stressed.

- (12)
- |             |            |
|-------------|------------|
| aaki'       | 'leaf'     |
| gInne'      | 'cup'      |
| puungaari'  | 'flower'   |
| kUUD@Baali' | 'sickle'   |
| @ndooru     | 'everyone' |

Since there is no count from the left or right, foot directionality is irrelevant. Since syllable weight is relevant, the feet constructed must be quantity-sensitive. That is, recessive nodes of feet cannot dominate long vowels. This enables long vowels to attract stress.<sup>3</sup> To get stress on the initial syllable, feet must be left-dominant. This partial analysis is given in (13) and some partial derivations in (14).

- (13) Build quantity-sensitive unbounded left-dominant feet.

- (14)
- |         |             |
|---------|-------------|
| @ndooru | kUUD@Baali' |
| o o /   | o / o /     |
| /       | /   /       |

As noted above, no directionality need be stipulated since it makes no difference whether feet are assigned rightward (15) or leftward (16).

- (15)
- |         |    |         |     |         |
|---------|----|---------|-----|---------|
| @ndooru | -> | @ndooru | ->  | @ndooru |
| o       |    | o       | o / |         |
|         |    |         | /   |         |
| ->      |    |         |     |         |

- (16)
- |         |    |         |     |         |
|---------|----|---------|-----|---------|
| @ndooru | -> | @ndooru | ->  | @ndooru |
| o /     |    | o       | o / |         |
| /       |    |         | /   |         |
| <-      |    |         |     |         |

From the data in (12), it is clear that the analysis of Koya should include a left-dominant word tree. This insures that the initial syllable always receives main stress. However, since the DDH requires an origin of foot construction, no prediction is made. Languages like Koya are thus irrelevant for the DDH. The full analysis of Koya is given in (17).<sup>4</sup>

- (17) a. Build quantity-sensitive unbounded  
left-dominant feet.  
b. Build a left-dominant word tree.

Diegueno (Langdon, 1970) has a similar analysis.

### 3.2 Noniterative Feet: Brazilian Portuguese

In the following section, I treat the basic stress pattern of Brazilian Portuguese (Lopez, 1979) to exemplify a noniterative system.<sup>5</sup> Consider the following data.

- (18)     $\acute{p}e$             'foot'                       $\acute{p}ele$             'skin'  
          $\acute{a}ma$             'he loves'                       $\acute{r}ecado$             'message'  
          $\acute{e}ncontro$  'meeting'                       $\acute{r}edondeza$  'roundness'  
          $\acute{a}gonia$             'agony'

Stress falls regularly on the penult. There are apparently no secondaries on such words. Since the count is from the right, that must be the origin of foot construction. However, there is no evidence that foot construction continues after the first foot is built. To account for this, let us assume that foot construction can be noniterative—that is, only one foot is built. The partial analysis is given in (19) with some partial derivations in (20).

- (19) Build one left-dominant binary foot  
on the right margin.

- (20)                       $\acute{a}ma$                        $\acute{e}ncontro$   
                             $\circ /$                        $\circ$   
                             $| /$                        $| \checkmark$

What of the word tree? It is not necessary to build one. There are only two degrees of stress -- stressed and unstressed -- and the distinction is already made by (19). If on theory-internal grounds one elected to build a word tree -- if, for example, the theory always required a word tree -- then the foot is always the head of it. This possibility is given as (21).

- (21) a. Build one left-dominant binary foot  
on the right margin.  
b. Build a right-dominant word tree.

If (21) is adopted, then the DDH makes (21b) redundant since the origin of foot construction is the right edge. However, since (19) is an adequate analysis, Brazilian Portuguese and languages like it are irrelevant for the DDH. Polish (Franks, 1985) has a similar analysis.

### 3.3 Bidirectional Feet: Lenakel Verbs

By bidirectional foot construction, I mean cases where some feet are built from the left and some are built from the right. Lenakel verbs exhibit bidirectional foot construction.

- (22) r Os 'he took it?'  
3sg take  
ar Ow 'be blind (pl)'  
pl blind  
y ag ya g@n 'we eat it'  
lplex cur du eat  
n im aliwOk 'you walked'  
2sg conj walk  
k @n am ar g@nim 'they have been pinching it'  
3pl perf cont pl pinch  
t y ag am ar olgEygEy 'we will be liking it'  
fut lplex cur cont pl like  
t in ag am ya sin@vin 'you will be copying it'  
fut 2 cur cont du copy  
na d y ag am Edw adamninpn  
about-to fut 1 cur cont interr shake  
'why am I about to be shaking?'

Let us consider the distribution of stresses independent of their degree. First, there is always a stress on the penult. As in Brazilian Portuguese, that stress must be built from the right. However, there are other stresses. The others appear to be built from the left; as in Pintupi, odd-numbered syllables counting from the left get stressed. Notice that the left-to-right iteration does not run up against the stress on the right margin. A partial analysis incorporating these observations is given as (23).

- (23) a. Make the final syllable extrametrical.  
 b. Build one right-dominant binary foot on the right margin.  
 c. Build left-dominant binary feet left to right.

A partial derivation is given in (24).

- (24)  $\text{tinagamyasin@vin} \rightarrow \text{tinagamyasin@}(\text{vin}) \rightarrow$   
 $\rightarrow \text{tinagamyasin@}(\text{vin}) \rightarrow \text{tinagamyasin@}(\text{vin})$
- |   |   |
|---|---|
| $\begin{array}{c} \backslash \circ \\ \backslash   \end{array}$ | $\begin{array}{c} \circ / \circ / \backslash \circ \\   /   / \backslash   \end{array}$ |
| <---  | ----->  |

Returning to (22), it is clear that the word tree is right-dominant. If the DDH is revised so that the first origin of foot construction is the relevant one, then this result is guaranteed. This revision is given as (25).

- (25) Directionality-Dominance Hypothesis (Revised)

The first origin of foot construction  
 uniquely determines word tree dominance.

Since the first foot is constructed on the right edge of the word (23b), the right margin is the first origin of foot construction. Piro (Archangeli, personal communication) has a similar analysis.

In conclusion, languages like Koya are irrelevant for the DDH; languages like Brazilian Portuguese are ambiguous; and languages like Lenakel force a natural revision of it. We are now ready to consider more problematic cases.

#### 4. Covert Iteration: Cairene Arabic

What prevented earlier researchers from maintaining a generalization like the DDH? There are languages like Cairene Arabic (McCarthy, 1979) that appear to counterexemplify it. In the following discussion of Cairene, I abstract away from the contribution of syllable weight, since it is irrelevant to the point made here. The data in (26) exemplify the basic pattern.

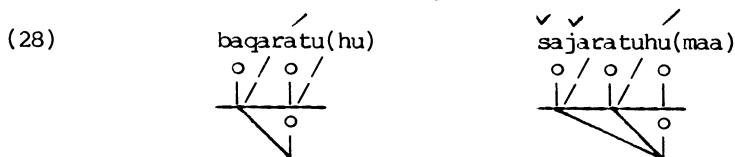
(26)	$\begin{array}{c} \diagup \\ \text{buxala} \end{array}$	'misers'
	$\begin{array}{c} \diagup \\ \text{kataba} \end{array}$	'he wrote'
	$\begin{array}{c} \diagup \\ \text{katabitu} \end{array}$	'she wrote it'
	$\begin{array}{c} \diagup \\ \text{fa9alatun} \end{array}$	'deed'
	$\begin{array}{c} \diagup \\ \text{baqaratuhu} \end{array}$	'his cow'
	$\begin{array}{c} \checkmark \checkmark \diagup \\ \text{sajaratuhu} \end{array}$	'his tree'
	$\begin{array}{c} \checkmark \checkmark \diagup \\ \text{sajaratuhumaa} \end{array}$	'their tree'

The basic generalization here can be summarized as follows. Main stress falls on the last odd-numbered syllable counting from the left, except that it cannot fall on the ultima.

To get such a pattern, most researchers have assumed that iterative binary feet are constructed from left to right. Since main stress falls on the last one, the word tree is right-dominant. A partial analysis incorporating this insight is given as (27).

- (27)
- Make the final syllable extrametrical.
  - Build binary left-dominant feet from left to right.
  - Build a right-dominant word tree.

Some sample representations are given in (28).



Such an analysis is an obvious problem for the DDH. Left-to-right foot construction should dictate a left-dominant word tree.

Before rejecting the DDH though, note that this analysis is not as straightforward as it looks at first blush. There are no secondary stresses. The iterative feet should leave secondary stress to the left of the primary, yet McCarthy (1979) reports none.

- (29)
- $\begin{array}{c} \diagdown \diagup \\ \text{*baqaratuhu} \end{array}$

$\begin{array}{c} \diagdown \checkmark \diagdown \diagup \\ \text{*sajaratuhumaa} \end{array}$

Possibly, this is an accidental correlation, but the other systems that might be counterexamples to the DDH -- Creek (Haas, 1977) and Macushi Carib (Hawkins, 1950) -- also have this property. They appear to violate the DDH and secondaries are covert.

Thus, while Cairene suggests that certain languages must be excluded from the domain of the DDH, their exemption is not ad hoc. The only cases of iterative foot construction that must be exempted from the DDH are those with covert iteration. This is given in (30).

- (30)                   Exception Clause for the DDH
- Languages with covert iteration  
(no overt secondaries) are exempt  
from the DDH.

To account for (30) formally, I extend an idea developed in Archangeli (1984) and Rappaport (1984). These authors propose that in addition to the metrical structure necessary to assign stress, languages may build metrical trees on another plane to account for syncope and reduction. Space limitations prevent me from motivating their proposals here.

What if the binary iteration in Cairene is accomplished via feet built on another plane? Such feet would not place secondary stresses, since the other plane is not relevant for stress. For such a procedure to work, the following assumptions must be accepted. First, nonheads on the parallel plane cannot be terminals on the stress plane.

- (31)                   Nonheads on the parallel plane cannot  
be terminals on the stress plane.

Second, the DDH cannot look at the parallel plane.

- (32)                   The origin of parallel plane foot  
construction is irrelevant to the DDH.

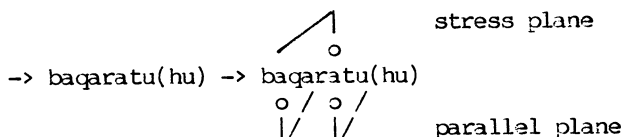
This permits us to reanalyze Cairene as follows.

- (33)   a.       Make the final syllable extrametrical  
          on the parallel plane.  
      b.       Build left-dominant binary feet from  
          left to right on the parallel plane.  
      c.       Build a right-dominant unbounded foot  
          on the stress plane.

A sample derivation is given in (34).



(34) baqarahuhu → baqaratu(hu) →



Such a proposal obviously needs further investigation. However, it allows us to incorporate (30) in the theory by means of the natural assumptions (31) and (32) and the independently motivated parallel plane.

In conclusion, we have seen that it is possible to go a long way toward eliminating word tree dominance from metrical theory and predict the distribution of primary stress from the assignment of secondaries. Cases of iterative foot construction like Lenakel nouns and Pintupi are accounted for. With the revision of the DDH in (25), cases exhibiting bidirectional foot construction like Lenakel verbs also fall out. Unbounded cases like Koya are irrelevant since there is no origin of foot construction. Noniterative cases like Brazilian Portuguese are irrelevant since only one foot is built. Lastly, cases like Cairene are excluded by the exemption clause (30) as realized by the parallel plane formalism.

Lastly, the DDH is an empirical claim, because it says that certain stress configurations are impossible. As an example, compare the analysis of Lenakel nouns repeated here as (35) with the hypothetical facts in (36) with their analysis in (37)

- (35) a. Make the final syllable extrametrical  
 b. Build right-dominant binary feet from right to left.  
 c. Build a right-dominant word tree.



- (37) a. Make the final syllable extrametrical.  
 b. Build right-dominant binary feet from right to left.  
 c. Build a left-dominant word tree!

The DDH excludes (36) as a possible language because its analysis is in violation of the DDH.

## Footnotes

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<sup>1</sup>See Hammond (1984a) for the version of metrical theory assumed here. This theory differs from earlier theories (e.g. Hayes, 1981) in that rhythm and destressing rules are sharply constrained in form and function. See Magnus (1983) and Pesetsky (1979) for earlier attempts to deal with the relationship between primary and secondaries in metrical theory.

<sup>2</sup>Lenakel transcriptions in this paper use capital letters to indicate lax vowels. The symbol [ə] indicates schwa, a macron indicates labialization, and [v] is a central glide. Abbreviations in morpheme glosses for the verbs: cur: current, sg: singular, pl: plural, ex: exclusive, du: dual, conj: conjunctive, perf: perfective, cont: continuative, fut: future, interr: interrogative, 1: first person, 2: second person, 3: third person.

<sup>3</sup>See Hayes (1981) for the full theory of syllable-weight assumed here, and Halle & Vergnaud (in preparation) for a revision.

<sup>4</sup>Other principles may determine word tree dominance in languages like Koya. It appears as if word tree dominance always equals word tree dominance. However, there are not enough cases to establish this convincingly.

<sup>5</sup>Lopez (1979) adopts the metrical theory of Liberman & Prince (1977). See Miguel (1984) for a treatment taking advantage of more recent developments.

<sup>6</sup>See Hammond (1984b) for an analysis incorporating these.

<sup>7</sup>Garawa (Furby, 1974) can be analyzed in two ways. One analysis satisfies the DDH; and one does not. Unfortunately, the data available do not motivate a choice. Thanks to an anonymous journal reviewer for drawing this to my attention.

## References

- Archangeli, D. (1984) Underspecification in Yawelmani Phonology and Morphology, doctoral dissertation, MIT.
- Bolozky, S. (1982) "Remarks on rhythmic stress in Modern Hebrew", JL 18, 275-289.
- Franks, S. (1985) "Extrametricality and Stress in Polish", LI 16, 144-151.
- Furby, C. (1974) "Garawa Phonology", Pacific Linguistics Series A - No. 37, Australian National University, 1-11.
- Haas, M. (1977) "Tonal Accent in Creek", in L. Hyman, ed., Studies in Stress and Accent, Southern California Occasional Papers

- in Linguistics 4, University of Southern California.
- Halle, M. and J.-R. Vergnaud. (in preparation) Grids and Trees: an Essay on Stress, manuscript, MIT.
- Hammond, M. (1984a) Constraining Metrical Theory: A Modular Theory of Rhythm and Destressing, Doctoral dissertation, UCLA, revised version distributed by IULC.
- \_\_\_\_\_. (1984b) "Obligatory Branching Revisited", paper presented at NELS XV.
- Hansen, K.C. and L.E. Hansen. (1969) "Pintupi Phonology", Oceanic Linguistics 8, 153-170.
- Hawkins, W.N. (1950) "Patterns of Vowel Loss in Macushi (Carib)", IJAL 16, 87-90.
- Hayes, B. (1981) A Metrical Theory of Stress Rules, Doctoral dissertation, MIT, revised version distributed by IULC.
- Langdon, M. (1970) A Grammar of Diegueno, University of California Publications in Linguistics #66.
- Liberman, M. and A. Prince (1977) "On Stress and Linguistic Rhythm", LI 8, 249-336.
- Lopez, B. (1979) The Sound Pattern of Brazilian Portuguese (Cariocan Dialect), Doctoral dissertation, UCLA.
- Lynch, J. (1974) Lenakel Phonology, Doctoral dissertation, University of Hawaii, in University of Hawaii Working Papers in Linguistics 7.
- \_\_\_\_\_. (1978) A Grammar of Lenakel, in Pacific Linguistics, Series B - No. 55, Australian National University.
- Magnus, M. (1983) "A Critique of Metrical Tree Theory and the Primary-Secondary Asymmetry", manuscript, MIT.
- McCarthy, J. (1979) Formal Problems in Semitic Phonology and Morphology, Doctoral dissertation, MIT.
- Miguel, S. (1984) "Stress in Portuguese", manuscript, University of Minnesota.
- Pesetsky, D. (1979) "Menomini Quantity", in K. Safir, ed., MIT Working Papers in Linguistics 1: Papers on Syllable Structure, Metrical Structure, and Harmony Processes.
- Rappaport, M. (1984) Issues in the Phonology of Tiberian Hebrew, doctoral dissertation, MIT.
- Tyler, S. A. (1969) Koya: An Outline Grammar, University of California Publications in Linguistics #54.

## Iambic and Trochaic Rhythm in Stress Rules

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## 1. Introduction

Iambic rhythm is the grouping of successive rhythmic beats into pairs in which the second beat is more prominent; trochaic rhythm is grouping into pairs with the first beat more prominent. In this paper I will discuss a general law that governs iambic and trochaic rhythm, and will show how the law is reflected in linguistic stress patterns. I will also show how my results bear on a current controversy over the proper phonological representation for stress.

The central tenet of the metrical theory of stress (cf. Liberman and Prince 1977, Hayes 1981, Prince 1983, Selkirk 1984, and much other work) is that the stress pattern of an utterance constitutes the utterance's rhythmic structure. There are two reasons for believing this to be so.

First, the alternative view that stress is a segmental feature seems unlikely; since stress, unlike other features, has no phonetic definition. Extensive phonetic research has shown that no physical phenomenon invariably accompanies stress; in particular, loudness and muscular effort are only loosely correlated with stress level. Instead, stress is manifested by phonetic elements that are often controlled by other phonological features as well, for example pitch and duration (Lehiste 1970). Thus stress is best thought of as a phonological "organizing framework" for the prosodic resources of a language rather than as a phonetic feature. This organizing framework is plausibly identified with rhythmic structure.

Second, there appear to be parallels between rhythmic structure and linguistic stress patterns. In particular, a defining characteristic of rhythm is the recurrence of events at regular intervals. Stress systems are likewise "designed" to place stresses at equal intervals. For example, in the English utterance twenty-seven Mississippi legislators, the stresses on seven and sippi are readily shifted leftward to space them evenly with the main stress on leg (cf. Hayes (1984a) and work cited there).

Rhythmic structure is also characterized by periodicity on several levels at once. Thus 4/4 time in music simultaneously defines periodicities of one beat, two beats, four beats, and often eight beats. Stress patterns typically share this hierarchical property. For example, the utterance noted above, when depicted with the "grid" representation for stress (cf. Liberman and Prince (1977) and below), clearly reveals the multiple periodicities that the English stress rules impart to it:

twenty-seven Mississippi legislators

worthwhile in its own right.

for the general theory of stress.

## 2. The Iambic-Trochaic Distinction

two sequences are schematized in (2):

(2)a. Intensity Contrast

... x x' x x' x x' x x' x x' x x' x x' x x' x ...

### b. Durational Contrast

• • • — — — — — • • •

Numerous experiments have shown that listeners can mentally group such stimuli into pairs. The pairing works as follows: if the prominence contrast is one of intensity, then the groupings are normally trochaic; that is, they take the form [x̌ x][x̌ x][x̌ x] etc. If the prominence contrast is one of duration, then iambic groupings are normally perceived, with the more prominent element occurring last: [- ---][- ---][- ---]. This is apparently a well-established result in psychology; for useful reviews see Woodrow (1951), Bell (1977).

There is anecdotal evidence that the relation goes in the opposite direction. If you ask someone to recite the meter of the iambic pentameter and of the trochaic tetrameter, and if your informant had the sort of high school education that provides this knowledge, (s)he will respond with

(3) duh duhhhhh duh duhhhhh duh duhhhhh duh duhhhhh duh duhhhhh

for the iambic pentameter and with

(4) DUH duh DUH duh DUH duh DUH duh

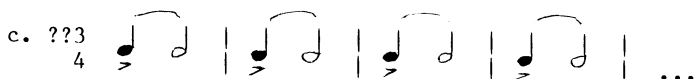
for the trochaic tetrameter. That is, the difference between intensity contrast and durational contrast is conventionally employed to signal the difference between iambic and trochaic bracketing.

The way actual verse is recited also supports the distinction. Typically, verse recitation is "tilted" by distorting the linguistically specified syllable durations to bring them closer to the rhythmic ideal; that is, even spacing for trochaic verse and uneven spacing for iambic. The effect is typically stronger in trochaic verse; for discussion of why, see Attridge (1982), Hayes (1984b).

The iambic-trochaic distinction also determines the relative well-formedness of musical structures. A sequence of alternating half notes and quarter notes in 3/4 time is naturally phrased as in (5):



The half note is placed on the strong beat, reflecting its greater prominence within an iambic structure. In contrast, notes of equal length group together more naturally in trochaic pairs; thus (6a), with trochaic grouping, is somewhat more natural than (6b), with iambic grouping. (6a) is certainly far more natural than (6c), in which trochaic grouping is imposed on notes of mismatched duration.



It is plausible that the iambic-trochaic bracketing effect is deducible from more fundamental principles. Mark Liberman has pointed out to me that if it is the onsets rather than the terminations of rhythmic events that are more perceptually salient, and if temporally contiguous events are grouped together, then it follows logically that unequal intervals will be grouped iambically. Note that this reasoning cannot account for why intensity-based contrast should favor trochaic bracketings; however, the trochaic effect is somewhat weaker than the iambic one. Whatever its ultimate origin, the iambic-trochaic contrast seems sufficiently well supported in other domains to justify looking for its effects in phonological systems.

### 3. Alternating Stress Rules

Alternating stress rules assign stress to every other syllable across entire words. They create the stress patterns that most closely resemble the experimental stimuli of (2), and thus are the area of phonology in which we are most likely to find evidence of an iambic-trochaic contrast.

There are two kinds of alternating stress rules; in Hayes (1981) I termed these "quantity sensitive" and "quantity insensitive." Quantity insensitive rules place a stress on every other syllable, irrespective of the syllable's phonological content. Quantity sensitive rules are more complex, and refer to a distinction of syllable weight. For example, syllables with long vowels may be opposed to syllables with short vowels, or heavy syllables may be opposed to light syllables; that is,  $C_0VV$  and  $C_0VC$  vs.  $C_0V$ . These two criteria are by far the most common. In what follows I will use the term "heavy" in a loose sense to refer to the weightier class of syllables in a given language, irrespective of the criterion of syllable weight actually used.

Quantity insensitive stress rules fall into four basic subtypes, determined by two parameters. These parameters are (a) the direction (left-to-right or right-to-left) in which the rule applies; (b) whether the alternation starts off with a stressed or a stressless syllable. To give an example, in Warao (Osborn 1966), alternating stress operates from right to left, beginning with a stressless syllable. Stress is accordingly assigned to the second to last syllable of a word, the fourth to last, the sixth to last, and so on. A later rule designates the rightmost of these stresses as the strongest.

As I showed in Hayes (1981), all four possible patterns of quantity insensitive alternating stress may be found in the world's languages. The four patterns are schematized below:

#### (7)a. Left to Right

##### 1. Stress First

# x x x x x ...  
----->

##### 2. Stressless First

# x x x x x ...  
----->

b. Right to Left

## 1. Stress First

... x x x x x x #  
 <-----

## 2. Stressless First

... x x x x x x #  
 <-----

Quantity sensitive stress rules are somewhat more complex. In a quantity sensitive system, every "heavy" syllable receives stress and blocks the alternating count. The alternating pattern is thus confined to sequences of light syllables. Again, there are four logical possibilities, depending on whether the rule applies right-to-left or left-to-right; and on whether the rule starts out with stress or stresslessness. However, it turns out that the latter criterion is only applicable at the beginning of the count, before a rule hits a heavy syllable. Whenever a heavy syllable or sequence of heavy syllables blocks the count, an overriding principle specifies that the count must resume in "stressless first" mode. This principle appears to be valid for all known cases of quantity sensitive alternation. The four logical possibilities for quantity sensitive alternation are shown below with a schematic, impossibly long word. X indicates a heavy syllable, x a light one.

(8)a. Left to Right

## 1. Stress First

# x x x x x X X X x x x x X X X x x x x x ...  
 ----->

## 2. Stressless First

# x x x x x X X X x x x x X X X x x x x x ...

b. Right to Left

## 1. Stress First

... x x x x x X X X x x x x X X X x x x x x #  
 <-----

## 2. Stressless First

... x x x x x X X X x x x x X X X x x x x x #  
 <-----

An example of a quantity sensitive alternating stress rule may be found in Munsee, an Algonquian language discussed in Goddard (1982). In Munsee, alternating stress is assigned from left to right, stressless first, with the ordinary heavy/light distinction



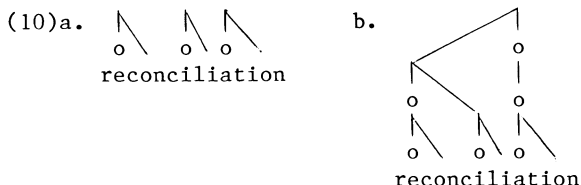
used as the criterion of syllable weight. The rightmost non-final stress is promoted to main stress by another rule. Some examples are as follows:

- (9)a. wə là ma ló sɤw 'he is well'  
 nó: la má lə sì 'I am well'
- b. a kə ta kó kè:w 'he does a fast dance'  
 nə kà kə tá kə kà 'I do a fast dance'
- c. sə kəh ta kə ní: ka nəl 'reins'  
 nə sə kəh ta kə nì: ka nố mal 'my reins'

#### 4. A Formal Account of Phrasing in Stress Rules

In order to determine how the difference between iambic and trochaic grouping might be detected in stress rules, we need a theory of stress that provides a clear grouping interpretation for surface stress patterns. The metrical theory of stress, in versions that incorporate the "metrical foot," provides such an account. Foot-based metrical theory was originally devised by Prince (1976), and has since been developed by Selkirk (1980), Hayes (1981), Hammond (1984), and other researchers.

The foot-based theory posits that stress assignment begins with the parsing of a word into low-level rhythmic phrases, or "feet." Rules that create feet specify either the first or the last syllable of a foot as its most rhythmically prominent; hence that syllable counts as stressed and all the other syllables of the foot (if any) as stressless. For convenience I will refer to initially-stressed feet as "left dominant" and finally stressed feet as "right dominant." In depicting feet graphically, I will use the notation of Hammond (1984), in which the dominant syllable of a foot is designated with an o. Thus the feet of the English word reconciliolotion, namely recon, cili, and ation, are depicted as in (10a). In most languages, metrical feet are organized into a higher level structure, which represents prominence relations among stressed syllables. The full metrical structure of reconciliation is thus as in (10b):




Note that if the /o/'s of the tree are vertically aligned with the stressed syllables, they form a representation of the rhythmic beats of an utterance, while the vertical and diagonal lines represent its phrasing. Hammond's notation thus obviates the need

for separate representations of these two aspects of rhythm. This seems conceptually superior to the proposals of Liberman and Prince (1977) and Hayes (1984a), in which rhythmic beats and phrasing have entirely separate representations.

Consider next the phonological rules that create metrical structure. Under most accounts, the basis of such rules is a template defining well-formed metrical feet. This template specifies (a) the maximum number of syllables a foot may contain; (b) whether the dominant syllable of the foot is its leftmost or rightmost; (c) which positions within the foot are optional; and (d) restrictions on what kind of syllable may appear in certain positions of the foot. A complete stress rule specifies a template, the direction in which parsing is to take place, and (on some accounts), whether parsing applies iteratively to the whole word or applies just once. In the course of parsing, stress rules create the largest well-formed foot possible. If conditions on syllable weight prevent this, or not enough syllables are available, then a smaller foot is created.

In Hayes (1981) I argued that the inventory of possible foot templates can be sharply restricted with no loss of descriptive adequacy. The following restrictions appear to be tenable: (1) If a template places a limit on foot size, that limit must be exactly two syllables. In other words, foot templates come only in binary and unbounded varieties. (2) All positions within a template are optional except the dominant position. (3) If the template requires any of its positions to be filled by light syllables, these must be recessive (i.e. non-dominant) positions. Together, these restrictions limit to eight the basic inventory of foot templates, defined by the parameters (binary/unbounded), (quantity sensitive/quantity insensitive), and (left dominant/right dominant). A further possibility not relevant here brings the actual total to twelve.

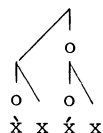
Consider now how this theory describes the patterns of alternating stress discussed above. In the case of quantity-insensitive stress patterns, no restrictions are placed on the terminal nodes of the foot template, but the template itself is restricted to two syllables. For example, to derive a pattern that optionally appears in Polish (Hayes and Puppel (forthcoming)), we set the template as left dominant and parse from right to left. The higher level structure is right dominant. This procedure derives the following stress patterns for words of one to six syllables:

(11)a. Template: 

b. One syllable:



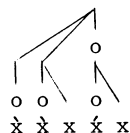
Four syllables:



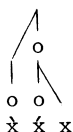
Two syllables:



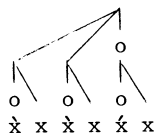
Five syllables:



Three syllables:



Six syllables:



The forms shown for one, two, four, and six syllables are in fact correct for Polish. The remaining cases require some discussion. Observe that when a word has an odd number of syllables, the template assigns the leftover syllable to a monosyllabic foot, since the recessive side of the template need not be filled. In the case of three and five syllable words, this leads to adjacent stresses. As quantity insensitive languages rarely permit adjacent stresses within a word, these configurations are usually resolved by destressing rules. In Polish, destressing works as follows. In trisyllabic words, the rightmost clashing stress is the main stress. Following the general principle that stronger stresses dominate over weaker, the stress on the left is removed, giving x x x as the output. In pentasyllabic words, the stress rules create two clashing stresses that are "tied," so that no general principle dictates the output. As it happens, either both stresses are retained (in very slow speech) or the second stress is selected for removal, resulting in x x x x x on the surface. Other languages (e.g. Warao, Osborne 1966) delete the first stress, with x x x x x resulting. In any event, the existence of the x x x x x stress pattern for pentasyllabic words in Polish (as well as English, Spanish, Hawaiian, and Modern Hebrew; cf. Prince 1983, 49) strongly supports the decision to create nonbranching feet at an intermediate stage of the derivation; a straightforward requirement for alternating stress would be unable to explain this common aberration.

To complete the picture, the four basic varieties of quantity insensitive alternating stress are derived under this theory as follows:

(12)a. Left-to-right, stress first:



Parse left to right.

b. Left-to-right, stressless first:



Parse left to right.

- c. Right-to-left, stress first:



Parse right  
to left.

- d. Right-to-left, stressless first:



Parse right  
to left.

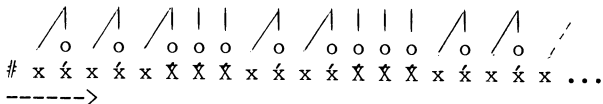
Quantity sensitive alternating stress is derived in much the same way. The difference is that quantity sensitive rules require the recessive side of the foot to dominate only light syllables (whatever the specific criterion of syllable weight happens to be). If, in the course of parsing, a disyllabic foot cannot be created without placing a heavy syllable in the recessive position of a foot, then a monosyllabic foot is created instead. Abstracting away from the effects of destressing, this procedure derives the four logically possible quantity sensitive patterns described under (8) by using the four available combinations for dominance and directionality:

(13)a. Left to Right

1. Stress First =  $\begin{matrix} & \nearrow \\ 0 & \\ \sigma & (\ddot{x}) \end{matrix}$

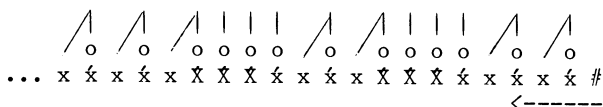


- ## 2. Stressless First =



b. Right to Left

1. Stress First =



$$2. \text{ Stressless First} = \begin{array}{c} | \\ \swarrow \searrow \\ \text{o} \quad \text{(\ddot{x})} \\ \sigma \end{array}$$



The foot based theory can also account for an observation made earlier: recall that in a quantity sensitive alternation, the light syllable that follows a heavy is always skipped over, regardless of whether the rule in question assigns stress first or stresslessness first at the edge of a word. Inspection of the examples above will show that this is an automatic consequence of the parsing procedure: the syllable after a heavy will be skipped no matter how the parsing parameters are set.

## 5. Iambic and Trochaic Stress Rules

We are now ready to link the formal theory of stress assignment to the difference between iambic and trochaic rhythm. Recall that in general, durational prominence contrasts are associated with iambic rhythm, intensity contrasts with trochaic. It is clear that if quantity sensitive and quantity insensitive stress rules behave differently, then the quantity sensitive rules should be associated with durational contrast, and the quantity insensitive rules with intensity contrast. The quantity sensitive rules are inherently designed to produce feet whose syllables will contrast in duration if possible, while the quantity insensitive rules are not. My assumption is that a normal, unmarked alternating stress rule will group the syllables of a word in the most rhythmically natural way, in accord with the law of iambic and trochaic groupings. This assumption leads to a number of predictions.

First, in the normal case quantity sensitive alternating stress rules should impose foot templates with iambic prominence. Expressed more directly, this means that they should impose a stress-first alternation when they apply from right to left and a stressless-first alternation when they apply from left to right.

To test this prediction and others, I have located as many alternating stress rules as I could find, analyzing them with iambic or trochaic feet as the data required. Obviously, in a number of cases my analyses are tentative and possibly incorrect; however, I believe that corrections to individual analyses and data are not likely to alter the overall picture.

My survey found fifteen quantity-sensitive alternating stress rules, encompassing fourteen languages and eight language families. Remarkably, in all fifteen rules, the foot template is iambic. The rules are listed in the following chart by direction of application. I include the criterion of syllable weight and reference sources.

(14) Quantity Sensitive Alternating Stress Rulesa. Left to Right

Eastern Ojibwa (Algonquian, Bloomfield 1957), long vs. short V  
 Menomini (Algonquian, Bloomfield 1962), long vs. short V  
 Passamaquoddy (Algonquian, Stowell 1979), long vs. short V  
 Munsee (Algonquian, Goddard 1982), heavy vs. light syllable  
 Creek (Muskogean, Haas 1977), heavy vs. light syllable  
 Choctaw (Muskogean, Munro and Ulrich 1984), heavy vs. light syl.  
 Chickasaw (Muskogean, Munro and Ulrich 1984), heavy vs. light syllable  
 Yup'ik Eskimo (Eskimo-Aleut, Alaska, Woodbury 1981), long vs. short V  
 St. Lawrence Island Eskimo (Eskimo-Aleut, Alaska, Anderson 1974), long vs. short V  
 Cayuga (Iroquoian, Foster 1982), long vs. short V  
 Macushi (Carib, Brazil, Hawkins 1950) heavy vs. light syl.  
 Tübatulabal (Uto-Aztecan, Voegelin 1935), long vs. short V

b. Right to Left

Aklan (Austronesian, Philippines, Hayes 1981), heavy vs. light syllable  
 Tiberian Hebrew (Semitic, McCarthy 1979b), heavy vs. light syl.  
 Tübatulabal (Uto-Aztecan, Voegelin 1935), long vs. short V

The appearance of Tübatulabal twice on the list deserves explanation. The left-to-right case represents the reconstructed stress rule of an earlier stage of the language, whose effects persist as a synchronic vowel lengthening rule. The right-to-left rule represents stress in Modern Tübatulabal. For discussion, see Prince (1983).

Although further research may uncover contrary cases, the unanimity of the examples found so far is encouraging, and suggests we may be justified in referring to quantity sensitive alternating stress as an "iambic" stress pattern.

Among quantity insensitive stress rules, we should expect to find at least a preference for trochaic feet; recall that the grouping effect for trochaic units is not as strong as that for iambic. The prediction would be reflected in the data by a preference for stress-first alternation going from left to right and stressless-first alternation going from right to left. I have collected 37 examples, which are listed below. The annotation 2ary means that the rule in question assigns only secondary stress, with primary stress either determined lexically or by an earlier rule.

(15) Quantity Insensitive Alternating Stress Rules

a. Trochaic

i. Left to Right

Auca (unclassified, Ecuador, Pike 1964)  
Piro (Arawakan, Peru, Matteson 1965), 2ary  
Livonian (Uralic, Latvia, Sjögren 1861)  
Vogul (Uralic, Siberia, Kálmán 1965)  
Central Norwegian Lappish (Uralic, Itkonen 1958)  
Votic (Uralic, env. Leningrad, Ariste 1968)  
Selepet (Papuan, New Guinea, McElhanon 1970)  
Ningil (New Guinea, Manning and Jagers 1977)  
Dehu (Austronesian, Loyalty Islands, Tryon 1968)  
Lenakel (Austronesian, Vanuatu, Hammond (forthcoming)), 2ary  
Southwest Tanna (Austronesian, Vanuatu, Lynch 1982), 2ary  
Pitjantjatjara (Pama-Nyungan, Australia, Douglas 1959)  
Pintupi (Pama-Nyungan, Australia, Hansen and Hansen 1969)  
Maranungku (Daly, Australia, Tryon 1970)  
Bidjara-Gungubula (Australia, Breen 1973)  
Mayi (Australia, Breen 1981)  
Modern Greek (Malikouti-Drachmann and Drachmann 1981), 2ary  
Czech (Slavic, Jakobson 1962)  
German (Giegerich 1983), 2ary

2. Right to Left

Warao (unclassified, Venezuela, Osborn 1966)  
Cavineña (Tacanan, Peru, Key 1968)  
Auca (unclassified, Ecuador, Pike 1964)  
Bikol (Austronesian, Philippines, Mintz 1971), 2ary  
Nengone (Austronesian, Loyalty Islands, Tryon and Dubois 1969)  
Lenakel (Austronesian, Vanuatu, Hammond (forthcoming)), 2ary  
Southwest Tanna (Austronesian, Vanuatu, Lynch 1982), 2ary  
Djingili (Tjingiluan, Australia, Chadwick 1975)  
Malakmalak (Daly, Australia, Birk 1975)  
Garawa (Karwan, Australia, Furby 1974), 2ary  
Modern Hebrew (Bolzky 1982), 2ary  
Modern Greek (Malikouti-Drachmann and Drachmann 1981), 2ary  
Spanish (Harris 1983), 2ary

b. Iambic

1. Left to Right

Southern Paiute (Uto-Aztecan, Sapir 1930-31)  
Winnebago (Siouan, Hale and White Eagle 1980)  
Seneca (Iroquoian, Chafe 1977)  
Onondaga (Iroquoian, Chafe 1977)

## 2. Right to Left

Weri (Papuan, New Guinea, Boxwell and Boxwell 1966)

The totals are 32 "trochaic" stress rules, five "iambic." Given the number and diversity of languages involved, I believe that the size of the disparity supports the hypothesis. As before, some languages appear twice in the chart because they have two stress rules. In Auca, trochaic feet are assigned from left to right up to the right edge of the stem and from right to left within a sequence of suffixes. Lenakel and Southwest Tanna assign trochaic alternating stress from right to left in nouns and from left to right in verbs. In Modern Greek, secondary stress is assigned freely, but trochaically, in either direction.

The law of iambic and trochaic grouping makes a third prediction. Note that while the mode of parsing for iambic feet is optimal for the creation of feet having an actual iambic durational contour, the actual phonological shape of a word does not always cooperate. For example, when an iambic stress rule parses two light syllables in a row, the result will be a foot with phonologically even duration. One thus might expect that iambic stress languages would contain later segmental rules that could impart a proper durational contour to such feet. In fact, such rules appear quite frequently among these languages. In Choctaw, Chickasaw, Yup'ik Eskimo, Cayuga, Onondaga, and reconstructed Tlbatulabal, short stressed vowels are lengthened, thus converting feet of the form [CV CŶ] to the more properly iambic [CV CŶV]. In Menomini and some dialects of Yup'ik, consonants following a short stressed vowel are geminated, again producing durationally iambic feet via the mechanism [CV CŶ] C --> [CV CŶC] C. Finally, in Tiberian Hebrew, Macushi, Eastern Ojibwa, Munsee, and Menomini, stressless vowels are reduced. Here, the iambic durational contour of a rising foot is enhanced by decreasing the duration of its first syllable.

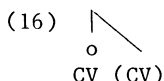
These effects are surprisingly absent among the trochaic alternating-stress languages: none phonologically lengthens stressed vowels, geminates consonants after stressed vowels, or even reduces stressless vowels. This sharp typological difference further argues that the iambic-trochaic distinction is a fundamental one.

To make this argument more solid, we must rule out an alternative explanation: that rules emphasizing durational contrast are simply a characteristic of quantity-sensitive languages, rather than of iambic languages per se. There are two reasons why this alternative is unlikely. First, it is possible for a quantity insensitive language to lengthen stressed vowels, provided that it has iambic stress: such a language is Onondaga, with two such lengthening rules. The second argument is somewhat less direct. Note first that a language may have vowel reduction together with non-alternating, quantity insensitive stress, as in Russian (Jones and Ward 1969), Catalan (Mascaró 1976), or Tiwi (Osborne 1974). These languages reduce any vowel of the



appropriate quality that fails to bear primary stress. Clearly, this form of reduction has nothing to do with reinforcing an iambic or trochaic timing pattern. If it is possible for a quantity insensitive language to have vowel reduction, then it seems all the more significant that no quantity-insensitive alternating stress language uses vowel reduction to reduce alternating vowels. This gap strongly supports the notion of a trochaic stress rule: to reduce stressless vowels that appear in an alternating trochaic pattern would destroy the even timing that is inherent to trochaic rhythm.

Some idiosyncratic stress patterns in other languages may also be explainable using the iambic-trochaic distinction. Alan Prince has pointed out one such case to me. The unusual stress pattern of Cairene Arabic is described by McCarthy (1979a) with a left-to-right rule that is both quantity sensitive and trochaic. This sounds like a counterexample to our generalization, except that the foot template McCarthy proposes requires a light syllable in both of its positions, as in (16):



In other words, although the Cairene rule is quantity sensitive, it nonetheless preserves the even timing required by trochaic rhythm in all the disyllabic feet it creates.

The rather unusual foot labeling rule required in Yidiny, an Australian language (Dixon 1977, Hayes 1982), also falls into place in light of the iambic-trochaic principle. Briefly, in Yidiny the word is parsed left-to-right into disyllabic feet. If any foot within the word contains a long vowel in its final syllable, then all the feet in the word are made right dominant. If all the feet contain short vowels in their final syllables, then every foot is made left dominant. Further, when right dominant feet occur, any long vowel occurring on the left side of a foot is shortened. It is clear that the iambic/trochaic distinction plays a central role in this system: it assigns iambic prominence when there is a foot suited to it, and trochaic prominence otherwise. Further, the shortening rule corrects rhythmically ill-formed feet of the type [V: V̆] and [V: V̆:] to the more appropriate [V V̆] and [V V̆:].

## 6. Comparison with Other Theories

I think that the above arguments constitute a good preliminary case for the claim that the law of iambic and trochaic phrasing is applicable to stress patterns. The crucial mechanism that links phrasing with stress is foot-based metrical theory, which postulates grouping as the basic operation of stress rules.

In this connection, it is worthwhile to compare the foot-based theory with other metrical theories of stress that do not invoke grouping, in particular the grid-based theories of Prince (1983) and Selkirk (1984). In these theories, the representation for

stress depicts only the hierarchical arrangement of rhythmic beats, using x's arrayed in a grid. (For an example of grid representation, see (1) above.) Phonological stress rules in grid theory directly place rhythmic beats in the appropriate positions. For example, the alternating pattern of Polish stress described above could be accounted for with a rule saying "going from right to left, place a beat on every other syllable, starting out with stresslessness."

Both Prince's and Selkirk's grid theories are well thought-out, and are serious candidates for a valid general theory of stress. In describing "stress clashes" and destressing rules, they are clearly superior to the purely tree-based account I proposed in Hayes (1981). Note, however, that the advantages of grids in this area also accrue to the modified tree theory of Hammond (1984), which incorporates grid-like information within tree structure.

One area where grid theories appear to be lacking, however, is in providing an account of the iambic/trochaic distinction in stress rules. The basic mechanisms available to grid theory for assigning alternating stress (cf. Prince 1983) are inherently neutral with respect to direction. Thus grid theory can provide no explanation for why quantity sensitive alternation should always begin with a stressed syllable when going from right to left but with a stressless syllable when going from left to right. By the same token, grid theory cannot explain why quantity insensitive alternation should show precisely the opposite pattern. In addition, grid theory lacks a perspicuous means of characterizing what we have called "iambic" stress, and cannot explain why rules that reinforce durational contrast should occur only in the iambic class of alternating stress systems. All three observations fall out straightforwardly from the law of iambic and trochaic grouping, as I have shown. But a theory that denies the existence of grouping in stress rules has no access to this law. In general, grid-based stress theory is conceptually simpler than tree theory, but in this instance, simplicity is bought with a loss of explanatory power.

#### References

- Anderson, S. (1974) The Organization of Phonology, Academic Press, New York.
- Anderson, S. (1981) "Why Phonology isn't 'Natural'," Linguistic Inquiry 12, 493-540.
- Ariste, Paul (1968) A Grammar of the Votic Language, Indiana University, Bloomington.
- Attridge, D. (1982) The Rhythms of English Poetry, Longmans, London.
- Bell, A. (1977) "Accent Placement and Perception of Prominence in Rhythmic Structures," in Hyman (1977).

- Birk, D. (1975) "The Phonology of Malakmalak," Pacific Linguistics, Series A, no. 39, Australian National University, Canberra.
- Bloomfield, L. (1957) Eastern Ojibwa; Grammatical Sketch, Texts, and Word List, University of Michigan Press, Ann Arbor.
- Bloomfield, L. (1962) The Menomini Language, Yale University Press, New Haven, Conn.
- Bolozky, S. (1982) "Remarks on Rhythmic Stress in Modern Hebrew," Journal of Linguistics 18, 275-289.
- Boxwell, H. and M. Boxwell (1966) "Weri Phonemes," Papers in New Guinea Linguistics 5, Australian National University, Canberra.
- Breen, J.G. (1973) Bidjara and Gungubula: Grammar and Vocabulary, Monash University, Melbourne.
- Breen, J.G. (1981) The Mayi Languages of the Queensland Gulf Country, Australian Institute for Aboriginal Studies, Canberra.
- Chadwick, N. (1975) A Descriptive Study of the Djingili Language, Australian Institute of Aboriginal Studies, Canberra.
- Chafe, W. (1977) "Accent and Related Phenomena in the Five Nations Iroquois Languages," in Hyman (1977).
- Chomsky, N. (1981) Lectures on Government and Binding, Foris, Dordrecht.
- Dixon, R.M.W. (1977) A Grammar of Yidiny, Cambridge University Press, Cambridge, England.
- Douglas, W.H. (1959) An Introduction to the Western Desert Language of Australia, Oceania Linguistic Monographs, Sydney.
- Furby, C. (1974) "Garawa Phonology," Pacific Linguistics, Series A, no. 37, Australian National University, Canberra.
- Foster, M. (1982) "Alternating Weak and Strong Syllables in Cayuga Words," International Journal of American Linguistics 48, 59-72.
- Giegerich, H. (1983) Studies in Metrical Phonology: English and German, Doctoral dissertation, University of Edinburgh.
- Goddard, I. (1982) "The Historical Phonology of Munsee," International Journal of American Linguistics 48, 16-48.
- Haas, M. (1977) "Tonal Accent in Creek," in Hyman (1977).
- Hale, K. and J. White Eagle (1980) "A Preliminary Account of Winnebago Accent," International Journal of American Linguistics 46, 117-132.
- Hammond, M. (1984) Constraining Metrical Theory: A Modular Theory of Rhythm and Destressing, Doctoral dissertation, UCLA, Los Angeles, Calif. Distributed by the Indiana University Linguistics Club, Bloomington, Indiana.
- Hammond, M. (forthcoming) "Obligatory Branching Revisited," to appear in Proceedings of the Fifteenth Meeting of the Northeastern Linguistic Society, Graduate Linguistic Student Association, University of Massachusetts, Amherst.
- Hansen, K.C. and L.E. Hansen (1969) "Pintupi Phonology," Oceanic Linguistics 8, 153-170.
- Harris, J. (1983) Syllable Structure and Stress in Spanish, MIT Press, Cambridge, Mass.

- Hawkins, W. (1950) "Patterns of Vowel Loss in Macushi (Carib)," International Journal of American Linguistics 16, 87-90.
- Hayes, B. (1981) A Metrical Theory of Stress Rules, 1980 MIT Doctoral dissertation, revised version distributed by the Indiana University Linguistics Club, Bloomington, Indiana. Forthcoming from Garland Press, New York.
- Hayes, B. (1982) "Metrical Structure as the Organizing Principle of Yidiny Phonology," in H. van der Hulst and N. Smith, eds., The Structure of Phonological Representations, Part I, Foris, Dordrecht.
- Hayes, B. (1984a) "The Phonology of Rhythm in English," Linguistic Inquiry 15, 33-74.
- Hayes, B. (1984b) Review of Attridge (1982), Language 60, 914-923.
- Hayes, B. and S. Puppel (forthcoming) "On the Rhythm Rule in Polish," to appear in H. van der Hulst and N. Smith, Studies in Nonlinear Phonology, Foris, Dordrecht.
- Hyman, L. (1977) Studies in Stress and Accent, Southern California Occasional Papers in Linguistics 4, University of Southern California, Los Angeles.
- Itkonen, E. (1958) "Über die Betonungsverhältnisse in den finnisch-ugrischen Sprachen," Acta Linguistica Academiae Scientiarum Hungaricae 5, 21-34.
- Jakobson, R. (1962) "Contributions to the Study of Czech Accent," Selected Writings I, Mouton, The Hague.
- Jones, D. and D. Ward (1969) The Phonetics of Russian, Cambridge University Press, Cambridge.
- Kálmán, B. (1965) Vogul Chrestomathy, Indiana University, Bloomington.
- Key, M.R. (1968) Comparative Tacanan Phonology, Mouton, The Hague.
- Lehiste, I. (1970) Suprasegmentals, MIT Press, Cambridge, Mass.
- Lieberman, M. and A. Prince (1977) "On Stress and Linguistic Rhythm," Linguistic Inquiry 8, 249-336.
- Lynch, J. (1982) "Southwest Tanna Grammar and Vocabulary," in J. Lynch, ed., Papers in the Linguistics of Melanesia 4, Australian National University, Canberra.
- Malikouti-Drachmann, A. and G. Drachmann (1981) "Slogan Chanting and Speech Rhythm in Greek," in W. Dressler, ed., Phonologica 1980, Innsbruck, IBS.
- Manning, M. and N. Jagers (1977) "A Tentative Phonemic Analysis of Ningil," in R. Loving, ed., Phonologies of Five New Guinea Languages, Summer Institute of Linguistics, Ukarumpa, Papua New Guinea.
- Mascaró, J. (1976) Catalan Phonology and the Phonological Cycle, MIT Doctoral dissertation, reproduced 1978 by the Indiana University Linguistics Club, Bloomington, Indiana.
- Matteson, E. (1965) The Piro (Arawakan) Language, University of California Press, Berkeley and Los Angeles.
- McCarthy, J. (1979a) "On Stress and Syllabification," Linguistic Inquiry 10, 443-465.
- McCarthy, J. (1979b) Formal Problems in Semitic Phonology and Morphology, MIT Doctoral dissertation, distributed by the Indiana University Linguistic Club, Bloomington, Indiana.

- McElhanon, K.A. (1970) Selepet Phonology, Australian National University, Canberra.
- Mintz, M. (1971) Bikol Grammar Notes, University of Hawaii Press, Honolulu.
- Munro, P. and C. Ulrich (1984) "Structure-Preservation and Western Muskogean Rhythmic Lengthening," to appear in the Proceedings of the Third West Coast Conference on Formal Linguistics, Stanford University, Stanford, Calif.
- Osborn, H.A. (1966) "Warao I: Phonology and Morphophonemics," International Journal of American Linguistics 32, 108-123.
- Osborne, C.R. (1974) The Tiwi Language, Australian Institute of Aboriginal Studies, Canberra.
- Pike, K. (1964) "Stress Trains in Auca," in D. Abercrombie, D.B. Fry, P.A.D. MacCarthy, N.C. Scott, J.L.M. Trim, eds., In Honour of Daniel Jones, Longmans, London.
- Prince, A. (1976) "Applying Stress," ms., University of Massachusetts, Amherst.
- Prince, A. (1983) "Relating to the Grid," Linguistic Inquiry 14, 19-100.
- Sapir, E. (1930-31) Southern Paiute, A Shoshonean Language, Proceedings of the American Academy of Arts and Sciences 65.
- Selkirk, E.O. (1980) "The Role of Prosodic Categories in English Word Stress," Linguistic Inquiry 11, 563-605.
- Selkirk, E.O. (1984) Phonology and Syntax: The Relation between Sound and Structure, MIT Press, Cambridge, Mass.
- Sjögren, J.A. (1861) Livische Grammatik nebst Sprachproben, Commissionäre der Kaiserlichen Akademie der Wissenschaften, St. Petersburg.
- Stowell, T. (1979) "Stress Systems of the World, Unite!" MIT Working Papers in Linguistics 1, 51-76, Cambridge, Mass.
- Tryon, D.T. (1968) Dehu Grammar, Australian National University, Canberra.
- Tryon, D.T. (1970) An Introduction to Maranungku, Pacific Linguistics, Series B, no. 15, Australian National University, Canberra.
- Tryon, D.T. and M.-J. Dubois (1969) Nengone Dictionary, Australian National University, Canberra.
- Voegelin, C. (1935) Tübatulabal Grammar, University of California Press, Berkeley.
- Woodbury, A. (1981) Study of the Chevak Dialect of Central Yup'ik Eskimo, Doctoral dissertation, University of California, Berkeley.
- Woodrow, H. (1951) "Time Perception," in S. Stevens, ed., Handbook of Experimental Psychology, Wiley, New York.

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# Fall-Rise Intonation and the Place of Intonational 'Meaning' in Linguistic Theory

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## 1. Introduction

A major issue facing studies of intonation is the question of whether intonational contours have context-independent meaning, and, if so, how that meaning should be characterized.<sup>1</sup> In these studies, the FALL-RISE contour in English has often served as a case in point. The contribution FALL-RISE makes to utterance interpretation has been claimed to be syntactic by some (Jackendoff 1972), lexico-semantic by others (Ladd 1980, Liberman and Sag 1974), pragmatic by others (Cutler 1977, Gussenhoven 1983), and affective by still others (Pike 1945, Bolinger 1982). In this paper we argue that much of this disparity stems from the equation of 'semantic' with 'context-independent' and of 'pragmatic' with 'context-dependent'. Based upon a corpus of naturally occurring data,<sup>2</sup> we propose an alternate account of the meaning of FALL-RISE as a case of Gricean CONVENTIONAL IMPLICATURE (Grice 1975). In Section 2 we provide a prosodic description of the FALL-RISE contour. In Section 3 we review our current work on the contribution of the contour to utterance interpretation. In Section 4 we show how this contribution can be accommodated in pragmatic theory as a type of conventional implicature.

## 2. Phonological Characteristics of the FALL-RISE Contour

FALL-RISE is a type of FALLING-RISING intonational contour. It is distinct from other such falling-rising contours in that it is a SCOOPED contour,<sup>3</sup> that is, one in which pitch peak is reached late in the accented syllable. A relatively abrupt drop in pitch occurs within two syllables of the accented syllable. In addition, FALL-RISE is characterized by a sentence-final rise in pitch. We provide a spectrogram of this contour in Figure 1.<sup>4</sup> This contour, which we are calling FALL-RISE, has been discussed in the literature under this and a variety of names in different intonational frameworks. It is not always possible to map between various systems with certainty; however, from contour descriptions and examples provided in these studies, as well as previous comparisons of intonational systems, we believe that FALL-RISE has been identified in the following ways:

Pike (1945)	<i>°2-4-3</i> contour
Bolinger (1958, 1982)	subtype of ACCENT A (most recently as AC CONTOUR)
Kingdon (1958)	tones <i>III</i> and <i>V</i>
Schubiger (1958)	a FALLING-RISING contour
O'Connor and Arnold (1961)	FALL RISE
Halliday (1967)	tone 4
Gunter (1972)	a FALLING-RISING contour
Jackendoff (1972)	Bolinger's B ACCENT
Lieberman and Sag (1974)	contrastive stress within CONTRADICTION CONTOUR
Cutler (1977)	FALL RISE
Bing (1979)	A-RISE contour
Ladd (1980)	FALL RISE
Pierrehumbert (1980)	L*+H- L- H%
Moulton (1982)	\ <i>2°32</i> 1/

**Table 1:** FALL-RISE in Previous Studies

To illustrate the relationship between our FALL-RISE and the contours in Table 1, it is necessary to map them into a single descriptive system. For this purpose, we adopt Pierrehumbert's (1980) description of intonational patterns, or TUNES. In her system, tunes are described as structured strings of low (L) and high (H) tones in the F0 contour. A well-formed tune for an intonational phrase consists of one or more pitch accents, which are aligned with stressed syllables on the basis of the metrical pattern of the text, plus single tones which characterize the phrase accent and the boundary tone. A pitch accent consists either of a single tone or an ordered pair of two tones, such as L+H. Accented syllables are marked by a star (\*), as L\*+H. Tones which lead or follow an accented syllable are marked by a raised hyphen (-). Thus '\*' and '-' correspond to a stressed/unstressed distinction. Boundary tones are marked with '%'.

In this framework, FALL-RISE can be represented as L\*+H- L- H%. That is, the nuclear accent is L\*+H-; the primary stressed syllable has a very low F0 (indicating an L tone) and the F0 peak (the H tone) occurs in the following syllable. The following phrase accent is low (another L tone) and the boundary tone is H, indicating sentence-final rise. Note that this contour differs crucially from the similar contour generally referred to in the literature as AC or A-RISE, which is depicted in Figure 2.

In this spectrogram, we have, in Pierrehumbert's terms, an L+H\* L- H% tune. The important distinction to be made between this tune and that of Figure 1 is the different alignment of the stressed syllable with F0. While primary stress occurs on the L tone in our FALL-RISE contour in Figure 1, it occurs on the H tone in Figure 2.<sup>5</sup> There may also be significant differences in the pitch frequencies of these two contours, the initial L tone, and the duration of the stressed syllable; however, these possibilities await further study. In further support of our claim that these two contours are in fact distinct, we now examine the contribution each makes to utterance interpretation.

### 3. The 'Meaning' of FALL-RISE

It is in large part the failure to distinguish FALL-RISE from more general falling-rising contours on phonetic/phonological grounds that has led to attempts to interpret its contribution to utterance interpretation in more general terms as well.<sup>6</sup> For some authors, FALL-RISE conveys some type of speaker attitude. Halliday sees this contribution as 'a statement or answer with reservation ("there's a 'but' about it")' (1967:27). Bolinger (1982, personal communication) characterizes this attitude as one of 'incompletion' or 'up-in-the-airness'. For others, FALL-RISE relates some discourse entity to other entities in the context. Ladd (1980) describes this relationship as 'focus within a set'; Gussenhoven (1983), as 'selection of a variable from the background'; and Liberman and Sag (1974), as 'contrast within contradiction contour'.

Problems have been found with each of these analyses. Liberman and Sag's contradiction contour analysis has been refuted by Ladd (1980), who notes that FALL-RISE is embeddable while contradiction contour is not<sup>7</sup> and that not all instances of FALL-RISE can be analyzed as conveying contradiction. Bolinger's subsumption of FALL-RISE under his AC contour leads him to subsume its meaning under the general notion of 'incompletion' or 'up-in-the-airness'. However, just as AC and FALL-RISE are phonologically distinct, so too are they functionally distinct. For example, while FALL-RISE is possible in 1, in 2 it is not.<sup>8</sup>

(1) A: What tourist trap are you going to this year?

B: We're going to \Dis/neyworld.

(2) A: Where are you spending the holidays?

B: #We're going to \Dis/neyworld.

If FALL-RISE is subsumed under AC, then we cannot account for this difference. Note that AC (i.e. rise on *DIS*, fall on *ney*, and sentence final rise) in this context is fine (3).

(3) A: Where are you spending the holidays?

B: We're going to DISneyworld/.

With AC, B's response may be interpreted as conveying Bolinger's 'incompletion' — A will expect B to list other places to be visited during the vacation.

Ladd (1980:153) claims that the function of FALL-RISE is 'something like "focus within a given set"'. It picks something out of a set of possibilities [either explicit or implicit in the discourse] and focuses on it, but it specifically notes the connection of the set of possibilities to the context.' For Ladd, then, in 4, FALL-RISE singles out *Opel* from the set

(4) A: You have a VW, don't you? (= Ladd's 18)

B: I've got an \O/pel.

of foreign (or small or German) cars.

Elsewhere (Hirschberg and Ward (1984), Ward and Hirschberg (To appear)) we have noted certain problems with this analysis. First, even *without* FALL-RISE intonation, a referent often must be interpreted as a member of some set in order for an exchange to be coherent. For example, in 5, A must perceive some relationship between *Opels* and *VWs* in order to make sense of B's response.



- (5) A: You have a VW, don't you?  
B: I've got an Opel.

Second, Ladd's analysis cannot explain the inappropriateness of FALL-RISE even where a set-member relationship is clearly salient, as in 6:

- (6) A: Did Shawn have a boy or a girl?  
B: #She had a \girl/.

Third, the set-marking function Ladd attributes to FALL-RISE does not account for the numerous tokens of FALL-RISE in our corpus in which no clear set-member relationship can be discerned.<sup>9</sup> Consider 7:

- (7) A: Is the restaurant open?  
B: We open at 5:\30/.

As an alternative to the discourse functions proposed in previous studies, we propose a more precise and comprehensive specification of both the attitude associated with FALL-RISE and the way in which a salient relationship between discourse entities provides the basis for that attitude. This reinterpretation of FALL-RISE not only accounts for the constructed examples of FALL-RISE in the literature but also accommodates the naturally occurring counter-examples discussed above.

In Hirschberg and Ward 1984, we claim that the function of FALL-RISE is the conveyance of speaker uncertainty about some salient relationship between discourse entities; however, contra Ladd, set-membership is only one such relationship. Although Bolinger's 'up-in-the-airness' or Halliday's 'reservation' might subsume our notion of 'speaker uncertainty', we claim that it is this more specific notion that is a necessary condition for FALL-RISE. Moreover, the 'speaker uncertainty' required for felicitous FALL-RISE is of a particular type.

FALL-RISE conveys speaker uncertainty regarding some SCALE evoked in the discourse or some VALUE on such a scale. Scales are defined as PARTIALLY ORDERED SETS, or POSETS. Posets are defined by a PARTIAL ORDERING  $R$  on a set  $B$ .  $R$  must be REFLEXIVE, ANTISYMMETRIC, and TRANSITIVE or, alternatively, IRRFLEXIVE, ASYMMETRIC, and TRANSITIVE.<sup>10</sup> The concept of poset provides a formal definition for an intuitive notion of SCALE, allowing the ranking of discourse referents as VALUES on such scales. The relationships that provide the basis for the felicitous use of FALL-RISE are just those that can be represented as *partial ordering relations*.<sup>11</sup>

A VALUE on a scale  $S$  may refer to an entity, attribute, event, activity, time, or place – or to a set of such items. In this way we can rank a property with respect to some entity which exhibits it via an *attribute-of* relation; an event with other events according to temporal precedence; elements or proper subsets of a set with respect to the set by an inclusion relation; and so on. Thus, defining scales as posets accommodates not only Ladd's set-member relationship but other orderings as well, such as spatial and temporal orderings, stages of a process, type/subtype, entity/attribute, and part/whole relationships. So, in 8, for example, Reagan conveys uncertainty about whether the scalar value *talking* – on a scale defined by stages-of-the-negotiation-process – is close enough

to the queried value *progress* to warrant mention:

- (8) Reporter: Any progress, Mr. President?  
Reagan: We're \talk/ing.

Given this definition of scale and of scalar values, we can say that a speaker may convey uncertainty with respect to some scale or scalar value in three ways: A speaker may convey uncertainty about whether it is appropriate to evoke a scale at all in some context (Type I). S/he may convey uncertainty about whether the scale s/he has chosen to evoke is an appropriate one for the hearer (Type II). Or s/he may convey uncertainty about whether the chosen scalar value is an appropriate one (Type III).

Type I uncertainty is exemplified in 9:

- (9) A: Oh, do you have a badminton team?  
B: I \had/.

In this exchange between student A and athletic coach B, B indicates via FALL-RISE that she is uncertain about whether A is interested only in knowing whether there is a current badminton team or in knowing whether there ever has been one. In 10, B conveys Type II uncertainty:

- (10) A: Do you know Michael B.?  
B: I've heard him \speak/.  
A: Oh, then you know what he looks like.

Here, the uncertainty is about which scale to choose, given that *some* scale is appropriate: *know* can be seen both as a value on the scale 'degree-of-personal-familiarity' or on the scale 'degree-of-academic-familiarity'. Here B did not know if A was inquiring about whether she knew Michael B. personally, or whether she knew his work. From A's response, B inferred that in fact it *was* the former scale – and the one B had chosen – that was salient for A. Finally, Type III uncertainty is illustrated in 11:

- (11) A: Well, because conventional implicature has a special status  
that you semanticists have not been able to handle.  
B: Well, there've been pro\po/sals.

In this exchange, B did not know whether A would count *proposals* as a counter to A's jibe at semanticists.

#### 4. Intonational Meaning and Conventional Implicature

While few would disagree that FALL-RISE makes some contribution to utterance interpretation, few would agree about the nature of this contribution. Having described FALL-RISE and our view of its contribution to utterance interpretation, it remains for us to locate this 'meaning' in broader linguistic theory. In this section, we claim that the 'meaning' conveyed by FALL-RISE is best seen as pragmatic; specifically, as a case of Gricean conventional implicature.<sup>12</sup>

While the boundary between semantics and pragmatics has been a source of considerable debate, we follow common practice in adopting a truth-conditional criterion

for distinguishing between semantic and pragmatic phenomena. Under this view, those aspects of utterance interpretation which enter into the determination of the truth-conditions of the proposition conveyed by that utterance constitute the SEMANTIC contribution. Those aspects which do not, constitute the utterance's PRAGMATIC contribution. In a Gricean framework (Grice 1975, 1978) this distinction is presented as one between the CONVENTIONAL FORCE of an utterance (i.e. 'what is SAID') and the NONCONVENTIONAL aspects of an utterance (i.e. 'what is IMPLICATED').

Grice terms the nonconventional aspects of utterance interpretation IMPLICATURES. Implicatures, while making no contribution to the truth conditions of an utterance, nonetheless constrain its appropriateness in discourse. Grice identifies two major types of implicature, CONVENTIONAL and CONVERSATIONAL, which he distinguishes chiefly on the basis of degree of context-dependence and defeasibility. While conventional implicature is context-independent and is not defeasible, conversational implicature is context-dependent and defeasible. So, for example, the utterer of 12a conventionally implicates that John's being brave is a consequence of his being an Englishman.

(12)

- a. John is an Englishman; therefore, he is brave.
- b. John is an Englishman; and, he is brave.
- c. #John is an Englishman; therefore, he is brave; however, his being brave does not follow from his being an Englishman.

Since 12a is, strictly speaking, true just in case both conjuncts are true, it is semantically equivalent to 12b. The implicature associated with 12a is thus *not* a part of 12a's conventional force. Similarly, in 13a, B implicates that it is at least possible that gas is available at the station.

(13) A: I'm out of gas.

- a. B: There's a gas station around the corner.
- b. B: There's a gas station around the corner, but unfortunately it's closed.
- c. B: Around the corner is a gas station.

However, B's response is true just in case there is in fact a gas station around the corner – even if it cannot provide gas.

The difference between the conventional implicature in 12a and the conversational implicature in 13a can be captured by Grice's classic tests for defeasibility and context-dependence: whether an implicature is CANCELLABLE and whether it is DETACHABLE.<sup>13</sup> An implicature is cancellable iff 'what is implicated' can be denied without denying 'what is said'. While conversational implicatures are cancellable, conventional implicatures are not. So, while 13b is felicitous, 12c is not. An implicature is detachable iff the substitution of a truth-functionally equivalent utterance preserves the implicature. Conversational implicatures are detachable, but conventional implicatures are not. While 13c licenses the same implicature as 13a, 12b does *not* license the implicature of 12a.

FALL-RISE does in fact pass all of the standard diagnostics for conventional implicature. First, FALL-RISE does not affect an utterance's truth conditions. In all of the examples we have presented of FALL-RISE, the truth of the proposition uttered is independent of

FALL-RISE; that is, the conditions under which a proposition is true will be just those under which the same proposition uttered without FALL-RISE is true.

If presupposition is seen as a semantic phenomenon, it could be claimed that Jackendoff's belief that FALL-RISE affects the presuppositions of an utterance would present a problem for our analysis. Jackendoff (1972:353ff) contends that, while falling intonation denotes 'what is asserted', FALL-RISE denotes 'what is presupposed'. So, for Jackendoff, FALL-RISE on *Fred* in 14 excludes *not* from the presupposition.

- (14) Fred doesn't write poetry in the garden. (=Jackendoff's 6.137)

Thus, in this example, the presupposition is 'x writes poetry in the garden' – not 'x doesn't write poetry in the garden'. Jackendoff claims that, with falling intonation on *Fred*, no such exclusion occurs, and the presupposition of the sentence remains 'x doesn't write poetry in the garden'. However, if we provide an appropriate context for 14, as in 15, the utterance *with* FALL-RISE would presuppose 'x doesn't write poetry in the garden', which Jackendoff's system could not account for.<sup>14</sup>

- (15) A: Name me one major poet who doesn't write poetry in the garden.

B: \Fred/ doesn't write poetry in the garden.

Thus, even if presupposition (as defined by Jackendoff) is seen as a semantic phenomenon, it is independent of FALL-RISE.

Cutler's claim that FALL-RISE negates the literal meaning of an utterance might also be viewed as counter-evidence to our claim that FALL-RISE does not affect truth-conditions. Consider 16:

- (16) A: How do you like my new color scheme? (= Cutler's 22)  
B: Not \bad/.

Cutler interprets B's response in 16 as conveying 'the speaker's opinion that the color scheme is not good.' (1975:112) We argue that *not bad* is not equivalent to *good*, but rather that *good* and *bad* represent poles on a continuum of values. The negative quality Cutler attributes to this example does not result from FALL-RISE but from the SCALAR IMPLICATURE which A is entitled to infer from B's response, i.e. that the higher value *good* is false or unknown to B. (See Hirschberg 1985.) Hence the inference on A's part that B believes that the color scheme is not good. So, FALL-RISE does not negate the literal reading of the utterance and thus does not affect an utterance's truth conditions in this way.

Second, FALL-RISE is detachable. A truth-conditionally equivalent proposition uttered without FALL-RISE does *not* convey the uncertainty associated with FALL-RISE. So, the substitution of falling intonation for FALL-RISE in any of the examples given above simply eliminates the uncertainty. For example, falling intonation on *proposals* in 11 simply conveys B's belief that the existence of 'proposals' constitutes a counter to A's claim. In 10, falling intonation on *speak* conveys B's certainty that the information that she has heard Michael B. *speak* will satisfy A's query. And, in 9, falling intonation on *had*

indicates that B believes information about a past team will be relevant for A.

Third, the contribution of FALL-RISE is not cancellable. In 17a, B's response may convey uncertainty about whether any scale at all is appropriate; that is, "Do you need a nickel or just five cents?"

(17) A: Do you have a nickel?

a. B: I have a \dime/.

b. B: #You're in luck – I have a \dime/.

c. B: You're in luck – I have a \dime.

However, in 17b, B's response seems contradictory, because the first clause appears to contradict the uncertainty conveyed by the second. Note that 17c – with falling intonation – is fine.

Given that the understanding FALL-RISE induces passes these tests, we conclude that FALL-RISE conveys this understanding via conventional implicature. Furthermore, we believe that, at least in the current Gricean framework, there is no principled basis upon which conventional implicatures derived from intonational phenomena can be distinguished from those derived from *non-prosodic* phenomena. So if, like Karttunen and Peters (1979), one attempts to extend a model-theoretic semantics to account for conventional implicature, FALL-RISE must be included in this extension. If other intonational contours convey conventional implicatures as well, then these must receive similar treatment.

## 5. Conclusion

It seems to us that the controversy over the location of intonational meaning in linguistic theory stems from the peculiar theoretical status of conventional implicature. While the non-truth-functional aspect of conventional implicature points to a pragmatic phenomenon, its context-independent aspect suggests a semantic phenomenon. No one would claim that *all* prosodic phenomena convey conventional implicatures, although we suspect that such a claim could be made for CONTRASTIVE STRESS and CONTRADICTION CONTOUR, for example. Regardless of which other contours turn out to generate conventional implicature, if our analysis of FALL-RISE is correct, then whatever status is ultimately assigned to conventional implicature in linguistic theory must also be assigned to FALL-RISE.

## Notes

<sup>1</sup>We would like to thank Dave Graff for his assistance in the preparation of the spectrograms used in our analysis and Franz Seitz for his help in recording the contours. We also thank Janet Pierrehumbert for her comments on our phonetic description of FALL-RISE, and Martha Pollack and Ethel Schuster for providing some of our naturally occurring data.

<sup>2</sup>These data were collected by the authors and others from November 1983 through January 1985.

<sup>3</sup>Cf. Ladd 1980.

<sup>4</sup>The spectrograms presented below were produced with the help of Dave Graff, using the Interactive Lab System. The tape recordings were digitized at a sampling rate of ten KHZ and analyzed for F0 estimations using a combination of zero-crossing and cepstrum computations.

<sup>5</sup>Pierrehumbert (1980) identified the A-RISE contour as  $H^* L \cdot H\%$ . However, it is not clear whether this phonological distinction between  $H^* L \cdot H\%$  and  $L+H^* L \cdot H\%$  triggers any semantico-pragmatic differences (Pierrehumbert, p.c.). What is clear is that both differ from our FALL-RISE.

<sup>6</sup>For a more comprehensive discussion of the controversy surrounding the 'meaning' of FALL-RISE, see Ward and Hirschberg (To appear).

<sup>7</sup>But see Bolinger (1982) for apparent counter-examples to Ladd's claim.

<sup>8</sup>In this and subsequent examples,  $\backslash x/$  is used to identify  $x$  as the accented syllable, and ' $\#$ ' to denote pragmatic infelicity.

<sup>9</sup>Our analysis of FALL-RISE is based on a corpus of naturally occurring tokens collected by the authors and others from service encounter exchanges, radio and television programs, and informal conversations. For each of the naturally occurring examples provided in this paper, we had access to either the speaker's or the hearer's own interpretation of the discourse.

<sup>10</sup> $R$  is reflexive iff for all  $b_1 \in B$ ,  $b_1 R b_1$ . It is ANTISYMMETRIC iff, for all  $b_1, b_2 \in B$ , ( $b_1 R b_2$  and  $b_2 R b_1$ )  $\rightarrow b_1 = b_2$ . It is TRANSITIVE iff, for all  $b_1, b_2, b_3 \in B$ , ( $b_1 R b_2$  and  $b_2 R b_3$ )  $\rightarrow b_1 R b_3$ .  $R$  is IRRFLEXIVE iff, for all  $b_1 \in B$ ,  $b_1 \not R b_1$ .  $R$  is ASYMMETRIC iff, for all  $b_1, b_2 \in B$ ,  $b_1 R b_2 \rightarrow b_2 \not R b_1$ . A relation satisfying the first definition of poset is *is-as-tall-or-taller-than*, and one satisfying the second is *is-taller-than*. Note that we can always start with a relation satisfying the second definition and produce one satisfying the first simply by adding an equality disjunct to the relation, as with the *is-taller-than* relation. For simplicity's sake, we will employ the the second definition below.

<sup>11</sup>Although one may define posets on singleton sets, we exclude such posets from our definition of scale. The only relationship such posets can model is one of simple equality, and we have defined the notion of scale to capture relationships *between* distinct VALUES on scales.

<sup>12</sup>Grice (1978:121-23) suggests that some stress might be regarded as a means of conveying implicatures. While he believes this interpretation holds for so-called 'default accents', he is unsure about whether it can be extended to cover other types of stress. Culicover and Rochemont, in passing, suspect that 'particular contours define conventional implicatures' (1983:126, Note 3), but do not go on to investigate this possibility.

<sup>13</sup>Grice and others have recognized certain problems with these tests insofar as they can be used to identify conversational implicature, in particular the fact that they are not sufficient; this difficulty is true for conventional implicature too.

<sup>14</sup>Gussenhoven (1983:79) makes a similar observation.

## References

- Bing, Janet. 1979. Aspects of English prosody. University of Massachusetts at Amherst dissertation. Reprinted by the Indiana University Linguistics Club, 1980.
- Bolinger, Dwight. 1958. A theory of pitch accent in English. *Word* 14.109-49.
- Bolinger, Dwight. 1982. Intonation and its parts. *Language* 58:3.505-533.
- Culicover, Peter W., and Michael Rochemont. 1983. Stress and focus in English. *Language* 59:1.123-165.
- Cutler, Anne. 1977. The context-dependence of 'intonational meanings'. *Chicago Linguistic Society* 13.104-115.
- Grice, H. P. 1975. Logic and conversation. Vol. 3: *Syntax and Semantics*, ed. by Peter Cole & Jerry Morgan, 41-58. New York: Academic Press.
- Grice, H. P. 1978. Further notes on logic and conversation. Vol. 9: *Syntax and Semantics*, ed. by Peter Cole, 113-127. New York: Academic Press.
- Gunter, Richard. 1972. Intonation and relevance. *Intonation: Selected readings*, ed. by Dwight Bolinger, 194-215. Harmondsworth: Penguin.
- Gussenhoven, Carlos. 1983. A semantic analysis of the nuclear tones of English. Ms. Reproduced by Indiana University Linguistics Club.
- Halliday, M.A.K. 1967. *Intonation and grammar in British English*. The Hague: Mouton.
- Hirschberg, Julia, and Gregory Ward. 1984. A semantico-pragmatic analysis of Fall-Rise intonation. *Chicago Linguistic Society* 20.173-180.
- Hirschberg, Julia. 1985. A Theory of Scalar Implicature. University of Pennsylvania dissertation.
- Horn, L. R. 1972. On the semantic properties of logical operators in English. ucla dissertation.
- Jackendoff, Ray. 1972. *Semantic interpretation in generative grammar*. Cambridge, MA: MIT Press.
- Karttunen, L. and Peters, S. 1979. Conventional implicature. *Syntax and Semantics* 11.1-55.
- Kingdon, Roger. 1958. *The groundwork of English intonation*. London: Longmans.
- Ladd, D. Robert. 1980. *The structure of intonational meaning*. Bloomington, Ind.: Indiana University Press.
- Liberman, Mark, and Ivan Sag. 1974. Prosodic form and discourse function. *Chicago Linguistic Society* 10.416-27.
- Moulton, William. 1982. Sentence perspective: linear order, stress, and intonation. Ms. Revision of paper presented at the Penn Linguistics Club, 10 March.
- O'Connor, J.D. and G.F. Arnold. 1961. *Intonation of colloquial English*. London: Longmans.
- Pierrehumber, Janet B. 1980. The phonology and phonetics of English intonation. Massachusetts Institute of Technology dissertation, September.

- Pike, Kenneth. 1945. *The intonation of American English*. Ann Arbor, MI: University of Michigan Press.
- Sadock, Jerrold M. 1978. On testing for conversational implicature. Vol. 9: *Syntax and Semantics*, ed. by Cole, P., 281-297. New York: Academic Press.
- Schubiger, M. 1958. *English intonation: Its form and function*. Tübingen: Max Niemeyer.
- Ward, Gregory, and Julia Hirschberg. To appear. Implicating uncertainty: the pragmatics of Fall-Rise intonation. *Language*.



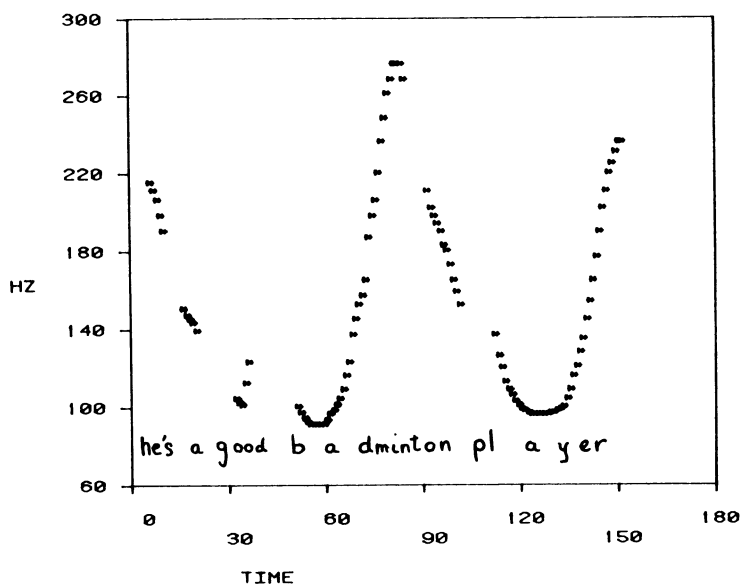


Figure 1: The FALL-RISE Contour

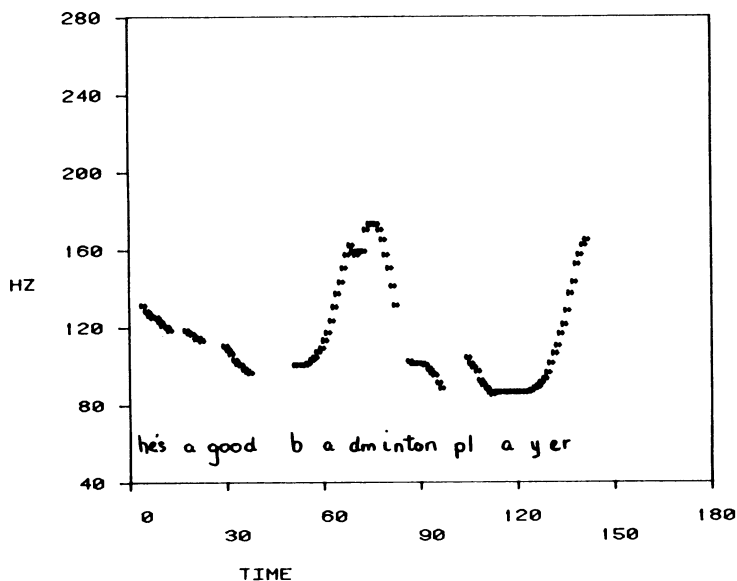


Figure 2: The A-Rise or AC Contour

Degrees of Stress in Russian Versification  
Emily Klenin

1. Introduction. Descriptions of Russian phonetics sometimes include discussion of secondary or light stress phenomena, which are, however, still poorly understood. I will discuss here light or secondary stress only with respect to words lacking any stress other than the one considered light. Several lists of such words exist in the Russian phonetics literature (see Avanesov 1956:81-84, Bulanin 1970:164-166, RG 1980:90-91), but the lists do not entirely agree, and criteria for inclusion are unclear. In general, classification seems to make use of a combination of phonological and morphosyntactic criteria: nonlexical (form) words, including pronouns, quantifiers, modals, numerals, and conjunctions, are all treated as lacking full stress, but, insofar as they do not undergo vowel reduction according to the patterns usual for clitics,<sup>1</sup> they are also not generally treated as stressless.<sup>2</sup> The acoustic correlates of stress in such words are not well studied, according to Bulanin 1970, and we will not deal with them here.

The category of lightly stressed words is examined in more detail outside the strictly phonetic literature, in work on Russian versification; the reason for this is that the rhythm of Russian verse depends in part on the distribution of such words. In 19th-century ternary-meter verse, all ictuses were obligatorily stressed, and arsis syllables tolerated some stresses, although only rarely the stress of an autosemantic polysyllable (see below). In binary meters, ictuses could be stressed or unstressed, and arsis position was normally filled by an unstressed syllable. However, the stressed syllable of some form words could occupy either arsis or ictus position; in ictus position, such syllables provide a stress, but in arsis position, it was traditionally felt that they did not create a hypermetrical stress, at least not necessarily. The term "light stress" in metrical usage refers to the class of stresses in such words. Thus, in ternary meters, ictuses could vary between light and full stress, whereas arsis syllables varied from stressless to lightly stressed.

The metrical notion of light stress is of particular importance in studying ternary meters, and arsis position in general; since binary-meter ictus stress ranges from full stress to stresslessness, the rhythm of binary-meter ictuses can more easily be studied without differentiating light stress from full stress, particularly if it is assumed, as it until recently generally was, that light-stress words do not provide hypermetrical stresses in arsis position. This assumption led to the treatment of light-stress words as variable in degree of stress, where variation was between 'stressed' and 'unstressed', conditioned by metrical position.

The idea of differentiating several degrees of stress in Russian verse was first developed in Žirmunskij 1925/1975, who distinguishes invariably-stressed, invariably-unstressed, and variably-stressed word classes, the last of which includes all form words that

are not stressless; stressless form words are distinguished from variably-stressed words by vowel reduction. In ternary ictus position, the variably stressed word is fully stressed. Elsewhere, variably stressed words will generally have any of several intermediate degrees of stress, depending on the morphosyntactic characteristics of the word and on its syntactic position; such words can, however, according to Žirmunskij, become completely unstressed, generally when the variable stress immediately precedes (or follows) a fully stressed syllable. Thus, Žirmunskij's description is based on grammatical categories, with adjustment for syntactic and metrical conditioning; this classification has become the basis of most later work.

In more recent studies of Russian verse, most notably Kolmogorov and Proxorov 1968 and Gasparov 1974, light-stress words are taken to provide a relatively light stress in ictus position, and to provide a hypermetrical stress in arsis position; however, this hypermetrical stress is less than that of a fully-stressed word in the same position, and is also weaker than the stress of the same lightly-stressed word in thesis position. Thus, Gasparov 1974 distinguishes at least four degrees of stress in Russian verse, and other scales, for example Baevskij 1966, distinguish even more—up to at least nine. I am unaware of any acoustic correlates of these different degrees of stress, and it is evident from the literature that native speakers do not have uniform judgments about at least the intermediate levels.

The more recent studies for the most part differ from Žirmunskij in not recognizing either the prosodically conditioned atonicization of variably stressed words, or the privileged status of ternary ictus position as reinforcing variable stress to the level of a fully stressed word. The absence of vowel reduction in a word does not, in Gasparov's system, necessarily preclude its being stressless.

Thus, the notion of light stress has become well established in studies of Russian versification, where it has been defined as the stress of those words that can occur both in arsis and thesis position in the line, if they are felt to be stressed when they occur as thesis. The metrical notion of light stress has not, however, been reconciled with the same phenomenon as described by phoneticians, and the units involved and the fundamental criteria for inclusion are not entirely the same. The work reported on below is part of a study of one aspect of the behavior in anapestic trimeter of words treated as lightly stressed in the linguistic literature. I will suggest that the behavior of these words in verse, on the one hand, is controlled by general phonological and syntactic factors and, on the other hand, controls the regular modulation of verse rhythm.

1.1 Preliminary marking of stress. I used in my preliminary analysis a greatly simplified stress classification. All words were assigned either full stress, light stress, or no stress, and words lacking vowel reduction were all either fully or lightly stressed, depending on their grammatical properties. Autosemantic words were fully stressed, form words were lightly stressed or unstressed. All

occurrences of all forms of all words were stressed alike, and I avoided creating pairs of homonyms differentiated by stress. My analysis at this stage dealt strictly with word forms, and did not deal with 'metrical words', as defined in Gasparov 1974 (see also Tarlinskaja 1984). The system I used is obviously not intended to allow for subtle gradations in degrees of stress, or for subtle variations in the ways forms are used, with consequences for their degree of stress. It isolates a maximally large number of items whose stress is likely to be variable, and avoids making a priori distinctions among them.

The purpose of the initial marking of light stress was to identify potentially variable-stress items so that their distribution could then be analyzed. In general, my preliminary marking of light stress was based on criteria used by Soviet linguists, mainly Avanesov and Bulanin, without adjustments for syntactic or metrical deformation or regularities, the description of which is one goal of the study part of which is reported on here. In some instances, stress marking was modified in the subsequent metrical analysis, but for the most part this will not concern us in the present paper.

1.2 The corpus. The corpus consisted of 439 lines of anapestic trimeter; this is, precisely, all of the anapestic trimeter in isometric verse contained in the "Basic Collection" of poetry by Afanasij Fet. The poems were written from 1842 to 1892, and cover several subgenres of Fet's lyric poetry.

2. General properties of anapestic trimeter lines. The anapestic trimeter line consists of 9 to 11 syllables, with an ictus on the 3rd, 6th, and 9th syllables. The ictus is obligatorily stressed. Non-ictus syllables are predominantly unstressed, but hypermetrical stresses occur very frequently on the first syllable of the line--in 46.9% of all lines in the corpus used here, slightly less for some other poets.<sup>3</sup> It has also been shown that hypermetrical stresses occur with decreasing frequency from left to right across the line (Gasparov 1974:183, Kiparsky 1975:594) and from beginning to end of the stanza (Gasparov 1974:186). Not commented on by Gasparov, but evident from his statistics, is the different behavior of the two arsis syllables: the first arsis syllable is heavier than the second. In general, the binary differentiation of arsis syllables in Russian ternary meters was first described by Bogorodickij (1930), who, however, studied only dactyls and amphibrachs.<sup>4</sup> The differentiation of the Russian anapestic foot is predicted by generalizations made from English and other languages in Kiparsky (1977), where the falling arsis type was found to be the only form of the anapestic foot in any language that had been studied from this point of view at that time.

3. Distributional properties of form words in the corpus. Table I lists occurrence of autosemantic-word stress (AWd), form-word stress (FWd), and stresslessness (OS) for the first and second arsis positions (A-1 and A-2 respectively) and thesis position (Th) for each foot (I, II, III); the total of the first three lines is 439 occurrences of each line position (A+F+0), and the proportion of FWd

stresses in relation to the total number of positions is listed in the last line of the table (F/AFO):

TABLE I

	I			II			III		
	A-1	A-2	Th	A-1	A-2	Th	A-1	A-2	Th
Awd	58	0	380	6	0	391	2	0	399
FWd	148	23	59	50	29	48	19	12	40
OS	233	416	0	383	410	0	418	427	0
A+F+O	439	439	439	439	439	439	439	439	439
F/AFO	34%	5%	13%	11%	7%	11%	4%	3%	9%

About a quarter of all the stresses in the corpus are in form words--428 out of 1664. About a third of the form-word stresses occur in line-initial position, which is generally known to tolerate full stress as well, more frequently than any other arsis syllable. Thus, the favorite single position for form words is the line position the fulfillment of which is most variable with respect to stress; as indicated in Table I, roughly one-third of such positions are filled by form words.

The two-thirds of the form words outside line-initial position are divided equally between, on the one hand, ictus (34%), and, on the other, the remaining arsis positions (31%).<sup>5</sup> Thus, form words divide evenly among stressed, non-stressed, and neutral positions; even aside from the first line position, there is some tendency for form words to occur in the first half of the line.

Although form words as a whole are thus statistically ambivalent with respect to metrical position, this ambivalence is greatly reduced within smaller subclasses of form words.

First, the distribution of form words in ictus and non-ictus position depends heavily on whether they are monosyllabic or disyllabic, as is shown in Table II, where the first line lists occurrences of monosyllabic form words and the third line lists the proportion of monosyllabic form-word stresses as compared with all form word stresses for each line position:

TABLE II

	I			II			III		
	A-1	A-2	Th	A-1	A-2	Th	A-1	A-2	Th
Mon	100	23	8	38	21	2	19	11	7
FWd	148	23	59	50	29	48	19	12	40
	68%	100%	14%	76%	72%	4%	100%	92%	18%

About half of all the form-words are monosyllabic (229 out of 428, or 53.5%), and yet only 11.6% of the ictus-position form words are monosyllabic.

Second, there are syntactic restrictions on the occurrence of disyllables in arsis position, whereas monosyllables are syntactically unrestricted in arsis position, but seem to show some restrictions in ictus position.<sup>6</sup> In the first place, disyllabic words in arsis position occur only in feet immediately preceded by a phrase- or higher-level boundary. This is illustrated in the following examples:

[1] Vidit tol'ko, što večno i čisto  
"Sees only what is eternal and pure"

[2] Podari ètu rozu poètu  
"Give this rose to the poet"

[3] Prixodi, moja milaja kroška  
"Come, my dear morsel"

[4] Počemu svetloj reči značen'ja  
"Why bright speech's meaning"

Disyllabic nouns and noun phrases almost never appear in arsis position, whether they are autosemantic or pronoun forms; disyllabic attributive forms do occur in arsis position, as is evident from examples [2] — [4] above. Thus, disyllabic words with arsis-position stress are normally modifiers of elements to their right, whereas monosyllables are not so restricted, as can be seen from examples such as [5] and [6]:

[5] Ja tebe ničego ne skažu  
"I will tell you nothing"

[6] Na zare ty ee ne budi  
"Don't you wake her at dawn"

We can therefore conclude that monosyllabic form words occur mainly in arsis position, and hypermetrical stresses are created nearly entirely by monosyllabic form words; nearly all other hypermetrical stresses outside of line-initial position are on form words that are syntactically subordinate to elements to their right, which, by virtue of their position, can carry phrasal stress. The occurrence of monosyllabic form words in arsis position is not syntactically restricted in this way.

Monosyllabic form words in ictus position, however, are generally syntactically or otherwise prominent: nearly all are emphatic, or are heads of syntactic constructions. This is not true, however, of the few monosyllabic form words in final ictus position. This is unexpected, because there is a well-known general tendency in binary verse toward heavy final ictuses. In the present corpus, however, monosyllabic form words in final ictus position are not emphatic or heads of constructions, although a clause boundary does

immediately follow all such ictuses, creating the possibility of syntagmatic stress. To the extent that the syntax of these form words suggests that they are heavily stressed, this is only because of scrambled word order, generally not semantically motivated. This is illustrated in the following examples:

[7] I emu ulybajusja ja  
 "And at it smile I"

[8] Pust' ty otblesk, plenjajuščij nas  
 "Even if you are a reflection captivating us"

[9] Vse bojus', ne prosnulsja by on  
 "I keep fearing lest he wake"

Since, however, final feet with weak ictuses do not have hypermetrical stresses, examples such as [7] through [9] do not contradict the general rule that ictuses are stronger than their arses. This rule is occasionally violated, when a form word ictus occurs in a foot with a hypermetrical stress. In such feet, as we would expect, the hypermetrical stress is generally on a monosyllabic form word, whereas the word in ictus position is generally polysyllabic. A disyllabic word occurs in the arsis of a foot with a monosyllabic form word in ictus position only if a line- or sentence-boundary immediately precedes the foot and a phrase- or sentence-boundary follows. An example, unusual in that the hypermetrical stress is heavier than the ictus, is the following:

[10] Mnogo l' ix na trevožnyx krylax.  
 "Whether there are many of them on anxious wing."

It would seem that form words vary with respect to their normal metric potential as arsis or thesis elements, depending on their length and syntactic status. The form words that occur in arsis position are monosyllabic and syntactically dependent. Those that occur in ictus position are usually longer and syntactically more independent, although this is not true in all cases. It has often been noted that form word stresses are lighter in arsis position than in ictus position; for the most part, however, this is not, as is sometimes suggested, because of their metric position, but because arsis form-words are generally shorter than ictus form-words and occur in syntactically weaker environments. Thus, to the extent that the stress of form words is variable--and the metrical literature, as we have seen, generally refers to the class of form words as variably stressed--their variability is for the most part conditioned syntactically, not prosodically: with only rare exceptions, light stress does not replace syntactically motivated full stress or the reverse as a result of a word's location in thesis or arsis position.

4. The stress profile of the line. We can now turn to the question of how the distribution of form words affects the modulation

of rhythm in the anapestic line. On the basis of the information in section 3 above, we will treat form-word stress as relatively lighter than the stress of autosemantic words, although not necessarily light in all occurrences in ictus position. Equating form-word stress with light stress, with the provisos indicated, we see that Table I accords with the general stress properties of metrical lines introduced in section 2.

Line-initial position is substantially heavier than any other non-ictus position; this is a characteristic of line-initial positions not only in anapests but also in iambic lines, whereas falling meters show a propensity toward relatively weak line-initial positions. Thus, the behavior of the first-foot first-arsis position is to some extent apparently controlled by a general tendency to weaken expected stress distinctions line-initially, rather than by stress patterns specific to the anapestic line. The sharp drop in A-1 from I to II is therefore not by itself particularly informative with respect to the anapestic line as such.

There is also, however, a sharp decline in the frequency of stressed syllables between foot II A-1 and foot III A-1; moreover, the relatively greater steepness of the drop between I A-1 and II A-1 is primarily in the frequency of full stress. Form-word (light) stresses, in contrast, decline much more steadily although nonetheless sharply: there is a 66% drop from I to II and a 62% drop from II to III. Thus, it is the distribution of arsis-position form words that provides the overall modulation of line rhythm. Since form words are, by definition, syntactic markers, we can see that syntax is integrated into line rhythm, and that the tension between syntax and meter is itself a highly regular and regulated phenomenon.

4.1 First vs. second arsis syllable. The relative heaviness of the first arsis position as compared with the second is shown in two ways: it has a much greater propensity for the occurrence of light-stress instead of stressless syllables, and the first arsis position can be filled by the stressed syllable of an autosemantic word, including disyllabic words, whereas the second arsis position can only be filled by unstressed syllables or by form words with light stress. In both respects, the first-foot position is the strongest and the third-foot position is the weakest of the three first arsis positions. In each successive foot, the difference between A-1 and A-2 diminishes, the sharpest change being between I and II; thus, the opposition of the two arsis syllables weakens from left to right.

4.2 Thesis vs. arsis. As indicated in Table I, ternary-meter ictuses are generally filled with autosemantic word stresses, but form word ictuses are found in all feet of the line. The form word ictuses decrease in frequency from left to right, but, as noted above, it is unclear that this actually constitutes a decrease in the number of actual light stresses. Because the frequency of hypermetrical stresses declines left-to-right across the line, we can conclude that the contrast of thesis vs. arsis increases; the weight of the thesis, however, plays no clear role in this rhythmic modulation,



which is therefore nearly entirely dependent on arsis rhythm and hence on the distribution of form words in the line.

4.3 Interaction of thesis vs. arsis and arsis-1 vs. arsis-2. As noted above, the distinction of first- vs. second-arsis position weakens across the line, whereas thesis vs. arsis becomes stronger. Thus, although all three syllables of the foot are differentiated from one another, there is maximized at any one point in the line no more than one of the two possible distinctions. In the terms of a description such as Kiparsky 1977, the lower-level contrast of W(eak) vs. S(trong) syllables is more evident first, later supplanted by the higher-level metrical grouping of thesis vs. arsis.

4.4 Thesis vs. thesis. As noted above, our data do not show the thesis increasing in strength from left to right across the line, and since monosyllabic nonemphatic pronouns occur more in third-ictus position than in other ictus positions, it can be argued that the final ictus can even be relatively weaker than other ictuses, perhaps because of its privileged position at line-end. Although it is more usual for final ictuses in general to be stronger than other ictuses, the relatively weak final ictus seems to be a stylistic peculiarity of some classes of Fet's poetry. The relative equality in strength of autosemantic ictuses in some of his poetry has been noted (see Žirmunskij 1925/1975:146), and the present corpus also displays a tendency not to associate line-end position with particularly strong syntactic elements (see Klenin, in preparation).

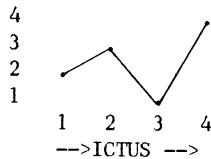
The tendency noted here runs counter to a suggestion by Gasparov (1974:183), that the decline in hypermetrical stresses at line end is the result of a tendency to make the line-final ictus maximally well differentiated perceptually from non-ictus positions. Since, however, the absence of hypermetrical stresses in the present corpus is not associated with any other tendency to enhance the prominence of the final ictus, Gasparov's hypothesis lacks expected support. Consequently, his perceptual explanation of the decline in hypermetrical stress at line end cannot be accepted. A likelier explanation is probably the tendency to avoid tension at closure, as observed by Kiparsky (1975:594).

4.5 The falling arsis and anacrusis. As noted in section 2 above, the falling arsis seems to be universally preferred to the rising arsis, but, as demonstrated in sections 4.1-4.3, the distinction is far better delineated at the beginning of the line than at the end. It may be added here that the falling profile of the arsis in the first foot--and in particular its tolerance for heavy stress in first arsis position--serves to help establish the status of the first foot as a basic part of the line, and not an extrametrical anacrusis. The status of anacrusis in Russian verse is generally marginal, and is restricted to stressless or light-stress syllables; there have, however, been ill-fated attempts to eliminate entire meters by assigning systematic anacrusis status to variously their first feet (in dactyls and trochees) or their arsis syllables preceding the first ictus (in iambs, anapests, and amphibrachs); for a discussion of such analyses, see Žirmunskij 1925/1975:122-127, Gasparov

1974:192-193. In the case of the anapestic line, the metrical status of the first foot is established in part by the fact that its internal structure is clearly the same as that of non-initial feet; the fact that the first arsis position can have a strong hypermetrical stress, albeit rarely actually felt to be strong enough to compete with the first ictus, further protects the integrity of the line. Thus, the two-layered internal articulation of the first foot in the anapestic line helps establish the uniform metrical structure of the line as a whole; this function of the hypermetrical stress on A-1 is peculiar to the first foot, which is also the favored location for such stresses, and for the clear differentiation of A-1 vs. A-2.<sup>9</sup>

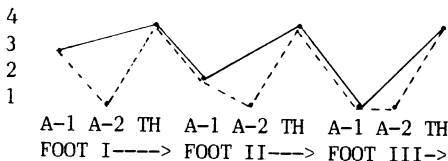
5. Comparison with the binary line. Statistical variation with respect to stress among ternary ictuses is not well known, and, indeed, such variation, as we have seen, is highly restricted. In contrast, ictus stress variation is well studied in binary meters, where there is a strong historical tendency in 19th-century Russian poetry toward the development of a regressive stress wave. The statistical pattern of the iambic tetrameter is shown in Figure 1, where the four ictuses are ranked with respect to their statistical propensity toward stress.

[Figure 1]



At first glance, this rhythm may appear completely different from what is observed in the anapestic trimeter. However, if we compare, not binary ictus with ternary ictus, but binary ictus with ternary first-arsis position and ictus, we find that the first arsis position behaves like the first ictus in each hemistich of the iambic tetrameter: it is weaker than the following ictus, but the degree of difference is increasingly great from left to right across the line. This pattern is shown in Figure 2; the dotted line connects successive syllables, and the solid line connects successive A-1 and thesis positions. (Grades are reduced to 4, flattening somewhat the bottom of the curve.) The similarity to Figure 1 is obvious.

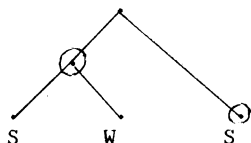
[Figure 2]



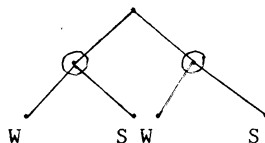
Thus, the first arsis position is a kind of weak ictus, in relation

to the strong ictus represented in ternary meters by the true ictus position; phenomena characteristic of the dipodic organization of binary meters have a direct parallel in foot-level organization of ternary meters. This can easily be expressed in a metrical description such as Kiparsky (1977), where, just as the two feet of a binary tetrameter hemistich command each other, arsis and ictus also command each other, in ternary as in binary meters, and A-1 and A-2 are also related as ictus to arsis. This is illustrated in Figures 3A and 3B, where the relevant nodes are circled:

[Figure 3A: anapestic foot]



[Figure 3B: the I4 hemistich]



6. Conclusions. We have seen that the words that are treated as lightly stressed by Avanesov, Bulanin, and others have a distinctive pattern of distribution in anapestic trimeter. They occur in ictus position for the most part only when their phonological or syntactic status assures their predominance over other stresses in the foot. The degree of stress that form words bear depends greatly on their syntactic situation; thus, the syntactic modeling of the line is an important element in the inherent rhythm of the anapestic trimeter. We have also noted certain regularities in the rhythm of the anapestic line, and drawn a parallel with binary-meter rhythm.

1. In addition to being longer and perhaps louder than unstressed syllables in the same word, the Russian word-stressed syllable is also differentiated qualitatively, in that unstressed non-diffuse vowels are subject to obligatory vowel reduction, the precise types of which depend largely on whether the unstressed vowel is pre- or post-tonic, and, if pre-tonic, then on whether it stands in first pre-tonic position (the first degree of reduction) or earlier (second-degree reduction). The quality of the reduced vowel is also affected by its local environment: the second degree of reduction is generally absent in syllables lacking consonantal onset, and can also be absent in absolute final position. The quality of reduced vowels (as of stressed vowels) also depends on the nature of surrounding consonants. Unlike length and loudness, vowel reduction is controlled specifically by word stress and is not associated with syntagmatic stress; for this reason, vowel reduction and its absence become in some analyses the main criterion for assigning word stress. In rapid or care-

less speech, both reduced and nonreduced vowels can be elided or qualitatively weakened, but such modifications are only very exceptionally obligatory even in rapid speech and are not subject to the same rules as vowel reduction in the usual sense of the term.

2. Russian also has stressless words not subject to normal vowel reduction; for example, the stressless conjunction cto is normally pronounced with the second degree of reduction (with vowel schwa), although it can in some styles of speech occur with a nonreduced [o]. It cannot occur with the first degree of reduction (with vowel [a]), even when a stressed syllable immediately follows.
3. Gasparov's Nekrasov corpus shows 44.6%, his Blok corpus 40.6% (Gasparov 1974:189). The apparent differences between the Fet corpus used here and the Nekrasov corpus are partly the result of different counting procedures.
4. Bogorodickij claims inter alia that the Russian dactyl normally has a rising arsis; this claim runs counter to the general tendency described by Kiparsky (1977:229).
5. One additional form word occurs in clausula position.
6. Syntactic restrictions on hypermetrical stress in the anapestic trimeter are discussed more fully in Klenin (in preparation).
7. Syntactically, of course, the first foot can nonetheless be argued genuinely to be in its entirety a kind of anacrusis to the line, in that the beginning of the second foot is a favored location for phrase- and sentence-level boundaries.

#### REFERENCES

- Avanesov, R. I. 1956. Fonetika sovremennogo russkogo literaturnogo jazyka. Moscow: Moscow University.
- Baevskij, V. S. 1966. "O čislovoj ocenke sily slogov v stixie al'ternirujuščego ritma". Voprosy jazykoznanija 1966.2, 84-89.
- Bogorodickij, V. A. 1930. Fonetika russkogo jazyka v svete eksperimental'nyx dannyx so mnogimi risunkami i s ěskkursami o tatarskoj orfografii i proiznošenii. Kazan': Dom Tatarskoj Kul'tury.
- Bulanin, L. L. 1970. Fonetika sovremennogo russkogo jazyka. Moscow: Vysšaja škola.
- Gasparov, M. L. 1974. Sovremennyj russkij stix. Metrika i ritmika. Moscow: Nauka.
- Kiparsky, P. 1975. "Stress, syntax, and meter". Language 51, 576-616.
- \_\_\_\_\_. 1977. "The rhythmic structure of English verse". Linguistic Inquiry 8, 189-247.
- Klenin, E. In preparation. "The hidden strength of the ternary ictus".
- Kolmogorov, A. and A. Proxorov. 1968. "K osnovam russkoj klassičeskoj metriki". Sodružestvo nauk i tajny tvorčestva

Moscow: Iskusstvo, 373-383.

RG = Russkaja grammatika, I. 1980. Moscow: Nauka.

Taranovsky, K. 1953. Ruski dvodelni ritmovi, I-II. Belgrade:  
Srpska Akademija nauka.

Tarlinskaja, M. 1984. "Rhythm-Morphology-Syntax-Rhythm".  
Style 18:1-26.

Žirmunskij, V. M. 1925/1975. Vvedenie v metriku. Teorija stixa.

Pub. 1925, repr. 1975, Teorija stixa. Leningrad:  
Sovetskij pisatel'.

## Improving Tree Theory

Alan S. Prince

### 0. Introductory

One of the compelling achievements of recent linguistics has been the creation of an explicit, tightly parametrized theory of lexical stress patterns. As with any work of many hands and plentiful combinatorics, the codification of metrical options has proceeded to some extent in a sedimentary rather than a fully integrative fashion; this has led to some intriguing redundancies and loosenesses of prediction. In what follows, I will offer two lines of attack on the problem of improving matters. First, I will show that within the logic of the theory as it is presently constituted, there is no need for a primitive notion of "unbounded foot" (more generally, "unbounded metrical unit"): thus, all primitive metrical units are bounded--maximally binary. Second, I will sketch a program for eliminating the burgeoning theory-of-stressing in favor of the already developed theory-of-stressing, through use of notions that have strong affinity with key elements of Lexical Phonology.

Here is a catalogue, somewhat *raisonné*, of the principles of Metrical Tree Theory:

#### (1) Tree Form

- a. **Exhaustiveness.** Everything must belong to metrical structure.
- b. **Level Structure.** (rime, foot, superfoot, ..., word, ...)
- c. **Headedness.** Each unit has a single head at the (left/right) periphery. (If branching is strictly binary, then each category has headship uniformly left or right.)
- d. **Maximality.** Units are of maximal size, within the other constraints on their form.
- e. **Magnitude.** Feet are either maximally binary ('bounded'); or unlimited in extent ('unbounded').
- f. **Quantity Sensitivity.** Nonhead (weak element) may be restricted to be a light syllable.
- g. **Obligatory Branching.** In a quantity sensitive foot, Head may be restricted to be a heavy syllable.

#### (2) Rule Application

- a. **Iterativity.** Metrical units are built iteratively throughout a domain; or only one is built.
- b. **Directionality.** Structure at a level is built in a left-to-right sweep; or right-to-left.

(3) Extrametricality Theory

- a. Extrametricality. A peripheral element may be disregarded in assigning structure by (1).
- b. Stray Adjunction. An element left unaccounted for is adjoined to nearby structure.

(4) Destressing and Shifting.

Various rearrangements may take place after the primary build-up is over or during it.

Sources for this theory include Prince(1976), Liberman & Prince (1977), Selkirk(1980), Leben(1981), Kenstowicz (1983), Halle & Vergnaud (1978), Hayes(1981), the latter two being especially significant systematizing works. Recent approaches to Destressing and Shifting are found in Hammond(1984) and Hayes(1984).

Not all of these notions are confined to stress theory. To General Phonology belong surely Exhaustiveness-- which is but a prosodic echo of the requirement that all features be filled in at some point in derivation-- as well as Directionality and Iterativity, these being properties that many different kinds of rules may have. Extrametricality is shared with other branches of prosodic phonology and morphology (Prince (1983), McCarthy & Prince (1985)).

Properly metrical, then, are Level Structure; Headedness; Magnitude; and the parameters relating to syllabic quantity, Quantity Sensitivity and Obligatory Branching.

1. Unboundedness and Stray Adjunction

My first goal will be to reduce Magnitude from parameter to principle. Basic metrical units will then be at most binary, unbounded units having disappeared from the primitive vocabulary. To see that this is already immanent in the theory, consider the role of Stray Adjunction. If syllables can be created in the course of derivation, or more generally, if syllables or other structure can enter the purview of metrical rules at some late point due to the effect of Extrametricality on earlier rule applications, then-- assuming Exhaustiveness--there must be a rule of Stray Adjunction to connect them up to metrical structure. Although most previous uses of Stray Adjunction involve a single extrametrical unit at an edge, there is no reason to assume that the rule itself should be limited to such environments. Consequently, if some bounded unit happens to be located amid an otherwise unmetrified string, we would expect Stray Adjunction to attach local stray material to it until

metrification is complete--thereby developing an unbounded structure from a bounded core. If stress patterns can be successfully described in terms of the placement of bounded units, using only the established parameters of the theory, then the creation of unbounded units can be comfortably ascribed to Stray Adjunction, and our goal will have been reached.

Unbounded units have been given two principal roles: as feet, to find stressable syllables in systems that lack the closely articulated rhythmic pattern of alternating stress; and at the word level, to choose the primary stress from among a set of candidates.

Descriptively, the commonly encountered principle for primary stressing is strikingly simple: elevate the first (or last) foot of the word to greatest prominence. In terms of the theory described under (1), this outcome is usually understood as following from the placement of an unbounded unit over the row of feet. Because of the Headedness condition (1c), the strong element or head of any unit is always peripheral: therefore it can only be the first or the last foot that becomes strongest in the word. However, the same general theory allows an entirely different explanation for the (hierarchical) peripherality of main stress.

Suppose that a bounded unit (eg. [s w] for initial-foot stress in words) is placed noniteratively over the foot-row. By Directionality this unit must be located at the word-edge. Although a long word may be only partially metrified by the bounded unit, the crucial information about primary stress has been installed. Stray Adjunction is entirely adequate to join up any material not included in the original bounded unit, completing the derivation. Figure (4) schematizes a typical course of events:



It is important to note that this manner of deriving peripheral main stress is fully within the standard theory. As long as there are rules placing single metrical units in edge position (here understood as noniterative applications), with Stray Adjunction to clean up after them, then there is no need to handle peripheral stress with a special primitive notion "unbounded unit", whose job it is to find edges. What we have here is a conceptual redundancy, of the sort that syntacticians have found it fruitful to eliminate, between the structural vocabulary ("unbounded unit") and the theory of rule application ("noniterative", "directional"). Each contains an independent



mechanism of edge-location. Rationality compels us to seek the annihilation of one at the hands of the other. Since noniterative or edge-anchored application cannot be reduced, within present understanding, to the placement of unbounded units, it follows that we should try for the demotion of unboundedness to derived status.

Standing in the way of this desirable tightening of the theory is the use of unbounded structures (as feet) to find not only word-edges but heavy syllables as well. Two particularly interesting types of patterning recur in the descriptive literature:

(6) **Non-Alternating Systems**

a. Default-to-Opposite-Side.

- i. Main stress falls on the last heavy syllable, or if there are no heavies, the first syllable.
- ii. Main stress falls on the first heavy syllable, or if there are no heavies, the last syllable.

b. Default-to-Same-Side

- i. Main stress falls on the first heavy syllable, or if there are no heavies, the first syllable.
- ii. Main stress falls on the last heavy syllable, or if there are no heavies, the last syllable.

(Readers interested in empirical underpinnings of this typology should examine Hayes (1981).)

The Default-to-Opposite pattern is commonly derived from the properties of Quantity-Sensitive Unbounded feet, following the line of Prince (1976). To illustrate the pattern of description let us consider the system (6ai) in which stress falls on the last heavy syllable, or lacking heavy syllables, on the first syllable. Suppose we assign Quantity Sensitive feet [s w\*] to words. Feet will be of two types: those beginning with a heavy syllable; and those beginning with a word-initial light syllable; in both cases the foot goes on to include the maximal string of following light syllables. Diagram (7) shows how three schematic words would be parsed by such feet (H=heavy syllable; L=light syllable):

- (7)a. # (L L L) (H L L L) (H) (H L L) #  
 b. # (H L L L) (H L L) #  
 c. # (L L L L L L) #

Primary stress is then placed on the last foot. If there are heavy syllables in the word, the last of these will initiate the last foot, and thereby receive word stress. If there are only light syllables, the word will contain but one foot; as the last (and only)

foot, its strong element or head--its first element, the word's initial syllable--will receive primary stress. For the mirror image pattern, unbounded feet [w\* s] will be called on, with word stress falling on the first foot.

The Default-to-Same systems do not succumb to this sort of analysis. To see this, observe that the foot structure portrayed in (7a,b) cannot be the basis for either the first heavy/first syllable or the last heavy/last syllable pattern.

Suppose we wish to compute the last/last pattern from feet [s w\*]. Words without heavy syllables, as in (7c), will have initial stress by foot structure alone, and cannot be given the required final stress.

Suppose we wish to compute the first/first pattern from feet [s w\*]. For words beginning with light syllables, as in (7a), we must say that the second foot receives greatest prominence; but for those beginning with heavy syllables, as in (7b), we must say that the first foot is chosen. Therefore there is no way to assign main stress consistently to the foot-row, without illegitimate, unsanctioned peeking across hierarchical levels.

Since the Default-to-Same systems cannot arise from quantity-sensitive feet [s w\*], it follows by symmetry that they can't arise from feet [w\* s] either.

The solution proposed by Halle & Vergnaud (1978) is to call on a new parameter, listed above as Obligatory Branching (1g), a refinement of Quantity Sensitivity. Obligatory Branching feet are quantity sensitive-- w-nodes are light syllables-- but they are also super-sensitive, as it were --the head must be heavy as well. Such feet serve to unambiguously mark the presence and location of heavy syllables. If the examples of (7) were parsed by feet [s w\*] constrained to be Obligatory Branching rather than merely Quantity Sensitive, the results would be as in (8):

- (8) a. # L L L (H L L L) (H) (H L L) #  
 b. # (H L L L) (H L L) #  
 c. # L L L L L L #

The crucial difference is that initial strings of light syllables belong to no foot at all. If we now assign final word stress via a metrical unit [w\* s], we elevate the last foot of (8a,b), but the last syllable of (8c).

Unboundedness plays a rather trivial role here and can easily be eliminated in the way suggested above for word-stress assignment; the real key is

the Obligatory Branching stipulation. Suppose that strictly bounded OB feet were used. The crucial distinction between heavy-syllable words (8a,b) and light syllable only words (8c) is equally well established, and in exactly the same way: light-syllabled words are footless. Let Stray Adjunction apply freely; it will iteratively attach adjacent unmetrified elements-- necessarily light syllables, since all heavies are taken up in feet--until the word is footed up. Stray Adjunction cannot apply to light-syllabled words like (8c) since there is no base structure to adjoin things to. Word stress is assigned at the right margin--using a bounded unit [w s], of course, to which Stray Adjunction may also freely apply.

Default-to-Same systems, then, do not require primitive unboundedness within the standard theory of (1)-(4). Default-to- Opposite systems, such as the one diagrammed in (7), make a more central use of unboundedness: when the Quantity Sensitive foot has no heavy syllable to stop it, it expands by Maximality to encompass the entire word, driving the foot-head to the margin, entailing for example (with [s w\*] feet) initial stress in light-syllabled words. Thus, the QS unbounded foot performs two functions: it finds heavy syllables, and it finds word-edges. But we now know that each of these can be accomplished by other mechanisms of the theory: OB feet find heavy syllables; and noniterative application leads to peripheral placement of stress. The standard theory must therefore contain an analysis of Default-to-Opposite solely in terms of bounded units.

Consider the type of pattern in (7): last heavy syllable, or first syllable if no heavies. Assign OB feet (bounded); these pick out the heavy syllables. Assign a foot [s w] noniteratively left-to-right, i.e. initially. Stray Adjunction attaches any remaining unaccounted-for material to these basic feet. Assign word stress to the final foot, and with Stray Adjunction at the word level the job is done.

An apparently unpleasant feature of this analysis is that an extra rule is required to stipulate initial stress; under the [s w\*] analysis, initial stress follows from Maximality defined over unboundedness, that is, from the very nature of the basic units. But the standard approach must pay for this local achievement within the larger empirical realm of non-alternating systems as a whole, basing the Default-to-Same/ Default-to-Opposite distinction on a stipulative choice between QS and OB unbounded feet. If we strengthen the theory by eliminating primitive unboundedness, then only OB can be used in the derivation of non-alternating systems. The choice that divides Default-

to-Same from Default-to-Opposite is whether or not a rule of peripheral stressing applies at the foot level. The option of noniterative application is made available quite independently. Thus it may be truly said of the revised theory that it too allows the occurrence of initial stress to follow from the basic character of the theory, from free combination of available parameters. The conceptual difference is that the standard approach seeks to derive the initial stress from the nature of structures (maximality, unboundedness), whereas the revised theory derives it from the nature of rule application (noniteration, directionality).

We have seen that the descriptive functions assigned to primitive unboundedness are entirely overlapped by other necessary devices of the theory. We are therefore able to extract from inside the corpulent standard theory a proper subtheory that generates the same central array of patterns. Unboundedness, governed by maximality, seeks edges: but applications limited to edges are required anyway. Unboundedness, governed by Quantity Sensitivity, seeks heavy syllables and edges: but we need a special device for finding heavy syllables anyway (Obligatory Branching), and edges can be found as before. Sufficient technology therefore exists to place bounded units in positions where they mark the essential distinctions; Stray Adjunction does the rest.

## 2. Remarks on the Argument

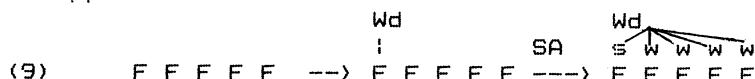
The argument has been presented in a stripped-down form so as to highlight its central contentions. Here I briefly discuss a number of auxiliary issues.

### 2.1 Peripherality

The method of implanting edge stresses suggested above does not automatically guarantee absolute peripherality. A bounded unit [w s] may be placed initially; a unit [s w], finally; giving second-from-edge stress. There are such cases in the literature (Tahitian, Goroa, Sindhi, Passamaquoddy, Ojibwa) but they submit to an extrametricality analysis as well, suggesting that the primacy of edgemostness should be insisted upon. (Particularly since such units may be composed with extrametricality, leading to even less heard-of systems.)

A plausible approach would be to attribute such edge stresses to the placement of a unary category, such a F (foot) or Wd (word). Initial foot stress would be derived, not as in example (5) by location

of [s w], but by association of the noncomplex category Wd in initial position (i.e. through noniterative, LR application.)



Since stray elements are always adjoined as weak non-heads, the same results are achieved as in (5). A similar approach would be to allow rules to mark head-position alone.

The problem is to force the kind of analysis in (9) over that in (5), given that the theory allows both. A number of moves are available, but lacking a conclusive argument, I will leave the matter open.

## 2.2 Shape of OB Feet

Deliberately left vague in the main discussion was the shape of the OB feet that form the basis for unbounded structures in nonalternating systems. In fact, the shape doesn't really matter--they could even be unary--, as long as Stray Adjunction works to tie everything up into feet (of any shape) before word stress is calculated. Hayes (1983,1985) shows that Quantity Sensitivity is strongly correlated with feet [w s]. Since OB is a subtype of Quantity Sensitivity-- indeed, its prototype-- Hayes's findings suggest that OB feet should be [w s] as well. There is no evidence as to exactly how Stray Adjunction should build on such cores.

## 3. Free Elements

The assignment of metrical structure is governed by a convention that has never, as far as I know, been explicitly stated in its full generality, even though it has been assumed in almost all descriptive work to date. The idea is this: once metrical structure has been erected, it can protect those elements in its domain from participating in further metrical construction. A stress analysis might contain two distinct rules of foot formation:

say a single foot is put down finally, and then iteration proceeds from the beginning (RL). Derivation would go as in (10a), preserving the first-assigned final foot; not as in (10b), overwriting it.

- (10) a. o o o {o o} ---> [o o] [o] {o o}  
       b. o o o {o o} ---> [o o] [o o] [o]

Analysts have assumed implicitly, then, that rules establishing the metrical analysis of a domain apply only to free elements--those that are not already specified for the relevant metrical relation. From the perspective of general phonology, we see that such rules are feature-filling -- they provide information where none exists--rather than feature-changing. (This identification presupposes that the term feature ought to be generalized in the obvious way to include prosodic structure as well as distinctive features proper.) Let us call the constraint implied by descriptive practice the Free Element Condition (FEC) and state it as follows:

- (11) **FREE ELEMENT CONDITION (FEC).** Rules of primary metrical analysis apply only to Free Elements--those that do not stand in the metrical relationship being established; i.e. they are "feature-filling" only.

A close look at the even most familiar metrical processes shows that the FEC must be assumed to play a central role in them. Consider derivational theories of syllabification, such as that propounded in Steriade (1982). We have two basic rules: an Onset Rule (OR), adjoining C to following V to form the basic syllable [CV]; and a Coda Rule (CR), adjoining C to a preceding V to close a syllable. The Onset Rule must precede the Coda Rule to encode the well-known fact that in the potentially ambiguous sequence VCV, only the parse V[CV] is found. As Steriade explicitly notes, the ordering OR < CR must be buttressed by a stipulation to the effect that the Coda Rule may apply only to what we have called 'free' elements, in order to avoid pathological derivations in which the Coda Rule overwrites the Onset Rule.

$$(12) \quad C \ V \ C \ V \xrightarrow{\text{OR}} [C \ V] \ [C \ V] \xrightarrow{\text{CR}} [C \ V \ C] \ [V]$$

Thus, if we accept the scattering of syllable formation rules among the other rules of the phonological derivation, as Steriade has proposed, we are already committed to a limited version of the FEC.

Within the stress theory we are discussing, the iteration of binary feet across a domain-- one of its most fundamental operations-- depends covertly on the FEC as well. At issue is why the window of foot-formation advances two syllables with each new iteration, allowing the domain to be sliced up into nonintersecting constituents. From the standpoint

of General Phonology, we should really expect a one-syllable advance: an iterative rule (for example, of tone- or backness-spreading) seeks out the very next place that will allow it to reapply; in the case of stress, if we bring but one new syllable into consideration after the iterative sweep has begun, that will be sufficient to form a new binary foot, so long as we can-- contrary to FEC-- seize on a syllable just metrified on the last iteration. Derivation (13) illustrates this unfortunate course of events:

(13)

o o o o --> [o o] o o --> [o [o o]] o --> [o[o[o o]]]

The FEC blocks this kind of derivation, since the crucial misstep takes place when a rule of primary metrification applies to an element that is not 'free' in the relevant sense. Thus it follows from the FEC-- and from nothing else-- that the window of analysis cannot include material from the previous iteration; commonly, this entails a two-syllable advance.

#### 4. Limits of the FEC

It is appropriate and useful to inquire whether the FEC governs all metrical rules, always. Since any metrical operation can be construed as adjunction, we might ask: is all adjunction, then, Stray? The answer must be no, for two quite independent reasons.

First, cyclical application allows (and must allow) re-writing of structure from earlier cycles, limited by the Strict Cycle Condition. Various issues, some prickly, involving the relation of the Strict Cycle to the FEC (and to prosodic structuring in general) assert themselves at this point. I will not be able to discuss them, much less resolve them, in the providentially limited space available here.

Second, an entire component of the theory-- called "Destressing and Shifting" in (4) above-- is devoted precisely to making rearrangements in established metrical structure. Rules of destressing in particular must be allowed to implement drastic changes in structural affiliation and category membership, of just the type banned by the FEC. The rest of this paper will be devoted to integrating such rules into the theory.

## 5. Toward a Theory of Destressing Operations

### 5.1 An Observation and a Hypothesis

Heavy syllables have special status in the theory of foot-form outlined under (1) above; two parameters are given to restrict foot-dependents and foot-heads so that heavy syllables can attract stress regardless of their position in the word. We find rules stressing both heavy and light syllables (Quantity Sensitive, Quantity Insensitive); we find rules stressing only heavy syllables (Obligatory Branching); strictly excluded, and not found empirically, are rules-- easy to imagine-- that can only stress light syllables. I would like to suggest that rules of de-stressing can be classified in an entirely parallel way: while we quite often find rules destressing light syllables, and rules destressing any syllable as well, we do not appear to find rules destressing heavy syllables only. This relationship is charted in (14):

(14) THERE ARE:

- |  |   |
|--|---|
| a. Rules destressing<br>only light syllables.    | a'. Rules stressing<br>only heavy syllables.    |
| b. Rules destressing<br>any syllable.            | b'. Rules stressing<br>any syllable.            |
| c. NO rules destressing<br>only heavy syllables. | c'. NO rules stressing<br>only light syllables. |

Here we have, if the facts are right, an impressive duality: the first column can be derived from the second (and vice versa) by exchanging the words 'heavy' and 'light', 'stressing' and 'destressing'. I would like to offer the following slogan to summarize the typological finding:

(15) **Observation.** Heavy syllables not only tend to attract stress, they also tend to retain it.

Statement (15) --an empirical hypothesis in the sense "low-level guess about what the facts are"--has a banal ring, but no work familiar to me assumes or explores it. More to the point: it does not follow from any version of metrical theory. Significant results have been achieved in predicting the contexts of distressing (Prince (1983b), and especially Hammond (1984)); but this is not among them.



The strictness of the parallelism in (14) between stressing and destressing suggests that at bottom there is only phenomenon, only one set of principles at play; yet there must be two domains of action. I suggest that the distinction between the rule types lies solely in their relationship to the Free Element Condition: basic stressing rules respect it; destressing rules are stressing rules that do not. There is then no special provision for destressing operations, no "theory of metrical transformations" with its own devices (Hammond (1984)). The proposal can be stated as in (16):

- (16) Hypothesis. Destressing is the reassertion of the basic foot vocabulary in the 'feature-changing' mode; that is, no longer governed by the FEC.

Under (16), only three types of destressing environment can exist: (1) Quantity Insensitive, in which any syllable is reduced adjacent to a stressed syllable; (2) Quantity Sensitive, in which a light syllable is reduced adjacent to a stressed syllable; and (3) Obligatory Branching, in which a light syllable is reduced adjacent to a heavy syllable. (I assume bounded feet; note that unbounded deletions could provide a new style of argument for primitive unboundedness.) Of these, the Quantity Insensitive and Quantity Sensitive varieties are frequently found; examples of the Obligatory Branching type do not readily spring to mind-- perhaps some explanation is owed here. At any rate, it is clear that if hypothesis (16) can be sustained, with the concomitant disappearance of an entire component, the theory will be notably strengthened, and a significant empirical generalization--the persistence of heaviness--will have been given its due.

The present proposal depends on a specialized feature of tree theory: to assign stress, we start out from nothing, from unspecification, and impose both stress (headship of foot) and stresslessness (nonheadship) in one rule. Foot formation is as much an act of unstressing as of stressing, and the process will appear to be one or the other, depending on the circumstances of application. In particular, if it is 'feature-changing' and if the stressing part is vacuous, it will give the appearance, to the unwary, of simple de-stressing. But the mask is easily stripped off.

## 5.2 Some English

English is as rich in destressing as in stressing, and well-studied to boot. Here I offer a brief account of four major destressing rules in order to illustrate how the general theory works out in practice.

I will assume that stress in English is assigned iteratively right-to-left (Lieberman & Prince (1977)), in binary feet of which only the first is Quantity Sensitive (Hayes (1982)); as a consequence, all initial syllables will be provided with a stress (Halle (1973)) on the last iteration. I will also assume that destressing is as in SPE and Kiparsky (1979); I will not be dealing with the important work of Hammond (1984).

All words must receive an initial stress, but only some retain it: the whole pattern will emerge from the discussion. Let us first consider the case where the initial stress is lost to a rule known as Pre-Stress Destressing. Some typical examples are cited in (17):

(17)	<u>Stressless Initial</u>	<u>Stressed Initial</u>
	America	ambiguous
	Monongahela	Montana
	police	poltroon
	Astyanax	October, November

A light initial syllable is destressed when it precedes another stress. We must say: a Quantity Sensitive foot [w s] is installed word-initially, completely overwriting (hence deleting) the unary foot that is the residue of the basic stress rule. Derivation proceeds like this:

(18)	Str	DeStr
	ameri(ca) ---->	[a] [meri] ca ---->
		[[a me] ri] ca

(Parenthesis indicates extrametricality: see Hayes (1982).)

Of course, it is not enough to simply place a certain kind of foot in a certain position: 'PAMEla', for instance, does not become 'paMEla'. (If it were, we could treat this as the first rule of stressing, its output protected by the FEC.) With Prince (1983b) and Hammond (1984), I assume that de-stressing rules are subject to strong general conditions which sharply limit the amount of rule-specific stipulation allowed;

indeed, in the present context, the natural conjecture is that such conditions reduce the rule vocabulary to that of stressing itself: choice of foot and manner of placing it.

Two conditions bear directly on the examples at hand: first, that destressing and shifting rules must apply only to increase eurhythmy, typically to eliminate clash (adjacency) of stresses; second, that main-stress of the relevant domain cannot be affected by such rules. (For detailed justification of these ideas, see Hammond (1984)). The proposed rule of foot-placement-qua-destressing is doubly blocked from applying to 'Pamela', because it cannot affect a main stress and because the word suffers from no dysrhythmy that would be ameliorated by rearranging its prosody. Similarly, a word like 'polypropylene' does not receive an initial, overwriting [w s] foot because it already satisfies the conditions of eurhythmy.

A second rule with SPE origins is "Post-Stress Destressing", importantly generalized in Hayes(1982): it requires the deletion of a stress on a light syllable immediately after another stressed syllable. In present terms, this is just the imposition of a Quantity Sensitive foot [s w], eliminating a clash. Some cases:

(19)	<u>Reduced</u>	<u>Unreduced</u>
a.	elementary	sedentary
b.	directory	accusatory
c.	Tatāmagouchi	Monōngahela
d.	Kilīmanjaro	Embācadero
e.	Winnīpesaukee	Ticōnderoga

Examples (a,b) illustrate that suffixes -ary,-ory lose stress when preceded by a stress. Examples (c,d,e) have relevance in terms of Hayes's analysis of English stress: parsing right-left with binary feet [s w], we derive structures like [ta][tama][gouchi], carrying an extra stress on the 2nd syllable. But it is in just the position to be removed by Post-Stress Destressing. The words in column 2 show that the rule does not affect heavy syllables.

In forms like [ta][tama][gouchi], there is a competition between Pre- and Post-Stress Destressing; that is, between using [s w] or [w s] to resolve the clash. Hayes ensures correct dominance by ordering the Post-Stress rule first. This is regrettably the opposite of the ordering which Kiparsky (1982), improving tacitly on Prince (1974), discovers necessary for a different range of facts. Surely the interaction ought to be adjudicated by principle--

presumably, there is some rhythmic advantage in initial stress, as we know from phrasal patterns-- but the matter must be left open here.

English provides two rules which pose clear problems for the theory. First, Sonorant Destressing (Kiparsky (1979), Hayes (1982)): this rule destresses a syllable closed by a sonorant, as in 'merchandise', 'Arkansas', 'serpentine', when it is both preceded and followed by a stress. Here is a rule that appears to apply only to heavy syllables (of a certain type), grossly contrary to our expectations. But this is an artefact: there is no need to prevent the rule from applying to light syllables, where its effect would be vacuous; and it could apply as well to syllables ending in a long vowel-- relevant examples are few, but 'diplomat', cf. 'diplo:macy', is a good candidate. The real restriction is that it may not apply to syllables closed with a consonant, e.g. stalactite: these, then, are 'heavy' with respect to the rule, which is Quantity Sensitive, all others 'light'. Language-specific variations in the definition of heaviness are well-known, although this particular bifurcation is not a popular one and has been ruled impossible in some theories (Prince (1983), but see Stowell (1979) on Seneca). Even if some distinctions are ultimately found between 'stressability' and 'reducibility', giving somewhat different meaning to 'heaviness' as applied to the domains of stressing and destressing, the present theory retains its essential content.

Then there is Fidelholtz's Law, a.k.a. the 'Arab' Rule, (Ross (1972)), which distinguishes between the final stress in 'Ahab' and the final unstress in 'Arab': a syllable containing a short vowel is destressed when it immediately follows a more prominently stressed light syllable. A final secondary stress on 'pyrex', 'Cantab', etc., is safe, because the initial syllable is heavy; safe on such as 'Hittite' and 'cathode' because of the long vowel; but lost in 'Essex', 'Arab', 'polyp', 'bollix', etc. The difficulty with this rule is that it displays sensitivity to quantity in both target and trigger, w and s. The reducing syllable must be 'light' in the sense that it can't contain a long vowel (not an uncommon definition typologically), the context syllable must be light in the usual sense: open, with a short vowel. The foot imposed might be described as "obligatory non-branching" --both head and nonhead must be light-- a type unsanctioned by the standard theory (but see McCarthy (1979a)); with the additional fillip that the meaning of 'light' depends on foot-position. In short, Fidelholtz's Law does not fall cleanly to

direct assault by the forces marshalled here. However, it has never been treated in any but the loosest of prosodic theories, which I take as a kind of consolation *ex silentio*. It is not impossible that further understanding of the nature of constraints on foot-types (perhaps along the lines of Hayes (1985)) will illuminate the process.

It is striking that every one of the reduction rules is sensitive to syllabic quantity, in one form or another. In Hayes (1982), the English stress rule starts off Quantity Sensitive at the edge and then iterates without regard to quantity. The respite from quantitative considerations is brief. The present theory gives a very direct account of many aspects of the destressing system; it also identifies some problems worthy of serious resolution.

### 5.3 Some Hebrew

The phonology of Biblical Hebrew provides an example of a single stress rule that applies in both feature-filling (FEC governed) and feature-changing modes. In the necessarily concise presentation that follows, I will be building on the general results of Prince (1975); readers seeking detail should consult that work.

Biblical Hebrew distinguishes two forms for many words: the 'pausal' form, which appears at the end of the intonational phrase, and the 'contextual' form, which appears elsewhere. For the most part, the differences between the forms are predictable and seem to stem from the pausal form's bearing phrasal main stress.

In the matter of main word stress, the pausal forms give a transparent indication of the fundamental rule: primary stress falls on the last syllable if it is closed by a consonant; vowel-final words have penultimate stress. The following chart lists some typical examples:

(20)

<u>Underlying</u>	<u>Pausal</u>	<u>Context</u>	<u>Gloss</u>
a. /katab +uu/	kaata <sup>ˈ</sup> abuu	kaatbu <sup>ˈ</sup> u	they wrote
b. /katab +tem/	ketabt <sup>ˈ</sup> em	-same-	you (m.pl.) wrote
c. /qum +uu/	qu <sup>ˈ</sup> umuu	-same-	they arose
d. /kookab+iim/	kooka <sup>ˈ</sup> ab <sup>ˈ</sup> iim	-same-	stars
e. /malak+ay+hem/	malkeeh <sup>ˈ</sup> em	-same-	their(m.pl.) kings
f. /dabar+e+ka/	daba <sup>ˈ</sup> are <sup>ˈ</sup> kaa	daba <sup>ˈ</sup> ark <sup>ˈ</sup> aa	your(m.s.)word

(Word-stress is bolded; long vowels are written double; spirantization of stops /p t k b d g/, which takes place following all vowels, underlying or inserted, is not marked.)

The contextual stress pattern differs from the pausal in only respect: when the pausal form has penultimate stress falling on a syllable that is underlyingly light, as in (20a,f), the context form has final stress. Stress, then, shifts rightward off a light syllable.

A variety of lengthenings regularly apply. Vowels lengthen finally (20f) and under word stress (20a). More strikingly, vowels lengthen in open syllables that immediately precede the locus of pausal main stress: such vowels have been underlined in (20). Notice that these vowels lengthen in both pausal and contextual forms, whether or not the environmental condition is satisfied in the context form: whence the lengthening in kaatbúu, from /katab+uu/, even though the syllable is surface-closed, and even though the lengthening vowel and the surface-stressed syllable are not adjacent at the relevant point of derivation. This fact shows unequivocally that every word receives the 'pausal' stress pattern-- yielding katabuu -- on the basis of which Pre-Tonic Lengthening, as it's known, can be computed-- giving kaatábuu. Phrasal placement of the word then determines whether stress shifts (context) or stays put (pausal).

Equally significant is the reduction of light syllables. In open syllables, short vowels reduce to schwa; many ultimately delete. Thus /dAbarEka/ => d-baarékaa (pause), d-baar-káa (context). The last form illustrates a singular fact: any vowel that occasions stress shift is also one that reduces. This suggests an explanation for the peculiar restriction that stress may only shift from light syllables: shift is not an independent rule of Hebrew grammar at all, but rather a concomitant of the more general reduction process.

Following Prince (1975) and McCarthy (1979b), I propose that the reduction pattern emerges from the imposition of an alternating stress pattern on the word. Quantity Sensitive feet [w s] are iterated from right to left. (Reduction and deletion of vocalic material takes place in w-syllables, but quite late.) These moves seem ordinary enough. The twist is that foot-formation follows on the prior and entirely distinct rule that lays the groundwork for main stress. We can think of this rule as attaching a unary foot finally, subject to extrametricality of the final vowel. Derivation proceeds as in (21):

(21)

Lexical:	/dabar+eka/	/malak+ay+hem/
M.Str.	daba(ré)(ka)	malakay(hem)
Alt.Str.	[dabá](ré)ka	[má][lakáy](hém)
PTL	[dabáa](ré)ka	
Other	[dabáa](réka)	[má][lakée](hém)

The Free Element Condition plays a crucial role, governing the interaction of the two processes of primary metrification, the Main Stress Rule and the Alternating Stress Rule. Once Main Stress has applied, its product cannot be overwritten; Alternating Stress must therefore begin its right-left sweep not at the absolute end of the word, but at the rightmost unmetrified point. This is exactly the pre-tonic syllable, which is now protected from reduction. The rule traditionally called Pre-Tonic Lengthening (PTL) is now understood to apply in the environment of stress-clash: it mitigates a dysrhythm by lengthening the distance between adjacent stresses. (For an almost identical rule in Cayuga, see Prince (1983a) and especially Benger (1984).)

So far the derivation is entirely concerned with lexical matters; but the notions 'pausal' and 'contextual' are defined phrasally. I propose that the rule of Alternating Stress also operates in the (rather extensive) phrasal component of Hebrew phonology, persisting from level to level in the manner made familiar by Lexical-Phonological theory. At the phrasal level, words are completely metrified, so the FEC is called off and the Alternating Stress rule applies in a feature-changing fashion. In contextual forms, when the penult is light, the resurgence of Alternating Stress may overwrite the output of the "Main Stress" rule entirely, shifting stress and setting up a vowel for later reduction. The derivation (21), column 1, would continue as in (22):

(22)

Lex.Out.	[dabáa](réka)
Alt.Str.	[dabáa][réka]
Other	[dəbáa][rkáa]

Before "pause", the lexical main stress may not be obliterated, presumably because it is also the phrasal main stress; this recalls the condition, noted above, that reduction and shift rules may not affect the main stress of the domain of their application.

Many complexities remain to be discussed. Recent work such as McCarthy (1981), Drescher (1983), and Rappaport (1984) offers much that is relevant. The fundamental generalizations seem quite secure, however, and the exposition here has aimed to deal directly with them.

Identifying the shift process with the independent rule of Alternating Stress explains its major properties: (1) that stress shifts from light syllables only; (2) that it shifts rightward. The Free Element Condition forces the rule to respect structure placed by the Main Stress rule, starting its RL iteration with the pre-tonic (penultimate, sometimes antepenultimate) syllable. This establishes a natural environment for Pre-Tonic Lengthening. Phrasally, free of the FEC, Alternating Stress overwrites any structure in its domain, giving rise to the observed shift.

## 6. Conclusion

A look at the logic of an explicit parametrization of metrical tree theory has shown that significant improvements can be made, essentially by trimming the fat. Unboundedness need not be a primitive of the theory, because its functions are already shared out among various independent parameters and processes. The Free Element Condition, implicit till now, must govern primary metrical analysis (including, I believe, rules of extrametricality); destressing can be understood, with notable empirical gain, as a reassertion of the basic foot vocabulary in the feature-changing mode.

## References

- Benger, J. (1984) The Metrical Phonology of Cayuga, M.A. Thesis, University of Toronto, Toronto.
- Chomsky, N. & M. Halle, (1968) The Sound Pattern of English, Harper and Row, New York.
- Drescher, B.E. (1981) "Accentuation and Metrical Structure in Tiberian Hebrew," in H. Borer and Y. Aoun, eds., MITWPL 3, 180-208.
- Drescher, B.E. (1983) "Post-Lexical Phonology in Tiberian Hebrew," WCCFL 2.
- Leben (1982) "Metrical or Autosegmental?" in H. van der Hulst & N. Smith, eds., The Structure of Phonological Representations, 177-190, Foris, Dordrecht.
- Liberman, M. & A. Prince (1977) "On Stress and Linguistic Rhythm," Linguistic Inquiry 8.2, 249-336.
- Halle, M. (1973) "Stress Rules in English: a New Version," Linguistic Inquiry 4.4, 451-464.

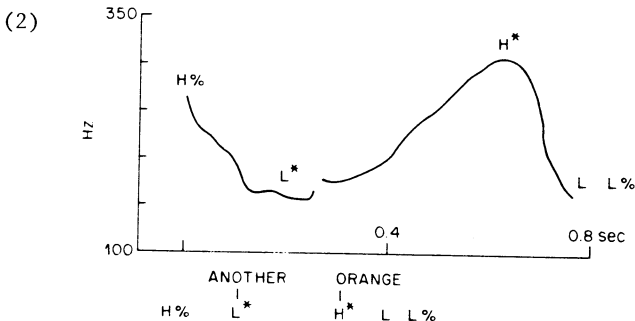
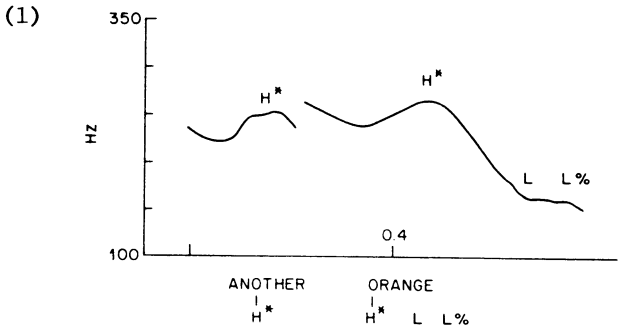


- Halle, M. & J.-R. Vergnaud (1978) "Metrical Structures in Phonology," unpublished ms., MIT, Cambridge.
- Hammond, M. (1984) Constraining Metrical Theory: A Modular Theory of Rhythm and Destressing, IULC, Bloomington, Indiana.
- Hayes, B. (1981) A Metrical Theory of Stress Rules, IULC, Bloomington, Indiana.
- Hayes, B. (1982) "Extrametricality and English Stress," Linguistic Inquiry 13.2, 227-276.
- Hayes, B. (1984) "The Phonology of Rhythm in English," Linguistic Inquiry 14.1, 33-74.
- Hayes (1985) "Iambic and Trochaic Rhythm in Stress Rules," BLS 11, Berkeley, California.
- Kenstowicz, M. (1983) "Parametric Variation in Accent Assignment," in J. Richardson, M. Marks, A. Chukerman, eds. CLS 19, U. of Chicago, Chicago.
- Kiparsky, P. (1979) "Metrical Structure Assignment is Cyclic!" Linguistic Inquiry 10.3, 421-441.
- Kiparsky, P. (1982) "From Cyclic Phonology to Lexical Phonology," in H. van der Hulst & N. Smith, eds., The Structure of Phonological Representations, 131-175, Foris, Dordrecht.
- McCarthy, J. (1979a) "On Stress and Syllabification," Linguistic Inquiry 10.3, 443-466.
- McCarthy, J. (1979b) Formal Problems in Semitic Phonology and Morphology, IULC, Bloomington, Indiana.
- McCarthy, J. (1981) "Stress, Pre-Tonic Lengthening, and Syllabification in Tiberian Hebrew," in H. Borer and Y. Aoun, eds., MITWPL 3, 73-100.
- McCarthy, J. & A. Prince (1985) "Dissecting the Skeleton", WCCFL 4, Los Angeles.
- Prince, A. (1974) "An Argument for the Cycle," ms., MIT, Cambridge.
- Prince, A. (1976) "'Applying' Stress," ms., U.Mass., Amherst.
- Prince, A. (1983a) "Relating to the Grid," Linguistic Inquiry 14.1, 19-100.
- Prince, A. (1983b) "Hierarchy without Constituency in Stress Theory," talk given at U.Mass. Conference on Prosodic Theory, Amherst.
- Rappaport, M. (1984) Issues in the Phonology of Tiberian Hebrew, Doctoral Dissertation, MIT, Cambridge.
- Ross, J.R. (1972) "A Reanalysis of English Word Stress," in M. Brame, ed., Contributions to Generative Phonology, University of Texas Press, Austin & London.
- Selkirk, E.O. (1980) "The Role of Prosodic Categories in English Word Stress," Linguistic Inquiry 11.3, 563-605.
- Steriade, D. (1982) Greek Prosodies and the Nature of Syllabification, Doctoral dissertation, MIT.
- Stowell, T. (1979) "Stress Systems of the World, Unite!" in K. Safir, ed., MITWPL 1, 51-76, Cambridge.

Intonation, Stress and Meaning  
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1.0 This is a paper about sentence prosody in English: about the intonation of a sentence and its rhythmic stress pattern and about the relation between these two, and about the ties of sentence prosody to semantics and pragmatics. It sketches a development of the theory laid out in Selkirk (1984) according to which the representation of intonation forms part of surface structure, and mediates between stress on the one hand and meaning on the other.

In speaking of intonation, I am drawing in particular on the work of Pierrehumbert (1980) and more recent work of Pierrehumbert and Liberman (1984), who have made great strides towards characterizing possible intonation contours of English. Consider the pictures in (1) and (2), from Pierrehumbert (1980).



$F_0$  contours like these we will take to be the phonetic transcription of the intonational contour. The theory of Pierrehumbert and Liberman includes both a phonological analysis of these contours and an explicit theory of phonetic implementation of this phonological representation by rules which give as their output the  $F_0$  contour. Pierrehumbert

assumes with others that a sentence, or utterance, may be partitioned into one or more intonational phrases, and that each intonational phrase has a characteristic intonational contour. For Pierrehumbert the phonological representation of each intonational contour consists of a sequence of tonal entities of various formally distinct sorts, shown in (3): an initial (optional) boundary tone, a sequence of one or more pitch accents, a phrase accent and a final boundary tone.

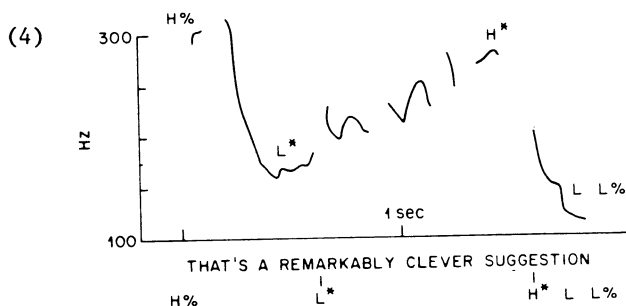
(3) Intonational contour (Pierrehumbert 1980):

(boundary tone)	pitch accent(s)	phrase accent	boundary tone
%T	$\left\{ \begin{array}{l} T^* \\ T_i^* + T_j \\ T_i + T_j^* \end{array} \right\}$	T	T%
(T = H, L)			

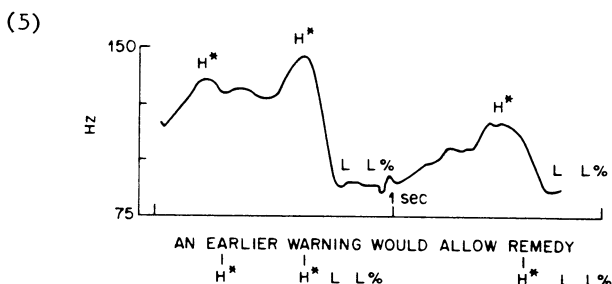
We can illustrate this with the contours in (1) and (2). The first, a typical declarative contour, consists of a sequence of H\* pitch accents, a L phrase accent and a L% boundary tone. The H\* pitch accents are on another and orange. Pitch accents are in general located on, i.e. (autosegmentally) associated with, the main stressed syllables of the words they are assigned to. As for the boundary tones of Pierrehumbert's theory, they are always associated with the first or last syllable of the intonational phrase. Here, there is a final L%. It, together with the preceding L phrase accent is responsible for the fact that in this sentence, there is a drop to the bottom of the speaker's pitch range. And, finally, in Pierrehumbert's theory the phrase accent has no particular association; it simply "floats" between the final boundary tone and the last pitch accent. In (1b) we have a quasi-phonological representation with association lines drawn in.

Look next at the intonational contour in (2). There is the same choice of phrase accent and boundary tone. There is also the same number of pitch accents, with the same location in the sentence. But there is a different choice of pitch accents on the first word--this time it is a L\*. And in addition there is an initial boundary tone H%. Presumably there are corresponding differences in the meaning of the sentence.

Finally, compare (4), which has the same tonal contour as (2), but a different text. In this sentence only two of the words bear pitch accents.



I'm going to use the term pitch accent assignment for the representation of which words in the sentence bear a pitch accent (regardless of the tonal composition of the pitch accents). We could write this pitch accent assignment with capital letters, and will do so below. From the point of view of pitch accent assignment, then, the phrases in (1) and (2) are identical. This talk concerns only this aspect of the intonational structure of the sentence. We'll be looking at the relevance of pitch accent assignment for the phonological and semantic interpretation of the sentence. Other aspects of the intonational structure, including the choice of tones (what differentiates (1) from (2)) and phrasing (such as we see, for example, in (5)) will not be treated here.



It is an old idea that the constituents of a sentence are in effect marked by sentence prosody with respect to their status in a discourse. Let us consider the particular case of noun phrases. Suppose that it were true that the presence or absence of an intonational pitch accent on an NP were systematically correlated with discourse-related properties of the NP, for example, with whether the NP were a new or old referent in the discourse. This being so one might be tempted to view pitch accents as morphemes, quite comparable in kind to morphemes indicating (in)definiteness, for example. On this view, pitch accents would be elements of a surface syntactic structure, freely assigned there, and submitted to a semantic/pragmatic interpretation on the one hand and a phonological interpretation on the other.

Now suppose furthermore that it were true that the presence of a pitch accent on a syllable determined the presence of a phrasal rhythmic stress prominence, and not vice versa. (Note that this is easy to grasp conceptually if pitch accents are elements of a surface structure).

In this talk I want to give some reasons for believing these two propositions about the semantic and phonological interpretation of pitch accents to be true. If they are true, then sentence stress patterns (involving NP's, and presumably other constituents as well) would be largely a reflection of the status of the sentence and its parts in a discourse. The pitch accents will have been freely assigned to words in the sentence, and the sentence interpreted for its consequence appropriateness in discourse. And the pitch accents would determine the location of local rhythmic prominences. So the place for syntax-dependent stress rules in the sentence, like the

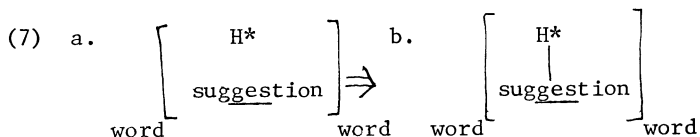
Nuclear Stress Rule (and perhaps even the Compound Rule), would be relatively small in prose spoken or read in normal discourse circumstances.

2.0 My basic proposal, then, is that English pitch accents are affixes, freely assigned to constituents of size word, or smaller, in surface structure.<sup>1</sup> And now I want to show three things. First, that the consequent relation (of autosegmental association) between a pitch accent and the main stress of a word can be seen as one of the perfectly banal sort already known in phonology. Second, that a straightforward treatment of the semantics and pragmatics of pitch accenting is at least possible. Third, that a quite elegant account of the pitch accent/phrase stress relation is permitted. Due to the limitations of time, I will not be able to contrast this "pitch accent first" theory with other theories of the pitch accent/phrase stress relation in the generative tradition, but simply point out here that seeing intonation as prior represents a radical departure from the line pursued by Chomsky 1971, Jackendoff 1972, Liberman 1975, and Pierrehumbert 1980, though it is a line that was in fact suggested to me originally in a remark by Pierrehumbert.

2.1 Let us first consider the word stress/pitch accent relation. There is a well known generalization, expressed in (6):

(6) A pitch accent is realized on the main stress of a word.<sup>2</sup>

This generalization is illustrated in (1), (2), (4) and (5) where the pitch accent (the "starred" tone) is associated with the main stress of another, orange, remarkably, suggestion and so on. The task at hand is simply to give an account of how a representation like (7a), which is the output of the assignment of a H\* pitch accent to a word by the morphology, is converted to (7b) where the accent is associated to the main stress of suggestion. Note that in (7a) we simply have a simultaneous representation of the floating tonal morpheme, the H\*, and the segmental material corresponding to the complex form suggestion both within the domain of a word.<sup>3</sup>



The mapping of (7a) into (7b) is a trivial matter. Whatever device guarantees the association of starred tone to text in normal pitch accent languages is available here for English. In Swedish, for example, the pitch accents found on every word are tropic to the main stress of the word (Bruce 1977). The only difference between English and Swedish in this connection is that in Swedish every word has a pitch accent, and so the presence of pitch accent can have no distinctive semantic interpretation, while in English the presence or absence of pitch accent is a free choice, and therefore interpretable. But as far as the alignment of pitch accent with the main stress in the word goes, English works like any pitch accent language. (This

indeed was more or less Goldsmith's (1977) point in his early article on an autosegmental approach to English intonation.)<sup>4</sup> Which is to say that, given our hypothesis that in English pitch accents are ("floating") morphemes assigned to words, nothing additional or English-particular needs to be said about the generalization expressed in (6).

2.2 Not all words bear pitch accent in English, and a task on which I am currently embarked is to figure out what the presence or absence of pitch accent means. I am adopting the general point of view shared certainly in the British tradition (cf. Halliday 1967, Allerton 1978) and in the American in particular by Bolinger that the presence or absence of pitch accents is crucial in characterizing the appropriateness of a sentence in a particular discourse.

For the present, I want to artificially confine the problem to the interpretation of the presence or absence of pitch accents on noun phrases. I think this will illustrate the general point that I wish to make, which is that

- (8) Each constituent of the sentence is evaluated individually for its status with respect to the discourse on the basis of the presence or absence of pitch accent(s).

This is another way of saying that

- (9) There are no phonological principles (syntax-based or otherwise) which govern the distribution of pitch accents in the sentence, and in particular there is no such thing as "deaccenting."<sup>5</sup>

The first aspect of the meaning of accent with respect to noun phrases may be illustrated by the two sentences (11a) and (11b), both of which are possible responses to the question in (10).

- (10) What did she do?

- (11) a. She {rejected, REJECTED} their SOLUTION  
b. She REJECTED their solution

In (11a) SOLUTION is pitch accented and this coincides with a possible interpretation of SOLUTION as a new referent in the discourse, whereas in (11b) the absence of pitch accent on solution requires us to presuppose that their solution, or solutions in general, already form part of the stock of entities at issue in the current discourse. Please ignore the pitch accents on the verb, which will not be discussed at the moment. Plenty of similar examples involving NP's have been discussed in the literature often under the rubric of "deaccenting", a misleading term. Consider for instance the examples in (12) from Ladd (1980), similar examples in (13) observed by myself, and the examples in (14) from Allerton (1978).

In each of these instances, the lack of a pitch accent on the underlined noun phrase (often accompanied by the presence of a so-called "default" pitch accent on a nearby constituent) is required if the NP is to be interpreted, as intended, as coreferent to, or as second mention of, an NP earlier mentioned.

- (12) a. A bill was sent to Congress today by President Carter which would require peanut butter sandwiches to be served at all government functions. At a press conference today, a group of Senators led by Republican Barry Goldwater of Arizona DENOUNCED the measure (\*denounced the MEASURE<sup>6</sup>).
- b. I can't imagine what it would be like to be a dentist but I'm awfully glad there are guys who want to BE dentists (\*be DENTISTS).
- (13) a. For them, it is WITH metrical trees that patterns of prominence must be represented.
- b. Some expressed concern that the President wouldn't be able to get a budget resolution THROUGH Congress.
- c. I didn't even know it was BY Beethoven.
- (14) a. Why don't you sit on our settee?  
By the way, where did you BUY the sofa? (\*buy the SOFA)
- b. John's bought some new shelves for his books. The books are very valuable of course. He bought some himself, but he was given a lot by his uncle. Anyway, I don't think MUCH of the shelves. (\*much of the SHELVES)

Note that in all these cases, the NP lacking an accent follows the last (nuclear) pitch accent in the sentence. In such circumstances, the lack of accent is especially easy to hear. But earlier in the sentence, i.e. preceding the nucleus, the presence or absence of pitch accent appears to have exactly the same function. So, for example, the sentences (15) have systematically different possibilities for appropriateness in discourse depending on the old/new status of the NPs.

- (15) a. THEN JANE sent her MANUSCRIPT to the PUBLISHER
- b. THEN Jane sent her MANUSCRIPT to the PUBLISHER
- c. THEN Jane sent her manuscript to the PUBLISHER

The important thing here is that the presence or absence of the pitch accent on each NP is assessed in the interpretation of the sentence.<sup>7</sup> In that sense, pitch accent is functioning somewhat like indefinite or definite morphemes. The examples discussed appear to support the following generalizations about the meaning of pitch accent:

- (16) The absence of a pitch accent on an NP indicates it is an old referent in the discourse.

- (17) The presence of a pitch accent on an NP may indicate its status as a new referent.

(I am using the term referent in the Heim (1982) and Kamp (1981) sense of discourse referent.)

The examples examined so far have only centered around the new/given status of an NP, as marked by pitch accents. But, as is well known, there is more to the meaning of pitch accents. There are at least two additional generalizations. The first goes, roughly speaking, back to Jackendoff (1972):

- (18) A pitch accent on an NP may indicate the NP is a FOCUS in a FOCUS-"Presupposition" structure (even if the NP is "old").  
e.g. Jane sent her manuscript to the PUBLISHER (not to the BOOK REVIEW EDITOR)

The second generalization I advance tentatively on the basis of work of Bardovi-Harlig (1983a,b) and others:

- (19) A pitch accent on an NP may indicate that it is a TOPIC in a TOPIC-comment structure (even if the NP is "old").  
e.g. What do you think of our new teacher?  
Oh, MR. JONES is all RIGHT.  
Oh, MR. JONES we LIKE.

(I'm assuming that the TOPIC occupies sentence-initial position.)

Together generalizations (17-19) might be thought of as falling together under the broader generalization (20).

- (20) The presence of a pitch accent on an NP implies a change in the status of that NP (i.e. its corresponding "referent") in a representation of discourse.

While (16) amounts simply to saying that

- (21) The absence of a pitch accent on an NP implies no change in the discourse status of that NP.

We can give straightforward expression to these semantic-pragmatic generalizations within the standard T-model of grammar of Chomsky and Lasnik (1977) if pitch accents are affixes in S-structure.

The basic empirical claim, then, is that the distribution of pitch accents in surface structure is "free", subject to appropriateness with respect to semantics/pragmatics, and that there are no phonological principles determining which word will bear a pitch accent.

2.3 Let us turn now to the question of the relation between phrasal rhythmic structure (phrase stress) and pitch accents. There is a first generalization about this relation which is assumed in the work of Liberman, Pierrehumbert and myself, for example:



(22) Pitch Accent Rule

A pitch accented syllable is rhythmically more prominent  
(= has more "stress") than any non-pitch accented syllable.

I will assume that (22) reflects the operation of a rule in the grammar which I will call the Pitch Accent Rule. This amounts to claiming that whatever properties there are that reflect rhythmic stress prominence--be they durational or otherwise--will be possessed in a greater degree by pitch accented syllables than by any non-pitch accented syllable. Suppose we represent phrase stress with a rather skeletal metrical grid, the lowest level of which here corresponds to main word stress.<sup>8</sup> Stated in grid terms, what (22) says is that the sentences in (23a) and (24a) will have, minimally, the stress patterns in (23b) and (24b). (Function words are assumed to have no word stress.)

(23) a. an EARLIER warning would ALLOW remedy

b.         $\frac{x}{x}$             x                     $\frac{x}{x}$             x

(24) a. an earlier WARNING would allow REMEDY

b.        x             $\frac{x}{x}$                     x             $\frac{x}{x}$

It is a simple fact that there exists a contrast in rhythmic structure here corresponding to the contrast in placement of pitch accents.

But is this all there is to say about phrase stress? Is it purely and solely determined by the pitch accent assignment of a sentence? Is there no place for the Nuclear Stress Rule and its assignment of prominence on the right? Clearly the Nuclear Stress Rule, if it exists, is not determining the location of rhythmic prominence in the phrases EARLIER warning and ALLOW remedy in (23), where the main stress is on the left. And in (24) it just happens that the principle that a pitch accented syllable has greater stress gives a rightmost prominence, making it look like the NSR has applied. What the generalization in (22) implies is that the principle guaranteeing greater rhythmic prominence for pitch accented syllables will take precedence over the NSR, if there is one.

Well, is there a Nuclear Stress Rule at play in English? A number of facts suggest that the answer is yes. First of all, note that there appear to be differences in rhythmic prominence among pitch accented words. In both (23) and (24), it seems to be that the rightmost pitch accent is the most prominent. This can be represented as in (25).

(25)        .....  $\frac{x}{x}$     x             $\frac{x}{x}$     .....

In general the following seems to be true:

(26) The syllable bearing the rightmost pitch accent in a sentence is the most rhythmically prominent syllable in the sentence.

As such, this is a latter day reconstruction of Newman's nuclear stress rule, here adjudicating among the entire sequence of accents in the sentence.

Is this all there is to be said about a tendency towards rightmost stress in the sentence? Recall that the Chomsky-Halle Nuclear Stress Rule claimed that within any smaller phrasal constituent, the rightmost constituent bore the greatest prominence. In view of the generalization in (22), one must look for evidence in support of the NSR in phrases, ones in which either both sisters are accented or neither are accented (otherwise the one with the pitch accent would take precedence). Relevant cases are those in (27), where the NSR would establish patterns of prominence amongst all-pitch accented entities and those in (28), where it would establish prominence relations amongst the underlined unaccented entities.

(27) an EARLIER WARNING would ALLOW REMEDY

x                     $\begin{smallmatrix} \times \\ \times \end{smallmatrix}$                     x                     $\begin{smallmatrix} \times \\ \times \\ \times \end{smallmatrix}$

(28) a. an earlier warning would ALLOW remedy

x                     $\begin{smallmatrix} \times \\ \times \end{smallmatrix}$                      $\begin{smallmatrix} \times \\ \times \\ \times \end{smallmatrix}$                     x

b. an earlier WARNING would allow remedy

x                     $\begin{smallmatrix} \times \\ \times \\ \times \end{smallmatrix}$                     x                     $\begin{smallmatrix} \times \\ \times \end{smallmatrix}$

Suppose speakers do indeed perceive that the righthand element in the underlying sequences above is more prominent than its left sister. Typically this sort of intuition would be seen as providing evidence for the operation of the NSR.<sup>9</sup>

In what follows, I will assume the existence of righthand greater prominence in cases like (27) and (28). I want to do this simply to show how the NSR, if there is one, interacts with the Pitch Accent Rule (PAR), which is responsible for guaranteeing the greater prominence of any pitch-accented syllable over any non pitch-accented syllable. As I said above, the PAR does override the application of the NSR in many circumstances, yet there are others where the two rules can collaborate in deriving a sentential stress pattern. What I hope will be clear is that the assumption that pitch accents are in surface structure, accompanied by the assumption that these two rules, the NSR and the PAR, give the "rhythmic interpretation" of the sentence, allow us to account for all the generalizations typically claimed to be true above the intonation-stress relation in the sentence.

We must begin by formulating the NSR in metrical grid terms:

(29) Nuclear Stress Rule

$\alpha[\dots\beta[\dots x_i \dots]\beta]_{\alpha} \Rightarrow \alpha[\dots\beta[\dots \overset{\cdot}{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{\underset{\cdot}{x_j}}}{x_i}} \dots]_{\beta}]_{\alpha}$

where  $\alpha$  is a Phrase or S

Conditions: (a)  $x_i$  is first and last on its level

(b)  $x_j$  is on metrical level three or higher

Operating on a cyclic domain  $\alpha$  (a Phrase or S), it picks out the beat  $x_i$  in the rightmost immediate constituent  $\beta$  that is (i) most prominent within  $\beta$  (only a most prominent beat could be alone on its own metrical level in  $\beta$ ) and (ii) on at least the third metrical (word) level, and it adds positions to the grid in alignment with  $x_i$ , of which  $x_i$  is the topmost. (A general condition ensures that the highest grid position introduced will be greater than any other in the domain  $\alpha$ , and that such a position will be only minimally greater than the others, cf. Selkirk 1984.)

To illustrate how the NSR functions together with the Pitch Accent Rule, let us do one derivation of a phrase stress pattern; the one in (30).

(30)  $\begin{array}{ccccc} & & H^* & & H^* \\ & & | & & | \\ [[\text{Sophie's friend}] & [\text{had}] & [\text{studied}] & [\text{modal logic}]] \end{array}$

word stress	x	x	x	x	x
NP cycle	x	$x_{\text{par}}$		x	$x_{\text{nsr}}$
VP cycle:			$x_{\text{par}}$ $x_{\text{par}}$ $x_{\text{par}}$	x	x
S cycle:	x	$x_{\text{par}}$ $x_{\text{par}}$ $x_{\text{par}}$	$x_{\text{nsr}}$ $x_{\text{nsr}}$ $x_{\text{nsr}}$	x	$x_{\text{nsr}}$

The pattern is derived cyclically (for arguments in favor of the sentential cycle, see Selkirk (1984)), and in many respects is reminiscent of a standard, SPE, derivation. Words (excluding function words) come into the sentence with word stress. On the two noun phrases, rightward prominence is produced, but for different reasons in each case. Friend is pitch-accented, and so receives greater prominence by the PAR, while logic is more prominent simply because rightmost, through the NSR. The grid positions assigned are sub-scripted with the initials of the rule that is the source. On the VP cycle, the PAR gives a lefthand prominence on the pitch-accented verb, here in effect overriding the potential effect of the NSR. And, finally, on the S cycle, the NSR will assign greatest prominence to the verb, which here bears the greatest prominence contained within the VP (cf. the formulation in (29)). (As for the PAR, it has a role, too, this time ensuring greater prominence of the pitch-accented friend over the non-pitch-accented logic.) Note that it is,

crucially, a combination, or collaboration, of the NSR and the PAR which gives greatest rhythmic prominence in the sentence to the non-final element studied. The PAR elevates both studied and friend to higher prominence, and the NSR picks the rightmost among them for greater prominence.

In a straightforward way, then, the pitch accent-first theory with the collaboration of these two rules gives automatically the result that "the last pitch accent is most prominent (bears the "nuclear stress"), or, put another way, that "there is no pitch accent after the nucleus", generalization (26). (In Pierrehumbert (1980), where a stress-first theory was assumed, and the pitch accents were mapped onto the sentence in function of the phrase stress pattern independently derived, this generalization had to be stipulated.)

To sum up, the theory laid out in this paper, according to which intonational structure (tonal contour, phrasing and pitch accent assignment) is part of surface structure and then interpreted in both the semantic and the phonological dimensions achieves a certain success. It holds promise of an approach to the semantics of intonation which makes the discourse-related issues tractable in rather conventional terms. And in the area of phonology, the intonation-stress relation is given an absolutely bland, but simple and completely accurate treatment with a bare minimum of machinery. It seems that by giving intonation a central place in the grammar, solutions of a surprising conceptual simplicity can be found to a variety of puzzles and problems which resisted analysis when intonation was thought of as somehow belonging simply to the phonology of a sentence.

#### FOOTNOTES

<sup>1</sup>Pitch accents are here being treated as any other morpheme. They have their own "syntax", which is a specification of the sort of syntactic object they "attach" to. The claim that they are assigned to constituents of size word (or smaller) and not to larger, phrasal constituents, is supported by facts concerning their (auto-segmental) association to particular syllables: on domains within the word, pitch accents associate to the most prominent syllable within the domain, where prominence is determined by the regular rules of word stress, whereas on the sentence (in phrases) it is (prior) placement of pitch accents that determines stress pattern, and not vice versa, cf. below.

<sup>2</sup>Unless, of course, subparts of a word are themselves being contrasted, as in DIvest vs. INvest. Here the pitch accents are assigned to the individual syllables/prefixes, and associated to the principal (and only) prominence within that domain. The only possible interpretation here is of a mini-Focus/"Presupposition" structure, the foci DI- and IN- being set against the "presupposition" x-vest.

<sup>3</sup>This sort of simultaneous representation of morphemes within some same domain is familiar from McCarthy's (1979, 1981) work on Semitic, as well as from African tonology, cf. Goldsmith (1976).

<sup>4</sup>In Goldsmithian terms, one would say for English and Swedish that a "star", \*, is assigned to the main stressed syllable in the domain. Then the association of the tone bearing the \* to the syllable in the text bearing the \* proceeds by convention. In Japanese, another pitch accent language, the location of the "star" in the text has nothing to do with stress. It is only partially determined by rule, and in nouns, for example, it must form part of the lexical representation (Haraguchi (1977)).

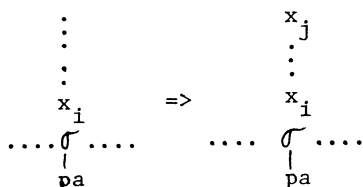
<sup>5</sup>The notion "deaccenting" implies that "normal stress" principles like the Nuclear Stress rule will always govern stress relations, at some (presumably early) point in the phonological derivation, and that, subsequent to the operation of the NSR, its effects may be undone, by "deaccenting", where discourse-related conditions seem to require this. Ladd 1980 subscribes to such a view. The model of grammar implied by such a view is one where, in effect, discourse conditions form part of the "structural description" of a phonological process like deaccenting; it is one therefore which recognizes no sentence grammar as distinct from "discourse grammar". I believe this line of thinking is not particularly revealing.

<sup>6</sup>To be precise, denounced the MEASURE is ungrammatical in this context, unless of course the MEASURE is "contrastively stressed". A similar remark obtains for other examples below.

<sup>7</sup>The point needs to be emphasized, lest it be thought that the pitch accenting of an NP is, instead, predictable from some other property of the sentence, e.g. the newness/oldness of a higher constituent containing it. The sentences in (15), for example, are all appropriate where the VP complex send x to y, x = manuscript, y = publisher is new in the discourse. The accenting of the NPs correlates with the oldness/newness of the NPs themselves. This is independent of the way in which the accenting of NPs may, in effect, license the interpretation of the higher constituent as old or new (via the Focus Rules, see Selkirk 1984, Chapter 5).

<sup>8</sup>For arguments in favor of the metrical grid as the representation of stress, see Liberman 1975, Prince 1983, Selkirk 1984.

In Selkirk 1984, the Pitch Accent Rule was stated in grid terms as follows (p. 276):



Conditions:  $x_j$  is on a metrical grid level  $\underline{n}$ , where

- (i)  $\underline{n}$  is (minimally) greater than the level of any other beat not aligned with a pitch accent
- (ii)  $\underline{n} > 4$

<sup>9</sup>It does seem, though, that greater care should be taken with such intuitions. Couldn't they be attributable instead to a) the fact that at the end of a phrase there is a rhythmic hiatus (evidenced in final lengthening and/or pausing, cf. works of Lehiste, Cooper, Klatt among others, and Selkirk 1984 Chapter (6) and b) the possibility that the pitch accent heard as more prominent is simply the one which precedes such a hiatus? To establish hypothesis (b) would require experimental investigation concerning the perception of prominence. The alternative NSR hypothesis would have it that some prominence effect independent of the phrase-final rhythmic hiatus is introduced and presumably realized in connection with the righthand prominent element in the domain. The analysis of actual production data in terms of (i) the derivational patterning around the putative NSR mainstressed syllable in the domain; (ii) degree of  $F_0$  obstruction (modulo declination, etc.) of that syllable and (iii) its intensity should presumably bring relevant evidence to bear.

#### BIBLIOGRAPHY

- Allerton, K.H. (1978) The notion of givenness and its relation to presuppositions and to theme. Lingua 44, 133-168.
- Bardovi-Harlig, K. (1983a) A Pragmatic Approach to English Intonation. Unpublished Ph.D. dissertation, University of Chicago.
- Bardovi-Harlig, K. (1983b) On the claim that topics are not stressed. Papers from the Parasession on the Interplay of Phonology, Morphology, and Syntax, Chicago Linguistic Society.
- Bolinger, D. (1965 ) Forms of English: Accent, Morpheme, Order. Cambridge, Mass.: Harvard University Press.
- Bolinger, D. (1972 ) Accent is predictable (if you're a mind reader). Language 48, 633-644.
- Bruce, G. (1977) Swedish Word Accents in Sentence Perspective. Gleerup: Lund.
- Chomsky, N. (1971) Deep structure, surface structure and semantic interpretation. In D. Steinbert and L. Jakobovits, eds., Semantics: An Interdisciplinary Reader in Philosophy, Linguistics and Psychology, 183-216. Cambridge: Cambridge University Press. Reprinted in Chomsky 1972b.
- Chomsky, N. and H. Lasnik (1977) Filters and control. Linguistic Inquiry 8, 425-504.
- Cooper, W. and J. Paccia-Cooper (1980) Syntax and Speech. Cambridge, Mass.: Harvard University Press.

- Goldsmith, J. (1976 ) Autosegmental phonology. Doctoral dissertation, Massachusetts Institute of Technology. Available from Indiana University Linguistics Club, Bloomington.
- Goldsmith, J. (1977) English as a tone language. In D. Goywaerts, eds., Phonology in the 1980's; also in Communication and Cognition (1977).
- Halliday, M.A.K. (1967 ) Notes on transitivity and theme in English, Part II. Journal of Linguistics 3, 199-244.
- Haraguchi, S. (1977) The Tone Pattern of Japanese: An Autosegmental Theory of Tonology. Tokyo: Kaitakusha.
- Heim, Irene (1982) The Semantics of Definite and Indefinite Noun Phrases. Unpublished Ph.D. dissertation, University of Massachusetts/Amherst.
- Jackendoff, R. (1972) Semantic Interpretation in Generative Grammar. Cambridge, Mass.: The MIT Press.
- Kamp, H. (1981) A theory of truth and semantic representation. In J. Groenendijk, T.M.V. Janssen, and M. Stokhof (eds.) Truth Interpretation and Information.
- Ladd, D.R. (1980) The Structure of Intonational Meaning. Bloomington: Indiana University Press.
- Liberman, M. (1975) The intonational system of English. Doctoral dissertation, Massachusetts Institute of Technology.
- Liberman, M. and J. Pierrehumbert (1984) Intonational invariance under changes in pitch range and length. In M. Aronoff, R. Oehrle, B. Wilker, and F. Kelley, (eds.) Language Sound Structure. Cambridge, Mass.: The MIT Press.
- McCarthy, J. (1979 ) Formal problems in Semitic phonology and morphology. Doctoral dissertation, Massachusetts Institute of Technology.
- McCarthy, J. (1981 ) A prosodic theory of nonconcatenative morphology. Linguistic Inquiry 12, 373-418.
- Pierrehumbert, J. (1980) The phonology and phonetics of English intonation. Doctoral dissertation, Massachusetts Institute of Technology.
- Prince, A. (1983) Relating to the grid. Linguistic Inquiry 14, 19-100.
- Selkirk, E.O. (1984) Phonology and Syntax: The Relation between Sound and Structure. Cambridge, Mass.: The MIT Press.

Early Welsh Metrics and the Indo-European Poetic Tradition<sup>0</sup>

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From the works of Lord (1960), Nagy (1974), Jakobson (1952), and others, it is clear that there existed a rich Indo-European oral poetic tradition, whose characteristics can in some measure be reconstructed from the cognate descendent traditions of Greek, Indic and Slavic poetics. Calvert Watkins (1963) has argued that Old Irish verse must also be seen as one of the legitimate heirs of Indo-European poetics.<sup>1</sup> An immediate question raised by Watkins' work is whether poetry in other Celtic languages also shows evidence of direct descent from this common Indo-European heritage. In particular, early Welsh verse has frequently been assumed to be a totally native development, or at least completely separate from its neighbors' poetic traditions.<sup>2</sup> This paper will argue that, in fact, one of the earliest extensive Welsh poetic sources shows every likelihood of being another daughter of Indo-European poetry.

My data come from a single 13th-century manuscript of 38 pages, usually referred to as Canu Aneirin ("the songs of Aneirin") or The Gododdin, and technically labelled Cardiff Central Library MS 2.81. This manuscript contains 88 poems in one hand (the "A" hand) and 42 poems in a second ("B") hand, plus four longer poems which the rubrics label as gorchanau.<sup>3</sup> The authorship of this body of verse has traditionally been attributed to the supposedly 6th-century poet Neirin or Aneirin.<sup>4</sup> Many of the poems concern British heroes who are praised for their heroic deaths at the late-fifth-century battle of Catraeth (probably fought at Catterick<sup>5</sup> in Yorkshire), when the Saxon kingdoms of Bernicia and Deira wiped out the neighboring British kingdom of Gododdin. However, there are poems in this corpus which must be dated later - in particular, one about the killing of the Irish king Domnal Breck (Dyfnwal Frych) by the Britons of Strathclyde in 642. Furthermore, scribal rubrics specifically assign one of the gorchanau to Taliesin (another early Welsh bard) rather than to Aneirin. So the corpus cannot be considered as monolithically 6th-century or necessarily all authored by the same poet.

### I. Dating the Text.

The greatest difficulty in dealing with the Gododdin manuscript has always been the unbridgeable gap between its supposedly early 6th-century origins (whether or not one believes the poetry was literally composed then) and the 13th-century manuscript which is the only text that has come down to us. The linguistic date, as opposed to the manuscript date, of the text, is of course essential for any assessment of the poems as evidence for the history of a linguistic or a poetic tradition. Luckily we



can narrow things down a good deal further: even Jackson (1969), who ranges himself on the side of 6th-century composition, does not claim that the extant corpus could possibly represent an unrevised early 6th-century text. Oral and/or literary transmission is assumed to have drastically modernized the linguistic forms.

First of all, the Gododdin corpus regularly reflects the effects of the radical syncope and apocope processes which are assumed to have been complete by the late 6th century, and which are a major part of the transformation of Brythonic to Welsh. For example, a Brythonic name such as Cuno-bélinos shows up in the Gododdin as Cynfélyn, with loss of the final unstressed syllable and the medial unstressed o. The Gododdin poems are not noticeably different from medieval Welsh with respect to these syllable-loss rules; and one must assume that they were written at least no earlier than the end of the 6th century, since there is no variation or other evidence that these changes were incomplete.

Secondly, the Gododdin poems regularly show various written manifestations of consonant-lenitions, some of which are not regularly present in the Juvencus englynion: e.g., m → v in final position - where the Juvencus writes m, we find f (for phonetic v) in the Gododdin. While this may be partly scribal conservatism on the Juvencus marginalist's part, no one has argued that the language of the Juvencus poems dates to a time prior to the 8th or 9th century. And the language of the Gododdin poems is manifestly less archaic than that of the Juvencus englynion. If, therefore, the Gododdin poems reflect a (written or "memorized") 6th-century text, they reflect it only distantly, via modernization to a language which is probably post-9th-century.

Third, and perhaps most interesting, the poetic structure of certain poems in the corpus clearly shows that they post-date the Welsh shift of word-stress from the ultima to the penult, a process variously dated to somewhere between the 9th and the 13th centuries. (Common opinion now places it in the 10th or 11th century, at the boundary between Old Welsh and Middle Welsh <sup>6</sup>.) So far as I am aware, no previous examinations of the Gododdin poems have made mention of this fact. But examples such as

med evynt melyn / melys maglawr (C.A. XI, A.11)<sup>7</sup>

wherein the rhyme is not word-final, would logically force us to assume that the rhymed syllables had stress-prominence (or pitch-accentual prominence) at the time of composition. "Internal rhyme" is normally between stressed syllables, as is alliteration; it would be odd for a poet to rhyme syllables which were neither word-final nor stressed. And in the example above, stress would not have been placed on the relevant syllables until after the stress-shift had taken place.

The relevant linguistic evidence, then, forces us to view these poems as not only compiled/revised, but probably composed,

at a date no earlier than about the tenth century. Given in particular the evidence of the rhyme-schemes, the burden of proof must rest on those who suggest that some earlier, much-revised text existed. A tenth-century date would, incidentally, still be within the range of probability from the point of view of later data; there is no doubt that the Gododdin is archaic in language when compared to 12th- or 13th-century Welsh.

## II. Linking the Gododdin with a poetic tradition.

A. Line-length and metrics: earlier views. Welsh scholars have been divided between an emphasis on the unique native quality of Welsh verse, and a desire to connect their poetic tradition with evidently prestigious neighbors such as Latin verse. There is, however, a shared tacit assumption that the long poetic lines of classical epic carry the prestige of antiquity, and that shorter lines are correspondingly less ancient and less venerable. This attitude carries over from earlier work such as that of Davies (1927) who derives the short-lined Welsh englyn from one and a half long Latin lines (!), or Williams' (1938) edition of Canu Aneirin, which argues for native line-lengths of up to twenty syllables, to Jackson (1969). In view of more recent work such as that of Watkins and Nagy, which suggests that Indo-European poetics had shorter as well as longer lines at its disposal, there is every reason to discard this prejudice in favor of the antiquity of the long line. Williams in fact normally prints short lines, despite his stated belief that these are only sections of longer lines. (The Gododdin manuscript, in common with most early Welsh poetic sources, does not arrange the poems in neatly-divided poetic lines, but writes them out like prose.)

What I am about to argue is that in fact the nativists and the classicists are both right, and both wrong. Welsh poetry is not a complete isolate; but its relationship to Latin and Greek verse is not via borrowing. Rather the Welsh tradition is an independently-developed descendent of the Indo-European verse forms, as are the classical poetic traditions. And, as we shall see, the Gododdin poems are in fact best analyzed as composed of short lines (frequently, though not always, identical to Williams' printed lines). As will become clear, Williams' "archaic" long lines would be most implausible descendents of an Indo-European metrical tradition, while the short lines dictated by the basic rhyme-schemes of the poems are also more likely descendents of a common poetics.

A second dispute (though related to the classicism/nativism debate) has arisen over the nature of the Gododdin poems' metrical framework. The nativist viewpoint has always drawn credibility from the fact that syllabic metrics are not characteristic of most of the likely sources for medieval Celtic versifiers. Latin verse moved from a classical quantitative model (long vs. short syllables) to a stress-metrical medieval model; Old English poetry is stress-metrical, as is the Germanic tradition at large.<sup>8</sup>

Although early Irish syllabic poetry exists, mutual influence between Celtic neighbors still leaves the syllabic metrics as a Celtic innovation. Furthermore, early accentual verse also exists in Irish, and may reflect a more archaic tradition than the syllabic forms (cf. Carney (1971), and the appendix to Klar, O Hehir and Sweetser (in press, a)). But high medieval Welsh poetry is (like modern Welsh verse) regularly and indisputably syllable-counting. The englyn, for example, consists of three lines, each line containing a fixed number of syllables (rather than stresses) - a classic form is the englyn milwr or "soldier englyn," of three seven-syllable lines.

So what are the metrics of the Gododdin corpus? A single glance at poems like gredyf gwr oed gwas (whose first four lines appear below) assures us that the Gododdin poems do not conform to a regular syllabic verse canon. Lines varying from four to seven syllables, occurring irregularly mixed in the same poem, seem unlikely in any syllabic tradition. Scholars have been balked in their efforts to produce a non-syllabic analysis of this poetry, however, because the lines also do not contain any regular number of word-stresses - hence a stress-metrical analysis has seemed as messy as a syllabic analysis, and less in tune with later Welsh poetic developments.

CA. I (A.1)	syllables
Gredyf gwr oed gwas	4
gwrhyt am dias	5
meirch mwth myngvras	4
a dan vordwyt megyrwas	7
...	

B. A Reanalysis: Short Lines and Stress Metrics. My personal moment of revelation came when I began to think about the Gododdin in the context of general theories of metrical stress. First of all, poetry based on stressed/unstressed alternations is NOT typically based on lexical stress, but rather on something closer to phrasal stress. Halle and Keyser's (1971) analysis of "Ride a cock horse" shows the single poetic stress in a two-lexical-stress phrase such as fine lady or white horse:

Sée a fine lady/ ón a white horse.

Halle and Keyser see the two stresses of fine lady as merged into one; later metrical stress analyses (e.g., Liberman and Prince (1977), Thompson (1980)) would, in my opinion more correctly, treat fine as effectively destressed relative to the adjacent strongly-stressed noun lady:

Sée ă fine lăď/ ón ă whĭte hórse.

My first crucial point, then, is that poetic stress is not lexical stress.

Secondly, poetic stress can vary greatly according to context. The same word may bear the metrical "beat" in one line but not in the next; the same phrase may constitute one foot (one "beat" plus adjacent unstressed syllables) in one line, and two feet in the next. In the following examples, look at the varying treatments of the preposition on and of the phrase into the tent, depending on the larger poetic context:

- (1a) Sée ă fine lădy/ 6n ă white h6rse
- (b) Sée ă fine lădy/ r6d6ng 6n ă h6rse
- (2a) Thē mēn wēnt/ 6nt6 the tēnt
- (b) Thēy wēnt 6nt6 the tēnt

In example (1a) above, we see on take the poetic beat, while the same word is treated as unstressed in (1b). In example (2a), the phrase "into the tent" constitutes two feet - a full dimeter line - but in (2b) the same phrase constitutes a single foot (half a dimeter line).

Without going into further details of a theory of the interaction between stress and metrics, it is only too evident that isoaccentual lines do not necessarily have the same number of lexical stresses in each line. Early analysts like Joseph Loth (1902) may well have been on the right track in their attempts to understand archaic Welsh verse. Loth, while assuming syllable count to be basic, tried to develop a theory of which syllables didn't count, if a line apparently had too many syllables to be regular. He suggested that, in the older Welsh verse, stress as well as syllable-count was involved. He never followed this up by doing actual stress-metrical analyses of early poems, but he did propose some rules of "rhythmic unit" structure which amount to stress-subordination rules. For example, he suggested that an article, preposition, or adjective adjoining a noun might fail to enter into the syllable count because it formed a "rhythmic unit" with the noun. Or a pronoun or particle might enter into a similar "rhythmic unit" with the verb. Loth noticed that the metrics of much early Welsh verse seemed considerably regularized by assuming such "exceptions" to syllable-count.

My suggestion, then, is that if we assume this early poetry to be essentially stress-metrical, then stress-subordination rules will be a natural part of the metrical system. As we have said, all accentual verse involves poetic, rather than purely lexical, accent - so an irregular number of lexical stresses per line is no surprise in an isoaccentual poem. An irregular number of syllables per line in an isosyllabic poem would, however, constitute a real exception to the rules of syllabic metrics, and

such exceptions would be extremely unlikely to recur as pervasively as they seem to occur in the Gododdin corpus. Finally, isoaccentual verse is bound to have some limits to the variation in numbers of syllables per line. Given that a language has some average number of syllables per word, and that there is also (more crucially) some average number of syllables per poetic stress-unit (i.e., per foot), isoaccentual lines will naturally average out at some appropriate syllable-number. Indeed, they may frequently be isosyllabic; nothing in the rules of stress-metrics bars isosyllabism from occurring. So apparent stretches of isosyllabism in the Gododdin poems (and such do occur) may in fact be chance occurrences, or may show some development from chance isosyllabism towards a later syllabic versification pattern.

As observed above, such a stress-metrical analysis is more in tune with other western Indo-European developments than is a purely syllable-counting analysis. Accentual metrics have, then, the added charm of a plausible connection with Indo-European verse. In my opinion, development towards regular syllable-count in high medieval Welsh verse could well have been influenced by an essential misunderstanding of classical Latin verse forms. Welsh poetics being accentual rather than quantitative, and hence lacking a native long-short metrical contrast, Middle Welsh poets could easily have reinterpreted Latin poetics as purely syllabic<sup>9</sup>.

However, there is a yet more cogent linguistic argument for the historical plausibility of accentual metrics. Despite the evidence against 6th-century composition, the material in the Gododdin poems probably reflects an oral poetic tradition which goes back to the sixth century and beyond. We know that oral composition was usual throughout medieval Europe, and Melia (1981) has argued persuasively that the Gododdin poems in particular show evidence of the same kind of oral formulaic structure which characterizes other oral poetic traditions. An oral poetic tradition depends (cf. Lord (1960) and others) on preservation of formulae which can be relied on to give appropriate chunks of metrical structure without the poet's having to actually think up each word of each line anew. Recomposition and transmission of such a poetic corpus are not accomplished by word-for-word memorization, but by learning of a (frequently narrative) content, and retelling of this content with the help of a common basic repertory of formulae. Many whole lines may indeed be preserved intact through recomposition, especially in introductory sections, where poets are most likely to remember earlier performances verbatim. To my knowledge, no one has previously observed that this oral formulaic method of composition poses insuperable obstacles to the direct descent of a syllable-counting poetic tradition from Brythonic to Welsh. The formulae would simply not retain their metrical structure. Earlier lines, recomposed in later (syncopated/apocopated) language, would become ametrical as well. Welsh poetry would indeed have to have been recreated ex nihilo.

An accentual poetics, however, would be unaffected by the syncope and apocope of unstressed syllables which were incapable of bearing poetic beat. Each line or formula would retain the same number of accents, however many syllables were lost. Recombination and transmission could continue unaffected by the surrounding linguistic changes.

Jackson (1969) argues that only a syllabic metrics could have descended unchanged through the linguistic reorganization of early Welsh. His claim might make sense if early Welsh verse were exclusively literary; poets would simply count syllables as they composed new lines. Older poetry would be frozen in an earlier syllabic regularity, and would necessarily lose its poetic character if linguistically modernized, since lines would not lose identical numbers of syllables by syncope and apocope. Jackson indeed denies the likelihood of oral transmission of the Gododdin corpus. However, his understanding of "oral transmission" is just rote memory - he has no understanding of formulaic structure. By all the evidence, oral tradition remains the most reasonable explanation for the form and content of the Gododdin as we possess it. And such orality makes direct transmission of syllabic poetics unlikely for Welsh. If the poetics of the Gododdin are syllabic, as Jackson and others believe, then they cannot also be as archaic as the same scholars have claimed they are.

The above discussion brings us back to the question of line length. Williams' long lines of 20 syllables clearly cannot be direct descendents of any accentual Brythonic verse tradition. The equivalent accentual lines in Brythonic would have been between 30 and 40 syllables long - far too long to be credible within an Indo-European tradition with a 16-syllable "long line." Morris-Jones also proposes some fairly long lines in his (unfortunately too-little-known) accentual analyses of early Welsh verse (as does Loth): however, his Cerdd Dafod (1925) examples of long lines are uniformly divided into shorter 2-stress units, as in this example of an "8-beat" rhupunt hir line:

Eil Néddig-Nár, / neus dúg Drwy fár /  
gwlédd i adár / o drydar drín.

It would be just as easy to see this as a quatrain of two-stress lines, linked to other quatrains by the final prifodl -in (which Morris-Jones sees as the line-final rhyme, the other rhymes being "internal"). Williams' long lines in Canu Aneirin are in fact equally reanalyzable into shorter subunits, to the significant improvement of their poetic regularity.

As a sample case, let us examine the apparently highly irregular C.A.45A (= A.42). Williams, who takes the prifodl or linking rhyme as the boundary-determinant of his long lines, would reach the following analysis if his method were applied to this

poem (slashes mark divisions into his "halflines" of 6-10 syllables):

Eur ar vur caer krysgwrwydyat aer/ cret ty na thaer aer vlodyat  
 Un axa ae leissyar ar gatwyt adar/brwydryar syll o virein  
 Neus adrawd a vo mwy o damweinyeit llwy/ od amluch lliuanat  
 Neus adrawd a uo mwy en awr blygeint/ na bei kynhawal  
 kynheilweing

This quatrain is composed of lines varying from 15 to 18 syllables, with no obvious regular accentual pattern either. Williams does not in fact print the poem in this format (I have already mentioned that he never prints the long lines for which he argues), but in the following format of shorter lines:

Eur ar vur caer	rhyme a	4 syllables
krysgwrwydyat aer	a	4
cret ty na thaer aer vlodyat	b	7
un axa ae leissyar	c	6
ar gatwyt adar	c	5
brwydryar syll o virein	d	6
neus adrawd a vo mwy	e	6
o damweinyeit llwy	e	5
od amluch lliuanat.	b	6
neus adrawd a uo mwy en awr blygeint	d	10
na bei kynhawal kynheilweing.	d	8

As far as I can tell, this printed poetic structure is even less regular than the hypothetical long-line version, both in line-length and in rhyme structure.

My own analysis of this poem, below, divides it into regular two-stress lines. It is noticeable that such a division also brings out a fully regular rhyme scheme. The only "irregularity" is in the length of stanzas or rhannau<sup>10</sup>, which alternate between 3 and 4 lines - surely a more acceptable variation than irregularity in line-length.

Eúr ar vur cáer	___ a rhyme
krysgwrwydyat áer	___ a
cret tý na tháer	___ a
áer vlodyat	a __ p
vn áxa ae léissyar	___ b
ar gátwyt ádar	___ b
brwydrýar syll o vírein	b __ q
neus ádrawd a vo mwý	___ c
o damweinyeit llwý	___ c
od ámluch (lliuánat)	__ c(?) __ p

(neus adrawd a vo mwy) \_\_\_\_\_? (from above?)  
 en <sup>q</sup>awr blýgeint \_\_\_\_\_q  
 na bei <sup>q</sup>kynháwal/ kynheílweing \_\_\_\_\_d/d'q  
 (last line = 2 lines?)

It remains for further study to show whether all early Welsh verse is reanalyzable along these lines, like the Gododdin poems (cf. Klar, O Hehir and Sweetser (in press, a) and Sweetser (in press)). But in the final section of this paper, I will give a few more reanalyses of poems from the Gododdin corpus.

My claim, then, is that early Welsh verse (like early Irish verse) was based on a two-stress line, with a one-stress catalectic variant. Such a line would average four or five syllables: an approximately 5-syllable Welsh line could readily correspond to a Brythonic decasyllable, and hence to an Indo-European short line. If this is so, Welsh poetics fits neatly in next to its Irish cognate, as a branch of the Indo-European poetic tradition. Paradoxically, the long Welsh lines proposed as "archaic" could never have had such an Indo-European origin, as discussed above.

### III. Lines and rhannau: metrical structure in Canu Aneirin.

To put the above analysis in context, it is necessary to discuss the metrics of the other Gododdin poems, at least briefly. My colleagues and I have found that the basic two-stress lines (with one-stress catalectic variant) are arranged into rhannau or stanzas of variable length. The Irish rann or stanza is canonically of four lines, but Welsh verse seems to have tended towards couplets and triplets. Notice the contrast between the early (linguistically archaic) Gwarchan Tutvwlch, with its highly variable rhan-length, and the later C.A.XII (A.12), with regular 2-line rhannau and cymeriad ("linking" rhyme) between the end of the first line of each couplet and the beginning of the next line:

Gwarchan Tutvwlch: Áryf angkýnnull  
 angkýman dúll  
 twryf en ágwed  
 e rac meúwed  
 e rac máwrwed  
 e rac máryed  
 pan ýstern  
 gwern  
 e am gámgyrn  
 e am gámgled...



pétwar lliwet  
 pétwar milet  
 miledawr...

C.A.XII (A.12):

Gwyr a aéth  
 gátraeth gan dýd

neus góreu  
 o gádeu gewílid

wy gwnáethant  
 en geugant gelórwyd

a llávnawr lláwn  
 ánnawd em béyd...

A regular combination of full 2-stress lines with catalectics could naturally develop into a 3-stress line. Once again, compare the (perhaps more archaic) structure of C.A. LXXVI (A.85) with that of C.A. LVB (B.2). The cymeriad rhyme between lines is fully regular in A.85, and the rhannau vary between 2 and 3 lines – the line-length is 2 stresses, varying with catalectic 1-stress lines. B.2, on the other hand, shows irregular use of line-internal rhyme (as opposed to the regular, required, cymeriad rhyme in A.85) and 3-stress lines; the internal rhyme is probably a relic of the earlier cymeriad linking between two shorter lines.

A.85: Diánnot  
 e glót e glútvan

diáchor  
 ángor yg kyman

diéchyr  
 éryr gwyr  
 govaran

trínódef  
 éidef  
 oed eíryan...

B.2: Godódin gomýnnaf oth blégyt  
 yg gwyd cánt en áryal en émwyt  
 a guárchan mab dwywei da wrhyt  
 poet gnó en vn tyno tréissyt...

Finally, the native Welsh englyn can easily be seen as a possible descendant of the Indo-European short-line verse form, via combination with a catalectic variant – rather than as (cf.

Davies) developing from one-and-a-half classical elegiac lines. The archaic Juvenus englynion (see Williams' 1972 edition), when rearranged, yield neat early three-stress lines of the same kind seen in C.A. LVB (B.2):<sup>11</sup>

nicánāniguárđam nicúsam  
 henóid / cet íben međ nóuel  
 mí am frānc dam an pátel  
 (slash = Williams' division between lines 1 and 2)

IV. Conclusions. I have used a combination of linguistic and poetic evidence to show that the metrical structure of the early Welsh Gododdin poems must be based on short accentual lines. Only such an analysis yields regular line-lengths and rhyme-schemes, so the internal data require it. Interestingly, such an analysis almost forces us to link early Welsh verse with an ancestral Indo-European short poetic line. Scholars like Williams and Jackson were probably wrong in positing a 6th-century text of the Gododdin poems, as they were misled in looking for "archaic" long lines. However, if the Gododdin's metrical forms do go back to the Indo-European short line, then a 6th-century bard or an earlier Brythonic bard could well have sung in exactly these poetic forms.

This does not mean that the Gododdin poems' accentual metrics are unconnected with later Welsh syllabic forms. As mentioned above, isoaccentuality does tend towards isosyllabism, and reanalysis could occur, turning (for example) a 3-stress line into a 7-syllable englyn-line.

In short, early Welsh verse provides the link between modern Welsh forms and the Indo-European metrical tradition. There was justification for the feeling of continuity expressed by the poet of these lines from C.A.V (A.5):

...gwerth méd  
 eg kýnted gan lliwédawr  
 hyueid hír  
 etmýgir tra vo kérdawr.

("Value of mead/ in the hall among the hosts/  
 Hyfaidd the tall/ will be praised while there be bards")

#### Notes

0 The work contained in this paper is part of a larger-scale collaborative research project; Kathryn Klar, Brendan O Hehir, and I are working on a full edition of the Gododdin poems. Kathryn and Brendan's input to my work has been crucial; indeed, it is not evident that this article is separable from our joint efforts. I would like to thank various other critics and colleagues, in

particular Dr. Geraint Gruffydd and Dr. Daniel Huws of the Welsh National Library at Aberystwyth, Dr. Marged Haycock, Professor Eric Hamp, Professor Daniel Melia, and all the participants in the June 1984 Colloquium ar y Hengerdd held at the Welsh National Library. Haycock (in press) presents another analysis of early Welsh verse which is accentual like this analysis, but in other ways quite different; I refrain from discussing it here because I have not yet seen it in final form.

1 For a fuller discussion and critique of Watkins' analysis, see the appendix to Klar, *O Hehir*, and Sweetser (in press, a). Carney (1971) is also of great interest.

2 See, for examples of two viewpoints on this subject, Davies (1927), Williams (1938), and Jackson (1969).

3 For a review of past work on the manuscript, and a full discussion of my own views, see Klar, *O Hehir* and Sweetser (in press, b). For the current discussion it is sufficient to say that although the two scribes probably had distinct sources, both sources clearly belonged to the same poetic tradition. So far as I have observed, there are no metrical distinctions between the two hands' contributions to the corpus, although such may yet emerge as my analysis progresses.

Two points which may be of interest to the reader are that the manuscript was originally catalogued as Cardiff Library MS Welsh 1, and that the relationship between the gorchanau and the other 130 Gododdin poems is usefully discussed in Klar (in press), where the meaning of the word gorchan or gwarchan (usually translated "lay") also receives some elucidation.

4 The attribution of the Gododdin poems to Aneirin is due originally to the thirteenth-century scribal rubricator of the manuscript. Patrick Ford, in a presentation at the 1981 University of California Celtic Conference (held at Berkeley), argued that the name Aneirin, like other names of early Welsh bards (e.g. Talhaearn or Gwenith Gwawd) is a mythical proto-bard name, symbolic of the essence of poetry. There has never been any good evidence for the historicity of Aneirin or Taliesin, and the poems attributed to them in fact appear to vary considerably in linguistic age - a good reason to suspect the medieval habit of attributing works to prestigious past "sages" of uncertain historicity.

5 See Jackson's (1969, pp. 83-84; 1953, pp. 409-10, 564) discussions of the name Catraeth.

6 T. Arwyn Watkins (1972) contains a reanalysis of data concerning the Welsh accent-shift, suggesting that (a) it took place earlier than usually supposed (perhaps in the 9th century)

and (b) that both pitch and stress accent may have been involved. So far as I can tell, the early poetry does not require separate consideration of two kinds of accents, and I have dealt solely with one, which I have called stress. This does not imply disagreement with Watkins, but simply lack of evidence for his theory in my data.

7 All references to the Gododdin poems in this paper have been given in double form: first the number of the poem in Williams' (1938) now standard edition (referred to as C.A., for Canu Aneirin), and secondly the number of the poem in the A or B hand's corpus as it appears in the manuscript (these are also the numbers used by Jackson (1969)).

8 It is noticeable that the Old French syllabic chansons de geste frequently also show accentual regularity, perhaps reflecting this general trend in northwestern Indo-European folk verse.

9 Brendan O Hehir (personal communication) has suggested that the early Irish syllabic verse form came into existence through just such a misinterpretation of Latin poetics.

10 Brendan O Hehir coined the term rhan by borrowing the cognate of the Irish word rann to use in the Irish sense of "stanza". Klar, O Hehir and myself have adopted this loan-translation as a technical term for the description of early Welsh verse, there being no extant Welsh term for the entity in question.

11 The manuscript form of the Juvenicus englynion does not provide line-divisions - nor do most early Welsh verse manuscripts, including the Gododdin manuscript.

### Bibliography

- Carney, James (1971) "Three Old Irish Accentual Poems," Ériu XXII, 23-80.
- Davies, J. Glyn (1927-8) "The Englyn Trisectual Long Line in Early Welsh Metrics," ZCP 17, 113-128.
- Halle, Morris and Samuel Jay Keyser (1971) English Stress: Its Form, its Growth, and its Role in Verse, New York: Harper and Row.
- Haycock, Marged (in press) paper from the Colloquium ar y Hengerdd held at Aberystwyth in June 1984, to appear in the volume from the conference, ed. Geraint Gruffydd.
- Jackson, Kenneth H. (1953) Language and History in Early Britain, Edinburgh: Edinburgh University Press.
- \_\_\_\_ (1969) The Gododdin: The Oldest Scottish Poem, Edinburgh: Edinburgh University Press.

- Jakobson, Roman (1952:1956) "Studies in Comparative Slavic Metrics," reprinted in Jakobson's Selected Writings IV, The Hague: Mouton.
- Klar, Kathryn (in press) "What Are the Gorchanau?" to appear in the volume from the 1984 Colloquium ar y Hengerdd, ed. G. Gruffydd.
- Klar, Kathryn, Brendan O Hehir, and Eve E. Sweetser (in press, a) "Welsh Poetics in the Indo-European Tradition," to appear in Studia Celtica.  
 \_\_\_\_\_ (in press, b) "The Components of Cardiff MS Welsh 1, Llyfr Aneirin," to appear in BBCS.
- Liberman, Mark and Alan Prince (1977) "On Stress and Linguistic Rhythm," Linguistic Inquiry 8:2, 249-336.
- Lord, Albert B. (1960) The Singer of Tales, Cambridge MA: Harvard University Press.
- Loth, J. (1902) La métrique galloise depuis les plus anciens textes jusqu'à nos jours (vols. ix-xi of H. d'Arbois de Jubainville, Cours de littérature celtique, Paris, 1883-1902).
- Melia, Daniel (1981) "Tension in the Two Texts of Canu Aneirin," paper presented at the University of California Celtic Conference in 1981, in Berkeley.
- Morris-Jones, Sir John (1925) Cerdd Dafod: sef Celfyddyd Barddoniaeth Gymraeg, Oxford: Oxford University Press.
- Nagy, Gregory (1974) Comparative Studies in Greek and Indic Meter, Cambridge MA: Harvard University Press.
- O Hehir, Brendan Patrick (in press) "What is the Gododdin?" to appear in the volume from the 1984 Colloquium ar y Hengerdd, ed. Geraint Gruffydd.
- Sweetser, Eve E. (in press) "Line Structure and Rhan Structure: The Metrical Units of the Gododdin corpus," to appear in the volume from the 1984 Colloquium ar y Hengerdd, ed. Geraint Gruffydd.
- Thompson, Henry S. (1980) Stress and Saliency in English: Theory and Practice, Palo Alto CA: XEROX Palo Alto Research Center.
- Watkins, Calvert (1963) "Indo-European Metrics and Archaic Irish Verse," Celtica IV, 194-219.
- Watkins, T. Arwyn (1972) "The Accent in Old Welsh - its Quality and Development," BBCS xxv:i, 1-11.
- Williams, Sir Ifor (1938: 1970) Canu Aneirin, Caerdydd: Gwasg Prifysgol Cymru.  
 \_\_\_\_\_ (1972) The Beginnings of Welsh Poetry, ed. R. Bromwich, Caerdydd: Gwasg Prifysgol Cymru.

## Prosodic Constraints and Processing Theory

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### 1. Introduction.

One of the key questions facing psycholinguists involved in language processing concerns the nature of interaction between theories of processing and theories of grammar.

There are extreme positions on this question. At one extreme is the view that there is absolutely no relationship between the structures which offer the best linguistic description of a language and the products of language processing. In this view, two grammars are needed: a grammar of competence, which represents a language user's knowledge, and a grammar of performance, which characterizes the structures and constraints relevant to processing.

At the other extreme is the position that there is a one-to-one correspondence between, on the one hand, the structures and constraints which best characterize language and, on the other, the processes and representations used in language understanding.

A position between these two extremes acknowledges the relationship between a theory of grammar and theory of processing, and seeks to find that relationship. It holds that there is no simple one-to-one mapping between linguistic structures and constraints, and psychological structures and processes, but that a mapping does exist.

This is the position I take in this paper. With the basic assumption that the structures and constraints proposed within linguistic theory are relevant to processing theory, the task before us is to specify how they are relevant.

#### 1.1. The role of phonological constraints.

My focus here is on phonological constraints and their possible role in the processing of spoken language. In particular, I am concerned with the use of phonological knowledge at the stage of lexical access: that is, contacting stored representations of lexical material.

It may be argued that phonological knowledge is not necessary for making decisions about lexical items before their representations are contacted. Since the set of items of a language is finite, it might in principle be possible to store all conceivable acoustic representations of a word, and simply match the incoming acoustic material to stored representations.

However, there is so much variability in the acoustic signal, due for

example to speaker differences, speech rate differences, and the syntactic context of a word, that this appears to be an inadequate characterization of how we process lexical material. In addition, the acoustic variants of a lexical item do not comprise an arbitrary collection of phonetic forms. Rather, they are tokens which are related to each other and to their underlying form in systematic ways. Part of knowing a language is knowing these systematicities in how phonetic forms are related to their underlying forms.

Given these considerations, it is plausible that the hearer calls upon that knowledge to impose an interpretation on incoming speech. That is, just as the listener must call upon syntactic knowledge to interpret incoming material above the word level, he may call upon phonological knowledge to interpret incoming material at or below the word level.

With that established, we can formulate two broad questions. First, at what level of processing are phonological constraints used? Second, what exactly are the phonological constraints which are relevant to processing? As an answer to the first question, I'd like to consider a place where constraints on lexical stress may play a role in processing. In particular, I'd like to focus on the process of word boundary identification, or what I will call "lexical parsing". As an answer to the second question, I'd like to consider theories of suprasegmental phonology, and in particular, theories of metrical structure as presented in Selkirk (1980) and Hayes (1980).

## **1.2. The segmentation problem.**

To identify words, the listener must segment the continuous acoustic signal into discrete units. This would be trivial if speakers regularly left silences between words; the speaker, however, is rarely so accommodating to the listener. Further, if every language provided reliable and consistent phonetic cues to word boundaries, lexical segmentation would not pose a problem for listeners. However, though cues to word junctures are found in some languages, none are systematically present in all languages, nor (to my knowledge) systematically present in all utterances within one language.

The segmentation problem is complicated by the temporal nature of the incoming signal. The hearer does not receive information about all parts of an utterance simultaneously. If that were the case, it would be possible to exhaustively parse the signal by imposing an analysis which would conform to the constraints of the language. Instead, the listener must assign meaning to portions of the signal as they are received.

It has been shown (Marslen-Wilson and Welsh, 1978; Cole and Jakimik, 1978) that listeners do not wait until the entire signal corresponding to a word has been heard before interpreting the signal. Thus, efficient lexical access

depends on accurately identifying word onsets and finding the correct candidate from a set of plausible alternatives. Considerable experimental evidence supports the contention that the identification of word onsets plays a distinguished role in word identification (Cole, 1973; Cole and Jakimik, 1980; Marslen-Wilson, 1975; Marslen-Wilson and Welsh, 1978). However, though those studies demonstrate the importance of word onsets, they do not directly address the question of how onsets are identified.

## **2. Prosody in lexical parsing.**

Prosody provides a potentially rich source of information to the listener. Stressed syllables are more salient than unstressed syllables and provide better acoustic information than unstressed syllables. In fact, there is evidence that listeners anticipate the arrival of stressed syllables (Cutler, 1976) and may structure the signal into rhythmic units which either begin or end with a stressed syllable (Martin, 1972). Thus, prosody is potentially useful for structuring the input and guiding the listener to the more important parts of the signal.

However, the role of prosody in onset identification has not been systematically explored. This follows in part from assumptions about the representation of lexical items. Current lexical access models assume that words are represented as concatenations of segments, with no structure internal to words (except possibly morphological structure). In none of the models is an explicit claim made about phonological representations. The implicit assumption appears to be that those representations are linear sequences of phonemes, represented as feature bundles, approximating the phonetic representations assumed in standard generative phonology (eg., Chomsky and Halle, 1968). Yet nothing in these theories forces a strictly linear view of word structure. Additional structure in lexical representations would simply be superfluous to current versions of these models, since at present they contain no parsing mechanisms to exploit the information about structure.

Given the consideration that prosody may play a role in access, we may now consider how the perceptual system might use prosodic constraints, as characterized first in the framework of Chomsky and Halle (1968), and then in a metrical phonology framework (e.g., Selkirk, 1980; Hayes, 1980).



## 2.1. Lexical access within alternative phonological frameworks.

Within the framework of SPE, lexical access can be characterized as moving backwards through a derivation, undoing each step to arrive at an underlying representation. Viewing lexical access in this way presents two problems.

One problem concerns the computational load that would result from undoing certain phonological rules. A case in point is the Main Stress Rule in English, a simplified version of which is given in (1). (Chomsky and Halle, 1968:77)

### (1) Main Stress Rule

$$V \rightarrow [\text{stress}] / \text{---} C_o \left( \left[ \begin{smallmatrix} \text{-tense} \\ V \end{smallmatrix} \right] C_o \right)$$

$$/ \text{---} \left\langle \left[ \begin{smallmatrix} \text{-tense} \\ V \end{smallmatrix} \right] C_o \right\rangle \langle N \rangle$$

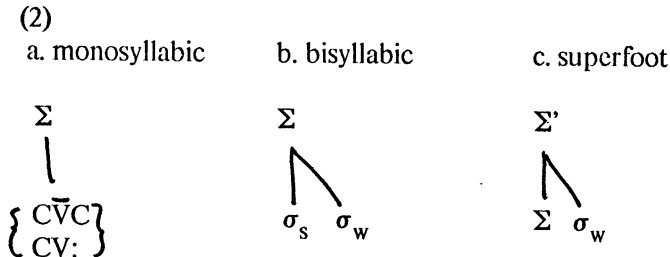
The computation which would be required to undo this rule may be enormous. Since real-time constraints such as memory limitations play a role in lexical access, such considerations would certainly weaken the appeal of certain types of phonological rules such as the Main Stress Rule.

Another problem with the notion of undoing a derivation concerns the length and nature of the material, or the "window", which would be necessary for the listener in order to undo rules. Phonological rules operate on entire words (though perhaps affecting only one segment for any particular rule). The successive lines of a derivation contain the representation of the entire word, up to that point in the derivation. Thus, in undoing a derivation, the listener would need access to the entire word to undo each phonological rule. Evidence from psycholinguistic studies (Marslen-Wilson and Tyler, 1980) indicates that a word can often be recognized before all of it is heard. Thus, it cannot be that the access process awaits the phonetic representation of an entire word and only then starts to perform a reverse derivation.

Metrical theory as proposed in Selkirk (1979, 1980) and Hayes (1980) brought a change in the level of representation at which stress is specified. In

particular, Selkirk argued that the prosodic categories of syllable ( $\sigma$ ), foot ( $\Sigma$ ), and word ( $\omega$ ) are linguistically significant levels of phonological representation. It was argued that certain phonological processes have as their domain the syllable, foot, or word, and thus that the description of certain processes crucially must refer to these categories.

For English it was proposed that words be exhaustively parsed into "stress feet" in underlying representations, with the possible foot types given in (2).



If syllables and feet constitute the domain for certain phonological processes, then information about these units may be extractable from the incoming signal, rather than being derived from an underlying representation. It is thus possible that the listener is constructing syllables and feet and submitting those units to the lexicon to compare with stored representations. Since words are assumed to be stored with information about foot structure, this provides a way of matching the incoming signal with stored representations at a level intermediate between the segment and the word.

In the next section, I consider the hypothesis that the listener is indeed structuring the incoming signal into rhythmic units and that this structuring is providing initial guesses about where word boundaries are located in the incoming signal.

### 3. Prosody-based lexical parsing strategies.

When an utterance first reaches a hearer, the onset of the first word can be easily postulated - it will be identical to the onset of the entire utterance. This onset can be submitted to the lexicon for comparison with stored lexical representations. It is not clear just how much information about a word is available at this point, but I assume that at the least, a phonological representation is accessed. This is compared to the incoming signal. Whatever information is included in the phonological representation, it is potentially usable in the mismatch procedure. In particular, I hypothesize that suprasegmental structure is available.

If feet are being constructed, then they provide a unit of matching with stored representations. That is, the "window" used for matching the incoming signal to stored representations is defined structurally (i.e., in terms of syllables and feet) rather than strictly temporally (i.e., in terms of a window of some specified amount of time). It will be the onsets of feet, i.e., strong syllables, which are the most salient portions of the signal. A salience-based strategy for onset identification could thus be formulated as in (3).

(3) *Salience to Onset Strategy (SOS)*

Use the salient portions of the incoming signal, plus the prosodic constraints of the language, to find word onsets.

For English, the SOS will take stressed syllables as the salient portions of the signal. Given the constraints on foot structure in English, stressed syllables are taken to be word onsets. The strategy for English is given in (4).

(4) *Salience to Onset Strategy (English)*

Hypothesize a word onset at each stressed syllable.

I have hypothesized that prosodic structures are imposed on the incoming signal. These structures are consistent with the language-specific constraints on prosodic structures. The formulation of this strategy is given in (5).

(5) *Prosodic Domain Strategy (PDS)*

Segment the incoming signal into prosodic units which are well-formed according to the constraints of the language. Submit these units to the lexicon for comparison with stored lexical material.

The language-specific version of the PDS defines the prosodic domain which is relevant to lexical access for that language. For English, I claim that the relevant prosodic domain is the stress foot. This means that the listener imposes a foot structure on the signal before making decision about lexical segmentation. The strategy for English is given in (6).

(6) *Prosodic Domain Strategy (English)*

Segment the incoming signal into feet. Submit these units to the lexicon for comparison with stored lexical material.

Elsewhere (Taft, 1984) I have presented experimental evidence supporting the SOS(E). One experiment tested preferred segmentations of phonetically ambiguous items (e.g., *lettuce* - *let us*; *incite* - *in sight*). The results were consistent with the hypothesis that listeners take strong syllables to be word-

initial, and do *not* take weak syllables to be word-initial unless they are clearly marked (e.g., are utterance-initial). Another experiment tested lexical access times for bisyllabic words whose stress pattern was pronounced either correctly (e.g., *CACtus*, *susPENSE*) or incorrectly (e.g., *cacTUS*, *SUSpense*). The results showed differential effects of a stress mispronunciation depending on whether it moved stress toward or away from the word onset. Thus, *CACtus* showed faster access times than *cacTUS*, but *SUSpense* showed faster access times than *susPENSE*. (However, only the first type of mispronunciation resulted in a significant difference in access time.)

Evidence for the PDS is more tentative, and comes from two studies described in detail elsewhere (Taft, 1984). The PDS predicts that the prosodic structure of an utterance should make a difference in how it is initially segmented into words.

In particular for English, since a rhythmic foot boundary will not necessarily coincide with a word boundary, the PDS may lead to a wrong segmentation in cases where the foot boundary crosses a word boundary. Consider, for instance, the sequences of strong and weak syllables shown in (7) (with " #" indicating true word boundaries).

(7)

- a. S W # W S
- b. S W # S W
- c. S W W # W S
- d. S W W # S W

The PDS predicts that (a) will be more difficult to parse than (b). This is because the listener is constructing feet, and will miss the word-initial *weak* syllable on the second word of (a), but will not miss the word-initial *strong* syllable on the second word of (b). (By hypothesis, the principle is to construct maximal feet, i.e., superfeet, where possible.) In contrast, the PDS predicts that (c) should be no more difficult to parse than (d). In (c), the maximal foot coincides with the word boundary, so the word-initial weak syllable will be tried as a word onset. In (d), the initial syllable of the second word will be tried as an onset, because it is strong, and also because the preceding maximal foot coincides with the word boundary. Thus, there should be a greater difference in segmentation time for (a) vs. (b) than for (c) vs. (d).

In an experiment testing these predictions, I presented 4- and 5-syllable sequences of either "word + word" (W + W) or "nonword + word" (NW + W) to subjects. Their task was to decide whether they had heard a word + word or a nonword + word sequence and press the appropriate button on a panel in front of them. Response times were measured, and are reported in Table 1

for the four conditions in (7).

**Table 3-1: Mean Reaction Times  
to Lexical Sequence Decision (msec.)**

Rhythmic Sequence:	Predicted Differences:	W + W	NW + W
a. SW # WS	(a-b)>0	998	1177
b. SW # SW		947	1126
c. SWW # WS	(a-b)-(c-d)>0	946	1028
d. SWW # SW		932	987

Table 2 presents the differences across conditions highlighted in the above discussion.

**Table 3-2: Differences across Conditions (msec.)**

Differences:	W + W	NW + W
(a-b)	51	51
(c-d)	14	41
(a-b)-(c-d)	37	10

Interaction between the form of the first item and the form of the second item was not significant, but the pattern of results is striking. For all conditions, the reaction time differences were in the right direction, i.e., they patterned exactly as predicted by the PDS. This would not be expected if rhythmic structure played no part in lexical segmentation. Thus, though the results did not present striking confirmation of the PDS, they suggest that rhythm is indeed relevant to segmentation.

**4. Implications for processing theory.**

This work affects lexical access models in three ways. The first concerns the structure of lexical representations. I have argued that the "flat" segmental word structures assumed by auditory lexical access models are oversimplified

in that they ignore word-internal structure. Of course, the phonological theories make no claims about the "psychological reality" of the constructs they employ to describe suprasegmental phenomena. However, the positing of linguistically significant units such as syllables and feet is motivated partly by the fact that phonological processes operate within or across those domains. For the listener, this means that phonetic information about those prosodic units may be extracted from the signal, by considering whether a particular phonological process has or has not occurred.

In addition, the evidence presented here suggest that the process of phonologically structuring the input may represent a distinct level of processing. If the conclusions I have drawn are correct, then they force the models to take account of both phonological structure and the process by which word onsets are identified. In addition, evidence from Japanese, which I have reported elsewhere (Taft, 1984) shows different parsing preferences from speakers of dialects which differ in permissible tone melodies on words. These experimental results demand the conclusion that phonological knowledge is important in processing.

Finally, theories of suprasegmental phonology provide a framework for formulating questions concerning the nature of the prosodic constraints relevant to processing, and how those constraints are used in understanding fluent speech.

## Bibliography

- Chomsky, N. and M. Halle. *The Sound Pattern of English*. : Harper and Row 1968.
- Cole, R. Listening for mispronunciations: A measure of what we hear during speech. *Perception and Psychophysics*, 1973, 13, 153-156.
- Cole, R. and J. Jakimik. Understanding speech: How words are heard. In G. Underwood (Ed.), *Strategies of Information Processing*. : Academic Press, 1978.
- Cole, R. and J. Jakimik. How are syllables used to recognize words? *Journal of the Acoustical Society of America*, 1980, 67, 965-970.
- Cutler, A. Phoneme monitoring reaction time as a function of preceding intonation contour. *Perception and Psychophysics*, 1976, 20, 55-60.
- Goldsmith, J. An overview of autosegmental phonology. *Linguistic Analysis*, 1976, 2, 23-68.

- Hayes, B. A Metrical Theory of Stress Rules. Published by Indiana University Linguistics Club, 1980.
- Liberman, M. and A. Prince. On stress and linguistic rhythm. *Linguistic Inquiry*, 1977, 11, 511-562.
- Marslen-Wilson, W. Sentence perception as an interactive parallel process. *Science*, 1975, 189, 226-228.
- Marslen-Wilson, W. and A. Welsh. Processing interactions and lexical access during word recognition in continuous speech. *Cognitive Psychology*, 1978, 10, 29-63.
- Marslen-Wilson, W. and L. Tyler. The temporal structure of spoken language understanding. *Cognition*, 1980, 8, 1-71.
- Martin, J. Rhythmic (hierarchical) versus serial structure in speech and other behavior. *Psychological Review*, 1972, 79, 487-509.
- Mehler, J. The role of syllables in processing: infant and adult data. *Philosophical Transactions of the Royal Society of London*, 1981, 3295, 119-138.
- Mehler, J., Y. Y. Domergues, U. Frauenfelder, and J. Segui. The syllable's role in speech segmentation. *Journal of Verbal Learning and Verbal Behavior*, 1981, 20, 298-305.
- Selkirk, E. The role of prosodic categories in English word stress. *Linguistic Inquiry*, 1980, 14, 563-605.
- Selkirk, E. On prosodic structure and its relation to syntactic structure. Paper presented at the Conference on the Mental Representation of Phonology, University of Massachusetts, Amherst, 1979. Distributed by Indiana University Linguistics Club, 1980.
- Studdert-Kennedy, M. Speech Perception. In N. Lass (Ed.), *Contemporary Issues in Experimental Phonetics*, : Academic Press, 1976.
- Taft, L. *Prosodic Constraints and Lexical Parsing Strategies*. PhD thesis, University of Massachusetts at Amherst, 1984.





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