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FEBRUARY 14-16, 1976

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OF THE
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Clause reduction in Spanish

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Attributiveness and referential opacity

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Drift versus diachronic universals

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PREFACE

For three convivial days in February, the Berkeley Linguistics Society hosted its second annual meeting. After little more than two shakes of a duck's whisker, this volume of Proceedings has appeared, thanks to a good deal of hard cheap labor and the miracle of photo-offset. It is eagerly anticipated by many who, for one reason or another, were unable to focus their complete attention on the oral presentations.

A large number of abstracts were received, and a large number of Berkeley students lent a hand (and often a strident voice of protest) in the exceedingly difficult selection process. Their aid is hereby gratefully acknowledged.

Our continuing thanks to The Chicago Linguistic Society and the Department of Linguistics of The University of California at Berkeley for their financial support.

Finally, a clause or two of thanks to the authors, the quality of whose papers made our minimal editorial tampering a pleasurable experience.

In a moment of self-congratulatory weakness, we have included below selections from a review of a bootleg prepublication copy which appeared recently in Formations of Language, Vol. 14 No. 5.

The Berkeley Linguistics Society

"...This reviewer was struck by the depth and power of the drama which unfolds within the pages of this tome. In this eagerly anticipated successor to their previous boffo hit, BLS I, the editors have outdone themselves... Once again plot continuity is not a strong point, but fortunately frequent doses of tasteless sex and gratuitous violence are included to stimulate the lay reader's flagging interest... One hesitates to criticize the distinguished and diverse selection of titles, but given

his magnificent, if somewhat inaccessible, contribution to the previous volume, I was disappointed by the omission of T. Fallows' latest hard-hitting period piece, "The Usage of soslovnost', vsesoslovnost' and bezsoslovnost' in the Debate on the Western Zemstvo Bill in the Third Duma, March-April, 1910."... Overall rating: 2 *'s, 2 #'s and a ?, with some dialectal variants."

Reviewed by T. Stuart
Berkley School of Music
Cambridge MA

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Two papers presented at the Annual Meeting are not included in this volume: "A functional approach to the 'Internal NP-Clause' phenomenon" by Alexander Grosu and Sandra A. Thompson, and "The sound of meaning" by John Robert Ross.

The following authors did not present their papers at the Annual Meeting, but the papers are published in this volume: Gerald L. Cohen, Leonard M. Faltz, Donald G. Frantz, Jeffrey Heath, Charlotte Linde, Janos S. Petofi, F. J. VanDamme.

Clause Reduction in Spanish*

Judith Aissen and David M. Perlmutter

Harvard

M.I.T.

0. Introduction

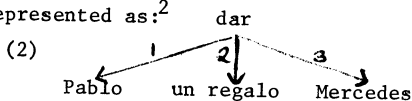
This paper is a report of work in progress on a number of syntactic phenomena in Spanish and Italian that we seek to explain by positing a rule of Clause Reduction that makes dependents of a complement verb dependents of the matrix verb. Here we confine ourselves to data from Spanish, though analogous arguments can generally be made for Italian.¹

Most of the discussion in this paper is couched in terms of the theoretical framework of relational grammar proposed by Perlmutter and Postal (in preparation). In this framework, the structure of a sentence is regarded as a network of grammatical relations or, more simply, as a relational network. For the purposes of this paper, we need only be concerned about a proper subset of the grammatical relations posited in that theory: the relations subject of, direct object of, and indirect object of. Following Perlmutter and Postal (in preparation), we will refer to these grammatical relations as 1, 2, and 3, respectively, and represent sentence structures as relational networks. For example, the structure underlying the sentence

- (1) Pablo le dio un regalo a Mercedes.

'Pablo gave a gift to Mercedes.'

is represented as:²



This structure consists of a governor (the verb dar) and three nominal dependents - Pablo, un regalo, and Mercedes. The arc between each nominal dependent and dar indicates that the nominal in question bears a grammatical relation to dar, and the numeral on each arc indicates which grammatical relation the nominal in question bears to the governor verb. The relative order of the 1, the 2, and the 3 in (2) is arbitrary, since the relational network represents grammatical relations and not the linear order of elements in surface structure.

In certain cases, it is necessary to make further distinctions. For example, consider the sentences

- (3) a. Los ministros fueron criticados por la prensa.
'The ministers were criticized by the press.'
- b. Los ministros parecen haber sido criticados por la prensa.

'The ministers seem to have been criticized by the press.'

Traditional grammarians would have said that in (3a), la prensa is the logical subject of criticar and los ministros is the grammatical subject. Transformational grammarians would say that in (3a), la prensa is the deep (structure) subject and los ministros is the derived subject. In Perlmutter and Postal's theory of relational grammar, in (3a) la prensa is the initial 1 of criticar³ and los ministros is the classic 1.

While Perlmutter and Postal's notion of initial 1 is close to the traditional notion of logical subject and the transformational notion of deep subject, their notion of classic 1 cannot be identified with the transformational notion of derived subject. To see this, consider (3b). In this sentence, la prensa is again the initial 1 of criticar, but los ministros is the classic 1 of parecer, not of criticar. Just as a given nominal can be the initial 1 of only one verb, it can be the classic 1 of only one verb. However, there is another notion of 'subject' that an adequate theory of grammar must capture - one in which los ministros is the 1 of both parecer and criticar in (3b); for example, los ministros triggers plural agreement on both parecen and criticados. Perlmutter and Postal refer to this notion as that of canonical 1, saying that los ministros is the canonical 1 of both of these verbs in (3b). The relational grammar notion of canonical 1 corresponds roughly to the notion of cycle-final subject in a cyclical theory of grammar.

A crucial difference between the notion of classic 1 and that of canonical 1 is that a given nominal can be the canonical 1 of more than one verb in a given sentence, but it can be the classic 1 of only one verb. If a given nominal is the classic 1 of a given verb it is also the canonical 1 of that verb, but the converse of this statement is not necessarily true. A given verb, however, has only one canonical 1. In a sentence in which no rule has created a 1, the same nominal will be the initial 1, the canonical 1, and the classic 1 of the verb. In (1), therefore, Pablo is the initial, canonical, and classic 1 of dar.

1. Two Rules of Spanish

1.1 Clitic placement

A non-pronominal classic 2 or 3 of a verb generally follows its verb in surface structure, as does el edificio nuevo in:

- (4) Eduardo vio el edificio nuevo.
'Eduardo saw the new building.'

A pronominal object is in the strong form when it occurs under emphasis and in positions of contrast. In such cases, it is subject to the same word order rules as non-pronominal objects. Therefore it generally follows the verb, as in:

- (5) Eduardo no la vio a ella sino a él.
'Eduardo didn't see her but him.'

Otherwise, the clitic form of the pronoun is used.

Spanish has a rule of Clitic Placement that attaches a clitic to the verb of which it is a classic dependent. When a clitic is attached to a finite verb, it precedes the verb:

- (6) Eduardo la vio.
'Eduardo saw her.'

When a clitic is attached to a non-finite verb form (either an infinitive or a gerund), it follows the verb:

- (7) a. Quiere verla.
'He wants to see her.'
b. Sigue viéndola.
'He continues seeing her.'

Since this contrast in clitic position is predictable from the finiteness (or non-finiteness) of the verb, we will not be concerned with it further here. When clitics are attached to verbs, the combination of clitic plus verb forms a single phonological word. This is reflected in Spanish orthography when the clitic follows the verb, but not when it precedes it.

1.2 Subject Pronoun Drop

In general, non-emphatic and non-contrastive subject pronouns do not occur in surface structure in Spanish. They are deleted by a rule we call Subject Pronoun Drop. In the sentences in (7), the third person singular subject pronoun has been deleted by Subject Pronoun Drop.

2. Two Classes of Verbs in Spanish

- (8) a. Luis quiere comer las manzanas amarillas.
'Luis wants to eat the yellow apples.'
b. Luis trató de comer las manzanas amarillas.
'Luis tried to eat the yellow apples.'
c. Luis suele comer las manzanas amarillas.
'Luis tends to eat (the) yellow apples.'
- (9) a. Luis insistió en comer las manzanas amarillas.
'Luis insisted on eating the yellow apples.'
b. Luis soñó con comer las manzanas amarillas.
'Luis dreamed of eating the yellow apples.'
c. Luis parece haber comido las manzanas amarillas.
'Luis seems to have eaten the yellow apples.'

Without attempting to justify this here, we assume that the (a) and (b) sentences in (8-9) involve Equi controlled by the matrix subject, while the (c) sentences involve Subject-to-Subject Raising. A pronominal object of the infinitive cliticizes to the verb, forming a single phonological word with it:

- (10) a. Luis quiere comerlas.
'Luis wants to eat them.'
- b. Luis trató de comerlas.
'Luis tried to eat them.'
- c. Luis suele comerlas.
'Luis tends to eat them.'
- (11) a. Luis insistió en comerlas.
'Luis insisted on eating them.'
- b. Luis soñó con comerlas.
'Luis dreamed of eating them.'
- c. Luis parece haberlas comido.
'Luis seems to have eaten them.'

The point of prime importance for us here is that alongside (10), the following sentences are also grammatical:

- (12) a. Luis las quiere comer.
'Luis wants to eat them.'
- b. Luis las trató de comer.
'Luis tried to eat them.'
- c. Luis las suele comer.
'Luis tends to eat them.'

In (12), the pronominal clitic that is the initial 2 of the complement verb appears on the finite matrix verb. If the matrix verb is one of the matrix verbs in (9), however, this is not possible. Thus, alongside (11), the following examples are ungrammatical:

- (13) a. *Luis las insistió en comer.
- b. *Luis las soñó con comer.
- c. *Luis las parece haber comido.

In brief, two classes of verbs must be distinguished in Spanish according to whether or not they can support a clitic pronoun that originated as a dependent of a complement verb (henceforth complement clitics). We will refer to verbs that can support complement clitics as trigger verbs and to those that cannot as non-trigger verbs. Thus, the matrix verbs of (8) are trigger verbs while those of (9) are non-trigger verbs.

For any given speaker, most verbs that govern infinitival or gerund complements fall clearly into one class or the other. However, the membership of each class varies somewhat from speaker to speaker. In this paper we present a hypothesis to account for the difference in syntactic behavior between trigger verbs and non-trigger verbs. This hypothesis does not predict the class any particular verb will belong to for any individual speaker. However, it does offer a means of testing the class membership of a particular verb for any speaker and makes certain predictions about the syntactic behavior of the verb once its class membership is known.⁴

Below is an illustrative list of trigger and non-trigger verbs.

<u>Trigger Verbs</u>	<u>Non-trigger Verbs</u>
soler 'tend'	parecer 'seem'
acabar (de) 'have just'	deber (de) 'must(epistemic)'
querer 'want'	insistir (en) 'insist'
tratar (de) 'try'	soñar (con) 'dream (of)'
poder 'can, be able'	decidirse (a) 'decide (to)'
deber 'ought, should'	evitar 'avoid'
empezar (a) 'begin'	sugerir 'suggest'
terminar (de) 'finish'	pedir 'ask'
continuar 'continue'	decir 'say'
seguir 'keep on'	afirmar 'affirm'
dejar (de) 'stop'	
volver (a) 're-,again'	
ordenar 'order'	
permitir 'permit'	

3. Three Hypotheses Concerning the Difference between Trigger Verbs and Non-Trigger Verbs

3.1 The Clitic Climbing Hypothesis

Under the Clitic Climbing hypothesis, the grammar of Spanish contains a rule of Clitic Climbing that optionally moves clitics from a subordinate clause into a higher clause under certain conditions that need not concern us here. This rule accounts for the position of the clitic pronouns in (12). Under this hypothesis, trigger verbs are characterized as triggering Clitic Climbing, while non-trigger verbs do not trigger this rule.

3.2 The Verb Adjunction Hypothesis

The Verb Adjunction hypothesis has been proposed by Rivas (1974) within the framework of transformational grammar. Under this hypothesis, trigger verbs trigger a rule of Verb Adjunction that adjoins the complement verb to the matrix verb. The rule of Clitic Placement is then formulated in such a way that its application to structures in which Verb Adjunction has applied results in complement clitics being moved to the matrix verb. Under this hypothesis, non-trigger verbs do not trigger Verb Adjunction; as a result, complement clitics never appear on a non-trigger matrix verb.

3.3 The Clause Reduction Hypothesis

In this paper, we present the Clause Reduction hypothesis within the general framework of relational grammar proposed by Perlmutter and Postal (in preparation). Under this hypothesis, trigger verbs differ from non-trigger verbs in that they trigger a rule of Clause Reduction that makes dependents of the complement verb dependents of the matrix verb. Consider (8a). Without Clause Reduction, the structure of this sentence is:

(14)



If Clause Reduction is triggered, the structure of (8a) is:

(15)



In (15), the fact that las manzanas amarillas bears the 2-relation to querer is indicated by the arc between it and querer.

Under the Clause Reduction hypothesis, there is no need for a rule of Clitic Climbing. The rule of Clitic Placement attaches each clitic to the verb of which it is a classic dependent. Thus, if instead of las manzanas amarillas the initial 2 of comer is pronominal, and if Clause Reduction is not triggered, as in (14), the pronoun is a classic dependent only of comer and therefore is attached to comer; the resulting sentence is (10a). If, on the other hand, Clause Reduction makes it a dependent of querer, as in (15), Clitic Placement attaches it to querer, and (12a) results. Under the Clause Reduction hypothesis, a clitic ends up attached to the verb of which it is a classic dependent.

Under the Clause Reduction hypothesis, trigger verbs are characterized as permitting Clause Reduction, while non-trigger verbs do not allow this rule. Since both the sentences in (10) and those in (12) are grammatical, Clause Reduction is an optional rule.

3.4 Brief Comparison of the Three Hypotheses

The three hypotheses account for the data concerning the distribution of clitics in surface structure in different ways. The Clitic Climbing hypothesis postulates an optional rule of Clitic Climbing, saying that a clitic from a complement can optionally move up to the matrix verb. The Verb Adjunction and Clause Reduction hypotheses, on the other hand, eliminate the rule of Clitic Climbing by saying that trigger verbs trigger another rule as a result of which the independently needed rule of Clitic Placement will be able to account for the surface distribution of clitics. The difference between these two hypotheses lies in the different rules they postulate to achieve this result as well as in the different theoretical frameworks in which they are embedded. The Verb Adjunction hypothesis could probably be formulated in such a way as to account for the facts presented in this paper, but we will not attempt to do that here. In this paper we will simply argue against the Clitic Climbing hypothesis and for the Clause Reduction hypothesis.

4. Evidence for Clause Reduction: Constraints on Clitic Climbing

In §4 we show that the Clause Reduction hypothesis immediately makes two predictions that the Clitic Climbing hypothesis does not make. In each case, a grammar that incorporates a rule of Clitic Climbing will be forced to postulate an additional constraint that is unnecessary in a grammar with Clause Reduction. We conclude that the data in §4 constitutes evidence for rejecting the Clitic Climbing hypothesis in favor of the Clause Reduction hypothesis.

4.1 Multiple Clitic Dependents of a Single Embedded Verb

Consider first the case of a complement verb that has more than one clitic dependent, as in

- (16) Quiero mostrárte⁺los.
 I+want show+you+them
 'I want to show them to you.'

In (16), both te and los are clitic dependents of the complement verb mostrar. Under the Clause Reduction hypothesis, (16) results from a structure that has not undergone Clause Reduction. If the underlying structure undergoes Clause Reduction, te and los will become dependents of querer and Clitic Placement will consequently attach them to that verb, producing the sentence

- (17) Te los quiero mostrar.
 'I want to show them to you.'

Under the Clause Reduction hypothesis, there are only two possibilities: either the structure undergoes Clause Reduction or it does not. The former produces (16), while the latter produces (17); no other sentences can arise from the structure in question.

Under the Clitic Climbing hypothesis, on the other hand, things are different. Since Clitic Climbing is an optional rule, there is nothing to prevent one complement clitic from moving to the matrix verb while the other stays behind. This would produce the following ungrammatical sentences:

- (18) *Te quiero mostrarlos.
 (19) *Los quiero mostrarte.

A grammar that incorporates a rule of Clitic Climbing therefore needs an additional constraint:⁶

(20) The Multiple Clitic Constraint

If a verb has more than one clitic dependent, then either all clitic dependents of that verb undergo Clitic Climbing or none do.

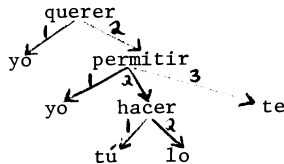
A grammar that accounts for the phenomenon by means of a rule of Clause Reduction, on the other hand, cannot generate *(18-19) and thereby automatically predicts that these sentences will be ungrammatical. In other words, the Clause Reduction hypothesis explains why these sentences are ungrammatical. The ungrammaticality

cality of sentences like *(18-19) constitutes evidence for rejecting the Clitic Climbing hypothesis, which needs an additional device to account for them, in favor of the Clause Reduction hypothesis, which explains them.

4.2 Intersecting Clitic Climbing

Now consider a three-storey structure such as⁷

(21)



in which (i) the second and third verbs each have a pronominal dependent, and (ii) the two higher verbs both optionally trigger Clause Reduction.⁸

The sentence that results from (21) is:

- (22) Quiero permitirte hacerlo.
'I want to allow you to do it.'

In (22), te is the classic 3 of permitir and lo is the classic 2 of hacer; as a result, te is attached to permitir and lo is attached to hacer in the surface structure of (22).

Consider what can happen to (21) under the Clause Reduction hypothesis.

In a structure in which only permitir triggers Clause Reduction, lo will become a dependent of permitir, producing the sentence

- (23) Quiero permitirte lo hacer.
'I want to allow you to do it.'

In a structure in which both querer and permitir trigger Clause Reduction, both te and lo will become dependents of querer, producing the sentence

- (24) Te lo quiero permitir hacer.
'I want to allow you to do it.'

In a structure in which querer triggers Clause Reduction but permitir does not, te will become a dependent of querer but lo will remain a dependent of hacer. The result will be the sentence

- (25) Te quiero permitir hacerlo.
'I want to allow you to do it.'

Finally, if neither querer nor permitir triggers Clause Reduction, te will remain a dependent of permitir and lo will remain a dependent of hacer, resulting in (22). Under the Clause Reduction hypothesis, this exhausts the possibilities.

Under the Clitic Climbing hypothesis, however, there is still another possibility. Since Clitic Climbing is optional, there is

nothing to prevent te from moving to querer and lo from moving to permitir in the same structure. The result, however, is ungrammatical:

- (26) *Te quiero permitirlo hacer.

A grammar that incorporates an optional rule of Clitic Climbing thus needs some device to prevent sentences like *(26) from being generated. Under the Clause Reduction hypothesis, on the other hand, the ungrammaticality of sentences like *(26) follows automatically, without any additional devices. Thus, unless it can be shown that the additional device or devices needed by the Clitic Climbing hypothesis to prevent sentences like *(26) are motivated independently,⁹ the ungrammaticality of such sentences constitutes grounds for rejecting the Clitic Climbing hypothesis in favor of the Clause Reduction hypothesis.¹⁰

5. Second Type of Evidence for Clause Reduction: Reflexive Passive

5.1 Reflexive Passive

Sentences (27-29) are produced by the rule we call Reflexive Passive, which advances a 2 to 1. This advancement produces sentences in which the clitic se (the third person reflexive pronoun) accompanies the verb. We therefore call this construction by the traditional name of reflexive passive.

- (27) Las propiedades se vendieron ayer.
'The pieces of property were sold yesterday.'
- (28) Estas canciones se cantan siempre primero.
'These songs are always sung first.'
- (29) Esta construcción se emplea con toda clase de sujetos.
'This construction is used with all kinds of subjects.'

In each case, the initial 2 of the verb has advanced to 1. In these examples, las propiedades, estas canciones, and esta construcción are the canonical and classic 1s of their respective verbs.

Spanish thus has two distinct rules that advance a 2 to 1.

- (27), produced by Reflexive Passive, contrasts with the sentence

- (30) Las propiedades fueron vendidas ayer.
'The pieces of property were sold yesterday.'

produced by Passive. In both (27) and (30), las propiedades, the initial 2 of vender, has advanced to 1. However, (30) has passive morphology, with fueron (a form of the auxiliary verb ser) and vendidas (the past passive participle of vender). In both (27) and (30), the finite verb is plural in agreement with its classic 1, las propiedades. The two constructions differ in another way. In an ordinary passive, the initial 1 can appear as the object of the preposition por 'by' while this is impossible in the reflexive passive:

- (31) Las propiedades fueron vendidas por los dueños ayer.
'The pieces of property were sold by the owners yesterday.'

- (32) *Las propiedades se vendieron por los dueños ayer.

The initial 1 of the construction illustrated by (27-29) is understood to be human. It never appears in surface structure in Spanish. We will refer to it as PRO. It is probably the entity that is realized as on in French and man in German.

The initial 2 that advances to 1 in sentences like (27-29) we will call the pivot nominal.

In § 5.2 we briefly sketch four arguments that the pivot nominals in (27-29) are canonical 1s. In § 5.3 we show that Reflexive Passive operates on the output of Clause Reduction, thus providing further evidence for Clause Reduction in Spanish.

5.2 The Subjecthood of the Pivot Nominal in Reflexive Passives

We now briefly sketch four pieces of evidence that the pivot nominal in reflexive passives is the canonical 1 of the verb and not its canonical 2. The first two arguments and the fourth argument are arguments that the pivot nominal is the classic 1 of its verb, from which it follows that it is also its canonical 1. The third argument is a direct argument that it is the canonical 1. Limitations of space prevent us from giving the arguments in full here; for the full arguments, see Aissen and Perlmutter (in preparation).

The first piece of evidence comes from word order. Spanish has considerable freedom of word order, but in the natural order used in many situations the classic 1 precedes the verb. The fact that the pivot nominal precedes the verb in (27-29) is thus evidence that it is the classic 1. It follows that it is also the canonical 1.

The second piece of evidence comes from the pronominal form of the pivot nominal in reflexive passives. Classic 2s appear as accusative pronouns, as in

- (33) Las vendimos ayer.
'We sold them yesterday.'

But replacement of the pivot nominals in reflexive passives by accusative pronouns results in ungrammaticality:¹¹

- (34) *Se las vendieron ayer.
(35) *Se las cantan siempre primero.

Replacement of the pivot nominals in reflexive passives by their pronominal counterparts requires nominative pronominal forms, which are generally deleted by the rule of Subject Pronoun Drop. The resulting sentences are:¹²

- (36) Se vendieron ayer.
'They were sold yesterday.'
(37) Se cantan siempre primero.
'They are always sung first.'

The pronominal form of the pivot nominal in reflexive passives is deleted by Subject Pronoun Drop, just as the pronominal forms of other classic 1s are. This is further evidence that they are classic

1s and hence also canonical 1s.

Third, 1s produced by Reflexive Passive undergo Subject-to-Subject Raising. Thus, the structure that underlies

- (38) Parece que las propiedades se vendieron ayer.

'It seems that the pieces of property were sold yesterday.'

can also be realized as

- (39) Las propiedades parecen haberse vendido ayer.

'The pieces of property seem to have been sold yesterday.'

in which las propiedades, the 1 produced by Reflexive Passive, has become the 1 of parecer, triggering the Verb Agreement rule that results in the plural form parecen. Since canonical 1s undergo Subject-to-Subject Raising, this is evidence that Reflexive Passive produces canonical 1s.

Fourth, 1s produced by Reflexive Passive undergo Head Start, a rule that applies only to classic 1s. As a result of Head Start, the classic 1 of the complement of parecer 'seem' appears in sentence-initial position, ahead of parecer, without triggering agreement on parecer. Head Start produces (40b) from the structure underlying (40a).

- (40) a. Parece que los chicos están cansados.

'It seems that the children are tired.'

- b. Los chicos parece que están cansados.

Note that the verb form parece is singular. That the pivot nominal in reflexive passives is the classic 1 can be seen in the fact that the structure underlying (38) can also be realized as:

- (41) Las propiedades parece que se vendieron ayer.

It follows that the pivot nominal is the canonical 1 of a reflexive passive.

5.3 Interaction of Clause Reduction and Reflexive Passive

We have already shown that certain verbs of Spanish, which we call trigger verbs, trigger Clause Reduction, which makes dependents of the complement verb dependents of the trigger verb; this accounts for complement clitics showing up on the trigger verb in surface structure. In § 5 we have shown that Spanish has a rule of Reflexive Passive that advances the 2 of the verb to 1. Taken together, our rule of Clause Reduction and our rule of Reflexive Passive make further predictions. Under Clause Reduction, dependents of a complement verb become dependents of the trigger verb, the 2 of the complement of a trigger verb becoming the 2 of the trigger verb itself. And since Reflexive Passive advances the 2 of a verb to 1, it should advance the original complement 2 (the derived 2 of the trigger verb) to be 1 of the trigger verb. We will now show that this prediction is correct.¹³

Consider the trigger verbs empezar 'begin,' tratar 'try,' and querer 'want.' If the prediction made jointly by Clause Reduction and Reflexive Passive is correct, there should be grammatical sentences in which the initial 2 of a verb embedded beneath one of

the trigger verbs empezar, tratar, or querer undergoes Reflexive Passive and thus becomes the canonical 1 of the trigger verb. The correctness of this prediction is indicated by the following examples:

- (42) Los mapas ya se empezaron a preparar.
the maps already began prepare
'PRO has already begun to prepare the maps.'
- (43) Las canciones cortas se tratan de cantar siempre primero.
the songs short try sing always first
'PRO always tries to sing the short songs first.'
- (44) Estas secciones de la ciudad se quieren eliminar sin
these sections of the city want eliminate without
que nadie lo sepa.
that no one it know
'PRO wants to eliminate these sections of the city without
anyone knowing it.'

In these examples, los mapas, las canciones cortas, and estas secciones de la ciudad are classic and canonical 1s of the the verbs empezaron, tratan, and quieren respectively. Each of these nominals precedes the verb of which it is the classic 1, and in each case the verb is plural in agreement with its classic 1. Further, the pro-nominal forms that replace these nominals are nominative pronouns that undergo Subject Pronoun Drop, producing the following sentences:

- (45) a. Ya se empezaron a preparar.
'PRO has already begun to prepare them.'
- b. Se tratan de cantar siempre primero.
'PRO always tries to sing them first.'
- c. Se quieren eliminar sin que nadie lo sepa.
'PRO wants to eliminate them without anyone knowing it.'

In addition, los mapas, las canciones cortas, and estas secciones de la ciudad can be shown to be canonical 1s in (42-44) by virtue of the fact that they undergo Subject-to-Subject Raising and classic 1s by virtue of the fact that they undergo Head Start.

(46) Subject-to-Subject Raising

- a. Los mapas parecen haberse empezado a preparar.
'PRO seems to have begun to prepare the maps.'
- b. Las canciones cortas parecen haberse tratado de cantar primero.
'PRO seems to have tried to sing the short songs first.'
- c. Estas secciones de la ciudad parecen quererse eliminar sin que nadie lo sepa.
'PRO seems to want to eliminate these sections of the city without anyone knowing it.'

(47) Head Start

- a. Los mapas parece que ya se empezaron a preparar.
- b. Las canciones cortas parece que se tratan de cantar siempre primero.

- c. Estas secciones de la ciudad parece que se quieren eliminar sin que nadie lo sepa.

Our hypothesis makes another prediction - that if the matrix verb in (42-44) is replaced by a verb that does not trigger Clause Reduction, then such sentences will be ungrammatical. This prediction is also correct. We illustrate this with the verbs insistir en, 'insist on' and soñar con 'dream of,' shown in § 2 to be non-trigger verbs.

Consider the sentences

- (48) Los turistas insistieron en visitar las pirámides.
'The tourists insisted on visiting the pyramids.'
(49) Sueño con solucionar esos problemas.
'I dream of solving those problems.'

If the subjects of (48-49) are replaced by PRO, the sentences that would be produced by Reflexive Passive are ungrammatical:

- (50) *Las pirámides se insistieron en visitar.
(51) *Esos problemas se sueñan con solucionar.

The ungrammaticality of these examples follows automatically under our hypothesis, under which only the 2 of a verb can undergo Reflexive Passive. Since insistir en and soñar con do not trigger Clause Reduction there is no way that las pirámides and esos problemas can become 2s of these verbs, hence they cannot undergo Reflexive Passive. Thus *(50-51) are ungrammatical.

Finally, note that if several verbs that trigger Clause Reduction are embedded one beneath the other, the initial 2 of a verb several storeys down can become the 2 of a trigger verb several storeys up and can therefore undergo Reflexive Passive. This results in sentences like

- (52) Estas secciones de la ciudad se quieren tratar de eliminar sin que nadie lo sepa.
'PRO wants to try to eliminate these sections of the city without anyone knowing it.'

Estas secciones de la ciudad, the initial 2 of eliminar, becomes the 2 of querer (two storeys up) by Clause Reduction, and thus becomes the canonical 1 of querer by Reflexive Passive. The result is (52). But if a verb that does not trigger Clause Reduction intervenes, there is no way that the initial 2 of eliminar can become the 2, and hence (by Reflexive Passive) the 1, or querer. As a result, the following sentence is ungrammatical:

- (53) *Estas secciones de la ciudad se quieren insistir en eliminar sin que nadie lo sepa.
'PRO wants to insist on eliminating these sections of the city without anyone knowing it.'

In sum, in § 5.3 we have shown that the initial 2 of a complement verb can become the canonical 1 of a matrix verb by Reflexive Passive

in those cases, and only in those cases, where it can become the 2 of that matrix verb by Clause Reduction. This is exactly what our hypothesis predicts.

6. Third Type of Evidence for Clause Reduction: Object Raising

6.1 Object Raising

Predicates like fácil 'easy,' difícil 'difficult,' and imposible 'impossible' take clausal 1s that can be extraposed, producing sentences like the following:

- (54) Será difícil componer estas radios.
'It will be difficult to fix these radios.'
- (55) Es fácil entender los resultados.
'It is easy to understand the results.'
- (56) Fue imposible comer el postre.
'It was impossible to eat the dessert.'

Spanish has a rule of Object Raising that promotes the 2 of a verb embedded immediately beneath one of these predicates to 1 of the matrix predicate. Object Raising produces sentences like the following:

- (57) Estas radios serán difíciles de componer.
'These radios will be difficult to fix.'
- (58) Los resultados son fáciles de entender.
'The results are easy to understand.'
- (59) El postre fue imposible de comer.
'The dessert was impossible to eat.'

In each of these sentences, the initial 2 of the complement is the canonical and classic 1 of the matrix clause, triggering agreement of the matrix verb and adjective. Thus, in (57) serán and difíciles are plural in agreement with estas radios, and in (58) son and fáciles are plural in agreement with los resultados. Note also that in Object Raising sentences the preposition de appears between the Object Raising trigger and the complement.

In all of the above examples, the 3 of the matrix clause (which is coreferential with the 1 of the embedded clause) is understood as PRO. Non-PRO 3s of the matrix clause appear in surface structure, preferably in clause-initial position:¹⁴

- (60) A Francisco le será difícil componer estas radios.
'For Francisco it will be difficult to fix these radios.'
- (61) A Francisco estas radios le serán difíciles de componer.
'For Francisco these radios will be difficult to fix.'

In § 6.2 we briefly sketch the evidence that the nominals promoted by Object Raising are canonical 1s. In § 6.3 we show that Object Raising operates on structures produced by Clause Reduction, providing further evidence for Clause Reduction in Spanish.

6.2 The Subjecthood of the Promoted Nominal in Object Raising Sentences

In § 6.2 we argue that the promoted nominal in Object Raising sentences is the canonical 1 of the matrix verb and adjective.¹⁵ Under an analysis in which the verb and adjective are each the initial main verb of a clause, the promoted nominal is the classic 1 of the verb and the canonical 1 of the adjective. From this it follows that it is also the canonical 1 of the verb. In this discussion, however, we will ignore this difference between the verb and the adjective, speaking loosely of the promoted nominal as the canonical 1 of both.

In § 6.1 we pointed out that the promoted nominal in Object Raising sentences triggers agreement on the matrix verb and adjective. This is one piece of evidence that it is a canonical 1.¹⁶

In addition, the kinds of evidence used to show that the pivot nominal in 2-Advancement sentences is the canonical 1 of the verb can also be used to argue for the canonical 1-hood of the promoted nominal in Object Raising sentences.

First, the fact that it generally appears in preverbal position in surface structure follows automatically if it is a classic 1. From this it follows that it is the canonical 1.

Second, if the promoted nominals are pronominal, they are nominative and undergo Subject Pronoun Drop:

- (62) Serán difíciles de componer.
'They will be difficult to fix.'
- (63) Son fáciles de entender.
'They are easy to understand.'

Since classic 1s undergo Subject Pronoun Drop, this is evidence that the promoted nominal is the classic (and hence canonical) 1.

Third, the promoted nominals undergo Subject-to-Subject Raising, which produces the (b)-sentences below from the structures underlying the corresponding (a)-sentences:

- (64) a. Parece que estas radios son difíciles de componer.
'It seems that these radios are difficult to fix.'
b. Estas radios parecen ser difíciles de componer.
'These radios seem to be difficult to fix.'
- (65) a. Parece que los resultados son fáciles de entender.
'It seems that the results are easy to understand.'
b. Los resultados parecen ser fáciles de entender.
'The results seem to be easy to understand.'

Fourth, the promoted nominals can undergo Head Start, which produces the following sentences from the structures underlying (64a) and (65a):

- (66) Estas radios parece que son difíciles de componer.
- (67) Los resultados parece que son fáciles de entender.

6.3 Interaction of Clause Reduction and Object Raising

We have shown that Spanish has a rule of Object Raising that promotes the 2 of verbs embedded beneath Object Raising triggers. The rule of Clause Reduction and the rule of Object Raising, taken together, make further predictions. Under Clause Reduction, dependents of a complement verb become dependents of the trigger verb, the 2 of the complement of a trigger verb becoming the 2 of the trigger verb. And since Object Raising promotes the 2 of a verb, it should promote the original complement 2 (the derived 2 of the trigger verb). We will now show that this prediction is correct.

Consider a structure in which difícil has a clausal 1 with a Clause Reduction trigger and a complement embedded beneath it. One such structure can be realized, with Extraposition, as:

- (68) Será difícil empezar a hacer estos mapas.
'It will be difficult to begin to make these maps.'

Since Clause Reduction makes the 2 of hacer the 2 of empezar, Object Raising should be able to make it the 1 of difícil. And it can:

- (69) Estos mapas serán difíciles de empezar a hacer.
'These maps will be difficult to begin to make.'

Similarly, if we substitute the trigger verb dejar (de) 'stop' for empezar, the initial 2 of the verb embedded beneath it can be promoted by Object Raising:

- (70) Es casi imposible dejar de comer estas galletas.
'It's almost impossible to stop eating these cookies.'
- (71) Estas galletas son casi imposibles de dejar de comer.
'These cookies are almost impossible to stop eating.'

Clause Reduction makes estas galletas the 2 of dejar, and Object Raising makes it the 1 of imposible.

The Clause Reduction hypothesis, together with the rule of Object Raising, further predicts that if a verb that does not trigger Clause Reduction is embedded beneath an Object Raising trigger, then the 2 of an embedded verb will not be able to undergo Object Raising. We will illustrate this with the verbs insistir (en) and soñar (con), which do not trigger Clause Reduction. These verbs can be embedded beneath difícil, as the following sentences show:

- (72) Es difícil insistir en hacer tales cosas.
'It is difficult to insist on doing such things.'
- (73) Es fácil soñar con componer sinfonías como esa.
'It is easy to dream of composing symphonies like that one.'

But, exactly as our hypothesis predicts, the corresponding Object Raising sentences are ungrammatical:

- (74) *Tales cosas son difíciles de insistir en hacer.
'Such things are difficult to insist on doing.'

- (75) *Sinfonías como esa son fáciles de soñar con componer.
'Symphonies like that one are easy to dream of composing.'

Our hypothesis likewise predicts that a nominal initially embedded several storeys down can become the 1 of an Object Raising trigger as long as all the intervening verbs are Clause Reduction triggers. And this is correct:

- (76) Errores como esos son difíciles de seguir tratando de corregir.
'Mistakes like those are difficult to keep on trying to correct.'

But if one of the intervening verbs is not a Clause Reduction trigger, there will be no way for the embedded nominal to become the 2 of the verb embedded immediately beneath the Object Raising trigger, and the resulting sentence with Object Raising will be ungrammatical:

- (77) *Errores como esos son imposibles de seguir insistiendo en corregir.
'Mistakes like those are impossible to keep on insisting on correcting.'

The ungrammaticality of *(77) follows from the fact that insistir does not trigger Clause Reduction.

In sum, in § 6.3 we have shown that in structures in which Clause Reduction has made the 2 of a verb embedded two storeys below an Object Raising trigger the 2 of the verb immediately beneath the Object Raising trigger, this 2 can become the matrix 1 by Object Raising. But in structures without Clause Reduction this is impossible. This is exactly what the Clause Reduction hypothesis predicts.

7. Further Evidence for Clause Reduction: Interaction of Reflexive Passive and Object Raising with Clitic Placement

7.0 Introduction

In § 5-6, we argued for Clause Reduction by showing that initial downstairs 2s behave like upstairs 2s by undergoing Reflexive Passive and Object Raising as 2s of the upstairs verb. Our formulation of Clause Reduction, however, makes not only the downstairs 2, but any dependent of the complement verb a dependent of the matrix verb. In this section we provide evidence that 3s of the complement become dependents of the matrix verb.

Crucial to the discussion is the assumption made explicit in § 3.3 that a pronominal dependent cliticizes to the verb of which it is a dependent. Our argument focuses on the position of clitics corresponding to initial downstairs 3s in sentences with Clause Reduction. The Clause Reduction hypothesis predicts that in a Clause Reduction structure the initial downstairs 3 will cliticize only to the upper verb and not to the lower verb. In § 7 we show that this prediction is correct.

7.1 Clitic Placement and Reflexive Passive

Consider the sentences:

- (78) a. Los dueños quieren alquilarles estas casas a los generales.
 b. Los dueños les quieren alquilar estas casas a los generales.
 'The owners want to rent these houses to the generals.'

The les in (78) is a clitic copy of the 3 los generales. (See footnote 14.) Since Clause Reduction is optional, there are two grammatical outputs. In (78a), without Clause Reduction, los generales is the classic 3 of alquilar and not of querer, and les consequently cliticizes to alquilar. In (78b), with Clause Reduction, los generales is the classic 3 of querer, and les consequently cliticizes to querer.

Now consider the structure that is like that of (78) except that the initial 1 of querer is PRO instead of los dueños. The structure to be considered has Clause Reduction and Reflexive Passive, with the result that the initial 2 of the complement is the classic 1 of querer. Now, our hypothesis that in sentences with Clause Reduction all dependents of the lower verb become dependents of the upper verb predicts that los generales, the initial 3 of alquilar, is a classic dependent of the upstairs verb, and that les will consequently cliticize to querer, the upstairs verb. And this is correct:

- (79) Estas casas se les quieren alquilar a los generales.
 'PRO wants to rent these houses to the generals.'

The fact that under Clause Reduction los generales must become a dependent of querer can be seen in the fact that its clitic copy les cannot cliticize to the lower verb:

- (80) *Estas casas se quieren alquilarles a los generales.

The ungrammaticality of *(80) is an automatic consequence of our hypothesis. The fact that las casas is advanced to 1 of querer by Reflexive Passive shows that this is a structure with Clause Reduction. This being the case, los generales must be the classic 3 of querer, and as a result its clitic copy les must cliticize to querer rather than to alquilar.

The same thing can be seen in the following examples. Since Clause Reduction is optional, los estudiantes can be the classic 3 of either vender or empezar, with the corresponding differences in the placement of its clitic copy les:

- (81) a. Esa compañía empezó a venderles estos libros a los estudiantes.
 b. Esa compañía les empezó a vender estos libros a los estudiantes.
 'That company began to sell these books to the students.'

But in a structure in which Reflexive Passive makes the initial 2 of vender the 1 of empezar, Clause Reduction must have made all dependents of vender dependents of empezar, with the result that the clitic copy of los estudiantes must cliticize to empezar and

cannot cliticize to vender:¹⁷

- (82) a. Estos libros se les empezaron a vender a los
estudiantes.
'PRO began to sell these books to the students.'
b. *Estos libros se empezaron a venderles a los
estudiantes.

Thus, the Clause Reduction hypothesis explains why the advancement of an initial complement 2 by Reflexive Passive in the upper clause restricts the placement of an initial complement clitic to the upper verb.

7.2 A Contrast Explained

We have seen that both Equi triggers like querer 'want' and Subject-to-Subject Raising triggers like soler 'tend' that trigger Clause Reduction make it possible for the initial downstairs 2 to become the canonical 1 of the upstairs verb by Reflexive Passive, as in the following examples:

- (83) Secciones de la ciudad como esas se suelen eliminar sin
que nadie lo sepa.
'PRO tends to eliminate sections of the city like those
without anyone knowing it.'
(84) Secciones de la ciudad como esas se quieren eliminar sin
que nadie lo sepa.
'PRO wants to eliminate sections of the city like those
without anyone knowing it.'

However, there is an interesting contrast between these two classes of verbs. In the case of Subject-to-Subject Raising triggers, the clitic se that results from Reflexive Passive can also appear on the downstairs verb, while in the case of Equi triggers this is not possible:

- (85) Secciones de la ciudad como esas suelen eliminarse
sin que nadie lo sepa.
'PRO tends to eliminate sections of the city like those
without anyone knowing it.'
(86) *Secciones de la ciudad como esas quieren eliminarse
sin que nadie lo sepa.

At first glance, the contrast between (85) and *(86) might seem mysterious. This contrast, however, follows automatically from our hypothesis. In the case of Subject-to-Subject Raising triggers like soler, Reflexive Passive in the complement can make the initial 2 of the complement the canonical 1 of the complement. As a result of Subject-to-Subject Raising, the canonical 1 of the complement becomes the canonical 1 of the matrix verb. All of this happens in a sentence without Clause Reduction (which is optional). As a result, the initial 2 of the complement is the canonical 1 of the matrix verb, but the se that results from Reflexive Passive in the complement is still in the complement.¹⁸ It consequently cliticizes to the complement verb, and sentences like (85) result. With an Equi trigger

like querer, however, this is impossible. With such verbs, the only way that the initial 2 of the complement can become the 1 of the matrix verb is as a result of the combination of Clause Reduction and Reflexive Passive. And in such cases, since the resulting structure has only one clause no clitics can appear on the complement verb. These sentences like *(86) are ungrammatical.

Thus, contrasts like that between (85) and *(86) are an automatic consequence of our hypothesis. At the same time, they provide an additional piece of evidence for the syntactic difference between Equi triggers and Subject-to-Subject Raising triggers that is quite unlike any of the arguments offered in support of the distinction between these two classes of verbs in English.

7.3 Clitic Placement and Object Raising

Consider the structure that is actualized as:

- (87) a. Va a ser difícil empezar a hacerles estos mapas a los profesores.
 b. Va a ser difícil empezarles a hacer estos mapas a los profesores.
 'It's going to be difficult to begin to make these maps for the professors.'

If empezar does not trigger Clause Reduction, estos mapas and los profesores are classic dependents of hacer, and les (the clitic copy of los profesores) consequently cliticizes to hacer, as in (87a). On the other hand, if empezar triggers Clause Reduction, estos mapas and los profesores are classic dependents of empezar, and les consequently cliticizes to empezar, as in (87b).

If empezar triggers Clause Reduction, estos mapas (as the 2 of empezar) can undergo Object Raising, becoming the 1 of difícil. Since this can happen only in a sentence with Clause Reduction, and since Clause Reduction makes both estos mapas and los profesores dependents of empezar, our hypothesis automatically predicts that the clitic copy les of los profesores cannot cliticize to hacer. And this is correct:

- (88) *Estos mapas van a ser difíciles de empezar a hacerles a los profesores.
 'These maps are going to be difficult to begin to make for the professors.'

Thus, our hypothesis automatically explains why, in Object Raising sentences like *(88), a clitic corresponding to the initial complement 3 cannot appear on the complement verb.

In Object Raising sentences, most speakers relax the requirement that the 3 have a clitic copy. Thus the structure underlying *(88) is actualized as:

- (89) Estos mapas van a ser difíciles de empezar a hacer a los profesores.
 'These maps are going to be difficult to begin to make for the professors.'

In sentences that are like (89) except that los profesores has a clitic copy, the clitic should attach to empezar because los profesores is a dependent of empezar. However, the resulting sentence is ungrammatical:

- (90) *Estos mapas van a ser difíciles de empezarles a hacer a los profesores.

The ungrammaticality of sentences like *(90) is left unexplained by our hypothesis.

8. Clause Union in Causatives and Clause Reduction

The causative construction in a number of different languages has been the subject of considerable study in recent years. In Spanish, this construction is found with the verbs hacer 'make' and dejar 'let.'¹⁹ In the framework of relational grammar being developed by Perlmutter and Postal, this construction is produced by the rule of Clause Union, which makes all dependents of the embedded verb into dependents of the matrix verb. When the complement is a 2-complement, Clause Union is universally characterized by the following:

- (91) a. If the complement is intransitive, the 1 of the complement verb becomes the 2 of the matrix verb.
 b. If the complement is transitive, the 2 of the complement verb becomes the 2 of the matrix verb and the 1 of the complement verb becomes the 3 of the matrix verb.

Clause Union produces sentences like the following:

- (92) Los hice caminar toda la noche.
 'I made them walk all night.'
 (93) Les hice poner sus nombres en la lista.
 'I made them put their names on the list.'

The complement 1 is the accusative pronoun los in (92) and the dative pronoun les in (93), indicating their status as classic 2 and 3 of hacer, respectively. With dejar, Clause Union is optional. In sentences with Clause Union, the complement 1 is the canonical 2 or 3 of the matrix verb, as in (92-93). Sentences without Clause Union may undergo Subject-to-Object Raising, which makes the complement 1 the 2 of dejar (regardless of the transitivity of the complement).

The question naturally arises as to the relationship between Clause Union in the causative construction and the process of Clause Reduction that is the topic of this paper. We characterized Clause Reduction by saying that dependents of the complement verb become dependents of the matrix verb. That is also the characterization of Clause Union in the causative construction. Viewed in the framework of relational grammar, the two must be the same rule. We will consequently begin to use the term Clause Union to refer to the process

studied in this paper.

The trigger verbs considered in this paper trigger Clause Union optionally. In this respect, they are like dejar rather than like hacer.

There is another respect in which the trigger verbs studied in this paper differ from both dejar and hacer. Consider what happens with querer. There are grammatical sentences of Spanish in which the 1 of the complement of querer is distinct from the 1 of querer:

- (94) Pilar quiere que mis primos pongan sus nombres en la lista.

'Pilar wants my cousins to put their names on the list.'

In (94), the complement is introduced by que, which is found in sentences with querer in which the complement and matrix 1s are distinct. But in sentences with querer that undergo Clause Union, the complement 1 has been deleted by Equi. Clause Union with querer is thus subject to the condition that the complement 1 must be deleted in order for Clause Union to be possible. This condition differentiates querer from dejar and hacer, accounting for the fact that sentences like (93) with hacer are not possible with querer:²⁰

- (95) *Pilar les quiere poner sus nombres en la lista a mis primos.

The other Equi triggers that trigger Clause Union that we have discussed in this paper are subject to the same condition as querer.

Since Clause Union is possible with these verbs only if the complement 1 is the victim of Equi, (91) holds with these verbs. Since the complement 1 is out of the picture, the only part of (91) that is relevant is that the complement 2 becomes the 2 of the matrix verb. Evidence that this is correct has already been presented in § 5-6.

It remains to consider the Subject-to-Subject Raising triggers that trigger Clause Union.

We could say that the following characterizes Clause Union with these verbs:

- (96) The 1 of the complement verb becomes the 1 of the matrix verb and the 2 of the complement verb becomes the 2 of the matrix verb.

(96) describes the data. But if we adopt (96), we have it as an additional statement in addition to (91), which is needed independently.

(96) is not needed to make the complement 2 the 2 of the matrix verb, since (91b) does that. (96) is needed only to make the 1 of the complement the 1 of the matrix verb. But we already have a device that makes the 1 of the complement into the 1 of the matrix verb: Subject-to-Subject Raising, which these verbs trigger. Thus, if we say that Clause Union operates on structures produced by Subject-to-Subject Raising, (96) can be eliminated. Then we can say that Equi

triggers like querer 'want' and Subject-to-Subject Raising triggers like soler 'tend' allow Clause Union under exactly the same condition:

- (97) Clause Union is possible with these verbs only if the complement has no 1.

Thus Clause Union will be possible with Equi triggers like querer only upon deletion of the complement 1 by Equi, and with Subject-to-Subject Raising triggers like soler only upon raising of the complement 1 to become the 1 of the matrix verb. Condition (97) governs Clause Union with both of these verb classes. And the fact that they are subject to this condition is what differentiates the behavior of these verbs with respect to Clause Union from that of hacer and dejar, which are not subject to (97).

9. A Proposed Universal of Grammar

We began this study with the observation that with certain matrix verbs, clitics that originate in the complement can appear on the matrix verb. We considered two hypotheses to account for this phenomenon of clitic climbing - one that posited a rule of Clitic Climbing and one that posited a rule of Clause Union. We have given evidence that in Spanish, the clitic climbing phenomenon is due to Clause Union and not to a rule of Clitic Climbing. We now wish to make an additional claim:

- (98) The grammar of no natural language contains a rule of Clitic Climbing that moves clitics from a complement clause into the matrix clause.

We claim that in any language with the clitic climbing phenomenon, this is due to the rule of Clause Union that unites the two clauses into a single clause. Clitic Placement then places a clitic on the verb of which it is a classic dependent.²¹ The fact that this happens in Spanish, we claim, is not an accident of Spanish grammar, but the only possibility.

(98) states the claim that Clitic Climbing is not a possible rule of human language. We thus adopt the view that particular languages are not free to make up rules, but rather must select their rules from a restricted inventory of rules put at their disposal by Universal Grammar.²²

Our claim that the clitic climbing phenomenon is universally due to Clause Union makes certain testable predictions.

First, recall the constraints on placement of more than one clitic dependent of the same verb that were discussed in § 4.1, and the ungrammaticality of sentences with intersecting clitic climbing of the kind that were discussed in § 4.2. Our hypothesis that the clitic climbing phenomenon is universally due to Clause Union predicts that these phenomena will be universal. More specifically, in no language will sentences like those starred in § 4 be grammatical.

Our hypothesis that the clitic climbing phenomenon is universally due to Clause Union has two sides to it. On the one hand, we claim that no language can have a rule of Clitic Climbing. On the other, we propose that in languages in which clitics are placed on the verb, a clitic is placed on the verb of which it is a classic dependent. This makes predictions about the placement of clitics in sentences in which initial dependents of a complement verb become dependents of the matrix verb.

In the framework of relational grammar in which we are working, there are two (and only two) ways that dependents of a complement verb can become dependents of the matrix verb - by raising rules and by Clause Union. Our hypothesis about Clitic Placement predicts that in cases in which complement dependents become matrix verb dependents by a raising rule, the raised nominal, if pronominal, will cliticize in the matrix clause. Other dependents of the complement verb, which do not become dependents of the matrix verb, will cliticize in the complement.

In cases where a given verb triggers Clause Union, however, all dependents of the complement verb will become dependents of the matrix verb. Thus, if they are pronominal, they will cliticize in the matrix clause. There are two aspects of this prediction.

First, our hypothesis predicts that in a language with the clitic climbing phenomenon, the class of verbs that can be shown on other grounds to trigger Clause Union will be the same class of verbs that accepts complement clitics, while those verbs that do not trigger Clause Union will be the verbs that do not accept complement clitics.

Second, our hypothesis predicts that in a given sentence that can be accounted for only on the assumption that Clause Union has been triggered (such as the reflexive passives in Spanish discussed in § 5 and the Object Raising sentences discussed in § 6), clitics originating in a complement that has merged with the matrix clause can be placed only on the matrix verb and not on the complement verb. Any deviations from this will be due to rules or constraints for which there is independent evidence in the language in question.

Stated in the most general terms, our hypothesis predicts that whatever evidence there may be in a particular language to decide between the Clitic Climbing hypothesis and the Clause Union hypothesis will in fact decide in favor of the Clause Union hypothesis.

Footnotes

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1. For more extensive discussion of this phenomenon in both Spanish and Italian, see Aissen and Perlmutter (in preparation).
2. This structure ignores a number of things, such as the tense of the verb, the internal structure of the nominal un regalo, and the clitic copy le of the 3 Mercedes. Spanish has a rule that creates pronominal copies of 3s. These pronominal copies appear as clitics attached to the verb in surface structure. This copying rule is generally obligatory. It produces the clitics that are crucial to the argument in § 7.
3. Throughout this discussion, we speak of the grammatical relations that nominals bear to criticar and to parecer, ignoring the verb forms fueron in (3a) and haber and sido in (3b).
4. The class membership of verbs whose indirect objects control Equi is subject to extreme variation from speaker to speaker. For example, for many speakers ordenar 'order' is a trigger verb, while sugerir is a non-trigger verb. But there are many speakers for whom sugerir is a trigger verb, and some speakers for whom ordenar is a non-trigger verb.
We have noticed that for many speakers there are certain verbs whose class membership is not clear. In such cases, the speaker may have difficulty deciding whether a particular verb behaves like a trigger verb or a non-trigger verb, or may change his or her mind from week to week.
5. Not only do diagrams (14) and (15) ignore tense and the internal structure of nominals, they should not be interpreted as making any claims whatsoever about Equi or the representation of coreference. The complement subject deleted by Equi is represented here as a pronoun simply for convenience, but that does not mean that we claim that it is present in pronominal form in the structure. These diagrams also fail to indicate deletion by Equi.
6. The Multiple Clitic Constraint is not the only device one might use to rule out ungrammatical sentences like *(18-19) in the framework of transformational grammar. For example, one might postulate a structure in which all clitic dependents of a verb are dominated by a single node and then make Clitic Climbing move that node rather than moving the clitics individually. The point is that under the Clitic Climbing hypothesis, the ungrammaticality of *(18-19) does not follow automatically. Under the Clause Reduction hypothesis, on the hand, it does.
7. (21) does not indicate the consequences of Equi, which deletes the 1 of permitir and the 1 of hacer. Further, the 3 of permitir is arbitrarily represented in the clitic form te and the 2 of hacer is arbitrarily represented in the clitic form lo. This is done only for convenience and incorporates no claims concerning the actual structures involved.

8. As was indicated in § 2, there is a great deal of variation from speaker to speaker with respect to which verbs are trigger verbs, especially in the case of verbs that take an initial 3. Thus, while permitir is a trigger verb for many speakers, there are also speakers for whom it is a non-trigger verb. For such speakers, our argument can be reconstructed using a different verb in the examples.

9. It might be thought that the ungrammaticality of such sentences will follow from the conjunction of the following three things:

- a) a cyclical theory of grammar
- b) a statement that the rule of Clitic Climbing is cyclical
- c) whatever device is used to account for the ungrammaticality of sentences like *(18-19) in § 4.1.

Thus, it might be thought that once lo moves to permitir on the second cycle, te and lo will have to move together thenceforth, or not move at all, and that *(26) will therefore not be generated. To see that this will not be sufficient to prevent the generation of ungrammatical sentences, consider:

- (i) *Jorge dijo que te quiero permitirlo hacer.
'Jorge said that.....'

Even with a)-c), under the Clitic Climbing hypothesis ungrammatical sentences like *(i) can be generated in the following way:

- (i) on the querer-cycle, te attaches to quiero.
- (ii) on the cycle of dijo, lo attaches to permitir.

Thus, even with a)-c), it would still be necessary to posit something to prevent sentences like *(i) from being generated. To accomplish this, one could add:

- d) a condition like the Strict Cycle Condition proposed by Chomsky (1973, 243).

However, this proposal is still untenable because in a cyclical theory of grammar, Clitic Climbing cannot be a cyclical rule. This conclusion was reached by Perlmutter (1973). We give here only one of his arguments, which is based on the Platense dialect of Spanish spoken in the Río de la Plata basin of Argentina and Uruguay.

The Platense dialect has an obligatory rule of Clitic Doubling that creates a pronominal copy of a definite animate 2; as a result of Clitic Placement, the pronominal copy appears on the verb in surface structure. This dialect thus has sentences like

- (ii) Los vi a los chicos ayer.
'I saw the children yesterday.'

in which the los preceding the verb is a clitic copy of the 2 los chicos. Clitic Doubling in the complement of an Object Raising trigger can be seen in the sentence

- (iii) Es difícil convencerlos a los chicos.
'It is difficult to convince the children.'

in which the clitic copy los of the 2 of convencer appears on convencer. Now, if Clitic Doubling is a cyclical rule, it will apply in the complement of sentences like (iii) on the first cycle. However, Object Raising might apply on the second cycle, producing the ungrammatical sentence

- (iv) *Los chicos son difíciles de convencerlos.

The grammatical sentence that must result is

- (v) Los chicos son difíciles de convencer.
'The children are difficult to convince.'

without a clitic copy. One could propose adding an ad hoc constraint to the grammar preventing Object Raising from applying if Clitic Doubling has applied in the complement, but even that would not work in dialects such as the Platense dialect in which Clitic Doubling is obligatory; with such a constraint in the grammar, (v) could not be generated. It is therefore necessary to conclude that in a cyclical theory of grammar, Clitic Doubling is a post-cyclical rule.

To show that Clitic Climbing cannot be a cyclical rule, it suffices to show that it applies to clitics produced by Clitic Doubling, as in:

- (vi) a. Quiero seguir criticándolos a los candidatos.
'I want to continue criticizing the candidates.'
b. Quiero seguirlos criticando a los candidatos.
c. Los quiero seguir criticando a los candidatos.

Since Clitic Climbing cannot be a cyclical rule and b) states that it is, any account of the ungrammaticality of sentences like *(26) that depends on b) must be spurious.

For dialects of Spanish that do not have the rule of Clitic Doubling, the interaction of Cliticization and Object Raising can be used to show that Cliticization must be post-cyclical in a cyclical theory of grammar. It then follows that Clitic Climbing cannot be cyclical because it applies to clitics produced by Cliticization. However, limitations of space prevent us from giving the argument here.

10. Note that the Clause Reduction hypothesis also correctly predicts the ungrammaticality of the sentence

- (vii) *Lo quiero permitirte hacer.

in which lo, the initial dependent of hacer, appears on the matrix verb querer, while te, the initial dependent of permitir, remains on permitir. Under the Clause Reduction hypothesis, the only way that lo can appear on querer in surface structure is if both querer and permitir trigger Clause Reduction. But then te would appear on querer as well, and the result would be (24).

11. (34-35) are actually generated by the grammar as grammatical sentences as a result of the application of the Spurious-se rule discussed by Perlmutter (1971, 20-25) and Aissen and Rivas (1975). This rule produces (34-35) from sentences with the clitic sequences le las or les las by changing the third person dative pronoun le or les to se. Thus (34-35) are grammatical with the meanings 'They sold them to him/her/them yesterday' and 'They always sing them to him/her/them first.' But the se in (34-35) cannot be the se found in reflexive passives, and as a result (34-35) do not have the meanings they would have if they were reflexive passives. Because they are ungrammatical as reflexive passives, we have starred them.

12. Subject pronouns can remain in surface structure only if they are animate and under emphasis or contrast. Since the pivot nominals in the sentences under discussion are inanimate, the nominative pronominal forms they would have cannot appear in surface structure, but rather must be deleted by Subject Pronoun Drop.

13. Arguments similar to these are offered by Rivas (1974) in support of the Verb Adjunction hypothesis.

14. Spanish has a rule doubling a 3 as a clitic pronoun. In most instances, this rule is obligatory. The le in (60-61) is the clitic copy of the 3 (Francisco).

15. Here again, we give the arguments for subjecthood in abbreviated form. To see them spelled out in greater detail, see Aissen and Perlmutter (in preparation).

16. Although we do not wish to argue for any particular analysis of Agreement here, it seems that in Spanish, Adjective Agreement makes a (predicate) adjective agree with its canonical 1, while Verb Agreement makes a verb agree with its classic 1.

17. Some speakers accept sentences such as

- (viii) Estos libros se empezaron a vender a los estudiantes.
'PRO began to sell these books to the students.'

in which the 3 los estudiantes lacks a clitic copy. In this construction these speakers relax the requirement that the 3 have a clitic copy.

18. In using the phrase "is still in the complement" we are deliberately being imprecise because a discussion of the nature of Reflexive Passive in Spanish lies beyond the scope of this paper. Given our assumption that Clitic Placement places a clitic on the verb of which it is a dependent, it would have to be the case that the se that results from Reflexive Passive is a dependent of the verb. In fact, we claim that this is the case, since we would maintain that Reflexive Passive advances the 2 of a verb to 1, leaving

behind a copy as 2, which reflexivizes. As a result, we get the reflexive pronoun se, which is a dependent of the verb and cliticizes to it. Spanish Reflexive Passive is thus a member of the class of copy advancements postulated by Perlmutter and Postal (in preparation). To justify that here, however, would take us beyond the scope of this paper.

19. For studies of this construction in Spanish, see Aissen (1974a, 1974b) and Bordelois (1974).

20. *(95) might be grammatical for some speakers with the meaning 'Pilar wants to put their names on the list for my cousins,' but regardless of whether or not it can have this meaning, it definitely is not grammatical with a meaning synonymous with (94). Since this is the only point of relevance here, we have starred it.

21. In languages in which the clitic appears not on the verb itself, but rather in second position in the clause, the clitic will appear in second position in the clause defined by the verb of which it is a classic dependent. In the discussion that follows, we will speak loosely of Clitic Placement as placing clitics "on the verb," not bothering to repeat each time that in some languages clitics actually appear in second position in the clause in surface structure, rather than attached to the verb.

22. On this view of the nature of the options open to particular languages, see Postal (1970), Ross (1970), Bach (1971), Hankamer (1971), and Perlmutter and Orešnik (1973).

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Interfixes Preserve Syllables and Word Roots

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The interfix has recently been defined by Malkiel (1970: 12) as an element "typically devoid of any clearly circumscribed meaning and in many instances serving no immediately recognizable purpose, which appears wedged in between the radical and the word-final derivational suffix." We can extend this definition further and state that the interfix has no meaning and fulfills one of several phonological purposes that result in the preservation of word roots and syllables. We want to posit an observable phonological function for interfixes as the best answer to critics who reject the interfix entirely. These critics (Baumann 1971 and Lázaro Carreter 1972) prefer an analysis with root + suffix rather than root + interfix + suffix. Such an analysis would describe Spanish polvareda 'dust cloud' as polvar=eda or polv-areda; that is, either the root would be complex, since polv-o is the word for 'dust,' or the suffix -areda would contrast with many other suffixes ending in -eda. In a better analysis, -ar- is an interfix.

Arguments may be made in favor of the interfix on the basis of theoretical economy (Malkiel 1970: 12). Without the interfix, we would be forced to posit multiple forms of the root, which would be difficult to justify semantically, or many long suffixes with all the attested permutations of interfixes and suffixes combined; this would complicate the grammar and the lexicon too much. However, this paper will not deal with the issue of theoretical economy, but rather with a study of the structure of word roots and of syllables under the influence of interfixes.

By simple definition, we could say that the interfix preserves word roots from having alternative forms for one semantic idea, or that the interfix keeps roots from phonological contamination by suffixes. But we are interested in the means by which the interfix preserves the root from phonological contamination by suffixes and adjusts the stress to prevent or remedy the rise of allomorphic forms of the root. If there were direct contact between the root and the suffix, diphthongization and assimilation would occur in many words.

A language that contains many examples of interfixes is the Cabraniego dialect of Asturian in Northern Spain. A list of Cabraniego nominal interfixes shows that the majority, or 17 out of 25, have the form -VC-, and many others have the form -VCC- (Malkiel 1970: 12-15). Since these were attached to nominal roots ending in a consonant before a suffix beginning with a vowel, these

interfixes do not change the basic CV syllable structure. Only one of the twenty-five interfixes consists of a single consonant. Since these interfixes preserve, rather than alter, the prevailing syllable structure, why are they used in the first place? Why does not Cabraniego simply attach the suffixes directly to the nominal roots in these instances?

A few of these interfixes protect the root-final consonant by separating a velar from a palatalizing vowel, as in the following compound (Malkiel 1970: 13-15):

picu 'woodpecker'
pic-an-iellu 'wagtail'

Another interfix plays a dissimilatory role between repeated suffixes and thus prevents haplology (Malkiel 1970: 15):

porc-on-z-ón 'big hog'

Aside from such obvious examples, where the environment for assimilation is blocked by the interfix, the phonological motivation for an interfixed syllable is to assure that the root syllable gets some degree of stress even though the primary stress falls on the suffix. Thus, the pattern of root + suffix is replaced by root + interfix + suffix, where the grave accent indicates secondary stress.

Several scholars have already noted that an interfixed syllable between a word-root and a stressed suffix allows a secondary stress to arise in the word-root. Pottier (1960: 86) says that, due to the interfix, the first syllable as well as the suffix is stressed in Spanish flòr-ec-íta 'little flower.' Migliorini (1935: 66) has mentioned the similar effect of intercalated syllables in Italian; this accentual pattern shows up in stàmp-at-éllo 'printing.' In more general terms, Lausberg says that the purpose of this type of interfix is rhythmic. That is to say, a syllable placed after a pretonic root and before a stressed suffix produces the following change (Lausberg 1953: 229):

X - \acute{X} X — \grave{X} - X - \acute{X} X

This explanation is likely since variations in stress play an important role in the development of Romance vowels, and vowel allophones conditioned by stress occur synchronically in such languages as Catalan. To relate secondary stress on the root with other functions of the interfix, we can say that the interfixed syllable rearranges the stress to preserve the word root.

Another function of the interfix is to make stress uniform in a paradigm and thus reduce or limit allomor-

phic roots to a single form. In Romance languages, a common development is the regularization of allomorphs of verb roots that arose from stress alternations within the Latin paradigm. Thus, the alternating stress in Latin AMĀS/AMĀTIS results in two separate Old French allomorphs aises/amez, and these are regularized into a single root morpheme in Modern French aises/amez. Old French offers numerous examples of such pairs of allomorphs:

root-stressed	ending-stressed
aises 'you (sg.) love'	amez 'you (pl.) love'
treuves 'you (sg.) find'	trouvez 'you (pl.) find'
poises 'you (sg.) weigh'	pesez 'you (pl.) weigh'
léves 'you (sg.) wash'	lavez 'you (pl.) wash'

For most of the verbs, the unstressed root was generalized so that French now has trouv-, lav-, and a form of pes- throughout the paradigm. Rarely, as with aimer, the stressed form was generalized. Where the alternation remains in Modern French, the verbs are classified as irregular, like the following forms:

root-stressed	ending-stressed
meurs 'you (sg.) die'	mourez 'you (pl.) die'
viens 'you (sg.) come'	venez 'you (pl.) come'
bois 'you (sg.) drink'	buvez 'you (pl.) drink'

This kind of alternation is common in such other Romance languages as Spanish:

root-stressed	ending-stressed
pienso 'I think'	pensar 'to think'
cuento 'I count'	contar 'to count'
siento 'I feel'	sentir 'to feel'
duermo 'I sleep'	dormir 'to sleep'
puedo 'I can'	poder 'to be able'

Such alternation in the verb root can be resolved by addition of an interfixed syllable which then keeps the stress from the verb root, as in golp-é-o/golp-e-ár 'to hit' and flor-esc-o/flor-ec-er 'to flower' in Spanish. This occurs very often in Catalan and almost as often in Spanish:

	Cat. inf.	pres. ind.	Sp. inf.	pres ind.
'to flower'	florir	floreixo	floreçer	florésco
'to beat'	colpir	colpeixo	golpear	golpéo
'to reverse'	invertir	inverteixo	invertir	invierto

The above examples show that Catalan uses the interfix eix where Spanish has a cognate interfix, a different

interfix, or two allomorphs of the root. By using an interfix that creates a paradigm with columnar stress, which means stress in the same place with respect to the root and endings, Catalan resolves irregularities present in Spanish invertir/invierto. Thus, an interfix may preserve a uniform word-root by keeping the stress from alternating between root and ending.

Finally, a single interfixed consonant before the initial vowel of a suffix can preserve the final syllable of the preceding root. Thus, the final root syllable remains closed in both Spanish mujer 'woman' and the diminutive mujer-c-ita, as well as in jardín 'garden' and jardín-c-ito, because of the intercalated c (Pottier 1960: 86). A similar function is performed by c in French éclair-c-ir 'brighten,' noir-c-ir 'blacken,' and obscur-c-ir 'darken.' Even more importantly, an interfixed consonant can separate two vowels, thus preventing the formation of a diphthong and keeping the word-root distinct from what follows. For example, French inserts t in a-t-il, the inverted form of il a 'he has.' The same interfix occurs after continuant consonants, as in aime-t-il 'does he love' and parle-t-il 'does he speak.' Similarly, Spanish has dramático and problemático, which could be analyzed with an interfixed t. However, to satisfy the objections of Lázaro Carreter, we can analyze these forms as drama + at + ico and problema + at + ico with appropriate elision of the root-final a's. It would then be easy to have a consistent analysis for fri-at-ico 'foolish' and bob-at-ico 'silly,' which Lázaro Carreter (1972: 257) offers as counter-examples. With either analysis, the interfix separates the root-final vowel from the i in -ico to avoid forms like *drama-ico.

In summary, interfixes preserve syllables and verb roots by preventing consonant assimilation, separating vowels, and, most importantly, altering stress. This has two interesting theoretical implications. For one, it unites previously separate phonological developments in a complementary fashion. For example, interfixed syllables either create columnar stress as in the verb system, or they allow the root to have secondary stress as in many nouns and adjectives. Another implication is that the interfix serves to minimize allomorphy by halting divergent developments of roots in paradigms and derived words. Kiparsky (1974: 334) states, "No unequivocal evidence exists for considering minimization of allomorphy as a separate motivating factor in linguistic change." Such evidence lies in the interfix, which has different forms and phonological effects tending toward the same aim--preservation of roots and syllables, and thus, avoidance of allomorphy.

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STRATEGIES AND COUNTERSTRATEGIES
IN THE USE OF YES-NO QUESTIONS IN DISCOURSE¹

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Native speakers of English overhearing the following two-speaker exchange would probably not have too much trouble getting a general idea of what is going on, even though they might not be able to contextualize some of the referential content of the exchange:

- (1) A: Do you do you think that you have a right to stop me from walking into the Fairmont hotel to listen to Dean Rusk? [Do you?]²
 B: [I have never/ I have never stopped you from walking into /the hotel/
 A: [But this is what those/ people wanted to do that night.

I want to suggest that, despite the apparent ordinariness of this exchange, it can be made to appear upon analysis to consist of a number of peculiarities and that if we can make ourselves aware of these peculiarities we can gain some insight not only into what the participants are doing but also into how they manage to accomplish it.

This sort of analysis might be seen as a way of making the ordinary seem strange so that we can understand how it is put together.³ There are a variety of ways we might go about doing this. For example, we might look at the exchange in (1) from a syntactic point of view, following the lead of the very valuable work of Sacks, Schegloff and their associates on sequencing in conversation, or of work by Labov on the taxonomic analyses of recognizable discourse types such as ritual insults or narrative. If we took this approach we might notice that in (1) we have an ABA exchange in which A asks a question, B replies, and A takes the floor again to make an assertion. We could see this as three separate but related events and note that, especially as regards the first two events, we have a type of constructional unit in which given the occurrence of event A it is a safe bet that event B will follow. Sacks and Schegloff (1974) have characterized a large class of such discourse units under the rubric of "adjacency pairs," and they have given this unit a specific and perhaps too restrictive definition, noting that adjacency pairs have these three features: "(1) two utterance length, (2) adjacent positioning of component utterances, (3) different speakers producing each utterance." Without quibbling over the details of this definition, it should be noted for the purposes of our

analysis of (1) that one of the important consequences for speakers of organizational units like adjacency pairs is that given the performance of a 'first pair part' by one speaker, the failure of a second speaker to produce a 'second pair part' is a noticeable absence in a conversation, and being noticeable can have consequences. Labov (1972) has expressed this notion of consequence in discourse very succinctly with regard to the pair question-answer: "If we consider the compelling character of all questions. . . it is clear that all requests, even the most mitigated, are to be heard against an unrealized possibility of negative consequences if they are not answered."

I want to suggest that, while we will need to call repeatedly on the insights of these workers in our analysis, we will not want to follow their approach exactly because we want to know more than the empirically observable recurrent patterns of discourse; we want to know how they get there in the first place and how they are made use of by conversationalists. The model of the actor implicit in the work of these scholars inclines toward a mechanistic view of speakers and hearers as relatively inflexible beings which may be more rigidly constrained by algorithmic rule-systems than perhaps real people actually are. They have not been able to present a fully convincing characterization of the decision-making processes actors use to construct meaningful exchanges nor of the relatively high degree of flexibility involved in these processes in everyday conversation.

Another approach we might follow and which we will certainly need to draw insights from is the work in the ethnography of communication. Although research in this field has not concentrated much on everyday conversation but has focused primarily on relatively formal exchanges in exotic cultures or subcultures, in an attempt to formulate the cultural knowledge required of participants in particular kinds of communicational events, such as the Japanese Rakugo performance (Sanches:1975), entering a Yakan house (Frake:1975) or the obtaining and use of drugs by heroin addicts (Agar:1975), it is important to recognize that the most ordinary conversational exchanges could not take place at all without the establishment and use of a wealth of cultural background knowledge. However, once given a characterization of this knowledge, we still need to know how conversationalists make use of it to put a discourse together into a meaningful whole. For our purposes here we do not need an exhaustive characterization of the shared cultural understandings of the two speakers in (1), but will need to know only the following: This exchange is taken from a larger piece of talk which was a panel discussion conducted on public television in a major American city between several representatives of opposing socio-political groups. The discussion is about race relations and the character of the discussion is one of informal debate in which a controversy develops between two of the participants, A and B, of which the exchange in (1) forms a

small part. Both A and B were well-known public figures at the time and their respective positions on race relations would have been part of informed public knowledge. The immediately preceding discussion has focused on demonstrators (i.e., "those people") who threw bags of blood at people going into a hotel to listen to a speech by Dean Rusk. Prior to the exchange in (1) speaker B has criticized the police for beating up and arresting some of these demonstrators.

The approach to the analysis of (1) that I want to take can be seen as an exercise in the reconstruction of what Schutz (1970) called the 'in-order-to' motives of actors, meaning by this "the state of affairs, the end, which the action has been undertaken to bring about." That is, instead of looking at discourse either as constructed of repeated surface patterns such as adjacency pairs, or as exchange events taking place against a formal set of culturally specific rules, I want to make the assumption that discourse is composed of more or less reasonable and reasoned acts which actors perform on their way toward achieving particular goals. I use the term 'reasonable' here not as any kind of claim for a rationalistic epistemology but merely to characterize what I take to be a fundamental working assumption of conversationalists; that is, that people say and do things in order to accomplish various communicational goals or acts. Given this assumption actors then go on to make inferences about what others are trying to accomplish. There is a kind of circular, self-contained system in this process such that we can often say either "A performed act X because he wanted to accomplish goal Y" or "A has accomplished goal Y which explains why he did act X." These inferences are based not only on what speakers say but on how they say it. Where choices are considered to be available for saying the same thing in terms of both propositional content and primary speech act (Searle: 1975), it can at least sometimes be presumed that particular choices senders make signify something about their intentions or in-order-to motives. As speakers we project plans across slices of discourse and as hearers we try to infer ahead of time what those plans are. Furthermore, in some cases these plans are designed to be transparent to hearers, while in other cases at least parts of them are designed to be opaque. In exchange (1) we will find both opaque and transparent plans working together simultaneously, and also that some possibly universal principles of discourse are made use of to carry out these plans.

To begin with I will attempt a possible reconstruction of what speakers A and B are trying to do in (1) and then go on to see if this reconstruction makes sense in terms of what we can actually observe there.

I see A as trying to construct a successful argument against B. Part of A's strategy is to avoid making this intention explicit. B tries to countermove against that argument, not by presenting either an answer to it or a counterargument against it, but by

attempting to prevent that argument from being brought to completion in the first place. Furthermore, B's attempt to countermove involves treating that argument as a non-argument. Then, following B's countermove A comes back with an effort to complete his argument anyway, and not by moving against B's countermove in any direct way, but by in turn treating it as if it were not a countermove at all. That is, A treats B's countermove neither as a failed attempt nor as irrelevant, but as if it were in fact a 'bad' move that causes B to fall into the trap A had set.

Accepting for the purposes of our (tentative) analysis that this characterization is more or less correct, let us go through exchange (1) and look at the ways language is being used and see if these can be made consistent with our reconstruction of the underlying action.

First note that A begins with a yes-no question that asks B to give an opinion. B gives a reply but notice that it is not exactly a reply to the question asked. Instead, by virtue of the fact that answers to yes-no questions--at least in the prototypical case--either affirm or deny the propositional content of the question, and by virtue of the operation of the Gricean maxim of relevance, B's answer pragmatically presupposes that a different question has been asked that might go something like,

- (2) A: Have you ever stopped me from walking into the hotel?

Finally, notice that A does not take exception to this answer by calling attention to its irrelevance but treats it instead as a 'no' answer. We can tell this at least partly by his use of the connective 'but' and by his use of 'this' as a discourse deictic. The word 'this' in A's comeback, if his utterance is assumed to be relevant, necessarily refers to the proposition "X PREVENT Y from ENTERING HOTEL Z." The use of 'but' makes sense here if we assume that A takes B's answer to be a negation of the proposition. If B's answer were taken to be a yes, the use of 'but' here would be distinctly odd, as we can see in the following exchange:

- (3) X: Do you think you have the right to block my driveway?
 Y: Yes, I do.
 X: ?But you're blocking my driveway!

The important thing to notice in (1) is that, despite the literal irrelevance of B's reply, A takes no remedial action, such as re-doing his question or pointing out that B's answer is not to the point. This fact alone might lead us to suspect that as far as A is concerned B's answer is good enough for the purposes of the moment.

Given these few observations about the language use in (1)

can we connect them meaningfully to our reconstruction of the actions going on in (1)? This will involve asking questions like the following: If A wants to make an argument why doesn't he just assert his beliefs and give his reasons for believing them? Why does he go to the trouble of asking B a question? Furthermore why does he ask him a question, that given that A knows B's political position, A can probably predict the answer to? We can also ask why B doesn't answer the question directly but instead answers a different question. And finally we can ask why A in his comeback to B's reply doesn't do some kind of repair work.

We can begin to answer some of these questions by looking first at the question A asks. If A is in a position of wanting to make a certain kind of argument his use of a yes-no question can be seen to have certain advantages. First, as we noted above in our quote from Labov, the asking of a question creates the expectation of a reply such that not replying may be seen to have consequences. Secondly a yes-no question puts fairly strong constraints on the acceptability of the answer. In general an appropriate answer to a yes-no question either explicitly affirms or denies the propositional content of the question. This fact, plus the Gricean maxim of relevance places fairly strong limitations on what constitutes relevant propositional content in the reply. That is, the answerer cannot disregard the question and he cannot just talk about anything either. The answerer is thus constrained to commit himself. Compare this to a WH-question of similar propositional content:

- (4) A: What is your opinion about your right to prevent me from going into a hotel to listen to Dean Rusk?

This type of question does not put the answerer into quite such a tight corner. He need not commit himself to the question of whether he has a right or not. In contrast, a yes or no answer to a yes-no question commits the answerer to a belief in the truth or falsity of the propositional content of the question by virtue of the sincerity condition on the type of speech act Searle (1975) calls 'representatives'. This condition is that the speaker of an assertion commits himself to a belief in the truth of that assertion.

A third advantage of using a yes-no question in this context is that questions not only can be used to select a next speaker but have the further property that upon completion of a reply the rights to take the floor again can legitimately go back to the asker of the question and are even likely to do so. Thus, A can expect that if B gives a straight answer to his question, he, A, will get a turn to speak upon completion of the reply. If A wants to make a further point this has an obvious advantage (v.Sacks, Schegloff and Jefferson:1974).

Thus from the point of view of making an argument, especial-

ly one in which you wish to defeat an opponent, the use of yes-no questions is particularly valuable because they can put pressure on your opponent to commit himself to a position. Given this commitment you can then easily make use of it as the antecedent to a conclusion which you can then draw. Since the answerer has already affirmed his belief in the truth of this antecedent, he cannot very easily deny the consequent, assuming you have obeyed the rules of logical inference.

I believe that this use of yes-no questions is simply one particular application of the general property of such questions that they can be used--and ordinarily are used--to get a hearer to commit himself to the truth of some assertion. There are thus a number of related uses for them in discourse which can be seen from the following examples:

- (5) (a) Focussing the hearer's attention; helps speaker to determine how to parcel information into given and new, topic and comment, etc.:

Do you remember that woman we were talking about last night?

- (b) Preliminary to a request; helps speaker to make sure his request will get him what he wants:

X: Did you get paid yet?

Y: Yeah.

X: Then how about paying me back the money you owe me.

- (c) As a polite request; the speaker can avoid imposing on the hearer by presupposing he is willing to do X:

Do you have the time?

- (d) Preliminary to a suggestion; helps speaker to determine whether the suggestion will be in order:

X: Do you like Truffaut's movies?

Y: Yeah.

X: Then lets go see Adele H.

- (e) Preliminary to an offer:

Do you need any help?

There are of course other cases of this type, but the main point is that yes-no questions get hearers to make a commitment which then gives the speaker something concrete to go on in carrying a plan to a successful conclusion.

We can now turn to B's reply and again ask why he gives the kind of answer he does. As regards this there are at least three assumptions we might make. First we might assume there is a misunderstanding; either B thinks he is answering the question presupposed by his answer, or he knows he didn't quite catch the question but just wants to give some sort of answer, etc. Second

we could assume that B intends his answer to be construed as an implicit negative answer to the question asked by way of implicatures based on Gricean maxims of relevance. In this case we would say that he intends to convey this meaning by getting A to recognize this intent. There are reasons in the rest of the conversation from which (1) is excerpted for not supposing either of these alternatives, but I will not take space to go into them here. Instead I suggest a third possibility, and that is that B has recognized A's unavowed attempt to lay a trap for him and seeks to prevent this. In order to make this assumption, B has to further assume that A is (1) not just asking for information, and (2) is not trying to convey an implicature by getting B to recognize certain intentions of A to do so. B will have to assume instead that (3) A is using language strategically. This assumption is I believe based on a rhetorical principle of language in discourse which I will return to in a moment.

If B's reply is a counterstrategy to A's strategy then we can see it has certain advantages. B is in a position of obligation; he must say something. A failure to reply in this debate situation may give the audience the impression he is inept or is hiding something. By giving an answer that presupposes a different but related question has been asked, he manages to do two things: (1) he avoids giving a yes or no reply to the actual question asked, (2) he gives an answer which is at least topically relevant and wards off the charge of evading the issue.

There are other strategies that B might have used to serve these purposes, some of which have been investigated by Weiser (1975). For example he might have said one of the following:

- (6) (a) Why do you ask?
- (b) I won't answer that, you're just trying to trap me.
- (c) Oh gee, I left my keys in the car.
- (d) Wait a minute, I think the moderator is trying to tell us something.

B could also give a false answer, such as saying yes when he really believed no. This could be taken as either a joke or as serious. If a joke then B could be charged with being unserious about serious issues. If serious he could be accused of being against democratic principles of free speech. The replies in (6) also have serious drawbacks in this context of informal debate. (6a) would allow A to say "I'm just trying to get your views clear" and then to repeat the question. (6b) leaves B open to the challenge that he is afraid to engage in open discussion. If B uses (6c) he will seem particularly inept as a political leader. (6d) might get him off the hook more gracefully but it has three disadvantages, one being that the moderator will say "No, go ahead"; a second being that the moderator will talk and then reselect A giving him a chance to pursue his ques-

tion; a third being that the moderator will talk and then select some other panel member, neither A nor B, thus not giving B a chance to make any further points of his own.

There is another strategy B might use which happens to be fairly common and that is to hedge his answer in some way and use this as a wedge to make a point which has the effect of disarming A's conclusion before it is made:

- (7) B: No, but it's not a question of whether I have the right or not; the question is whether people like Dean Rusk should be in power at all.

This last strategy might have been effective because it might have turned the argument around to B's advantage. It has the disadvantage of giving A the opportunity to parry it by saying something like, "No we're talking about rights of free speech, not whether Dean Rusk is or is not a good leader." (This in fact does happen earlier in the conversation before the exchange in (1) occurs).

None of these strategies is airtight, and that includes the strategy B actually does use. This leads us to the final utterance in (1), A's comeback to B's reply, which, as we have seen, treats B's reply as if it were a negative answer to the question A had originally asked. Why doesn't A take explicit notice of the skewed quality of B's reply and come back with something like, "No I'm asking about what you think your rights are, not about what you have or have not done in the past " I suggest that A doesn't do this because he is less concerned with the clear and efficient exchange of information than with drawing the conclusion of his argument. That his comeback overlaps B's reply might lead us to suspect this in fact.

In order to treat B's reply as constituting a negative answer A must treat it as the second of the three alternative ways we mentioned earlier of treating this reply; i.e., as being meant to convey an implicature by virtue of getting A to recognize this intention. This involves the further assumption that B's reply actually does accord with the Gricean principles of cooperation and relevance. The point here is not whether B's reply was meant to be taken this way but that A goes on to act as if this were the case, and he does this in order to serve his own purpose which is to defeat B in a debate. Thus A's argument can be roughly sketched along these lines:

- (7) (a) You have said that you do not think you have the right to prevent me from doing X.
 (b) Therefore you will think it wrong for others to do this (Given certain assumptions that civil rights are equally true for all members).
 (c) But you have implied earlier that you support 'those people' who attempted to do just that.
 (d) (b) and (c) cannot both be true in the same world

at the same time.

(e) Therefore you contradict yourself.

(f) If you contradict yourself you are wrong, etc.

Notice that in his comeback to B's reply A does not make this argument explicit. He especially does not directly accuse B of being self-contradictory. This has the advantage in the context of this kind of informal political debate of letting the audience draw this conclusion for themselves. Furthermore, if A had made such an explicit accusation he would leave himself open to the charge that he was less interested in discussing issues than in discrediting B.

We can now return to a question raised earlier, which was: given that B sees A as setting a trap when he asks his question, what enables him to make this recognition? We can note in passing that a variety of factors go into such recognitions and that they range across all channels of communication as well as involving making use of any other information that might seem relevant at the time, derived either from general cultural knowledge or from the rest of the discourse. I want to pass over these however to suggest an operating principle that may have universal or at least widespread application in the processing of language in discourse. I will refer to this principle as the Principle of Expressivity. I mean this to be not so much a rule of conversation that should be added to Grice's maxims, but as a rhetorical principle which can be derived from one of the four 'charges' that Slobin (1975) places on any natural language, namely that a natural language should be clear, processible, simple and expressive. The last of these he divides into two categories, semantic and rhetorical, and it is the charge to be 'rhetorically expressive' that is particularly relevant here. However, instead of seeing this charge as a requirement for a complete natural language, I want to present it as an assumption that speakers can make use of in both the construction and interpretation of discourse. I will give it a tentative and informal characterization as,

THE PRINCIPLE OF EXPRESSIVITY: Assume that language with its accompanying paralinguistic and nonverbal channels of communication has the capacity to enable speakers to perform any communicational act they may want to perform.

I call this a rhetorical principle for two reasons. First, it has a speaker corollary that, like the much-maligned mythical beast the High School English Teacher, tells language users what to do:

SPEAKER COROLLARY: Be as effective in your use of communicational channels as you need to be or want to be.

Second, the Principle of Expressivity does not seem to operate in quite the same way as the Gricean rules of conversation. In fact it is more akin to those metarules in board games like chess

that tell players they are supposed to be as effective as they can be. But there is something like a Hearer Corollary that nevertheless can enter into the decision-making process hearers are involved in when making inferences about what speakers are trying to do:

HEARER COROLLARY: Assume that speakers are being as effective as they need to be or can be.

Turning now to B's reply in (1) I would argue that the Hearer Corollary enables B to understand A's question as being 'more than it seems', and conversely for B to assume that A's question is not more than it seems would require B to 'set aside' the Hearer Corollary as not relevant for this exchange and to assume that A is not being as effective a language user as he could be. If he made this latter assumption, B might then conclude that A was just asking for information and we would expect B--if he understood the question--to give a relatively straight answer, which he of course does not do. Furthermore the Gricean maxims won't necessarily lead B to make the assumption that A has something up his sleeve because A is not trying to get B to recognize this intention but is in fact masking it.

This argument has been theoretical in two ways. First, I do not want to claim that the particular imputations about A's and B's in-order-to motives are facts which I have 'proven'. I have merely tried to demonstrate a method of analysis whereby, trying to make the ordinary seem strange, we make a reasoned attempt to reconstruct the motives of actors, 'reasoned' insofar as hypotheses are tested against observable communicational phenomena in a systematic way. There is no ultimate method that will without fail tell us in any absolute sense what actors are 'doing' in any given exchange. Once an analysis has been done it should be tested against judgments of what actors themselves see each other as doing. Ways of doing this have been suggested in Gumperz (1975) and Erickson (1975). Secondly, this discussion has been theoretical in that it tries to show what assumptions people operate on when they try to make a skilled use of language to accomplish certain goals. Some of these assumptions might be candidates for universal principles operating in language use, such as certain aspects of Searle's speech act theory, particularly the sincerity condition on speech acts, Grice's rules of conversation, especially the maxim of relevance and the rules for implicature, certain principles of sequencing and turn-taking, such as those suggested by Sacks, Schegloff, et al, and perhaps some rhetorical principles like the Principle of Expressivity.

Finally, I want to emphasize that, as Weiser (1975) has usefully pointed out, we can look at communication as being accomplished in two ways, one involving what she calls 'communicative devices' whereby speakers intend utterances to accomplish purposes by means of getting the hearer to recognize this intention, and the other which she calls 'conversational strategies'

whereby speakers intend utterances to accomplish purposes by some other means than by getting the hearer to recognize this intention. We can make two extensions of this distinction. First, we can extend the accomplishing of purposes beyond the utterance level to include all channels of communication including the nonverbal. A rich understanding of what goes on in communication can only be accomplished by looking at both verbal and nonverbal levels together. Second we need to realize that the two ways of accomplishing purposes Weiser has delineated should not be seen as mutually exclusive alternatives for doing the same things, but as two melodic lines that run through communicational exchanges simultaneously working in counterpoint to each other. That is, the two means of accomplishing ends function reflexively in the sense that communicative devices make possible the use of conversational strategies, and conversational strategies constrain the interpretation or decisions speakers and hearers make about what communicational devices are in effect. There has been an understandable emphasis in linguistics on the study of communicational devices, but I would suggest that in so doing we are not only missing half of what is going on in the use of language in its practical applications, but that without understanding both we cannot fully understand either one.

FOOTNOTES

1. This work, especially with respect to suggestions for a theory of discourse based on an interactional model, owes much to John Gumperz, whose patient teaching over the past few years has provided me much illumination and encouragement.
2. Connected slash marks in (1) = overlapping talk.
3. I owe this characterization of interactional analysis to Fred Erickson (personal communication).

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CODE-SWITCHING IN DOWNS SYNDROME¹

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The category "retardate" is a broad one, while the term "Downs Syndrome" refers to a specific disorder (Mongolism or Mongoloidism). One result of this disorder can be termed "mental retardation", and although it is open to question how much various retardation disorders have in common, Downs Syndrome (D. S.) individuals are treated in much the same manner as other patients with low verbal I.Qs. The specific syndrome is caused by a trisomic diploid at Autosome 21, which forms a trivalent structure during meiosis so that, during prophase, one of the chromosomes migrates to one pole of the cell, and a pair to the other (Stansfield, 1969). The impairment as a result of this structure manifests itself in a number of ways. Besides the obvious mental deficiencies (and no doubt more covert problems as well), physiological manifestations also appear. Most striking is perhaps the shape of the hands, which may have a webbed-like look; the size of the head (Lenneberg, et al, 1964), which frequently is overly small for the body size; and the articulatory and respiratory areas are characteristically misshapen to such an extent that these patients have a great deal of difficulty mastering articulation, and are prone to a number of upper respiratory infections. Up until recently, in fact, D. S. individuals were not expected to live past puberty, because they tended to develop infections which became pneumonic.

For the purposes at hand, communicative competence will be defined as related to linguistic performance, both productive and receptive, in the sense that communicative competence involves the acts of encoding and decoding rather than just the tacit structural knowledge of what is being en- and de-coded. Furthermore, such competence involves a myriad of so-called "extra-linguistic" factors, such as knowing when and how to use (and using) politeness forms, questions or declaratives, imperatives or requests; when to form an utterance around one type of content as opposed to another. In other words, one must know and use communication properly. In the words of Dell Hymes (1971: 278): "the acquisition of such competency is of course fed by social experience, needs, and motives, and issues in action that is itself a renewed source of motives, needs, and experience." One might say that linguistic competence is more of an individual, cognitive function, while communicative competence develops in the human animal as social being, in

accordance with (external) socio-cultural factors.

A linguistic community is known to be diverse and heterogeneous. Each such community possesses a set of " sub-codes ", to borrow Gumperz' term (1968). Because each code has a specific function within the community, removal of any of them causes a noticeable gap in the communication matrix (Hymes, 1971 : 278). The choice of code is determined by factors such as topic, speaker-hearer relationship, and so on. It is this relational element in code-switching that this investigation concerns itself with.

The data used in this analysis consisted of audio-tapes made of nine men with D. S. at Pacific State Hospital in Southern California. Video-tapes have been made, but for the most part were not used as part of this study, although one was viewed (and a sequence from it appears, below). Analysis yielded three elements which seemed to be significantly involved in the codes used by the men: pause-length, phonological features (including suprasegmentals), and a category of miscellaneous discourse features which included contrasting syntactic, semantic, and stylistic devices with respect to setting, situation, and event (Blom & Gumperz, 1972). Any consistencies in the repetition of elements in cooccurrence with a given context, from one sequence to another (perhaps isolated) sequence, was assumed to be evidence that code-switching which was rule-governed and socially meaningful took place.

In peer-peer interactions, as contrasted with caretaker-retardate interactions, pause-length exhibited great variability, ranging from two seconds in length (at longest) to negative value (overlap). Such an interaction would often be followed by a longer, six or seven second pause, after which the participants in the interaction changed. For example (figure 1), following one such seven-second pause, R, a caretaker in the workshop, who was previously not involved in the interaction, was summoned to the scene by SH, one of the patients. This longer pause thus seemed to mark a transition; and although it was not " created " for the purpose of making a transition, it marked a possible one (or perhaps a " pre-closing " -- Sacks and Schegloff, 1973). This possibility was seized upon by SH to shift the topics and participants.

#1	SH:	(ʔ̌ o:yz)	
	F:	(pʔ̌apʔ̌apʔ̌apʔ̌apʔ̌a:ə)	
	C:	(ʔ̌ə)	
	F:	('haə)	overlap

(two seconds)
 F: (ə'hɪ)
 C: (now mɔː) (" no more " ?)
 attention shift (seven seconds)
 summons SH: (ʃɪ) (Q-intonation)
 R: Very good. Sh, very good.
 SH: (ɒ 'hɒv)
 attention shift (seven seconds)
 summons F: (hɑ) (Q-intonation)
 R: huh ? Good, Frank
 (C: (tʌt fræŋk))
 F: ('əʊə)

As R participated, the pauses again shortened to less than two seconds. This brief interchange was followed by a seven second pause, and again the transition possibility was utilized, this time to shift the object of R's attention. F (a D. S.), who has almost entirely vowel-speech, made what is interpreted on the basis of his intonation pattern a request for R's attention. During the exchange which followed, pause length again shortened to less than two seconds (including C's echolalic utterance). Note that more overlap occurred in exchanges involving just the men themselves than in those involving R as well.²

A different situation and event offers contrast in pause length phenomena. Such a contrastive situation occurs in a formal setting where the interaction of the participants is more controlled. In this next example (figure 2), S, a caretaker on the ward, SB, a researcher, and J., a D. S. individual, are the participants. S is administering the Peabody Pictures Vocabulary Test to J in order to elicit naming responses, while SB observes.

#2 S: And what's this ? (banana)
 J: (b'nəns ?) (Q-intonation)
 S: It's a what ?
 J: (bənəns)
 S: bananas ?

The longest pause that occurred in this situation was three seconds. All longer pauses (i.e. of one to three seconds) represent, predictably, transition periods of the following two types: 1) from question (Q) to answer (A), when J must consider his response; and 2) from A to the following Q, when S must pause to take up the next picture. Though at first glance this seems almost absurdly insignificant-- that is, testing situations are always characterized by Q and A exchanges separated by pauses-- it must be made clear that these pauses were exceptional, and occurred only when J did not have the A readily avail-

able. Most of the time, his response came immediately (after less than a one-second pause) and in a rather automatic fashion. These short pauses and rapid responses were dictated by the nature of the situation; both of the " authorities " involved were clearly uncomfortable with longer pauses, and J may have sensed this and regulated his communication accordingly.³

Following the testing situation, a semi-casual conversation took place between SB and J (" semi " because SB, having been associated with S, was probably considered by J to be in some position of authority with respect to him.). The pause lengths suggest that such was the case: they were shortened considerably, probably in deference to SB's discomfort with longer pauses; and in marked contrast to the previous, more formal setting, overlap of utterances occurred.

To summarize briefly the findings, in casual peer-peer interactions, pause length covers the widest range of variability, from overlap of utterances to two seconds. All longer pauses (up to seven seconds) represent possible transition periods and are frequently used as such. In a semi-casual conversation between caretaker and D. S. patient, pause length was shortened considerably but overlap still was tolerated, though to a lesser degree. This is significant as the two features of short pause length and overlap can be correlated with formal and informal speech settings, respectively. The interaction concerned was, essentially, somewhere between these two extremes, and so it is fitting that the pause phenomena appear to be a combination of effects. Finally, in the most formal situation, that is, where there is the widest gap in status between the participants, non-transitional pauses are of the shortest duration and no overlap occurs. These findings suggest an awareness of role-rights on the part of the patients, and that speech behavior is modified with respect to the roles involved in an interaction.⁴

Co-existing phonological codes or phonetic systems have been shown to play a role in code-switching behaviors in normals (Blom & Gumperz, 1972; Labov, 1972; and so on). Phonological contrasts in the speech codes of a young D. S. child have been observed by A. Bodine (1971)⁵. Charles Ferguson (1973) mentions Bodine's study which revealed that the " five-year-old Mongoloid boy who was studied...was shown to have at least three distinct styles of speech...almost all of his speech was

structured and meaningful....What is of interest here is that the child used one kind of pronunciation when he was trying to make himself understood to his mother and a considerably different pronunciation when he was 'talking to himself'. " In this study, variations in phonological codes were also observed. In speech with caretakers, and most notably in testing situations where a misunderstanding of pronunciation might lead to a lowering of test scores, D. S. patients exhibited much more awareness of their articulation. The following sequence occurs in the transcript of the S-J Peabody Pictures test (figure 2, above, and figure 3).

#3 S: What color's this ?
 J: gre:(k)
 S: It's what ?
 J: (I said) red.

In this sample, J is being " forced " to pay attention by the nature of the situation, but the revealing factor is that articulation is not the only feature which could be misunderstood. Note that two factors indicate that J is aware of his own pronunciation. First of all, S's repair request⁶ (" It's a what ? ") is ambiguous: it may mean that the answer J gave is merely poorly articulated, or that the content was incorrect. In figure #2, S uses a similar form to that in figure #3, but in the former it refers to pronunciation, while in the latter to content.

How does J know which interpretation to give S's question ? The answer may be that he knows both when he has given an incorrect response, and when he has poorly articulated his response. In peer-peer interaction, content repairs were more prominent than repairs of pronunciation, but in this situation, either type may be required.

The first sequence (figure 2) indicates J's awareness of the situation: he is being asked to make a factual response, and will be judged on the correctness of that response. The rising intonation seems to indicate some insecurity on his part, not unlike normals who are in a similar situation. The second sequence (figure 3), on the other hand, seemed to arise from a lapse in attention on J's part, when he really was not very concerned at all with his initial answer. In addition, in the first sequence, J's response to S's repair initiation was to change the very vowel which had caused the misunderstanding, as well as to add a previously deleted final syllable. This is a particularly

significant factor in determining that J has, indeed, interpreted S's utterance correctly.

Another D. S. patient, F, whose speech consists primarily of vowels and glides, can monitor his speech through the use of intonation contour. Such contours are almost non-existent in his interactions with peers. These indications lead rather logically to the conclusion that speech-code-switching does take place, with D. S. speakers utilizing a different code when speaking to caretakers.

A discourse-type feature of D. S. speech which illustrates some contrast is that of communicative intent. It seems highly possible that peer-peer interaction frequently involves topics of less urgency, while increase in the importance of the intent correlates with increased caretaker involvement or requests for caretaker involvement. Some of the strategies used to gain this attention are similar to those of children and obnoxious adults (Elinor Keenan, personal communication): hand-waving, repetition, loud voices. Such frustration is not frequently observed to occur if a man is not attended to by one of his peers: he will, rather, tend merely to " drop the subject. "

The general structural organization of the discourse also differs significantly from peer-peer to patient-caretaker interactions. The former are difficult to analyze because they seem, to the linguist and experienced discourser, somehow " disconnected ", and the non-retardate cannot understand, for example, why an interaction ends the way it does (note, e.g., the suggestive falling intonation contours at the end of the sequences in figure 1). In patient-caretaker interactions, on the other hand, we are able to answer questions that have been developed for " normal " discourse: are there pre-openings and pre-closings being used ? (Sacks & Schegloff, 1973) Is the second utterance of a pair related to the first ? Does the first determine the boundaries of possible second parts ? The fact that we cannot answer such questions while listening to peer-group interactions suggests that a radically different code is being used. Although it has been demonstrated that individuals with D. S. are capable of coherent discourse-- most strikingly illustrated whenever topic is controlled by the caretaker, and thus there is one less variable that the D. S. must handle-- peer-group interaction is characterized by a loss of intonation, loss of clear-cut phonological distinctions, and loss of greater lexical range. These features contrast with those

of patient-caretaker discourse.

Interestingly, a connected and coherent sequence can frequently be found embedded in the discourse of D. S. patients. These sequences occur elsewhere between the same two interlocutors (both individuals with D. S.). In figure 4,

#4 (request) C: (You. Papa.)
 (grant) SH: (You call me ____?)
 C: (Papa.)
 (?) SH: (Papa ?)

C wants to play the " papa " game, in which SH is " papa ". Is this imitation of the testing situations, or of caretaker-patient speech in general (the situations in which these men so often find themselves) ? If so, then the context is certainly appropriate for the sudden switch to a clear phonological and syntactic code, a case of " metaphorical " code-switching (Blom & Gumperz, 1972). The other instances of such code-switching within peer-group exchanges are frequently requests, which are not always accomplished verbally, but are, regardless of medium, usually clear and connected. It may be that the " importance " of an act like requesting may be greater than that of casual, peer-group talk. It may be that the above code-switch which is in a sense also a request (i.e. a request to play a game) can be explained by the fact that such speech acts must be coded differently from other types of language.

In the speech of " normals ", too, requests have come to be coded differently. It is well-known, for example, that requests are often couched in quite indirect terms, taken literally only in joking situations. Thus the famous " can you pass the salt " is of course not a question about one's physical abilities, but merely a polite variant of the more abrupt " pass the salt ! ". The above sequence illustrates in a sense the same kind of presupposition which must exist for indirect requests to be successful: SH knows that C's comment " papa " is not merely a disconnected morpheme, but is indeed a request to play a game. SH and C have established, through time, a set of shared presuppositions.

Requests may be accomplished with the aid of deictic gestures. Requests within requests such as repairs or " contingent queries " (i.e. queries based on a preceding utterance, usually a request for further specification or clarification of some or all of the preceding utterance- Garvey, 1975) have been viewed in one sequence from a video-tape

of the lunch-hour at the hospital (figure 5).

- #5
1. (ənh) (nods head in direction of food)
 2. (iː) (Q-intonation- points to food)
 1. (əh) (nods head to indicate "yes")

A rather long piece of discourse which followed the Peabody testing situation, in which caretakers SB and S and D. S. patient J participated, illustrates a quite elaborate series of verbally encoded repair initiations and repairs. The three have been discussing Indians, a topic J had successfully established (albeit with much difficulty, as SB and S did not understand his rather sudden mention of "Indians" - see figure #6). J had established, among other things, that "Indians are right" and that "Indians'll kill you". Note the keen awareness of role rights that J displays: by referring to S as "Big Chief", he has recognized not only S's position of authority on the ward, but also expresses his trust of S.

```
#6      r.i. = repair initiation
      r. = repair
      S: hehehe
      J: not him
r.i.SB: not him ?
      SB: }
      S: } laugh
r.i.SB: He's not an Indian ?
      r. J: no
      S: I'm a cowboy aren't I, J ?
      J: Big Chief
      S: hehehehe
      J: Him on horse
      ( .8 seconds )
r.i.SB: On your horse ?
      r. J: Him on horse
      ( .8 seconds )
      J: How
      SB: How
      J: Big Chief Sam
r.i.SB: Big Chief who ?
      r. J: Sams
      ( .8 seconds )
      r. J: Big Chief
      ( 1.0 seconds )
      r. J: Indian
      ( .8 seconds )
      r. J: Ony Indian indians
```

A remarkable fact about this interaction is that the final four utterances by J are actually a sequence of three repairs. Observe his strategy of backing up in the precise order in which each lexical item had been mentioned, from the specific referent (S) all the way back to the general category they were discussing (Indians). J pauses after each utterance, presumably to await a possible response, and when none occurs he backs up still further, trying to come upon the referent which caused the problem.

This strategy is neither limited to J nor to instances of interaction with caretakers. Sharon Sabsay (personal communication) reports that similar sequences have taken place in other discussions; that is, the same " backing-up " ploy was used. This may be, therefore, more an instance of communicative competence in general than code-switching in particular, although caretakers were frequently present during these sequences. Furthermore, F (the D. S. with vowel-speech) has shown himself to be adept at initiating and making repairs through the use of intonation alone, as non-retardates frequently do. SH (a D. S. patient) too, in contrast with the first interaction (cf. figure #1), uses the repair system with caretakers, and exhibits contrast in phonological codes (cf. Sabsay, 1975).

One cannot help but notice the " connectedness " of these interchanges between D.S. men and caretakers, in marked contrast to the seemingly " disconnected " quality that characterizes peer-peer interchanges. To be sure, there is no way to determine that the former are more cogent, rational, or formal, because these features have not yet been quantified. We are hindered, too, in our ability to understand much of the peer-group discourse. It may be that genuine discourse is occurring in a communicative medium still unavailable to researchers, just as is much child-language, idiopathic twin-language, and other forms of communication outside our domain of existence. We can observe only that there are systematic contrasts, and conclude that at least one aspect of communicative competence, specifically code-switching, has been acquired in spite of monumental cognitive disorders. The implications of such findings should speak for themselves.

Notes

1. I would like to express my great appreciation of Sharon Sabsay of U.C.L.A. , who generously shared both data and interpretations; to thank Dr. Elinor Keenan whose helpful comments will

always be an inspiration to me; and to acknowledge Dr. Stephen Krashen for his patient assistance. The work within remains my responsibility, however.

2. Note, incidentally, the similarity in phonetic shape of the last utterances of each exchange. It has not been determined whether or not this is significant.

3. This might possibly account for some of the unclear comments that J made in answer to Qs he had earlier demonstrated knowing the answers to. He may have been responding impulsively merely to "break the silence".

4. Elinor Keenan suggests that these pause lengths are related to semantic work accomplished. Thus in the peer-group interactions, the men are left to their own devices to get a listener's attention, establish a topic, and so on. The pauses are thus significantly longer than during those interactions in which the attention of the listener is controlled by the caretaker (listener), and the topic as well.

5. The entire passage (page 39) reads as follows:
 " To take an extreme example, a five-year-old Mongoloid boy who was studied recently was shown to have at least three distinct styles of speech. A typical victim of Downs Syndrome, the boy was extremely retarded in language development and many of his utterances were unintelligible even to his immediate family. Patient study by a linguistic analyst eventually showed that almost all of his speech was structured and meaningful. She was able to formulate the systematic deletions and distortions by which his own internalized grammar modified the English to which he was exposed....What is of interest here is that the child used one kind of pronunciation when he was trying to make himself understood to his mother and a considerably different pronunciation when he was " talking to himself ". It is probably universal in human languages to include different registers for ordinary conversation and for speech which is being produced carefully to clarify a previous utterance or to make certain a message is transmitted under adverse conditions. Certainly every individual and every speech community has patterned ways of speaking with extra clarity. What is impressive is that such differences of register begin so soon and are part of the repertoire even of seriously retarded children. "

6. The repair initiation by S is also syntactically incorrect for J's plural response. For an excellent and thorough study of the repair system of D. S. patients, see Sabsay (1975).

7. These peer-group repairs might more often be coded non-verbally, too, though perhaps vocally.

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WHY THE WHATS ARE WHEN:
MUTUALLY CONTEXTUALIZING REALMS OF NARRATIVE

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In this paper I will be arguing for the need for a pragmatic theory of narrative to account for the surface structure phenomena which are common in the narrative texts of real speakers. Pragmatic analysts consider the organization and performance of discourse to be crucially constrained by such real world considerations as interpersonal relating and ways of framing real world information in accordance with the cultural conventions of how such information is arranged in nature (Hymes 1962, 1971; Labov and Waletzky, 1967; Labov, 1972a, b; Linde, 1974a, b, c, 1975; Deutsch, 1974, 1975; Eisner, 1975; Bowditch, 1976). Narrative is seen as a social phenomenon which can not be studied profitably unless linguists consider to be of basic importance

concepts of shared or social knowledge, the roles of speaker, addressee and audience, their rights and obligations, and other constraints which have not appeared before in the array of linguistic primitives (Labov, 1972, pp. 359-60).

Since linguists are concerned with what people do with language, a study of narrative is a proper linguistic endeavor because people do produce narratives; however, the thrust of a linguistic theory of narrative must be to describe "how" and "why" people encode information in narrative form and to account for all of the structures which appear in the surface structure of narrative texts.

Traditional narrative analysts have concerned themselves with narrative as a formal system to be studied without regard to real world or extra-systemic constraints. They conclude that narrative structure should be described in terms of a sequence of changes of state brought about through the action of a character. Their analysis reduces to stating that in narrative the action of a character changes the narrative situation from one of Lack to one of Lack Liquidated (Doležel, 1972; Prince, 1973; Bremond, Todorov and Greimas in Scholes, 1974; Knapp, 1976). To me this seems to be a description of what a narrative may be about and not a description of how it is structured as a form of language encoded discourse.

I hope to show that this formal approach is inadequate to account for the fact that people regularly

understand a given narrative text to be about something other than the events or changes of state in the narrative. Perhaps the narrative merely describes a mood (such as: I'm in such a rotten mood today followed by a string of illustrative examples); or, as in the case of the narrative which we will be examining in some detail later, the point of the story may be encoded in the non-temporal, descriptive part of the narrative.

Before I go any further, I think it is necessary to define a few of the nearly homophonous terms I will be using: "narrative," "the narrative text," and "the narrative." Throughout this paper, I will adopt Labov's definition of narrative as a linguistic structuring of events in which the order in which the events are told recapitulates the order in which they actually, or supposedly, occurred (Labov, 1972a). For Labov, narrative order signals when an event happened relative to other events which occurred at definite times in the text.¹ "What happened?", "why?", "to whom?", "where?", and "in what circumstances?" make up the narrative, while the narrative text is the complete utterance which conforms to the basic narrative constraint, recognized by speakers as constituting a linguistic unit. The unit of the written narrative text is usually the length of the written material. It begins on the first page and ends on the last. Oral narrative texts, too, are marked units recognized by speakers as units by suspending rules for turn-taking (Eisner, 1975). The narrative, a more restricted term, only refers to those parts of the text which are part of the temporal, spatial, or rhetorical world created in the narrative text. An interjection such as

and here's the funny part

in the midst of a narrative is clearly part of the narrative text, but it is not part of the narrative since it is a comment about something within the narrative from a vantage point located outside the narrative.

Producing a narrative text, like creating other linguistic texts which involve imparting information from speaker to hearer, is a social act which takes place between people. And exactly as one does not give directions (Hobbs, 1975), describe an apartment (Linde, 1974 a, b, c) or talk about taking apart a water pump (Deutsch, 1974, 1975) for no reason at all, one does not produce a narrative text for no reason at all. The kind of narrative which formal analysts examine, such as this one by Prince, are somehow not the kind of narrative people tell to one another.

A man was unhappy, then he fell in love, then as a result, he was happy (Prince, 1973, p. 21).

Although this narrative conforms to Labov's basic narrative constraint of narrative ordering, it is not what he would call a "well formed narrative" but is rather a "So what?" narrative which no one would care to produce, because no one would stand still to hear it. Labov terms a narrative text which is worth telling a well formed narrative. A well formed narrative must contain evaluation devices which point out "its *raison d'être*, why it was told and what the narrator was getting at" (Labov, 1972a, p. 366). These devices, are conventions understood by the participants in the narrative situation to signal to the hearer that there is some point to what the narrator is saying, lest the audience feel itself deluged with a mindless stream of details of various sorts.

So far, though I have mentioned the need for evaluative devices, I have said nothing of what they evaluate. Narrative, as distinct from narrative text, is composed of two kinds of structures: temporal structure which charts the progress of the narrative through time by presenting a series of events which are understood to occur sequentially; and durative/descriptive structure which provides a spatial, characterological, and durational context for which the temporal structure marks time and changes of state. Both events from the temporal structure and details from the durative/descriptive structure may be pointed out by evaluators in the evaluation structure as particularly important. Other details, both temporal and descriptive, will remain unevaluated and function only as descriptive, contextualizing background material. It must be emphasized that there is no structural difference between the clauses and sentences which are evaluated as encoding the meaning or "why" of the text, and those clauses and sentences which contextualize the "why."

The only difference between crucial and background information is that one is seen as important within the context of the narrative text and the other is not. Crucial details are crucial only because they are evaluated by the narrator as important or because they are believed to be crucial by both narrator and audience because they contain material which would be important if it occurred in "real" or extra-narrative life. The importance of investigating the belief systems of the participants in the narrative situation in order to understand why the surface structure of the text is as it is argues persuasively for the need for a pragmatic analysis of narrative. An analysis which is simply

syntactic or even "semantic" will never be able to explain the choices which speakers make between seemingly indistinguishable alternatives and will necessarily consign much real-world linguistic behavior to a garbage can marked "stylistics" and glossed "random" (Linde, 1974a).

Temporal, durational/descriptive and evaluative structures should be considered mutually contextualizing structures of different logical types. The participants in the narrative situation rely upon each of these structures to provide context in which information from the other structures makes more sense. The evaluative structure selects some details to be crucial from the temporal and durative/descriptive structures. Those crucial details contextualize the rest of the text because they are the reason why the narrator has bothered the audience with all the other narrative text materials, including the evaluative devices themselves. Without some details singled out as crucial and providing a meaning structure against which to try and understand what is going on, details in the temporal and durative/descriptive structures are merely trivial and uninteresting. The evaluators themselves are also contextualized by the crucial details since, without something to evaluate, they obviously could not function. The temporal and durative/descriptive details which are not singled out as crucial continue to fulfill their expected contextualizing functions of giving the crucial material and the evaluators a framework in which to take place.

Each of these structures is encoded in a distinctive form. Temporal structure most often encodes events which occur at a definite time relative to each other in main clauses in the present or past tense. Descriptive/durative structure encodes descriptions of states, places, people, or lengths of time in clauses containing copula constructions, durational adverbial constructions, or verb forms of a durational nature (continue, stay, etc.). Many durative/descriptive details are described with participles, nominals, and in subordinate clauses. Unlike the other two structures, evaluation is properly seen as a structure of narrative text, not limited to the narrative itself. Evaluative devices have no fixed form but may be of many forms, some which manifest themselves within the text (direct and indirect discourse, change of tense or person, unusually florid or terse language) and others which are observed as being within the text by the observer (repetition or redundancy of information is not marked in English by a particle which announces: "this is being repeated") (Pyle, 1976).

Redundancy must be seen as, paradoxically, the most powerful evaluator and the most powerful inhibitor of evaluative effect. I have argued elsewhere (Bowditch, 1976) that redundant use of a device at crucial moments in the text reinforces the evaluative effect of the device because the device becomes increasingly associated with crucial material. However, if a device is one of the normal structures of the text (direct discourse in dialogue, for example), it is not available to the narrator as a way of commenting on the text. An attempt to use the device evaluatively would fall flat since it would be seen as "Crying wolf."

It must be emphasized that there is no reason for a given sentence, clause, or word to be exclusively of one logical type. For example:

and then she said. "John. I have always loved you. too."

contains the word said which is a time definite event, and therefore a constituent of the temporal structure, and an evaluator because it is a signal of reported speech (in this case, direct discourse) which evaluates text material. In the text which we will be examining in an attempt to make all this a bit clearer, there are several examples of constituents from the temporal structure and from the durative/descriptive structure functioning evaluatively at the same time as they perform their normal functions. Repetition, in fact, is most commonly an evaluator with this confusing dual nature. Part of the text is considered repeated because there is a repetition of something previously mentioned in the text. Both the first and subsequent mentions may be constituents of either the durative/descriptive or temporal structures, and probably do belong to one of these since the presence of purely evaluative material in a narrative text is relatively rare. A great deal of work remains to be done to clarify this whole matter of being a member of two structures simultaneously. Russell's theory of logical types should help the barber get shaved.

Although a great many events happen in "The Lady and the Housefly," (text follows paper) readers agree almost without exception, that the story is not primarily concerned with the peripatetic life style of a nameless fly but is a love story--Lady meets Fly. How do they know this? I would like to try and answer that question by looking first at the temporal and durative/descriptive structures of the narrative and then examining in some detail the evaluative structure to try and establish exactly what details and events are

evaluated as crucial and by which devices.

The movement of time within the narrative is accomplished through a recital of events arranged sequentially. All of these events are encoded in main clauses with verbs in the simple past. A cursory examination of a list of the events encoded in the temporal structure indicates how uninteresting a narrative it is:

- (2) Luba Harrington returned to her New York apartment
- (4) When she began to arrange the flowers in a bowl
- (5) a small fly flew out
- (10) Mrs. Harrington noticed the fly hovering here and there
- (21) One day Mrs. Harrington opened a window
- (22) And the fly flew out
- (25) and she said to the fly
- (26) as it left
- (27) and she shut the window
- (29) Mrs. Harrington came back to the room
- (34) So I opened the window
- (35) and it flew in
- (36) went straight to the lamp on the desk
- (40) and then it flew over to me
- (41) and finally landed on my knee

As formal narrative analysts would predict, the temporal structure of this narrative can be characterized as encoding changes of state brought about through the actions of a character. However, an analysis which posits the "structure of narrative" to be merely a description of its temporal structure is unable to account for the intuition of native speakers that this narrative is not about a fly buzzing around in any particular fashion but it is about the emotional attachment between Mrs. Harrington and the fly. An adequate theory of narrative must posit as the "structure of narrative" theoretical constructs which, at the very least, contain the information of what the narrative is all about.

The durative/ descriptive structure of a narrative text contains all the narrative material other than the temporal events. In this story, the "why" of the narrative text, that the Lady and the Fly have a deep attachment for one another, is contained in this structure which gives the reader all the details of the usual activities of Mrs. Harrington and the fly, the appearance of the fly, events which took place over time, and explanatory or justifying information. For example:

Usual activities

(16) Subsequently, she began to leave crumbs in a dish for the fly to eat. (17) The fly, by then, was following Mrs. Harrington from room to room, (18) when she sat down (19) it would light on her shoulder, or her hand, or her knee.

Descriptive Details

(8) It was such a small fly

Events which took place over some duration of time

(9) The days passed
 (28) Plastered against the window (29) was the fly
 (43) The attachment deepening

Explanatory or Justifying Information

(6) I didn't bother killing it
 (37) where the temperature was warm

Without the evaluative structure, however, it would be almost impossible to pick out the crucial facts and events. Direct discourse, indirect discourse, change of tense from past to present, and repetition are the major evaluative devices in this text. It is important to notice that all of these devices operate contrastively in some sense. They may be contrastive in form (reported speech in a descriptive text; use of present tense in a text set in the past; use of first person singular in a largely third person text) or in content (explaining events which deviate from what one would expect either from the world of the text, or from the real world). (For the following discussion, refer to Chart B).

Direct discourse (and indirect discourse) can operate either deictically or contentially as an evaluator. Deictic evaluation functions by quoting material which points beyond itself to relevant information elsewhere in the text. (A) is a deictic use of direct discourse.

A. (23) "So, if that's what you want, (24) that's what you want," (25) she said to the fly.

The material quoted points back to (22) the fly flew out as the information being evaluated. As with a pronoun, a hearer does not know what a deictic evaluator is talking about without making connections to what is

evaluated. (B) is a contential evaluator, in which the quoted material itself has "meaning" without referencing any other textual materials.

- B. (34) "So, I opened the window. (35) and it flew in (36) and went straight to the lamp on the desk, (37) where it was warm" (38) Mrs. Harrington says. (39) "It stayed there a while, (40) and then it flew over to me (41) and finally landed on my knee."

Sometimes the distinction between the two forms is very fuzzy. For example, (C) which is the only other instance of direct discourse in the text could be seen both as standing independently (contential) and as so crucially contextualized by preceding material that it should properly be seen as deictic.

- C. (6) "I didn't bother killing it," (7) Mrs. Harrington says. (8) "It was such a small fly."

(C) evaluates (5) a small fly flew out. By explaining why she did not do something which would be normally expected, the narrator establishes simultaneously the importance of (5) and the storyworthiness of the narrative (Labov, 1972a). (5) is seen as important because it is singled out for comment. A fly flying out of a bouquet of flowers is not normally an important enough event to tell a story about, nor are any of the other details which the audience has learned so far. Through the device of direct discourse emphasizing what she did not do, the narrator is assuring the audience that his story is an interesting one, worth telling and worth hearing about.

Like other evaluative devices, direct discourse may work either anaphorically or cataphorically in text. In (B) we have a complex use of direct discourse in which the material quoted is itself evaluated and yet the So which begins the quote deictically evaluates the importance of its referent situation (31) and it was (32) beseeching her which caused her to open the window and let the fly in.

There is a contrastive use of direct and indirect speech in this text. While direct discourse evaluates events from the temporal structure, indirect discourse evaluates emotional states and customary events from the descriptive/durative structure:

- D. (12) Mrs. Harrington says (13) she became attached to it (14) She does not explain the

- attachment (15) she states it simply as a fact.
- E. (31) and it was (32) she insists (33) beseeching her
- F. (44) when friends visited (45) she told them (46) to be careful not to swat a fly
- G. (47) although the friends looked at her a little oddly (48) she says (49) she does not care.

Due to space limitations, I will only analyze the first two instances of indirect discourse functioning. Since (E) is simpler than (D), I will begin with it. (E) operates both deictically and contentially. It provides cataphoric motivation for the actions described in (B) as was mentioned above as well as contains the contential information that the fly should be seen anthropomorphically since beseeching is normally marked +human. Since person-like flies are not ordinary, then their activities are not ordinary and are thus reportable. The shift into the present tense further underlines the importance of the evaluated material. The narrator brings Mrs. Harrington directly to the audience. She insists to the audience in its own time-frame and from a vantage point beyond the text.

Similarly (D) is not part of the narrative, because the change in tense from past to present signaled by (12) Mrs. Harrington says shifts the statement from the time of the narrative to the present in which the narrative text is being read. The redundant use of indirect discourse to impress upon the audience the most reportable aspect of the text, namely that a lady and a fly have fallen in love, evaluates this section as the most crucial part of the text. (12-13) contentially evaluates the attachment: (12) she became attached to it. (14) she does not explain the attachment operates similarly to (6) "I didn't bother killing it" by detailing that she did not do what the narrator assumed his audience would imagine to be the normal thing to do in her situation, namely, explain why she became attached to the fly. Both (14) and (15) repeat the message of (13).

The repetition of a device is a powerful evaluative device in itself as is shown by the example above. The audience is insistently battered with the device (indirect discourse) and with the message of the device (there is an attachment between this lady and this fly). When indirect discourse is encountered later in the

text at (F) and (G), the distinctive nature of the attachment evaluated earlier by this device together with the intensity with which it was applied (a triple repetition) serve to lend weight to the device and therefore to the importance of what is evaluated later in the text.

Repetition of a particular word, phrase, or message impresses the audience with the importance of what is being repeated. In this text, in addition to the repetition of (D) there are two other times when material is repeated:

H. (20) the attachment, in fact, was deepening

I. (43) the attachment deepening

Significantly for this text, this attachment is the oddest aspect of the story because the world of the narrative deviates most in this aspect from the one in which the narrator believes his audience lives. The combination of the oddness of the attachment and the fact that it is impressed upon the audience more than any other fact leads the audience to see it as the point of the story.

Let us summarize this evaluation section (See Chart C). Only a few events from the temporal structure are evaluated. All the other temporal details are not evaluated and serve only to give temporal context to the text. The few crucial temporal events, in addition to being temporally contextualizing, are the key events in the text. These are the important changes of state.

- (5) a small fly flew out [of the flowers]
- (22) the fly flew out [of the window]
- (34) I opened the window
- (35) and the fly flew in

The narrative world is a very different place on either side of one of the temporal junctures separating these events, while it really makes no difference to the progress or meaning of the narrative if the other events encoded in the temporal structure are reversed in relation to one another.

Only one aspect of the durative/descriptive structure is evaluated--the attachment between Mrs. Harrington and the fly. Yet, as was argued above, this is the point of the text. It is the aspect of the text which is most storyworthy and most insistently evaluated.

A question arises about the generalizability of this approach to other texts and to texts produced in

other languages. Certainly, the relative importance of the specific evaluative devices varies from text to text, and the specific nature of the devices included in the battery of possibly evaluative devices differs from language to language and from culture to culture. But it is my claim that each well formed way of telling other people about things which have happened will include analogs of all three structures: temporal, durative/descriptive, and evaluative. The temporal structure may well not be temporal in nature, but built around some other text-building principle of the language (Becker, 1974; Morrison, 1976; Zubruchen, 1976). The descriptive/durative structure will be present contextualizing the text-building structure and the evaluative structure will be present contextualizing the entire narrative act. Evaluation should be seen as a pragmatic necessity related to the social nature of the narrative situation and not a constraint limited to a particular genre or language.

I have thought a great deal about the proper formalism for the presentation of these structures. Grammars on the transformational model seem to be all wrong.

Narrative —→ Temporal + Descriptive + Evaluative

seems inadequate to describe the complex social, interpersonal, and content constraints on narrative or to be able to include adequately the underlying semantic structure of what the narrator is telling the story about. A performative model as suggested by Longacre (forthcoming) is highly unsatisfactory. A high order predicate labeled NARRATE would need an entire lending library of felicity conditions and constraints hidden somewhere behind the scenes. I would suggest a formalism built on the concept of mutually contextualizing frames--each frame containing a structure governed by its own rules, and the three frames as a whole constituting a narrative frame operating within the communicative structure as one way of encoding and reporting information to other people. This idea is still in the pre-proto model stage and needs a great deal of thought and work before I can even tell if this would be a reasonable way to frame a discussion of narrative pragmatics.

THE LADY AND THE HOUSEFLY
by John Corry

(1) A woman named Luba Harrington (2) returned to her New York apartment from her summer home last fall, (3) bringing with her some flowers from a garden. (4) When she began to arrange the flowers in a bowl, (5) a small fly flew out. (6) "I didn't bother killing it," (7) Mrs. Harrington says. (8) "It was such a small fly."

(9) The days passed, (10) and Mrs. Harrington noticed the fly hovering here and there, (11) and in time, (12) she says, (13) she became attached to it. (14) She does not explain the attachment; (15) she states it simply as a fact. (16) Subsequently, she began to leave crumbs in a dish for the fly to eat. (17) The fly, by then, was following Mrs. Harrington from room to room, (18) and when she sat down (19) it would light on her shoulder, or her hand, or her knee. (20) The attachment, in fact, was deepening.

(21) Then one day Mrs. Harrington opened a window (22) and the fly flew out. (23) "So if that's what you want, (24) that's what you want," (25) she said to the fly (26) as it left, (27) and she shut the window. (28) About thirty minutes later, however, (29) Mrs. Harrington came back to the room. (30) Plastered against the outside of the window was the fly, (31) and it was, (32) she insists, (33) beseeching her. (34) "So I opened the window, (35) and it flew in (36) and went straight to the lamp on the desk, (37) where it was warm," (38) Mrs. Harrington says. (39) "It stayed there a while, (40) and then it flew over to me (41) and finally landed on my knee."

(42) And the fly continued to live in Mrs. Harrington's apartment, (43) the attachment deepening. (44) When friends visited, (45) she told them (46) to be careful not to swat a fly (47) and, although they looked at her a little oddly, (48) she says (49) she does not care.

(c) 1974

("The Lady and the Housefly" was originally printed in The New York Times and reprinted in The Reader's Digest [October, 1974], p. 182). It appears here with their permission.

CHART A
TEMPORAL STRUCTURE

- (2) Luba Harrington returned to her New York apartment
- (4) When she began to arrange the flowers in a bowl
- (5) a small fly flew out
- (10) Mrs. Harrington noticed the fly hovering here and there
- (21) One day Mrs. Harrington opened a window
- (22) and the fly flew out
- (25) she said to the fly
- (26) as it left
- (27) and she shut the window
- (29) Mrs. Harrington came back to the room
- (34) So I opened the window
- (35) and it flew in
- (36) went straight to the lamp on the desk
- (40) and then it flew over to me
- (41) and finally landed on my knee

(All of these clauses contain verbs in the simple past which are not of a durative or habitual nature. A change in order of any of these clauses relative to any of the others would change the original semantic interpretation of the text. Disturbing clauses encoding durative or habitual events do not necessarily disturb the temporal order of the narrative) (Labov, 1972a).

CHART B: EVALUATION STRUCTURE OF "THE LADY AND THE HOUSEFLY"

EVALUATING CLAUSE		TYPE OF DEVICE		EVALUATED MATERIAL	
Number	Content			Number	Content
C (6-8)	(6) I didn't bother killing it	Direct Discourse		(5)	a small fly flew out
	(7) She says	Direct Discourse			
	(8) It was such a small fly	Contential			
D (12-15)	(12) She says	Indirect Discourse		(13)	the attachment
	(13) she became attached to it	Contential			
	(14) She does not explain the attachment	(Very) Indirect Discourse			
H (20)	(15) She states it simply as a fact	Contential Repetition		(13)	the attachment
	(20) The attachment, in fact, was deepening	Repetition			
	(23) So, if that's what you want, that's what you want	Direct Discourse			
A (23-25)	(24) that's what you want	Delictic		(22)	the fly flew out
	(25) she said to the fly				

EVALUATING CLAUSE		TYPE OF DEVICE		EVALUATED MATERIAL	
Number	Content			Number	Content
A (24)	(24) that's what you want	Repetition		(23)	the fly flew out
(26)	(26) As the fly flew out	Simultaneity		(23)	the fly flew out
E (31-33)	(31) and it was (32) she insists (33) beseeching her	Indirect Discourse Contential		(31) (33)	it was beseeching her
B (34-41)	(34) So I opened the window (35) and it flew in (36) and went straight to the lamp on the desk (37) where it was warm (38) Mrs. Harrington says (39) It stayed there a while (40) and then it flew over to me (41) and finally landed on my knee (34) So I opened the window	Direct Discourse Contential		(34-35)	opening the window the fly flying in
		Direct Discourse Deictic		(31-33)	fly's beseeching her

EVALUATING CLAUSE		TYPE OF DEVICE		EVALUATED MATERIAL	
Number	Content			Number	Content
B (41)	(41) and finally landed on my knee	Repetition		(19)	fly would light on her knee
I (43)	(43) the attachment deepening	Repetition		(13)	the attachment
F (45-46)	(45) she told them (46) to be careful not to swat a fly	Indirect Discourse Contential		(43) (46)	the attachment didn't kill the fly
G (47-49)	(47) Although the friends looked at her a little oddly (48) she says (49) she does not care	Indirect Discourse Deictic		(46)	don't kill the fly (the attachment)

CHART C: EVALUATORS AND EVALUATED

<u>EVALUATED</u> (E_1)	<u>EVALUATOR</u> (E_2)	<u>STRUCTURE OF</u> E_1/E_2
(5) A small fly flew out	Direct Discourse	Temporal/ Evaluative
(13) the attachment	Indirect Discourse Contential	Descriptive/ Evaluative (12, 13, 14)
	Repetition: five times	Descriptive/ Descriptive (19-40)
(22) the fly flew out (of the window)	Direct Discourse	Temporal/Temporal
(33) the fly be-seeched her	Indirect Discourse Contential	Descriptive/ Evaluative
(34- opening the 41) window	Direct Discourse	Descriptive/ Evaluative
the fly flew in	Direct Discourse Contential	Temporal/ Evaluative
(41) the fly landed on her knee	Direct Discourse Repetition (of 18)	Temporal/ Evaluative
(46) don't kill the fly	Indirect Discourse	Descriptive/ Temporal

NOTE

¹To clarify this constraint on narrative chronology, let us consider the following three sets of clauses:

- (1) I ate dinner, went over to John's house, then saw a movie.
- (2) I went over to John's house, ate dinner, then saw a movie.
- (3) I saw a movie, ate dinner, then went over to John's house.

Clearly, they are not telling the same story. Switching the clauses around alters our understanding of what went on. Narrative is only one kind of linguistic encoding of experience in which the order of recital of events in the discourse mirrors the conventional conceptualization of a structure in the real world. Other discourse types so constrained include giving directions (Hobbs, 1975), describing one's apartment (Linde, 1974a, b, c), or conversing about a physical task being performed (Deutsch, 1974, 1975; Langacker, forthcoming). This definition of "narrative" does not necessarily apply to non-Indo-European languages. But in all ages and cultures people tell each other "what happened" and tell stories with fixed formal structures.

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STRATEGIES IN LOAN PHONOLOGY¹

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1. Introduction

Hyman (1970) maintains that, "Foreign sounds are perceived in terms of underlying forms" of the borrowing language, thereby denying the role of phonetics in loan phonology. According to him the phonology of the borrowing language is the sole determinant factor involved. Furthermore, in the Chomsky and Halle (1968) system phonological considerations are exclusively articulatory (except for one feature - [strident]).

The purpose of this paper is to suggest that phonetics does indeed play a role and that there are many other considerations that are employed in loan phonology. These could be phonological, acoustic, articulatory, and even social. Finally, it will be shown that loan phonology may sometimes be used to resolve some problems that may not be easily determined purely on internal synchronic evidence.

2. "Hyman's Paradox"

In rejecting phonetic conditioning in loan phonology, Hyman wonders why the same segment (eg: English /θ/) should be borrowed differently in different languages (eg: as /s/ in French and Haya and as /t/ in Serbo-Croatian.). He prefers to account for this phenomenon through the phonological systems of the respective languages rather than their phonetics. He also argues that if phonetic approximation was the cause, then different speakers would go in different directions in nativising the loan words. I would like to argue (in line with Lovins, 1973) that in fact the very arguments that Hyman uses in rejecting phonetic conditioning are the very ones that are followed in loan phonology.

Lovins (1974:242) states, "Perception of the 'closest sound' in another language occurs in terms of phonological processes, not binary features: features are not perceptual primes." If this were true then features would have no psychological reality. Indeed, cases like the borrowing of English /θ/ as /t/ in Serbo-Croatian and as /s/ in French and Haya are due to the fact that different languages put greater significance on certain features than on others and it is this kind of difference that accounts for this diversity. Thus, for the French in this case it is the shared

marking for the feature [continuant] (the fact that *θ* and *s* are both [-cont.]) that counts while for Serbo-Croatian it is the shared marking for the feature [strident] (the fact that both *θ* and *t* are [-strident]). It is this very reason that makes the French say "— — — it is like our *s*" and Serbo-Croatians say "— — — it is like our *t*" (Hyman p. 11n). This demonstrates that it is the perception of the features in the native languages that counts in such cases. In Haya the English and Swahili /*θ*/ and /*ʒ*/ are borrowed as /*s*/ and /*z*/ respectively--for the same reason as outlined above and demonstrated in #1 below:

1. SW.	θamaani	esamaani	'value'
ENG.	something	esaamusingi	
SW.	ʒambi	ezambi	'sin'
SW.	feða	efeéza	'silver/money'

Haya does not have /*v*/ either. A borrowed /*v*/ gets changed to /*b*/ although it is sometimes realised as [bw]. The significance of the latter will be discussed later.

2. SW.	vitunguu	ebitúngulu	'onions'
SW.	viungo	ebilungo	'spices'
ENG.	silver	esílibwa	

What counts in this case is the fact that both sounds (*b* and *v*) share the features [labial] and [voice] : /*b*/ being the only voiced oral labial consonant in Haya. And this is probably also due to the fact that Haya does not have a bilabial fricative. If it did probably the feature [continuant] would have prevailed as for the dentals.

This kind of analysis -- based in the feature matrices -- accounts for Haya students of French describing the French high front round vowel /*y*/ as "some kind of 'juu'" (describing it as if it was the high back vowel *u*). This means that to them it is the feature [round] that counts in their perception of this vowel. At the moment there are no detected cases of borrowing by Haya from French. Probably, a word like /*syr*/ would be borrowed as [sur] (ignoring for the time being what would happen to *r*). On the other hand for speakers of another language, the feature [back] would count more perceptually than [round]. For these speakers it would be reasonable to speculate that they would describe the same French vowel as "some kind of 'ii'", the high front non-round vowel. For them, then, the word /*syr*/ would be borrowed as [si].

This means that different languages treat 'same'

sounds differently. If two languages both have the sound /t/ two things are possible. First, the two sounds might be audibly different, eg: the English t being alveolar and the Italian dental. Secondly, even though the two sounds may not necessarily be audibly different their perception by the respective speakers might be different -- different features being more salient for speakers of different languages. It is this fact that accounts for the fact that two languages may borrow a given sound from a third language differently.

3. Noun Morphology

In Haya the nouns belong to classes -- classes 1 and 2 being human, 9 and 10 animal, and all the rest inanimate. All non-human nouns borrowed into Haya belong to classes 9 and 10.

Nouns are of the structure pre-prefix+prefix+noun-stem. The prefix is determined by class membership of the noun and has the structure CV. The only vowels that occur in the prefix are i, u and a. The pre-prefix is always a single non-high vowel V the quality of which is predictable from the vowel of the prefix:

3.	<u>pre-prefix</u>	<u>prefix</u>
	e	i
	o	u
	a	a

However, the classes 9/10 prefixes are comprised of a homorganic nasal only (without a vowel) and the pre-prefix is e. It might be reasonable to argue that underlying the class 9/10 prefix has i which conditions the e and then gets deleted. However, borrowed nouns do not have the prefix but still have the e pre-prefix, as the examples in #4 below show:

4.	eshágama	'blood'	Luganda
	edúúka	'a shop'	Swahili
	emótoka	'a motor car'	English
	esimu	'a telephone'	Swahili

Under the circumstances it does not look reasonable to posit an underlying whole Ci prefix that gets deleted after conditioning the pre-prefix. It might be necessary to take the concrete view and say that in borrowed cases the pre-prefix is morphologically conditioned. In fact it might even be worthwhile to extend the notion to all of them; the pre-prefix is morphologically conditioned. If this view is adopted #3 will be modified to #5.

5.	<u>pre-prefix</u>	<u>prefix</u>
	e	i, N, Ø
	o	u
	a	a

If the borrowed nouns do not have prefixes, how do we tell that they are really in class 9/10? This problem is resolved by examining the effect these nouns have on other forms in sentences. Demonstratives will be used to illustrate this phenomenon:

- 6.
- | | | | |
|-----|------------------------|----------------|----------------|
| (a) | Class 7 (non-borrowed) | e-ki-ntu e-ki | 'this thing' |
| | Class 8 (" ") | e-bi-ntu e-bi | 'these things' |
| (b) | Class 9 (" ") | e-n-jubu e-gi | 'this hippo' |
| | Class 10 (" ") | e-n-jubu e-zi | 'these hippos' |
| (c) | Class 9 (borrowed) | e-Ø-duuka e-gi | 'this shop' |
| | Class 10 (") | e-Ø-duuka e-zi | 'these shops' |

It will be observed that realizations on demonstratives is the same in both (b) and (c) irrespective of whether nouns are borrowed or not. It is this fact that groups them together.

One question must be answered: Why does Haya put all its borrowed non-human nouns into classes 9/10 (together with animals)? One possibility could be due to the fact that speakers might be demoting incoming loans and the way to show this is by grouping them together with animals. This "demoting" explanation cannot be used to explain why French has its borrowed nouns in the masculine gender. It seems that Anttila's (1972) indifferent account of this is appropriate. Anttila says that these kinds of "---alignments are often impossible to predict though the language may have set morphological classes where loanwords are accommodated."

Anttila goes on to say, "Often the gender of the lending language is retained". This notion should be carefully examined. In many languages "gender" normally refers to the masculine/feminine opposition. However, in Bantu languages gender means the singular/plural pairs of classes (eg: classes 1 and 2 are one gender--singular and plural: human, and 9 and 10 are another gender--singular and plural: animal). Thus for Anttila's observation to hold it must be restated: the gender is retained if the lending and the borrowing languages are similar. This explains why Swahili borrowings into Haya retain their gender as shown in #7 below:

7.	SWAHILI	HAYA	
	5 tunda	eitúnda	'fruit'
	6 matunda	amatúnda	'fruits'
	3 mnada	omunaada	'auction'
	4 minada	eminaada	'auctions'

SWAHILI	HAYA	
1 mreno	omurééno	'a Portuguese'
2 wareno	abarééno	'Portuguese' (pl.)

This kind of distinction should not be expected to hold where Swahili or Haya borrows from English or vice versa. However, it should be remembered that although languages try to make loan words conform to their already existing structures (phonological, etc.), they also try to maintain the structure of the incoming loans as much as possible. The latter constraint might be the motivation for putting all these nouns into the 9/10 gender in one case and allowing others to maintain their gender in the other. First, nouns in this gender retain the same prefix form on the noun for singular and plural. (See Appendix 1 of Byarushengo and Tenenbaum in this volume). Secondly, the language goes further and refuses to add the prefix to these borrowed nouns (only the pre-prefix). The end result of both of these is that the structure of the noun is retained as much as possible (except for internal adjustments that might be made).

4. Syllable Structure

The preferred syllable structure in Haya is CV. The only consonant clusters allowed are those where a nasal precedes a homorganic consonant and/or a glide follows a consonant. Borrowed words that contain an unacceptable consonant sequence get modified. Most of these words would be those that are of the structure fricative-stop-liquid, those that are stop-syllabic liquid, and those that end in consonants. The examples in #8 below illustrate what happens:

8.	ENG.	HAYA
a)	spray	esipuréi
b)	hospital	ehósipito
c)	bicycle	ebáísiko
d)	stamp (postage)	esitámpu
e)	shirt	esááti
f)	goal-keeper	golikípa
g)	soup	esúpu
h)	nib	eníbu
i)	pilot	omupáíloti
j)	screw	esikurúu

These examples indicate that in most cases the vowel *i* is inserted. This vowel is chosen probably due to the fact that it is the closest vowel in the language.² Thus, using it inflicts the least amount of disruption on the original form of the loan word--thereby allowing the word to maintain as much of its original form as can

possibly be allowed.

Two other methods are employed in removing unacceptable consonant clusters. It will be noticed that in examples a, d, g and h the vowel u is used instead of i. This only happens when the preceding consonant is grave. The vowel u is grave too. Thus, the quality of the consonant in these cases determines the vowel -- the one with which they are similar.³

However, if the word ends in a syllabic liquid the latter gets replaced by the vowel o. This process is attested too in the diachronic development of Serbo-Croatian. It is due to the fact that syllabic l and o have similar formant structures (Ed Purcell, personal communication).⁴ This means that they sound alike -- a case where a sound in the donor language (a consonant) is replaced by one that sounds like it in the borrowing language (a vowel).

The constraint against consonant clusters of the form fricative-stop, stop-liquid and fricative-stop-liquid is both a MSC (Stanley, 1967) and an SPC (Shibatani, 1973). However, the requirement that consonants should not occur in final position is only an SPC since verb stems in Haya end in consonants. The situation in Haya is like that in Japanese as stated by Shibatani, "--- stems ending in consonants take suffixes ending in vowels" (p. 87). This prevents the possibility of realizing a consonant in final position on the surface. It should be noticed, however, that neither of the above requirements is only a MSC. Thus this confirms Johns' view that, "In fact it would seem that a language's ability to borrow words is at least largely determined by the shapes permitted at the surface level." (1969: 377--quoted in Shibatani p. 99).

What is interesting about all this is the fact that the strategies employed in removing clusters are phonetic even though the motivation (to maintain the CV structure) is phonological. As Shibatani (p. 97) stresses "--- the more plausible hypothesis is that a loan word tends to be modified according to the SPC's of a borrowing language". In fact he goes further (personal communication) to suggest that it is only those rules that have direct connection with SPC's that act on loan words. This means that we should separate the cause from the means -- motivation from strategy. It will be observed that all of the three processes above have one aim in common -- to convert an unacceptable sequence (a consonant cluster) to one that is acceptable: a CV structure. All three rules are in conspiracy to maintain that structure. Although they are different from each other in terms of the structures to which they apply they are all explained phonetically.

5. Tone Placement

In Haya, there are two important tonal phenomena.

First, the final syllable is never prominent (it never gets either high or falling tone). Secondly, the penultimate syllable before a pause is the preferred syllable for prominent tone. A framework that accounts for borrowing solely in phonological terms (MSC's and P-rules) would expect the high tone to occur on the penultimate syllable and never on the final. The latter is true: even in borrowed words the final syllable never acquires prominent tone. This is a phonological constraint (and a strong one too). However, in most cases the prominent syllable in the donor language (the stressed syllable) remains the prominent syllable when the word is borrowed into Haya, as the examples in #9 below will show. Thus the prominent syllable remains the one from which prominence is first heard from the donor language. This is further evidence of phonetic conditioning.

9.	ENG.	HAYA
	pīlōt	omupāfloti
	mōtor-car	emōtoka
	hōspital	ehōsipito
	bīcycle	ebāisiko

The last two forms have alternate pronunciations as shown below.

10.	ehosipitāli
	ebaisikéli

This is because the alternative forms are borrowed via Swahili. It further shows that tone placement in loan-words in Haya is mainly phonetically conditioned -- because in Swahili prominence (stress) always falls on the penultimate syllable. (It will be seen that Swahili treats borrowing differently than Haya -- in the way it breaks clusters and insisting on making the penultimate syllable prominent).

6. Rule Reversal - Sequential Constraints

In Haya p and d occur only when preceded by a nasal. Otherwise they are realized as h and l respectively in other environments. These pose a problem in determining which one of each pair should be taken as being basic (underlying). There are two considerations that were taken into account in Byarushengo (1975). First, p and d are the historic forms: Proto-Bantu is assumed to have had these stops that became the respective non-stops. Secondly, there was a need to attain symmetry in stops: matching each voiced stop with a voiceless counterpart and vice versa. At that point borrowings were ignored and there were no processes which could help resolve the

problem. The stops were, therefore, taken as being underlying. Thus these rules were proposed:

11. a) $p \rightarrow h / [\sim N] \text{---}$ i.e., \underline{p} and \underline{d} became \underline{h} and
 b) $d \rightarrow l / [\sim N] \text{---}$ \underline{l} respectively if they
 were not preceded by N.

This worked in so far as we were considering historical Haya forms only. However, if these rules were productive we should have expected borrowed \underline{p} and \underline{d} that did not meet the above requirements to become \underline{h} and \underline{l} . But this does not happen, as the examples in #12 show:

12.		HAYA	
SW	pilipili	epilipili	'pepper'
ENG	pin	epini	
SW	duuka	eduuka	'shop'
ENG	radio	eredio	

However, borrowed \underline{h} and \underline{l} change to \underline{p} and \underline{l} after a nasal as shown in #13 below:

13.		HAYA	
SW	andika	handika	'write'
		mpandika	'I write'
SW	hesimu	hesimu	'obey'
		mpesimu	'obey me'
SW	laumu	laumu	'blame'
		ndaumu	'I blame'

This observation indicates three significant points. First, to have a productive rule the existing rule should be reversed:

14. a) $h \rightarrow p / N \text{---}$ i.e., \underline{h} and \underline{l} become \underline{p} and
 b) $l \rightarrow d / N \text{---}$ \underline{d} after a nasal.

Formulated this way both historical and borrowed forms are accounted for without exception. The new rule is more productive than the older one.

Secondly, it will now be noticed that new "phonemes" have been created: \underline{l} and \underline{h} . Equally important is how these "phonemes" have been created. A comparison of the treatment of the dental and labial fricatives on the one hand and these stops will show a strategy by which new "phonemes" are acquired in a language -- by splitting the bundle of allophones of an already existing "phoneme" rather than by acquiring a completely new sound that is not found in the language even at the phonetic level. This agrees with Shibatani's observation that "--- bringing in a new segment costs more than dealing with

already existing segments---" (p. 104).

The third observation relates to Lovin's (1974:243) view that, "Sounds are perceived sequentially, not individually; in relation to context-sensitive process": the view also strongly held by Hyman. What this Haya phenomenon shows is that this is not always so; otherwise these stops would not have been accepted in the environment they occur in. In fact if this was a strong universal requirement there probably would not be any cases of rule reversals.

However, another assertion of Lovins (P.242), that: "Processes governing the phonological system of a language sometimes appear explicitly only in an interference situation" is demonstrated by these stops. It is this phenomenon that determines the form of the p-h and d-l rule and establishes h and l in the underlying representation. This way we get rid of the semi-ad-hoc solutions of Byarushengo (1975) quoted above -- and still maintain symmetry.

At this point we come back to what was observed with /v/ -- the fact that it is sometimes realized as b and sometimes as bw. This might mean that the voiced bilabial Haya stop has some salient characteristics that have yet to be uncovered.

7. Vowels - Social Constraint

Swahili, like Haya, has five vowels and the vowel systems of the two languages are almost identical. As a result, on borrowing from Swahili, no modifications are made on the vowels. The interesting situation is in borrowings from English -- as would be expected. English vowels are reduced, within the Haya system, as shown in 15 below.



One interesting observation is that there are no known cases of the same vowel being realized differently in different words. This situation contrasts with that in Japanese (Lovins, 1974: 241) where the same vowel might be borrowed differently. This might be further evidence that Haya is more phonetic oriented in its borrowing and less phonological.

There is one further interesting consideration. According to the illustration above the English word

manner should be realized in Haya as [mana] . However, this happens to be a taboo word. As a result the word is realized as [mena] : one of the vowels is purposely changed to make the word acceptable. This illustrates a case of institutional constraints on loan phonology--or borrowing as a whole. Under the circumstances one can imagine the problem which priests and ministers have with the word manna. Some selected vowels are demonstrated in #16 below.

16.	<u>Vowel</u>	<u>English</u>	<u>Haya</u>
	i	green	gur <u>i</u> ni
	ɪ	pin	ep <u>i</u> ni
	e	desk	ed <u>e</u> siki
	æ	map	em <u>a</u> pu
	a:	pass	ep <u>a</u> si
	ə	singer	sing <u>a</u>
	ʌ	mudguard	madig <u>a</u> di
	ɒ	hospital	ehosip <u>o</u> to

8. Conclusions

Although some of my arguments are based on speculation I maintain that they are of theoretical validity. It should have been noticed by now that several factors interact in determining the direction of loan phonology: phonological, phonetic, social, etc. It is inappropriate then to attempt to account for borrowing through one and only one strategy. Furthermore, motivation and strategy should be separated. There are cases where loan phonology plays an important role in shedding more light on areas that would be difficult to understand clearly on the basis of purely internal evidence: this should be seen as the application of loan phonology.

9. Footnotes

1. I would like to express my gratitude to Larry Hyman and M. Shibatani for their invaluable comments on an earlier draft. Acknowledgements are also being extended to Ed Purcell for making it possible to understand some of the salient issues involved.
2. The vowel i is the most closed in the sense that high front vowels are actually higher than their back counter parts. It is possible, too, that this vowel is the shortest in the language. However, I intend to explore this possibility instrumentally.
3. Indeed u does occur before non grave consonants (as in tuma "send for") and i may also occur after grave consonants (as in kila "recover"). So the selection of these vowels is not due to any already existing consonant-vowel sequential constraints.
4. Further experimentation is intended to verify this, too.

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AGREEMENT AND WORD ORDER:
A Case for Pragmatics in Haya

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O. Introduction

The purpose of this paper is to show the extensive effects of pragmatics on Haya word order and agreement pronouns.

Initially, it appears that Haya, a Lake Bantu language, is a "free" word order language. All permutations of the verbal complex and the subject, indirect object, and direct object noun phrases are allowed with the relationships between the various syntactic roles remaining stable. However, a closer examination reveals that rather than having "free" word order, Haya has the underlying basic structure: subject--verbal complex--indirect object--direct object. All other syntactically possible permutations are the result of specific pragmatically conditioned processes such as : emphasis, topicalization, focusing and/or afterthought. The pragmatic conditioning is motivated by the tendency in this language to separate old and new information. In Haya, except in the case of a new subject, new information never precedes the verbal complex.

Markers in the verbal complex, which agree in noun class membership with their "antecedent" nouns, allow for this apparent "free" movement. The stability of the syntactic functions of the various noun phrases is maintained due to the rigid ordering of the agreement markers--they indicate old discourse information.

In this discussion, it will be necessary to differentiate between information and reference. A referent is the idea which is expressed by the noun, while old (or given) information deals with what is in the hearer's consciousness (Chafe 1976). In other words, the notion of reference must involve shared background knowledge, and information must be tightly bound with the state of the discourse at the time of the utterance. Therefore, any one of three possible situations may arise in discourse:

	<u>reference</u>	
	<u>old</u>	<u>new</u>
<u>information</u>	+	-
	<u>new</u>	+

If our hypothesis is valid, only sentences belonging to the class "old referent--old information" would include these morphemes.

1. Description

1.1 Nouns and Their Noun Classes

In Haya, as in other Bantu languages, nouns are grouped into classes. Each noun class has a corresponding prefix and pre-prefix (or initial vowel--IV) which is determined by the prefix. Nouns have the following structure:

pre-prefix < prefix - noun stem

Class membership indicates number and animacy.

1. a) o-mu-kâzi 'woman'
IV cl₁ stem
- b) a-ba-kâzi 'women'
IV cl₂ stem
- c) e-ki-tooke 'banana'
IV cl₇ stem
- d) e-bi-tooke 'bananas'
IV cl₈ stem

1.2 The Verbal Complex (VC)

For each specified noun in a given sentence, an affix, marked for class membership, may be attached to the verb in a rigid manner, indicating the grammatical function of the nouns. This order is: Subject--Direct Object--Indirect Object, and occurs prefixed to the verb radical. Other markers indicating tense and case may also be affixed to this unit. The verbal complex is the name given to the verb radical and all its possible affixes.

2. abakâzi ba-gi-mu-cumb-îl-a kakûlw' énkôko
women they it him cook APP MD Kakulu chicken

VERBAL COMPLEX

 'The women cook chicken for Kakulu.'

The verbal complex may occur as a sentence without any specified noun.

3. ba-gi-mu-cumb-îl-a APP=applicative
they it him cook APP MD MD= mood
'They cook it for him.'

Notice in example (3) that ba-, -gi-, and mu- function as pronouns in addition to indicating class membership. These markers will henceforth be called agreement pronouns.

The agreement pronoun corresponding to the subject is obligatorily present and will be referred to as the Subject-Agreement-Pronoun (SAP). The Object-Agreement-

Pronoun (both DO and IO--OAP) may be optionally present depending upon conditions that will be discussed in detail in Sections 2 and 3.

1.3 Basic Word Order

Upon examining the data (Appendix II), it appears that the only possible orders that can occur with merely the SAP are SVIO or VIOS. Since VIOS is in actuality VIO||S -- as can be detected tonally (see Section 3) -- we will therefore postulate that SVIO is the unmarked or basic order and that VIOS is actually the result of right dislocation--i.e. afterthought.

4. abakâzi ba-cumb-il-a kakûlw' énkôko
 women they cook APP MD Kakulu chicken
 'The women cook chicken for Kakulu.'
5. ba-cumb-il-a kakûlw' énkôk' || ábakâzi
 they cook APP MD Kakulu chicken women
 'They cook chicken for Kakulu, the women.'

By "unmarked", we mean the order one gets if everything in the sentence is new information--not previously mentioned in discourse, or if only the subject is old information.

$$\left\{ \begin{array}{c} \text{S, V I O} \\ \text{OLD NEW} \\ \text{ALL NEW} \end{array} \right\} = \text{UNMARKED}$$

This basic order then is found to have the following properties:

- a) sentence contains all new information or only the subject is old information
- b) no tonal peculiarities
- c) occurs without OAP's

This finding agrees with Givón (1976) who stated that there seems to be a universal tendency for the IO to be positioned closer to the verb than the DO when both DO and IO are equally marked/unmarked. It also helps explain the less acceptable judgment given to sentences of the form SVOI.

6. kakûlw' a-cumb-il-' énkók' émbwa
 Kakulu he cooks APP chicken dog
 'Kakulu cooks chicken for the dog.'

On first reading, one would expect énkôko to be the IO. But since this is semantically highly improbable, a second reading is attempted--making énkôko the DO.

It can therefore be hypothesized that example (4) cannot be considered ambiguous since word order disambiguates, and only when that fails do other semantic factors intervene (cf. Hawkinson and Hyman, 1974).

2. Left Dislocation

2.1 Presence of OAP's

In Haya, as in many other languages, there seems to be a fairly consistent separation between old and new information. This separation is the motivation for left dislocation which allows the old information to be placed to the left of the verbal complex.

In order for an object to become topicalized (the result of left dislocation), it must be old information, the morphological realization of which is the obligatory presence of its corresponding OAP in the verbal complex. It is at this point that we differ from previous analyses of the OAP's function. Rather than indicating definiteness (Givón, 1976), our findings, which took contextual considerations into account, reveal that the indication of definitization is a by-product of a more general function.

Old information is by definition an old referent which is, in turn, by definition definite. Generics can also be considered old referents. However, an old referent may be either old or new information. Therefore, one would expect generics to occur with or without their corresponding OAP's, dependent only upon whether the information is old or new. Similarly, one would not expect to find an OAP corresponding to any NP which is new to the discourse.

7. 'The women cook for Kakulu.'

[old info]

- a) abakázi kakúlu ba-mu-cumb-îl-a
 - b) *abakázi kakúlu ba-Ø-cumb-îl-a
 - c) ≠abakázi ba-mu-cumb-îl-a kakúlu
 - d) ≠abakázi ba-Ø-cumb-il-a kakúlu
- women they cook APP MD Kakulu

(7b) is ungrammatical because an object without its corresponding OAP in the VC was topicalized. The OAP is not present because the object is new information and therefore may not be topicalized.

(7c) is an example of afterthought (see Section 3).

(7d) is merely a declarative sentence. kakúlu in this case is taken as being new information.

Notice in (7d) that no OAP occurs in the VC even though a proper noun (kakúlu) must be definite. That implies that its presence in (7c) must be attributed to another function.

The fact that the absence of OAP's have no effect on definiteness may be further illustrated by the fact that if a Haya speaker wants to say "Kakulu cooks chicken for the children", the sentence in (8) will result.

8. kakulw' a-Ø-cumb-il-' ábáán' énkôko
 Kakulu he cook APP women chicken

Notice that enkôko is generic and does not have its corresponding OAP in the VC. Furthermore, in this situation, the speaker assumes that the hearer knows the particular children under discussion (Sentence (8) can of course also mean 'Kakulu cooks chicken for children'). The absence of the OAP implies that ábáana is new information. Obviously then, OAP does not cause definiteness nor does definiteness require the presence of OAP.

2.2 Topic Prominence

Either or both objects may be topicalized dependent only upon prior mention in discourse. In this type of situation, where more than one NP occurs to the left of the VC, the one in sentence-initial position receives greatest prominence--i.e. the NP on which the speaker is focusing or setting up as topic.

3. Afterthought

3.1 Tonal Change

Underlyingly, high tone in Haya has two surface realizations: falling in phrase penultimate position and high elsewhere.

9. / o-mu-kázi /
 IV cl st em
 omukâzi 'woman'
 omukâzi wange 'my woman'

Therefore, a falling tone in non-phrase-penultimate position indicates a pause signifying a syntactic break.

As mentioned in Section 1.3, the configuration VIOS is actually the result of right dislocation of the subject. In comparing the following examples, notice the difference in tone on abakâzi and enkôko.

10. abakâzi ba-cumb-' énkôko
 women they cook chicken
 'The women cook chicken.'
11. ba-cumb-' énkôk' ábakâzi
 they cook chicken women
 'They cook chicken, the women.'
12. abakâzi ba-cumb-' énkóko ge
 women they cook chicken well
 'The women cook chicken well.'

Whatever causes the falling tone on enkôko in examples (10) and (11) is not present in (12). Notice also that abakâzi has a falling tone in (11) but not in (10) or (12).

We claim, that in all cases, the falling tone is caused by the same factor--a syntactic break.

3.2 Right Dislocation

A syntactic break within a sentence is the result of afterthought. Imagine a situation in which the speaker begins a sentence without including the subject NP, in which case, the SAP functions as a pronoun. By the time he/she reaches the end of the sentence, he realizes that the reference of the SAP may not be in the conscious mind of the hearer. In such a situation, the speaker may choose to add the subject NP to the right of the VC as an afterthought. The speaker, knowing he changed the normal word order, places pause(s) separating the subject NP from the rest of the sentence. This phenomenon can be attested to tonally as seen in the following examples:

13. ba-cumb-' énkòk' || ábakâzi
 they cook chicken women
 'They cook chicken, the women.'
14. ba-cumb-il-a kakúlw' énkòk' || ábakâzi
 they cook APP MD Kakulu chicken women
 'They cook chicken for Kakulu, the women.'

Notice that in both of the above examples, everything to the left of the pause constitutes a complete sentence.

3.3 OAP Without Movement

Recall the presence of OAP's indicate that their respective NP's are old information and therefore the NP's will either be topicalized or not mentioned at all. In cases where both the OAP's and their NP's co-occur and no movement takes place, the NP's are interpreted as being afterthought. This can also be tonally verified.

15. ba-gi-cumb-il-a kakûlw' || énkôk' || ábakâzi
they ~~I~~ cook APP MD Kakulu chicken women
'They cook it for Kakulu, the chicken, the women.'
16. ba-gi-mu-cumb-îl-a || kakûlw' || énkôk' || ábakâzi
they ~~I~~ him cook APP MD Kakulu chicken women
'They cook it for him, Kakulu, the chicken, the women.'

Extending what was mentioned in connection with examples (13) and (14), everything to the left of any phrase boundary constitutes a complete sentence.

4. Conclusion

In view of the tonal behavior discussed above, we conclude that ANY NP TO THE RIGHT OF THE VC IS CONSIDERED AN AFTERTHOUGHT WHENEVER ITS CORRESPONDING AGREEMENT PRONOUN IS PRESENT. This finding is in accordance with our hypothesis that OAP's mark old information. Since the normal position for old information is to the left of the VC, its occurrence elsewhere in the sentence indicates an addition to what the speaker originally intended to say.

n! sentences may be generated, where n is equal to the number of NP's occurring to the right of the VC simultaneously with the presence of their corresponding agreement pronouns. The pragmatic conditioning of these various alternatives, as well as possible cases of ambiguity, will be discussed in Tenenbaum and Byarushengo (forthcoming).

ACKNOWLEDGEMENTS

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APPENDIX #1CLASS CONCORD SYSTEM

Class	Noun Prefix	Example	SAP	OAP
1.	mu-	mu-ntu (person)	a-	-mu-
2.	ba-	ba-ntu (persons)		ba-
3.	mu-	mu-kôno (hand)		gu-
4.	mi-	mi-kôno (hands)	e-	-gi-
5.	i-/li-	i-cûmu (spear) lí-ino (tooth)		li-
6.	ma-	ma-cûmu (spears)		ga-
7.	ki-	ki-ntu (thing)		ki-
8.	bi-	bi-ntu (things)		bi-
9.	N-	m-bógo (buffalo)	e-	-gi-
10.	N-	m-bógo (buffaloes)		zi-
11.	lu-	lú-go (fence)		lu-
12.	ka-	ka-húka (small insect)		ka-
13.	tu-	tu-húka (small insects)		tu-
14.	bu-	bu-húka (small insects)		bu-
15.	ku-	ku-gulu (leg)		ku-

APPENDIX #2

'The women cook chicken for Kakulu'

VSID

bagimucumbîl' ábakâzi kakûlw' énkôko
 *bagicumbîl' ábakâzi kakûlw' énkôko
 bamucumbîl' ábakâzi kakûlw' énkôko
 *bacumbîl' ábakâzi kakûlw' énkôko

VISD

bagimucumbîla kakûlw' ábakâzy' énkôko
 bagicumbîla kakûlw' ábakâzy' énkôko
 bamucumbîla kakûlw' ábakâzy' énkôko
 *bacumbîla kakûlw' ábakâzy' énkôko

VSDI

bagimucumbîl' ábakâzy' énkôko kakûlu
 *bagicumbîl' ábakâzy' énkôko kakûlu
 bamucumbîl' ábakâzy' énkôko kakûlu
 *bacumbîl' ábakâzy' énkôko kakûlu

VDSI

bagimucumbîl' énkôk' ábakâzi kakûlu
 *bagicumbîl' énkôk' ábakâzi kakûlu
 bamucumbîl' énkôk' ábakâzi kakûlu
 *bacumbîl' énkôk' ábakâzi kakûlu

VIDS

bagimucumbîl' énkôko kakûlw' ábakâzi
 *bagicumbîl' énkôko kakûlw' ábakâzi
 bamucumbîl' énkôko kakûlw' ábakâzi
 *bacumbîl' énkôko kakûlw' ábakâzi

VIDS

bagimucumbîla kakûlw' énkôk' ábakâzi
 bagicumbîla kakûlw' énkôk' ábakâzi
 bamucumbîla kakûlw' énkôk' ábakâzi
 bacumbîla kakûlw' énkôk' ábakâzi

SVID

abakâzi bagimucumbîla kakûlw' énkôko
 abakâzi bagicumbîla kakûlw' énkôko
 abakâzi bamucumbîla kakûlw' énkôko
 abakâzi bacumbîla kakûlw' énkôko

SVDI

abakâzi bagimucumbîl' énkôko kakûlu
 *abakâzi bagicumbîl' énkôko kakûlu
 abakâzi bamucumbîl' énkôko kakûlu
 abakâzi bacumbîl' énkôko kakûlu

Appendix #2 cont.

SIVD

abakázi	kakúlu	bagimucumbîl'	énkóko
*abakázi	kakúlu	bagicumbîl'	énkóko
abakázi	kakúlu	bamucumbîl'	énkóko
*abakázi	kakúlu	bacumbîl'	énkóko

SIDV

abakázi	kakúlw'	énkóko	bagimucumbîla
*abakázi	kakúlw'	énkóko	bagicumbîla
*abakázi	kakúlw'	énkóko	bamucumbîla
*abakázi	kakúlw'	enkoko	bacumbila

SDIV

abakázy'	énkóko	kakúlu	bagimucumbîla
*abakázy'	énkóko	kakúlu	bagicumbîla
*abakázy'	énkóko	kakúlu	bamucumbîla
*abakázy'	énkóko	kakúlu	bacumbîla

SDVI

abakázy'	énkóko	bagimucumbîla	kakúlu
abakázy'	énkóko	bagicumbîla	kakúlu
*abakázy'	énkóko	bamucumbîla	kakúlu
*abakázy'	énkóko	bacumbila	kakúlu

DVSI

enkóko	bagimucumbîl'	ábakázi	kakúlu
*enkóko	bagicumbîl'	ábakázi	kakúlu
*enkóko	bamucumbîl'	ábakázi	kakúlu
*enkóko	bacumbîl'	ábakázi	kakúlu

DVIS

enkóko	bagimucumbîla	kakúlw'	ábakázi
enkóko	bagicumbîla	kakúlw'	ábakázi
*enkóko	bamucumbîla	kakúlw'	ábakázi
*enkóko	bacumbîla	kakúlw'	ábakázi

DSIV

enkók'	ábakázi	kakúlu	bagimucumbîla
*enkók'	ábakázi	kakúlu	bagicumbîla
*enkók'	ábakázi	kakúlu	bamucumbîla
*enkók'	ábakázi	kakúlu	bacumbîla

DSVI

enkók'	ábakázi	bagimucumbîla	kakúlu
enkók'	ábakázi	bagicumbîla	kakúlu
*enkók'	ábakázi	bamucumbîla	kakúlu
*enkók'	ábakázi	bacumbila	kakúlu

Appendix #2 cont.

DIVS

enkôko kakûlu bagimucumbîl' ábakâzi
 *enkôko kakûlu bagicumbîl' ábakâzi
 *enkôko kakûlu bamucumbîl' ábakâzi
 enkôko kakûlu bacumbîl' ábakâzi

DISV

enkôko kakûlw' ábakâzi bagimucumbîla
 *enkôko kakûlw' ábakâzi bagicumbîla
 *enkôko kakûlw' ábakâzi bamucumbîla
 *enkôko kakûlw' ábakâzi bacumbîla

IVDS

kakûlu bagimucumbîl' ênkôk' ábakâzi
 *kakûlu bagicumbîl' ênkôk' ábakâzi
 kakûlu bamucumbîl' ênkôk' ábakâzi
 *kakûlu bacumbîl' ênkôk' ábakâzi

IVSD

kakûlu bagimucumbîl' ábakâzy' ênkôko
 *kakûlu bagicumbîl' ábakâzy' ênkôko
 kakûlu bamucumbîl' ábakâzy' ênkôko
 *kakûlu bacumbîl' ábakâzy' ênkôko

ISVD

kakûlw' ábakâzi bagimucumbîl' ênkôko
 *kakûlw' ábakâzi bagicumbîl' ênkôko
 kakûlw' ábakâzi bamucumbîl' ênkôko
 *kakûlw' ábakâzi bacumbîl' ênkôko

ISDV

kakûlw' ábakâzy' ênkôko bagimucumbîla
 *kakûlw' ábakâzy' ênkôko bagicumbîla
 *kakûlw' ábakâzy' ênkôko bamucumbîla
 *kakûlw' ábakâzy' ênkôko bacumbîla

IVDS

kakûlw' ênkôko bagimucumbîl' ábakâzi
 *kakûlw' ênkôko bagicumbîl' ábakâzi
 *kakûlw' ênkôko bamucumbîl' ábakâzi
 *kakûlw' ênkôko bacumbîl' ábakâzi

ISDV

kakûlw' ênkôk' ábakâzi bagimucumbîla
 *kakûlw' ênkôk' ábakâzi bagicumbîla
 *kakûlw' ênkôk' ábakâzi bamucumbîla
 *kakûlw' ênkôk' ábakâzi bacumbîla

Etymology of Greek agalma, agallō, agallomai

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I. PREVIOUS ETYMOLOGIES

The Greek words agallomai (= to delight, exult in a thing; + dative) and agalma (= glory, delight, ornament; image; statue, etc.) have long been etymologically unclear. At least eight hypotheses have been set forth, but none has proved convincing. First, Ahrens (1868: 256) and later Prellwitz (1892: 1) derive agallomai from *mgaljo, a reconstructed variant of megalo- (= big, great). This view is rejected by Schmidt (1895: 152) and treated as highly doubtful by Frisk (1960: 1), while Chantraine (1968: 7) does not even mention it in his list of possible etymologies for agallomai. Except for Prellwitz 1892, Pokorny 1959 is the only etymological work that offers any support to Ahrens' hypothesis, but due to a confused presentation even this support is far from clear. On p. 366 Pokorny connects agalma with gelaō (= I laugh) et al., but on p. 708 he connects ('wohl') agalma with megalo-.

Secondly, Curtius (1879: 172) tentatively connects agallō with agamai (= I wonder, admire; envy), a view that has won clear support only from Szemerényi (1964: 155, 156), while Boisacq (1916: 5) acknowledges it as one of two possibilities. A third and related hypothesis is set forth by Hofmann (1950: 1; 'perhaps'), viz. that agalma and agallō are derived from aga- (= very). Frisk (1960: 6) and Chantraine (1968: 7) both regard this hypothesis as uncertain; Chantraine, for example, says: 'A connection with the family of aga-, agamai could be based on the meaning of complete satisfaction and abundance that is connoted by the most ancient words of the group. But this is just a possibility, and it is not supported by any evidence'.

A fourth possibility is that agallomai is derived from *agalos, as suggested by Schwyzler (1939: 725) and hesitantly approved by Frisk (1960: 6). Chantraine (1968: 7), however, is dubious about this suggestion, pointing out that *agalos is nowhere attested.

A fifth suggestion appears in Weber (1861: 49, 50), viz. that agalma et al. have a *Grundbedeutung* 'shine'. Persson (1891: 146), unaware of Weber's hypothesis but knowing of Danielsson's work (1888: 35) on gl- = bright, connects agalma et al. with this root. According to this view agalma is related to Lat. glōria (= glory; originally, according to Persson: shine) and Greek gelaō (= I laugh; Danielsson and Persson reconstruct 'shine'). Szemerényi (1964: 155, 156) presents essentially the same hypothesis, although he is apparently unaware of Persson's suggestion; Szemerényi connects agalma et al. with agla(w)os (= splendid, bright). Chantraine (1968: 12) acknowledges the possibility of agalma < *bright but is clearly not enthusiastic about it. This

proposed derivation involves positing a prothetic a-, which Brugmann (1875: 214, 311) finds unconvincing. And Wyatt 1972 (The Greek Prothetic Vowel) passes over agalma et al. in silence, thereby indicating an unwillingness to subscribe to the view that this word contains a prothetic vowel.

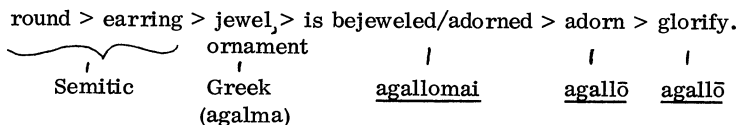
A sixth etymology, advanced by Pisani (1928: 396) is that agallō is composed of a- (= to; like Latin ad) and gall- (= call; as in Latin gallus (= rooster) and English call); semantically, agallō (= to glorify) originally meant 'to call to'. Walde-Hofmann (1965: I, 843) comment tersely: 'not convincing'. Pisani's etymology does not take into account that agallō was not the original form but is rather a back-formation from agallomai; see e.g. Szemerényi (1964: 156).

Seventh, Brugmann (1875: 214, 311) suggests that agallō arose from *gagallō, a partially reduplicated form of IE *gal- (= shine). Brugmann is here unaware that agallō is a back formation from agallomai, and his proposed etymology has been mercifully ignored by later scholars.

Finally Frisk (1960: 1) very tentatively connects agallomai with aganos (= mild, gentle) on the assumption of a possible 1-n alteration. This hypothesis is ignored by Chantraine 1968 however.

II. POSSIBLE SEMITIC ORIGIN OF AGALMA, ETC.

The search for an IE origin of agalma/agallō/agallomai has therefore proved inconclusive, and suspicion might therefore be aroused that perhaps we deal here with a borrowing. I would like to pursue this lead by first following Schwyzler (1939: 725) in reconstructing *agalos and by then suggesting that this form is a borrowing from Hebrew or an unattested Phoenician form. Biblical Hebrew presents 'agil (= earring; Ezek. 16: 12, Nu. 31:50), which is clearly based on the root 'gl (= round)¹.



The following points may be made here:

- (1) The semantic development 'round > earring' within Semitic presents no problems.
- (2) The semantic development 'earring > jewel > ornament' is plausible, even if Greek does not contain agal- with the specific meaning 'earring'. We deal here with a widening of meaning, examples of which can be found in any detailed treatment of semantics; see e.g. Bloomfield (1965: 426).

- (3) It is already recognized that agallō is a back formation from the passive agallomai; agallomai appears already in Homer, but agallō is first attested in Pindar (e.g. Szemerényi 1964: 156; also Hirt 1912: 470).
- (4) The possibility of agallomai deriving from a noun (viz. *agalos) has already been recognized by Schwyzler (1939: 725). At this point we see the possibility of: agallō < agallomai < *agalos.
- (5) Adorning the temple of a god was the equivalent of glorifying that god; hence, agallō: adorn > glorify. Also, if a god was adorned by certain jewels ('by' - takes the dative) he would naturally delight or exult in them (. . . agallomai + dat. = to delight in (a thing), exult).
- (6) Why did Schwyzler's *agalos disappear? The answer to this question may lie in the double meaning of agallomai (be adorned; delight in); we may plausibly deal with the following developments:
- (a) Agallomai is derived from *agalos and originally meant only 'be adorned'.
 - (b) When agallomai acquired the additional meaning 'be delighted in', *agalos underwent a change: -ma was added to the root agal- as if this new noun literally meant 'that wherein one delights'²; however the meaning of *agalos (viz. ornament) was retained. *Agalos therefore never really disappeared; it survives in agalma.
 - (c) Agalma therefore arose from two sources:
 - a. as a nominal formation from agallomai.
 - b. from *agalos, which already meant 'jewel, ornament'. We deal here with multiple causation, a well recognized although thus far superficially treated linguistic feature; see Malkiel 1967.
- (7) The initial ayin in 'agil was not rendered by Greek. For a similar omission, cf. the Greek name Anna (< Hebrew Ḥanāh) with omission of the initial h-.
- (8) The second -a- in Greek agal- (vs. -i- in Hebrew 'agil) is frankly problematical. The modification of 'agil to agal- may have occurred under the influence of agamai (= I wonder at, admire) or aga (= very). Perhaps, though, we deal simply with the inaccurate rendering of a foreign word in Greek. Borrowed words frequently appear in a modified form in their new language, e.g. English shivaree (a noisy serenade) from French charivari (= hubbub) and Greek Ozumandias (an awkward rendering of the Egyptian Ramses).
- (9) The assumption of Greek agal- deriving from a Semitic root meaning round can help clarify the etymology of agallis (a plant; Liddell and Scott: the iris or flag), a word that is currently of unclear origin. Since the outer three perianth segments of the

iris droop down, the resulting curvature could plausibly cause roundness to enter into the name of the plant. The flag plant does not contain such curvature, and so agallis probably did not refer to this plant³.

NOTES

¹Within Hebrew, 'gl seems to be a blend of the roots 'g and gl, which both denote roundness.

²The suggestion that agalma literally means 'that wherein one delights' is found in Hesychius and echoed in Liddell and Scott.

³For a survey of the literature on Semitic borrowings into Greek, see Szemerényi (1974: 147-148) whose title, incidentally, dramatically calls attention to the importance of such borrowings. My article may be regarded as a small contribution in carrying out the detailed study of this subject that Szemerényi's article calls for.

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A STATISTICAL MODEL OF LOW-LEVEL PHONOLOGICAL PROCESSES¹

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To correctly recognize differing phonetic realizations of a word, an automatic speech recognition system must incorporate information about low-level phonological variation. A simple statistical model is proposed to describe this variation, and an analysis technique is developed to estimate the statistical parameters of the model. Preliminary results suggest the usefulness of the model for automatic speech recognition.

Description of the Problem

A great deal of the research in automatic speech recognition has been based on the premise that speech recognition systems will eventually have to incorporate detailed information about the structure of speech and language -- a simple "pattern recognition" analysis of the acoustic signal will never be sufficient. For example, Fry and Denes write in 1956:

Linguistic knowledge must be added to primary recognition and to be completely successful the machine would have to "know" as much about the language as a human brain does.

The practical effects of this tenet were at first extremely limited, but more recently, a determined effort has been made to solve the many problems of including linguistic knowledge within speech recognition systems.

The particular problem addressed here is how to incorporate a knowledge of low-level phonetic and phonological rules into recognition strategies.

The phonetic realization of a word will in general depend on its context, on speech rate and style, on the speaker's dialect, and on other similar factors. If the differing realizations are all to be correctly recognized as the same word, then some knowledge of phonological variation is clearly necessary.

It should be emphasized that only those low-level phonological processes which describe alternations in pronunciation are considered here; higher level processes (such as the derivation of "sanity" from "san+ity") are beyond the scope of this paper. Figure 1 shows three examples of the sorts of rules which are of interest.

Rules from the linguistic literature are not necessarily directly applicable to automatic speech recognition. While optional phonological rules generate the possible phonetic realizations of a word, it is also important to know the relative

HOMORGANIC STOP DELETION (Zue, 1974)

$$\left[\begin{array}{c} \text{C} \\ \text{+stop} \\ \text{[place]} \end{array} \right] \rightarrow \text{Ø} / \left[\begin{array}{c} \text{C} \\ \text{+nasal} \\ \text{[place]} \end{array} \right] \text{---} (\#) \text{C}$$

especially if the following C is a nasal, a sibilant, or l.

kindness: [kainməs]
bends: [bɛnz]

MERGER OF FRONT VOWELS BEFORE NASALS (Cohen and Mercer, 1975)

- (1) e → I / _nasals any: [Inɪ]
- (2) I + e / _nasals him: [hɛm]
- (3) I + æ / _ŋ think: [θæŋk]

(1) is common in many varieties of General American and in the South and Southern Mountain region. (2) and (3) occur sporadically in the South and Southern Mountain region.

fθ SIMPLIFICATION (Hill and O'Malley, 1973)

fθ → θ / _V

fθ → f / _C

fifth avenue: [fɪfθəˈvænʊ]

fifth street: [fɪfθstri:t]

FIGURE 1. Some examples of low-level phonological variation.

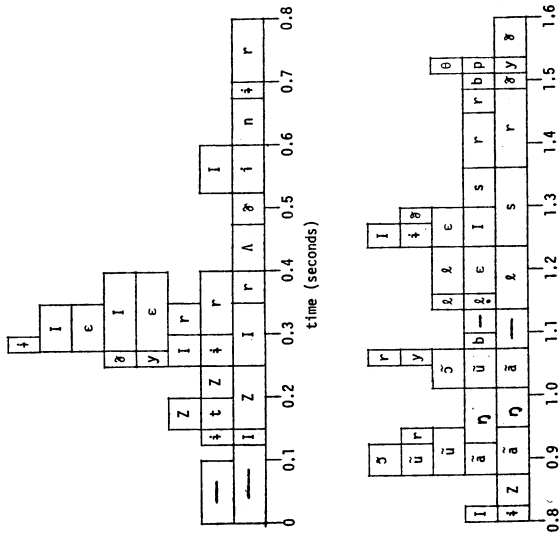


FIGURE 2. A machine transcription² of the sentence "Is there any news on the blizzard?"

frequencies with which these different realizations occur -- rule statistics are required.

The treatment of phonological variation in the framework of speech recognition is also complicated by the notorious inaccuracy of machine produced transcriptions. A basic step in most systems is the segmentation and labeling of the acoustic signal to produce what is approximately a phonetic transcription. But errors in both the segmentation and the labeling occur frequently, as illustrated in Figure 2, which shows a typical example of a machine transcription.

The most frequent error is one of substitution. A segment is given the wrong label, and so identified as the wrong phone. Another common error is detection of a segment boundary where none actually exists. This insertion error produces an extra segment in the transcription, but may also be viewed as a decomposition error, since a single real segment is decomposed into two transcribed segments. Conversely, missing a real segment boundary leads to a deletion error in the transcription, or a coalescence error in the sense that two actual segments are merged into a single transcribed segment.

To higher levels in the system, recognition errors and phonological variation look the same, making it difficult to treat either problem in isolation. It may be desirable to describe both sources of variation with a single set of rules. If so, rules from the linguistic literature will be inappropriate.

A Model of Low-level Variation

To deal with the problem of low-level phonological variation in the context of automatic speech recognition, we propose a simple model.

First, each word has one or more base forms, each of which represents a basic pronunciation of the word. More than one base form is allowed per word to handle idiosyncratic variations such as the two forms of "either":

- (1) /a^Iɛə/
- (2) /iɛə/

Since this alternation is not one which would be predicted by low-level rules, both forms are given in the lexicon.

Low-level phonological processes are modeled by a set of generative rules. Each rule maps the base level into the surface level without intermediate stages, and each segment at the surface level is the output of some rule. Each rule must be an instance of one of a small number of rule schemata, defined by the lengths of the input and output strings. Figure 3 shows one possible set of rule schemata. The model does not require that this specific set be used, but it is assumed that each rule falls into one of a limited set of patterns similar to those shown.

FIGURE 3. A set of rule schemata. The symbol "b" represents a base segment, "s" a surface segment.

Substitution	$b \rightarrow s$
Deletion	$b \rightarrow \emptyset$
Insertion	$\emptyset \rightarrow s$
Coalescence	$b_1 b_2 \rightarrow s$
Decomposition	$b \rightarrow s_1 s_2$

Each rule is also characterized by an application probability which is a function of its context.³ The precise nature of this probability function is unimportant; it might simply be a list of appropriate probabilities for each of the relevant contexts. Another possibility is the use of a variable rule model such as those discussed by Cedergren and Sankoff (1974).

The derivation of an output form from a base form involves the application of several rules. We will assume that the probability of each such derivation is given by some function of the individual rule probabilities. Again, the exact nature of this function is unimportant. One simple possibility is to calculate the probability of a derivation as the product of the probabilities of the individual rules applying in that derivation. This definition corresponds to an assumption of statistical independence of rule applications; different assumptions will lead to different definitions.

As a final point, since there are no intermediate levels between the base and surface levels, there is no need for rule ordering. That is, a rule cannot apply to another rule's output, so the order in which they apply is irrelevant.

Though this model of phonological variation is computationally simple, it may not be immediately applicable in a speech recognition system where transcription errors mask, and are confused with, phonological variation. We may, however, take the previously suggested approach of describing the combined effects of both sources of variation with a single set of rules. In this case, the machine transcription corresponds to the surface or output level of the model.

To show one way in which this model could be used in a speech recognition system, assume that we are given a machine transcription of some utterance which is to be recognized, and that a number of base sequences have been hypothesized, perhaps with the aid of a preliminary examination of the phonetic transcription or with syntactic, semantic, and pragmatic information.

We wish to know which of these base sequences, if any, is the correct one. Since it will normally be impossible to give an absolutely certain answer to this question, we instead simply try to find that hypothesized base sequence which is most likely to have generated the observed transcription.

This process is conceptually straightforward. Find all possible derivations producing the transcription from any one of the

base sequences.⁴ Since each such derivation has a probability, we need only find that derivation whose probability, weighted by the a priori probability of the base sequence underlying it, is greatest. That base sequence is then selected as the one most likely to be correct (of the given set of possibilities).

The simplicity of the proposed model of combined phonological variation and recognition error, and in particular its lack of rule ordering, allows finding the most likely derivation without actually finding all possible derivations. Briefly, the mathematical technique of dynamic programming allows us to drop from consideration those partial derivations which cannot possibly turn out to be the most likely.⁵

The model thus appears to be a computationally attractive one for use within automatic speech recognition systems. Two questions remain. First, how do we actually find the rules and their application probabilities? And second, how accurate is the model? The following two sections will suggest answers to these questions.

Estimation of Rule Probabilities

In the past, the determination of rule application probabilities has been a laborious task. The data must be examined to find the number of rule applications in a given context compared with the total number of occurrences of that context. Since the context must occur enough times in the data to provide some statistical reliability in the estimates, a large amount of data is normally required. But before the rule counts can be determined, each utterance must be carefully and consistently transcribed. This has been a time consuming and expensive task.

No real solution to the problem exists if only phonological variation is to be studied. But if it is acceptable for the rules to describe both phonological variation and machine recognition error, then machine produced transcriptions may be used instead of hand transcriptions. This allows virtually unlimited amounts of data to be analyzed. The solution is especially useful, of course, in speech recognition, where information about both sources of variation is required.

A second, more theoretical problem is how to tell which rules have actually applied. A complete set of generative rules may well be ambiguous in spite of the rule writer's precautions. That is, more than one derivation may produce a given output from a given base form.

A trivial example may serve to clarify the difficulty. Let us assume that we have both a degemination rule (which deletes one of two adjacent identical consonants) and a dental deletion rule (which deletes /t/ or /d/ between an obstruent and a following consonant). Then, for example, the phonetic form [læsta^hm] for "last time" is produced by either one of the two rules. Which one shall we say has actually applied?

This problem is especially severe when the "rules" describe machine recognition error instead of or in addition to phonological variation. Because of the large number of errors that can, and sometimes will, be made, it is often possible to describe the erroneous transcription of an utterance as the result of any one of several different combinations of specific errors.

We suggest the use of an iterative estimation procedure to answer the question of which rules have applied and to find application probabilities for these rules.

We start with a set of utterances for which the correct base forms are known, and for which transcriptions (hand or machine) are available. We also assume that we have a set of rules whose application probabilities are unknown.

The first step is to make a rough guess at the application probabilities of the rules. These guesses might be totally unmotivated (e.g., every rule applies with probability one-half in all contexts), but should, if possible, be based on previous studies or on an examination of a subset of the data or at least on linguistic intuition.

Using the estimated rule probabilities, it is now possible to determine the most probable derivation out of all derivations which produce the observed transcription from the known base sequence. By assuming that this most probable derivation is in fact the correct one, we now have a probabilistic answer to the fundamental question of which rules have applied.

After repeating this process for each utterance, it is possible to tally the number of times each rule has applied in a given context, and the total number of times that context has occurred in the data. These frequency counts may then be analyzed by, for example, one of the variable rule models proposed by Cedergren and Sankoff (1974) or Sankoff (1975) to obtain new estimates of rule application probabilities.

These new estimates will not be perfect since the decisions about which rules actually applied were based on the original guesses of application probabilities, so that some of these decisions will have been incorrect. The new estimates will be better than the original ones, however, in the sense that they explain a greater proportion of the variation present in the data.

The entire procedure may be performed repeatedly, each time using the most recent set of estimates. This produces successively better sets of estimates which will eventually converge to a final set of values.

One problem of this maximum likelihood method for determining application probabilities of all rules simultaneously is that the final results may depend on the initial estimates. A locally optimum set of probabilities is always found, but finding the global optimum may depend on an auspicious set of initial estimates.

For this reason, it is desirable to make the initial estimates of rule probabilities as accurate as possible. Alternatively, the entire procedure may be repeated with several different sets of initial values in the likelihood that at least one such

set will yield the best possible answer.

The foregoing has assumed that the rules are known and that only their application probabilities as a function of context are unknown. In practice, especially when using machine transcriptions, this will not ordinarily be true. However, this is not a serious problem, for the initial set of rules may include not only all known rules, but all suspected, or even all possible, rules. As the iterative estimation technique is applied, rules which exhibit no descriptive power with respect to the data will be given zero or near zero probabilities, and may be discarded. The remaining rules, which all have a significant probability of applying in at least some contexts, are the rules actually observed in the data.

We have, then, what is in at least a limited sense a discovery procedure for rules. If machine transcriptions are used, then these rules will represent the combined effects of phonological variation and recognition error, while, if hand transcriptions are used, the rules will describe phonological variation together with any possible inconsistencies in the hand transcription process.

Preliminary Results

To test the usefulness of the model proposed here, a small pilot study was performed on a data base consisting of 33 sentences read by a single speaker. A total of 48 different words occurred one or more times in the data. A machine transcription of each utterance was provided by Carnegie-Mellon University's Hearsay II speech understanding project.

The purpose of the study was to determine rule probabilities on the basis of the data, and to evaluate the accuracy of these rules. Because machine transcriptions were used, we expected the rules to describe both phonological variation and machine transcription error.

Not knowing which rules were actually appropriate, we included all possible rules of segment substitution, deletion, and insertion (the first three forms shown in Figure 3). This gave a total of slightly more than 4,000 rules.

Because of the limited size of the data base, it was not possible to determine the effect of context on rule probabilities except in the cases of a few exceptionally frequent rules. Consequently, for the purposes of this study, all rules were assumed to be context-free.

The initial estimates of substitution probabilities were based on a preliminary study of the data; all insertion and deletion probabilities were arbitrarily estimated by two separate constants.

The iterative estimation technique described above was then applied separately to utterances 1-16, utterances 17-33, and to the entire set of 33 utterances, resulting in three sets of final probabilities, based on different portions of the data. Of the original set of more than 4,000 possible rules, only slightly more than 10% ever occurred.

Assuming our model, and given the context-free nature of the rules, the probabilities are the best possible. But a fundamental question still remains: how accurately can the model describe the actual variation in the transcriptions? The answer to this question is not obvious; in fact, it is not even easy to decide what "accuracy" means in this context.

For the purposes of speech recognition, one useful though indirect measure of accuracy is how well an actual recognition system performs when using the model. If the model is hopelessly inadequate, good recognition scores will never be obtained. On the other hand, good recognition scores imply that the model is a useful one.

Consequently, we designed a simple recognition experiment to evaluate the adequacy of the model. For each word in the set of utterances, a single incorrect word was randomly chosen from a list of words often confused (by the machine) with the correct word. Both the correct word and the incorrect word were assumed to be possible, giving, for each sentence, many possible word sequences, depending on which word was chosen at each point.

Using the final set of probabilistic rules, the model was then applied as previously explained to find that word sequence most likely to have generated the observed machine transcription. The percentage of correct words chosen was used as a measure of performance for the model.

Because at any point only one of two words was possible, chance performance was 50%. Using the initial guesses at application probabilities, performance was significantly better than chance, with correct words being selected 80.3% of the time. Using the final calculated values of rule application probabilities, a performance of 93.9% was achieved, which is a statistically highly significant improvement over the initial guesses. Further details are shown in Table 1.

TABLE 1. Word recognition scores with rule probabilities based on different portions of the data.

Score on utterances	Initial estimates	Probabilities based on utterances		
		1-16	17-33	1-33
1-16	78.7%	93.5%	85.2%	93.5%
17-33	81.8%	80.2%	93.4%	94.2%
1-33	80.3%	86.5%	89.5%	93.9%

These results indicate that the model of combined phonological variation and transcription error which we have proposed is accurate enough to be of use in automatic speech recognition, even when the effect of context is ignored. Use of contextual information will further improve this accuracy.

The procedure for estimating rule probabilities also appeared, at least in this instance, to be a robust one. Although seven iterations were required before the probability estimates converged, one or two iterations would have been sufficient to obtain very nearly the same performance. Table 2 shows the recognition performance obtained with the probability estimates resulting from each iteration.

TABLE 2. Improvement in word recognition scores on utterances 1-33 with iteration of the rule application probability estimation procedure.

Iteration	0	1	2	3	4	5	7
Recognition	80.3	93.0	93.4	94.3	93.9	93.9	93.9

To illustrate the sort of rules which might result when a larger data base permits contextual effects to be taken into account, we examined several rules which occurred frequently enough in our data to allow at least a crude estimate of the influence of context.

One such rule was the insertion of an [n] in the transcription. Possible contexts were classified according to the nature of the preceding segment (consonant, vowel, or utterance boundary) and the following segment (stop consonant, non-stop consonant, vowel, or utterance boundary) at both the base and surface levels. The data was analyzed by the variable rule model of Sankoff (1975)⁶. Results are shown in Table 3. In this model, probabilities greater than one-half represent factors favorable to rule application, while factors with probabilities less than one-half tend to block the rule.

TABLE 3. Effect of context on probability of the [n]-insertion rule $\emptyset \rightarrow n$. The symbol "##" signifies an utterance boundary.

Input probability $p_0 = 0.07$				
Preceding base segment	##_	V_	C_	
	0.55	0.53	0.42	
Following base segment	$\begin{bmatrix} C \\ +stop \end{bmatrix}$	_V	$\begin{bmatrix} C \\ -stop \end{bmatrix}$	##
	0.54	0.51	0.49	0.47
Preceding transcribed segment	V_	##_	C_	
	0.65	0.53	0.32	
Following transcribed segment	##	$\begin{bmatrix} C \\ +stop \end{bmatrix}$	-V	$\begin{bmatrix} C \\ -stop \end{bmatrix}$
	0.87	0.69	0.25	0.16

One of the most favorable contexts for [n]-insertion is seen to be between a vowel and a following stop or utterance boundary (at the transcription level). Since this fails to correspond to any known phonological rule, the [n]-insertion rule clearly represents a recognition error phenomenon.

On the other hand, the /v/-deletion rule shown in Table 4 appears to be similar to a real phonological process previously noted by Shockey (1973). In our case, /v/-deletion is most likely to occur before a (surface level) consonant, and especially likely to occur before a (base level) /m/. The effect of left context could not be estimated for this rule because, except for two cases, the left context was essentially the same for all occurrences of /v/.

TABLE 4. Effect of the following base and surface segments on probability of the /v/-deletion rule $v \rightarrow \emptyset$.

Input probability $p_0 = 0.25$			
Following	<u>m</u>	<u>C</u> *	<u>V</u>
base			
segment	0.75	0.42	0.32
Following	<u>C</u> *	<u>m</u>	<u>V</u>
transcribed			
segment	0.53	0.50	0.46

*The symbol "C" is here used to include all consonants except m.

The final example, a [t]-insertion rule, appears to represent a combination of real phonological tendencies and recognition error. The analysis in Table 5, which includes the effect of a single segment of context at the base level only, indicates that [t]-insertion is most likely between two consonants. In the particular context of a preceding /n/ and a following /s/, this is a special case of the homorganic stop insertion rule (this context occurred twice in the data; both times [t]-insertion took place). However, in many other cases, the rule seems to be an artifact of machine recognition error.

TABLE 5. Effect of the preceding and following base segments on probability of the [t]-insertion rule $\emptyset \rightarrow t$.

Input probability $p_0 = 0.01$		
Preceding	<u>C</u>	<u>V</u>
base		
segment	0.68	0.32
Following	<u>C</u>	<u>V</u>
base		
segment	0.62	0.38

These examples illustrate that when machine transcriptions are used, rules can reflect either true phonological variation or transcription error. But in most cases, the rules will demonstrate a combination of these two factors.

In conclusion, we have described a model of phonological variation and an analysis technique which allows automatic processing of large amounts of data to compute estimates of application probabilities simultaneously for an entire set of rules.

The method appears to be a promising way of including information about phonological variation in speech recognition systems. Furthermore, as machine transcriptions of speech become better, the probabilistic rules will describe true phonological variation more accurately. But even with the current level of machine transcription, we believe the results are both informative and suggestive.

Notes

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²This transcription was produced by Carnegie-Mellon University's Hearsay II speech understanding system. Because the system may make several guesses at the identity of a single sound, several possibilities are shown in many locations. Uncertainty about segmentation also produces overlapping phones.

³"Context" is interpreted broadly to include both phonological (base level) and phonetic (surface level) context as well as other relevant linguistic and extra-linguistic factors.

⁴If the set of rules is sufficiently "complete", at least one such derivation always exists.

⁵Details of several similar techniques are discussed by Bahl and Jelinek (1975) in connection with a somewhat different model of machine recognition error.

⁶In this model, the probability p of rule application in some context is defined by

$$\frac{p}{1-p} = \prod_{i=0}^n \frac{p_i}{1-p_i}$$

where p_0 is an overall input probability, and p_i is a probability associated with that particular factor of the i th (of n) factor groups actually occurring in the context.

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ATTRIBUTIVENESS AND REFERENTIAL OPACITY

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The paper which I am about to present does not constitute a complete work in itself. Rather, it is a preface to the study of a number of related problems in the theory of reference. In this short paper I try to provide a framework for the explanation of a linguistic and logical phenomenon referred to by Quine (1953) as referential opacity. The point of view adopted differs considerably from that of Quine. In fact, it would be quite justified to call it neo-Fregian.

In recent years both linguists and philosophers of language have found the semantics of singular terms (proper names and definite descriptions) to be of considerable interest. One of the more puzzling problems in the study of singular terms is referential opacity. A singular term is said to be opaque when Leibniz's Law of the Indiscernability of Identicals fails.¹

Leibniz's Law, as used here, is taken to be the principle that extensionally equivalent terms are freely substitutable *salva veritate*.² For instance, given (1),

- (1) the morning star=the evening star

on the basis of Leibniz's Law, if (2) is true, (3) must be true as well.

- (2) The morning star is a planet.
(3) The evening star is a planet.

Contexts like (2) and (3), where extensional equivalents are freely substitutable, are, following Quine's *Word and Object* (1960), termed 'referentially transparent.' The substitution of extensional equivalents, however, does not always leave the truth value of a sentence unaffected. The purpose of this paper is to examine why in some cases substitution is blocked. In an earlier paper (Cole 1975), I suggested, without providing any rationale for my suggestion, that the sole source of opacity had to do with attributiveness. I proposed that only attributive descriptions (in the sense of Donnellan 1966) within the scope of verbs of propositional attitude, like *believe* and *know*, are not freely substitutable. In the present paper I attempt to provide a rationale for those somewhat bold claims.

I would like to begin by giving some examples of attributive and referential uses of descriptions. The italicized description in (4) invites an attributive interpretation.

- (4) *The best doctor* spares no efforts to save a patient.

When used attributively, the speaker of (4) need not know who the best doctor is. The speaker is claiming that whatever the identity of the best doctor may be--and this may vary from time to time³--the doctor describable as best spares no efforts to save his patients. Notice that if, at the time (4) is uttered, Dr. Frank Adams is the best doctor, (4), on the attributive interpretation, is not to be understood as a statement about Frank Adams. Rather, the statement is about the best doctor qua best doctor, not qua Frank Adams, nor qua whoever might be the best doctor at a particular time. To take another example, given that Oedipus wanted to marry Jocasta, and that Jocasta is Oedipus's mother, we still cannot say, on the attributive reading, that Oedipus wanted to marry his mother. To summarize, I interpret Donnellan to mean by 'attributive' that the description in question is a non-rigid designator in the sense of Kripke (1972). The description is essential to the proposition expressed, and may select different referents in different possible worlds.⁴

The attributive use is to be contrasted with referential use of descriptions. The italicized description in (5) is most naturally interpreted referentially.⁵

- (5) *The restaurant on Broadway between Grant and Stockton* serves great dim sum.

On the referential interpretation, the serving of great dim sum is not claimed by the speaker to be characteristic of whatever restaurant may be at that location. (There are in fact several.) Rather, the location is used in lieu of the name to indicate the identity of the restaurant under discussion. Sentence (5) is intended as a statement about a particular restaurant. That is, referential descriptions are assumed to function as rigid designators in the sense of Kripke (1972). They have the same referent in all possible worlds. Referential descriptions are in effect substituted for the proper names of the objects to which they refer.

To return to the matter of opacity, I propose that opacity results when a sentence containing an attributive description is embedded beneath a verb of propositional attitude. For instance, the truth of (6) and (7) does not insure the truth of (8). (The descriptions in (6) are intended attributively.)

- (6) the best doctor=the shortest basketball player
- (7) Tom believes that *the best doctor* spares no effort to save a patient.
- (8) Tom believes that *the shortest basketball player* spares no effort to save a patient.

Tom's belief about the ideally qualified physician does not extend to the ideally short basketball player--even when the world is such that they happen to be the same individual. Hence, (7) might be true and (8) false.

The substitution of equivalent referential descriptions in the scope of verbs like *believe* does not affect the truth value of the sentence. The truth of (9) and (10) guarantees the truth of (11). (The descriptions in (9) are intended referentially.)

- (9) the restaurant on Broadway between Grant and Stockton=the restaurant where Carol got poisoned last year
- (10) Tom believes that *the restaurant on Broadway between Grant and Stockton* serves great dim sum.
- (11) Tom believes that *the restaurant where Carol got poisoned last year* serves great dim sum.

If (9) and (10) are true, so is (11), although perhaps Tom wouldn't put it that way.

To digress for a moment, I would like to note that (10) and (11) do not seem to me to be ambiguous between an understanding in which the italicized descriptions are the speaker's descriptions and an understanding in which they are Tom's descriptions. Rather, I claim that responsibility for referential descriptions must always be attributed to the speaker. Tom may happen to agree with one or both of the descriptions, but this does not affect the truth of the sentences. At a later date I hope to have the opportunity to argue at length for this point.

I have given examples which show that referential descriptions under *believe* are referentially transparent and attributive descriptions are referentially opaque. The reason for this is that two sentences with extensionally equivalent referential descriptions express the same proposition, but two sentences with extensionally equivalent attributive descriptions do not. For example, (5) and (12) both express the same proposition:

- (5) *The restaurant on Broadway between Grant and Stockton* serves great dim sum.
- (12) *The restaurant where Carol got poisoned last year* serves great dim sum.

In both (5) and (12) the definite description has the function of picking out a single referent *r*. The varying descriptions simply identify *r* in different ways. Both sentences express the proposition (13).

(13) *r* serves great dim sum.⁶

If (13) is represented by *P*, both (10) and (11) may be represented as (14).

(14) Tom believes that *P*.

Sentences (10) and (11) express the same proposition and, therefore, have the same truth value.

But sentences containing extensionally equivalent attributive descriptions do not express the same proposition. This is because the description is an essential part of the proposition, and is not merely a device used to identify a referent, as is true of referential descriptions. Thus (4) and (15),

(4) *The best doctor* spares no efforts to save a patient.

(15) *The shortest basketball player* spares no effort to save a patient.

on the attributive reading, cannot be collapsed to a single proposition as (5) and (12) were. It follows that sentences (7) and (8) cannot be represented as (16),

(7) Tom believes that the best doctor spares no effort to save a patient.

(8) Tom believes that the shortest basketball player spares no efforts to save a patient.

(16) Tom believes that *Q*.

but, rather, as (17) and (18).⁷

(17) Tom believes that *R*.

(18) Tom believes that *S*.

Because (7) and (8) express different propositions, their truth values are independent.

To summarize my argument, I have suggested that the complements of verbs of propositional attitude are propositions, not sentences. When extensionally equivalent referential definite descriptions in the complement of such verbs are substituted for each other, this does not result in a change in the proposition expressed by the complement. Thus, there is no effect on the truth value of the matrix clause. But when extensionally

equivalent attributive definite descriptions are substituted for each other, the effect is quite different. The substitution alters the proposition expressed by the complement. It is this alteration that may affect the truth value of the matrix clause.

Viewed from a slightly different perspective, my analysis does not so much explain referential opacity as deny that opacity exists. Such a denial is far from revolutionary. It is, in fact, well within the Fregean tradition. Indeed, if the objects of verbs of propositional attitude are propositions, then the nonsynonymy which results from the substitution of distinct propositions would not seem to violate the spirit of Leibniz's Law. But it would require a reformulation of that law. The extensional formulation of that logical principle would, in the context of propositional attitude predicates, have to be replaced by an intensional formulation. Perhaps (19) would be reasonably general for all contexts:

- (19) Appropriately equivalent terms are freely substitutable salva veritate.

If (19) is not to be vacuous, it is necessary to define 'appropriately.' The definition for one class of terms, objects of verbs of propositional attitudes, would have to be intensional. The appropriate equivalent would be an equivalent proposition. This would not deter me from adopting such a stand, but there are those who find intensions so pernicious that the analysis I have proposed would hold no attraction for them.

I would like to close by mentioning some of the myriad questions raised by my proposal. Note, first of all, that the referential-attributive distinction is a binary one. Several widely accepted analyses of transparency-opacity like McCawley's "Where Do Noun Phrases Come from?" (1971) and Keenan's "On Semantically Based Grammar" (1972)--to mention only two which follow in the footsteps of Quine (1956)--treat the ambiguity in question as an ambiguity of scope. But a relative scope analysis predicts that each level of embedding will add an additional reading to the description. According to the relative scope analysis, (20) should be two ways ambiguous and (21) three ways ambiguous.⁸

- (20) Carol believes that *the man who killed Kennedy* wore size twelve galoshes.
 (21) John thinks that Carol believes that *the man who killed Kennedy* wore size twelve galoshes.

Which is found, a binary or an n-ary ambiguity? I believe that the ambiguity is binary, and that the scope analysis is wrong, but there are data that would seem to support the n-ary position, and these data must be examined, a task which I must reserve for another time.

Another unresolved issue is that of pragmatics versus semantics. Are the definite descriptions that I have described as ambiguous between a referential and an attributive use semantically ambiguous, or merely semantically indeterminate and pragmatically ambiguous? If the ambiguity is pragmatic, what principles determine how a description is understood, referentially or attributively? These are questions that I have only had space to raise in this paper, but I hope to attempt to answer at least some of them in a more extensive work.

FOOTNOTES

¹Or when it appears to fail. See below.

²An intensional version of Leibniz's Law is suggested below to be appropriate in certain contexts.

³That is, the identity of the best doctor is not the same in all states of affairs (possible worlds). The description determines its referent anew in each state of affairs. See below. Cf. Kripke (1972) and Reinhart (1975).

⁴It should be noted that Kripke has suggested in some rather oblique comments that he has misgivings regarding Donnellan's analysis. This need not deter me from making use of notions proposed by Kripke in order to bring out Donnellan's point.

⁵Both referential and attributive interpretations are possible for nearly all definite descriptions.

⁶My analysis of the logical form of referential definite descriptions follows Kaplan (1974).

⁷R and S are taken to represent distinct propositions.

⁸Certain versions of the relative scope analysis, such as the version that I advocated in Cole (1975), would predict (20) to be three ways ambiguous and (21) four ways ambiguous.

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AREAL FEATURES AND NATURAL PHONOLOGY: THE CASE OF FRONT ROUNDED VOWELS

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1. Front rounded vowels (FRV's) are known to be a relatively rare type of sound.¹ Like some other marked phonological segment types they are areally restricted. They occur with considerable frequency in a large area including most of Europe and northern Asia, but are extremely rare in the rest of the world. I suggest the hypothesis that FRV's arose independently only once in this area, and that all the other languages or language groups in the area acquired them by contact. The alternative, that the FRV's arose independently, would imply an amazing set of coincidences not only in areal distribution, but also in the time periods when the FRV's arose.

2. Phonetic properties of FRV's and their phonological role. The traditional articulatory definition of FRV's appears clear enough: the lips are rounded, the tongue is advanced toward the hard palate. But descriptive data on the world's languages is almost exclusively perceptual. Perceptually an FRV falls somewhere between a front unrounded vowel and the back rounded vowel of the same height. Back unrounded vowels also fall into the same intermediate area. The possibilities for confusion were dramatically illustrated by an experiment by Ladefoged, in which a number of highly trained phoneticians perceived a recorded back unrounded vowel as front rounded. Given this, a descriptive statement that a language has FRV's must be viewed as provisional, pending more careful investigation. In the case of a mid FRV ö , it hardly seems possible to distinguish it from a weakly rounded mid central vowel. This means that Trubetzkoy's claim that languages with FRV's must have ü cannot be tested, at least from ordinary descriptive data, because we do not know whether ö is really front. For several languages ö without ü is reported: Akha, Archi, Bashkir, Icelandic, Korean, Lak, Provençal, Saisiyat, Ulithian, Yukaghir (see Ruhlen).

In determining whether a language has FRV's I will use the criterion of (surface) distinctiveness, i.e. relative independence of FRV's from neighboring segments. The FRV's of French and German are clearly distinctive, those of Turkish perhaps less distinctive, because subject to vowel harmony constraints, and those of Asmat (an Indo-Pacific language) strictly non-distinctive, because they occur only as allophones of i , e before w .

3. Areal distribution of FRV's. The evidence for a Eurasian area of languages with FRV's comes from a sample of 203 languages, compiled as part of the Stanford University Phonology Archiving Project², supplemented by other sources. The map shows the distribution of the 203 languages, distinguishing those that do not have FRV's either allophonically or distinctively, those that have them allophonically, and those that have them distinct-

ively. The dotted line on the map outlines the FRV area, and is drawn to maximize the concentration of FRV languages in the area.³ The overall ratio of FRV languages to non-FRV languages inside and outside the FRV area is overwhelmingly different (see table). It is notable that it does not make much difference whether or not one counts as FRV languages those with allophonic FRV's.

Of the three FRV languages outside the FRV area, one, Akha (Tibeto-Burman) has only ô, which, as mentioned earlier, is somewhat problematic as an FRV. Likewise, in Hopi (Uto-Aztec) ü and ö (which are short and long counterparts to each other) are described in unclear terms. Iai (Austronesian) apparently has ü, ö, and ÿ; however, although transcriptions indicate a distinction between u and ü in roughly the same environments, the material was transcribed from taped texts, and it is not clear that repetition tests were made with speakers, so the absence of minimal pairs leaves some doubt about the distinction.

As for other sources, Hockett reports a number of languages with FRV's, all but one within the FRV area. (Some languages of course are the same as ones in the 203 language sample.) The one exception, Taki-Taki, a creolized English spoken in Surinam, has ü, but apparently only in Dutch loanwords (Hall). Trubetzkoy reports no FRV's outside the FRV area. Ruhlen gives segment inventories (not necessarily phonemic) for 692 languages, including nearly all of the 203 languages in the Stanford archive. Eighty of these have FRV's, and only nine are located outside the FRV area. Of these nine, five are in the smaller sample, the three languages with distinctive FRV's (Akha, Hopi, Iai), and two with non-distinctive FRV's (Wolof, Asmat). Of the other four, Malinka (a Mande language of Mali) has ü, but only as an occasional variant of u, apparently adjacent to dentals. (See Delafosse p.20. Tokarskaja does not mention ü.) Ngwe (a Benue-Congo language of West Cameroon) is said to have several FRV's, but the orthography is plainly not phonemicized, and the source is not concerned with phonetics or phonology (Dunstan). The remaining two languages, Uliethian and Saisiyat (Austronesian) both have the problematic ö. Clearly then distinctive FRV's are extremely rare outside the FRV area.

4. The spread of FRV's by language contact. The most appealing hypothesis to explain the distribution of FRV's is that they arose independently only once in the FRV area, and that the concentration is due otherwise entirely to contact. The data I now have on the historical development indicates that FRV's arise for the most part by regular sound changes that could conceivably have occurred spontaneously, and are generally interpreted that way in the literature on specific languages. FRV's do not arise simply by lexical borrowing of words with FRV's, though of course this may occur, as in Albanian, in which the majority of words with ü are Turkish loans. What I mean by contact is that the sound changes producing FRV's do not occur spontaneously, but are cultivated or encouraged by bilingual speakers who regard the FRV's as a prestige feature, and seek to transfer them from one language



The Spread of FRV's.

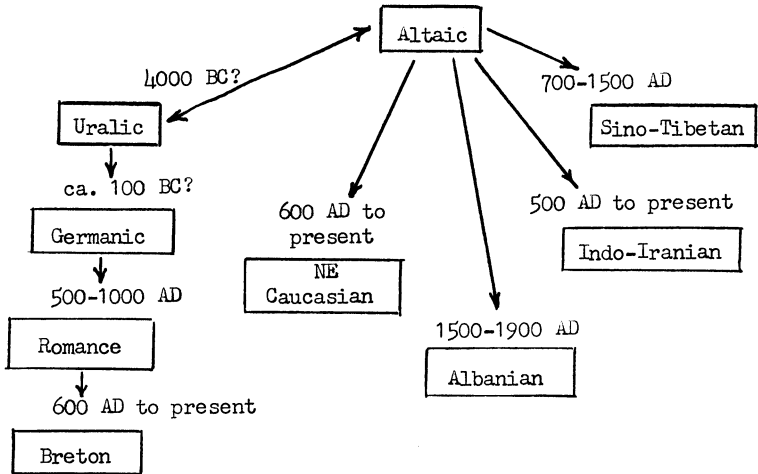


Table.

Sample area	World	FRV area	non-FRV area
no. of languages	203	34	169
no. with FRV's (distinctive)	19	16	3
% with FRV's	9%	47%	2%
no. with FRV's (including non-distinctive)	28	17	11
% with FRV's	14%	50%	7%

to the other.

The general picture of language contacts relevant to the FRV area is as follows. Three main language families, Uralic, Altaic, and Germanic have FRV's. Palatal vowel harmony and FRV's can be reconstructed for Uralic and Altaic proto-languages. The north and west branches of Germanic have palatal umlaut, a curtailed form of palatal harmony. Palatal harmony is not known to occur elsewhere in the world (Ullan⁴). A number of adjacent languages of different families seem to have acquired FRV's, including northern Sino-Tibetan, Iranian, Northeast Caucasian, Albanian, Romance, and Breton.

4.1 Altaic and Uralic. A period of substantial contact and linguistic influence between early Uralic and early Altaic is regarded as well established by scholars in both fields. Collinder (1965 p.30) cites extensive resemblances in the morphology, including several common suffixes, as well as some lexical resemblances. Menges considers the two groups related genetically, and argues that 'the numerous isoglosses...even if they were due to borrowing...could only be explained on the assumption of enduring, extensive and rather ancient mutual contacts.' (p.57) He places the area of contact 'on the steppes between Tien-Shan and Ural or Volga', Altaic peoples being subsequently pushed to the east during the period of Indo-European expansion in the second millennium BC. Estimates of the date of contact range from 2000 BC to 4000 and beyond.

4.2 Altaic and Chinese. The Chinese have had extensive contacts with Altaic groups throughout their history. One can hardly say that there was any single period to which possible Altaic influence could be restricted. Karlgren proposed that Ancient Chinese, the language of the T'ang dynasty (618-907 AD) had a vowel system with no FRV's, but did have extensive palatalization and labialization of initial consonants, from which ü and y eventually developed, e.g. ACh. -niwo > Peking 'jy' 'fish' (y=ü), ACh. -xiwet > Peking /cye 'blood' (y=y) (Forrest). This change could have taken place in the centuries after the fall of the T'ang. The T'ang themselves had extensive contacts with Turkic peoples (Menges p.22,ff.) and after their fall northern China was overrun by Mongolian and other Altaic peoples. Mongol rule did not finally end until 1368. Although the period 900-1400 seems most probable for the emergence of FRV's in Chinese, it is possible that it occurred a good deal earlier, and that the complex palatalized and labialized consonants posited by Karlgren for Ancient Chinese already represent FRV's, or the front rounded glide. This would not be inconsistent with Altaic influence at a much earlier date.

4.3 Altaic and Tibetan. Modern central Tibetan has FRV's ü, ö which developed from u, o before dental consonants. The consonants were then lost, except n, which either remains or is lost with nasalization of the preceding vowel (Chang & Sherts, Roerich). Since the orthography was imported from India about the sixth century AD, loss of the final dentals and the emergence of distinctive FRV's must have occurred later, but one cannot be sure

that the fronting of *u*, *o* had not already occurred. Altaic influence in this development is plausible through a long period of history. During the period of the Tibetan empire in the seventh to ninth centuries the Turkic Uighurs were conquered, and there were certainly contacts with other Turkic peoples. Later Tibet was subject to Mongol rule. Santa and Monguor, Mongolian languages of west China (Kansu and Tsinghai provinces) have a number of Tibetan loans, and Tibetan religious terms occur in other Mongolian languages. Poppe dates the latter to the foundation of Tibetan speaking monasteries in the 16th and 17th centuries. To judge from one word, fronting of *u* had occurred by this time: Khalkha *güngerwa* < Tibetan *kun-dgah-ra-ba* (orthographic) 'shrine'.

4.4 FRV's are reported for another northern Sino-Tibetan language, Dungan, spoken in Kirghiz SSR (see Ruhlen).

4.5 Indo-Iranian, Northeast Caucasian, and Altaic.

By the sixth century AD Turkic peoples, in their westward expansion, had reached the area just east of the Caspian, initiating contacts with Indo-Iranian that continue today. In the eleventh century the Seljuk Turks (a tribal confederacy) moved from there through Persia into Anatolia. Other Turkic groups (the Oghuz) followed into present day Soviet Azerbaijan, Iran, Afghanistan, and India, forming the basis of present Turkic populations in those areas.

In Ruhlen's segment inventories I have found two Iranian languages with FRV's. Tat, in Daghestan SSR probably borders on Azerbaijani, while Yaghnobi (a Pamir language) is a southern neighbor of Özbek (Turkic) in Tadshik SSR (Menges p.55).

There is a cluster of Northeast Caucasian languages spreading through Azerbaijan SSR and Daghestan SSR which are reported to have FRV's (Ruhlen). In addition to Azerbaijani influence, there is also the question of contact with the more northerly Turkic groups, which first appeared around the lower Volga in the seventh century.

4.6 Albanian and Turkish. The Albanians, under Turkish rule from 1501 to 1912, were partly converted to Islam, and acquired a considerable number of Turkish loanwords. The majority of Albanian words with *ü* (the only FRV in Albanian) are Turkish loans (based on Meyer), e.g. A. *bütün* 'entirely' < T. (same). In addition, *ü* developed adjacent to a labial consonant, in both Turkish and older words, from earlier *i*, e.g. *mbül*, *mbil* < *mbil* 'to close' (native word). Latin *ū* (but not *ü*) became Albanian *ü*, e.g. *gük* < L. *judicem* 'judge'. There are also other, apparently somewhat sporadic processes by which *ü* arose. While the rule Latin *ū* > Albanian *ü* looks like a regular sound change, it must be remembered that it accounts for only a tiny fraction of the *ü*'s in the lexicon. It is most plausible to assume that Latin *ū* became a diphthong in Albanian (or better, had become a diphthong in neighboring late Latin dialects), and that the regular rule was just part of a much more general process by which Albanian first acquired Turkish words with *ü*, and then, as it were, seized upon likely pretexts to introduce the same sound into the older

lexicon.

4.7 Uralic and Germanic. The north and west Germanic languages acquired FRV's by the process of palatal umlaut, the fronting of back vowels when *i* or *j* occurred in the following syllable. The FRV's became distinctive when the conditioning syllable was reduced or lost. While the orthographic indication of FRV's is sporadic or altogether lacking until relatively late (in High German, for example, FRV's were not indicated until after 1000 AD), this has been viewed in the more recent scholarship as resulting from the non-distinctive character of the FRV's when *i* and *j* were still present in the following syllable (Twaddell, Fenzl). Given that palatal umlaut occurs in fundamentally the same form throughout the north and west Germanic area, it must have developed at an early time, when the Germanic tribes formed a compact geographical unit. This would have been before 100 AD, by which time substantial migrations into southern Germany had occurred. Before this time, when the Germanic tribes formed a more unified group in southern Sweden, Jutland, and the north of Germany, FRV's and palatal umlaut could have arisen under Uralic influence, either from Lapp or from Finnish. The linguistic contact between early Germanic and Uralic is well documented, there being Germanic loans of ancient form in both Lapp and Finnish.

A recently expressed theory is that what was established in this early period was a kind of basic tendency to umlaut (including palatal umlaut) which then unfolded by independent parallel development in the separate Germanic areas (Höfler, Sonderegger). A clear case of this kind of parallel development cited by Höfler is the gradual loss of unstressed syllables by similar courses of change in the different Germanic languages. This also was the common cause of the emergence of fully distinctive FRV's in all the north and west Germanic languages. However, while the loss of unstressed syllables can be readily understood as the consequence of an inherited accentual system in which the root syllable was strongly stressed, palatal umlaut is quite another matter. Given the rarity of FRV's and the greater rarity of palatal harmony in the languages of the world, it is hardly credible that palatal umlaut could have developed independently in several Germanic dialects from some unspecified inherited tendency. It is far more plausible to attribute to early Germanic, ca. 100 BC, a fully developed system of palatal umlaut.

The fact that fully distinctive FRV's developed later, at various times in different Germanic languages, would then result simply from the different periods at which unstressed *i* was reduced or lost. In addition to FRV's, palatal umlaut also produced a fronted *a*, presumably at first *æ*. This fell together with *e* in different languages at different times, as is readily understandable from the closeness of the two sounds. There is no need to ascribe this merger to an inherited tendency, as Höfler does.

While Finnish must have had FRV's and palatal harmony at the time of early contact with Germanic, it is only a plausible assumption that Lapp did. (Modern Lapp has neither.) Both

must have had the Uralic system of initial accent. It is striking that Germanic acquired a substantially similar accent system (stress on the first syllable of the root) as well as FRV's and a system of palatal harmony. Furthermore both palatal umlaut and velar umlaut (the 'breaking' found in Old Norse and Old English) had the effect of harmonizing words and transferring the vocalic distinctions to the stressed first syllable (see Höfler), which resembles the Uralic system of concentrating vocalic differentiation in the first syllable. Collinder reconstructs five back and four front vowels in the first syllable of proto-Uralic words, while the second syllable contained only two front and two back (Collinder 1965 p.94 ff). The development of palatal umlaut can be seen, not as a specific imitation of Uralic vowel harmony, but as part of a general process of imposing a Uralic style word prosody on Germanic, including the occurrence of FRV's in the first syllable.

4.8 Romance, Celtic, and Germanic. The development of Latin ū to ü is found in France (including Provence), Swiss dialects, some Tirolean dialects, and Italian dialects in Lombardy and Emilia (Lausberg). This change is generally dated before the year 1000. Also, one or more mid FRV's emerged in a number of these same dialects, e.g. French ö from Latin ō in open syllable, presumably via a diphthong eu (Regula p. 46 ff). It is clear that the FRV's arose in areas of west Germanic conquest and settlement, or areas with close and lasting contact with west Germanic. The Frankish takeover of Gaul was already under way in the fourth century; by the beginning of the 6th Franks were rulers of all of the modern French area. Elcock assumes that Frankish influence on Latin speech was especially heavy in the north. 'Though the Gallo-Roman speech of northern Gaul eventually prevailed, when first it appears as a literary language it is permeated with words of Germanic stock and even shows unmistakable Germanic influences in its pronunciation and word formation.' He notes the spread of the Germanic suffix -isk in France and Italy and acquisition of German h and w in France. The Lombard invasion of northern Italy in the latter half of the sixth century likewise put a west Germanic people in control of a large stretch of Roman territory. The linguistic influence may not have been as pervasive as that of the Franks, but Elcock mentions numerous Lombard loans that are still to be found in rural dialects, if not the literary language.

The emergence of ü in these areas coincided very closely in time with the absorption of the new German speaking aristocracy into the Roman speech community. The development can be imagined in this way. In late Latin ū and ü had diverged substantially in quality, the latter remaining close to its original quality, but the former being possibly diphthongized to wi, or something of the sort. German speakers rendered this diphthong with ü, reserving their u for Roman ū, and possibly also for ou. This became the standard aristocratic pronunciation which, due to the prestige and mobility of the ruling class, spread throughout the conquered area.

My theory that Germanic influence caused the emergence of

ü and ö seems more likely than either of the two explanations generally offered in accounts of Romance historical phonology, the theory of the Celtic substratum (Wartburg p.36ff), and the theory of spontaneous development due to structural crowding of the back vowel space (Lausberg). According to the Celtic theory the original Gallic dialects of France etc. had an ü which was very gradually absorbed into Roman speech. The fundamental weakness of this theory is that there is absolutely no basis for assuming a Gallic ü. Appeal has to be made to the British Celtic shift of IE u to i, which may never have gone through a stage ü (see below). As for the spontaneous theory, it of course does not account for the restriction of ü to areas of Germanic contact, and also does not reckon with the rarity of spontaneous development of FRV's.

The Bretons, who left Britain in the course of the Anglo-Saxon invasions, seem to have acquired FRV's by a process very similar to that in French. Modern Breton ü has been taken as the reflex of a British Celtic ü, but this reconstructed sound could equally well have been a diphthong iw. Similarly, Breton ö, which corresponds to Welsh aw (and o) and Cornish e, all of which go back to British Celtic o, has been derived from ö, an intermediate state between British and later Breton and Cornish. (At the intermediate stage Breton spelling is eu, Cornish e, eu, ue, u, o (Lewis & Pedersen p.6).) But it would be better to assume a diphthong in British, e.g. ew or aw, which would account for the development in Welsh as well. Breton ö would then have a history very similar to French ö, possibly emerging at the same time.

4.9 Summary. The idea that FRV's emerged by contact is plausible in all cases examined. Ancient influence between Altaic and Uralic is well established. Influence of Altaic on northern Sino-Tibetan is quite likely, though not precisely dateable. Turkic influence on some Iranian and Northeast Caucasian languages is suggested by known contacts going back a thousand years or more. Turkic influence on Albanian during the past 500 years is amply documented in the Albanian lexicon. Substantial contact is known to have occurred between Uralic and Germanic, from the ancient Germanic loan words in Finnish and Lapp. Germanic word prosody, originally very different from the Uralic pattern, developed some striking resemblances. Finally, the distribution of FRV's in the Romance dialects and Breton fits so exactly with west Germanic expansion into Roman areas, and coincides so closely in time with that expansion, that it is difficult to accept any other theory as to the origin of FRV's there.

5. Counterexamples. Two apparent counterexamples to the contact theory are the reconstructed ü of ancient and early medieval Greek, and the reconstructed ü of British Celtic. While These languages occur within the FRV area, the supposed FRV's arose at a time when influence from Germanic or Altaic was impossible, and they would have to be considered independent internal developments. In both cases it is known that an earlier u eventually became i, through an intermediate stage which has been reconstructed as ü. There is no reason to question the beginning or

end points of the chain, but the middle is a problem.

According to Allen in Attic Greek u had become a sound intermediate between u and i by the time of Herodotus (5th century BC), and this intermediate form may have lasted as long as the tenth century AD (Browning) before becoming i. The major evidence for an intermediate sound in Ancient Attic is as follows. (1) Herodotus transcribed Old Persian vi (= wi) with Greek Y (i.e. the original letter for u, which was retained in Greek for the intermediate sound.) (2) The Boeotians, in adopting Attic spelling, used the letters OY for their own inherited u (presumably Attic ou (OY) had become u by this time); also they used the letter Y to represent a sound corresponding to Attic OI (oi). Both pieces of evidence show that Attic Y represented neither the earlier u nor the later i at this time, but they hardly prove the existence of ü; the sound could just as well have been wi or wə. Further evidence shows that the intermediate sound was retained for some time, but does not help to identify the phonetic quality more closely. (3) In Indo-Greek coins of the 2nd century BC Greek Y is transliterated by i. (4) Latin originally borrowed Y as u. In the first century BC Dionysius of Halicarnassus mentions a 'marked contraction around the lips' in the pronunciation of Y. (5) In the 2nd century AD OY (i.e. u) sometimes replaces Y, especially after r. (6) In the 4th century AD Wulfila, in adapting the Greek alphabet for Gothic, used Y for Gothic w, as well as for Greek Y. It should be noted also that classical Attic had lost w and abandoned the letter for it, so that if Y was a diphthong, there would not have been an obvious alternative spelling for it.

Clearly the hypothesized rule u > ü of Ancient Attic is based on the assumed naturalness of vowel systems with ü and the naturalness of the fronting process. But we have seen that FRV's are relatively rare. Unambiguous cases of the change of u to ü are known only under conditions of contact with an FRV language, and even then probably went through a diphthongal stage. This greatly diminishes the probability of ü in Ancient and Medieval Greek.

In British Celtic u became i (Lewis & Pedersen p.7). ü is assumed as an intermediate stage, but there is no evidence for this. A diphthong or back unrounded vowel would be equally plausible. Also in British Celtic ü (written u) is considered to be the pronunciation of the sound which developed from the IE diphthongs au, ou, eu and from ō in Latin loans. This became u in modern Welsh, i in Cornish, and ü in Breton. The reconstruction is to some extent an extrapolation from the modern Breton. One could equally well reconstruct u or a diphthong.

6. Phonetic processes leading to FRV's. Not surprisingly FRV's generally arise by (1) fronting of a back rounded vowel next to an anterior segment, (2) rounding of a front vowel next to a labial segment, and (3) contraction of a diphthong with labial and palatal components (i.e. (1) and (2) combined). Examples: (1) Albanian krük < Latin crucem (k is palatal); Peking /nü < Anc. Chinese /nwo; Wolof u → ü after a palatal stop;

Akan $\underline{u} \rightarrow \ddot{u}/t,d,s \underline{\quad} V$; Nyangumata $\underline{u} \rightarrow \ddot{u}$ next to a laminoal-veolar consonant; Greenlandic \underline{u} tends to be fronted between dentals and before \underline{i} , \underline{j} ; Old Norse $\underline{u} \rightarrow \ddot{u}/R$; Tibetan \underline{u} , $\underline{o} \rightarrow \ddot{u}$, \ddot{o} before dentals; Cantonese $\underline{u} \rightarrow \ddot{u}$ after \ddot{c} or before \underline{n} (\underline{u} occurs after labials; see Chao). (2) Akan \underline{i} , $\underline{e} \rightarrow \ddot{u}$, $\ddot{o}/\underline{\quad} mu$; Asmat \underline{i} , $\underline{e} \rightarrow \ddot{u}$, $\ddot{o}/\underline{\quad} w$; Washkuk $\underline{i} \rightarrow \ddot{u}/\underline{\quad} w$; German $\underline{finf} \rightarrow \underline{fünf}$; Old Norse \underline{i} , $\underline{e} \rightarrow \ddot{u}$, $\ddot{o}/\underline{\quad} Cw$; Turkic (Osman, Qyrghyz, Jakut) $\underline{i}, \underline{u} \rightarrow \ddot{u}$, \underline{u} following \ddot{u} , \ddot{o} in the preceding syllable (labial harmony); various Altaic languages \underline{a} , $\underline{\ddot{a}} \rightarrow \underline{o}$, $\underline{\ddot{o}}$ following \underline{o} , $\underline{\ddot{o}}$ in the preceding syllable (labial attraction); Albanian $\underline{i} \rightarrow \ddot{u}$ next to a labial consonant. (3) French $\underline{eu} \rightarrow \underline{\ddot{o}}$; $\underline{ue} \rightarrow \underline{\ddot{u}}$; Old Norse $\underline{iw} \rightarrow \underline{\ddot{u}}$; $\underline{wi} \rightarrow \underline{\ddot{u}}/C$.

As to the unconditioned fronting of a back rounded vowel, as was stated earlier we cannot be sure that this actually happened, rather than some kind of diphthongization, in Ancient Greek, Celtic, and early Romance. In Uralic Collinder reconstructs a development from \ddot{oo} ($=\underline{\ddot{a}}$) to \ddot{o} . In Sentani Cowan suggests that \ddot{o} , which has a variant $\underline{\ddot{a}}$, derives from earlier $\underline{\ddot{a}}$.

Palatal harmony (including palatal umlaut) cannot be regarded as a direct cause of the origin of FRV's, but has to be considered a complex phenomenon resulting from a series of developments. Hypothetically FRV's and palatal harmony could arise in a language with palatalized consonants before palatal vowels ($\underline{Cj_i}$) and labialized or plain consonants before back vowels ($\underline{C^w u}$, \underline{Ca}). Palatalization of back vowels before the palatalized consonants could lead to the beginning of FRV's and palatal harmony. Then the original palatal or velar vowel of the 2nd syllable could have been absorbed by a following suffix vowel, to begin the development of suffix harmony. Once established, the pattern could be extended by analogy to all suffixes and stem internal vowel sequences, e.g. $\underline{uCj_i+a} \rightarrow \underline{\ddot{u}Cj_i+a} \rightarrow \underline{\ddot{u}Cj_i+\ddot{a}}$, and $\underline{uCa+a} \rightarrow \underline{uC+a}$.

Generally speaking the types of processes listed above produce non-distinctive FRV's, or produce more FRV's in languages that already have them, or introduce FRV's into a language in imitation of the FRV's of a neighbor language. It seems as though there is a natural beginning point for FRV's in assimilation, but that phonological systems are, as it were, unwilling to accept them without outside pressure. I interpret this as being due to the optimal character of small vowel quality systems. Certainly the system of five vowel qualities is the commonest in the world's languages. It is also the one which conforms most neatly, of known vowel systems, to a perceptual model in which the vowels are equidistant from each other (Iiljencrants and Lindblom). Perhaps the most natural development of vowel systems would be for languages to resist expansion beyond a system of five qualities. In a large vowel system some of the phonemes will be rare, and correspondingly it may be unimportant whether they maintain an optimal perceptual distance from other vowels in the system. It may then be a matter of fashion or style for a language to have more than the strictly functional number of vowels, and also a

matter of style just what the quality of those vowels is. By inheritance and contact these stylistic preferences may spread over large areas, given sufficient time, and favorable cultural circumstances.

FOOTNOTES

1. This paper is presented here in a shortened preliminary form. Some data and discussion have been omitted. I am grateful to a number of participants in the ELS conference for useful comments and additional data which I hope to incorporate into the future version of the paper. Lynn Friedman gave much needed help and encouragement during the preparation. In the bibliography only a few references are given for particular languages. Others are found in Vihman or Ruhlen.
2. The 203 languages represent a nearly completed sample of segment inventories of the world's languages, being compiled as part of the Stanford University Phonology Archiving Project. The general character of the results reported here will undoubtedly not change much in the finished sample. The sample languages were selected to give a broad survey of the geographical areas and language families of the world, without regard to particular types of phonological system. The areal distribution of FRV's is thus the result of impartial methods.
3. The term 'FRV area' is offered for convenience. I do not mean to suggest either that there is a precisely delimitable area within which FRV's are to be found, or that the general area represents some kind of coherent linguistic community. The proliferation of FRV's took place piecemeal, in widely separated contact situations.
4. Nez Perce has a mixed type of vowel harmony which might be reconstructed as a palatal type (very different from Ural-Altaic), though other reconstructions are possible. Somali has basically a 'vertical' harmony system, like a number of African languages, but the heightened correspondents of u, o are described as being fronted, while remaining phonetically central or back vowels. (Ultan, Armstrong).

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List of Languages in Sample

(+) = distinctive FRV's; (') = non-distinctive FRV's

INDO-EUROPEAN		NIGER-KORDOFANIAN	
Bengali	Pashto	Wolof (')	Katla
English	Punjabi	Fulani	Koalib
French (+)	Sinhalese	Kpelle	Tegali
German (+)		Grebo	Katcha
Portuguese	AFRO-ASIATIC	Gbari	
Russian	Arabic (Egypt)	Dagbani	NILO-SAHARAN
Spanish	Shilha	Mianka (')	Luo
Breton (+)	Amharic	Ewe	Nubian
Icelandic (+)	Somali	Akan (')	Songhai
Norwegian (+)	Awiya	Mbembe	Kanuri
Polish	Iraqw	Ga	Logbarra
Rumanian	Walamo	Swahili	
Italian	Hausa	Ewondo	KHOISAN
Albanian (+)	Angas	Iuvale	Nama
Lithuanian	Margi	Zulu	
Persian	Arabic (Malta)	Gbeya	

CAUCASIAN	URALIC	ESKIMO-ALEUT	Tewa
Georgian	Cheremis (+)	Greenlandic	Luiseno
Zan	Komi	Alaskan	Hopi (+)
Kabardian	Ostyak (+)	Aleut	
Lak	Yurak		OTO-MANGUEAN
Dido		NA-DENE	Mazahua
	AUSTRONESIAN	Haida	Mazatec
DRAVIDIAN	Wolio	Chipewyan	Mixtec
Telugu	Malay	Tolowa	
Malayalam	Batak	Hupa	MACRO-CHIBCHAN
Kota	Cham		Cayapa
Kurux	Sa'ban	MACRO-	Itonama
	Malagasy	ALGONKIAN	Paez
AUSTRO-ASIATIC	Sundanese	Ojibwa	
Mundari	Javanese	Delaware	GE-PANO-CARIB
Kharia	Atayal	Tunica	Amahuaca
Sedang	Tagalog	Alabaman	Chacobo
Pacoh	Chamorro		Carib
Koho	Maori	MACRO-SIOUAN	Ocaina
Khasi	Hawaiian	Seneca	Apinaye
Vietnamese	Arosi	Oneida	ANDEAN-EQUATORIAL
	Nengone	Wichita	Wapishana
SINO-TIBETAN	Iai (+)	Dakota	Island Carib
Dafila	Adzera	Yuchi	Quechua
Mandarin (+)	Kaliai		Jaqaru
Tibetan (+)		HOKAN	Amuesha
Burmese	INDO-PACIFIC	Karok	Campa
Akha (+)	Asmat (')	Pomo	Goajiro
Naga	Selepet	Diegueno	Guarani
Garó	Gadup		Moxo
Rawang	Auyana	PENUTIAN	Siriono
Bodo	Sentani (')	Maidu	Ticuna
Yao	Washkuk (')	Nez Perce	Barasano
Cantonese (')	Telefol	Zuni	Jivaro
Hakka	Kunimaipa	Chontal	
Wu	Nasioi	Zoque	UNCLASSIFIED
		Totonac	Basque
KAM-TAI	AUSTRALIAN	Tzeltal	Burushaski
Nung	West. Desert	Araucanian	Ket
Yay	Maung		Chuckchi
Lao	Nungubuyu	SALISHAN	Yukaghir
Lakkia	Nyangumata	Squamish	Gilyak
	Wik Munkan	Puget Sound	Ainu
ALTAIC	Maranungku		Tarascan
Turkish (+)	Mantjiltjara	WAKASHAN	
Azerbaijani (+)	Kunjen	Nootka	
Chuvash (+)		Kwakiutl	
Kirghiz (+)			
Mongolian (')		AZTEC-TANOAN	
Evenki		Papago	
Ryukyuan		Picuris	

LOCATIVE NP'S, LOCATIVE SUFFIXES,
AND GRAMMATICAL RELATIONS

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0. Introduction. This paper discusses certain aspects of the behavior of locative noun phrases in the OluTsootso dialect of (Olu)Luyia, a Bantu language of Kenya. Locative NP's in this language are capable of bearing grammatical relations to verbs, and their status as grammatical terms provides some interesting insights into areas of relational grammar. In the first sections of this paper, I discuss the behavior of locative NP's with respect to various syntactic rules, including passive, tough-movement, A-raising, cleft-question-formation, and others. In certain cases, a verbal locative suffix appears, while in others, the suffix does not appear. A general proposal for predicting the appearance of the locative suffix is offered. In later sections I briefly discuss some implications for the theory of relational grammar that are raised by the data and analyses.

1. Morphology and Syntax. Some preliminary remarks on OluTsootso morphology and syntax are needed before an examination of the various syntactic processes can proceed. The morphology of nouns consists of class prefixes (usually listed in numbered pairs denoting singular and plural) preceding roots. For the purposes of this paper, locative noun phrases (henceforth LOC NP's) consist of one of three locative prefixes₁ (henceforth LOC pfx'es) preceding the regular noun class prefix₂, followed by the root. Verbal markers include subject and object markers, derivational, passive, and tense/aspectual (henceforth T/A) suffixes, and locative suffixes (henceforth LOC sfx'es). The subject and object prefixes (as well as the LOC sfx'es) must "agree" with the corresponding NP's which are subjects or objects of verbs. Subject prefixes precede object prefixes.

LOC NP's govern verbal and certain concordial agreement processes, and can participate in most relativization phenomena. In many cases, LOC NP's are moved by rules which also affect non-LOC NP's. LOC NP's can bear the grammatical relations of 'subject of' and 'object of' to verbs. In each of these cases, LOC NP's differ from prepositional phrases, which are more restricted in movement and relativization, govern no agreement processes, and bear no grammatical relations to verbs. OluTsootso sharply distinguishes LOC NP's from prepositional phrases.

2. Syntactic rules. We may now turn to a discussion of the various syntactic phenomena in which LOC NP's may participate. In some cases I shall introduce the syntactic processes involved with data involving non-LOC NP's, and then discuss the behavior of LOC NP's for each process. I shall be interested here mainly in predicting the occurrence of the LOC sfx in certain of these constructions.

2.1. Passive. The first syntactic process described will be passive (henceforth PSV). Below are examples of underlying active and corresponding PSV sentences involving non-LOC NP's:

- (1a) Ombooko a--lol--aanga³ in---zu
 O. cl.1-see-T/A cl.9-house
 'Ombooko sees the house'
- (1b) → In---zu yi-lol--uungwa neende Ombooko
 cl.9-house cl.9-see-PSV,T/A by O.
 'The house is seen by Ombooko'

Note that in sentence (1b), the derived subject inzu (class9), 'house', governs (class 9) subject agreement on the verb. The logical subject Ombooko becomes the object of the preposition neende, 'by'.

Similar results obtain when LOC NP's become subjects of passivized verbs. Note that some verbs allowing PSV to apply might traditionally be considered, "intransitive", while others are indisputably "transitive".⁴ As in the above, the (b) sentences are the PSV counterparts of the corresponding active (a) sentences:

- (2a) aBa--xasi Ba--tsiits-aanga ha--mu--chela
 cl.2-woman cl.2-go-T/A LOC-cl.3-river
 'The women go near the river'
- (2b) → Ha--mu--chela ha--tsii-Buungwa--ho neende aBaxasi
 LOC -cl.3-river LOC-go-PSV,T/A-LOC sfx by women
 'Near the river is gone by the women'
- (3a) esie en-deer-aanga eshi-taBo mu-shi--iro
 I I-bring-T/A cl.7-book LOC-cl.7-market
 'I bring the book in the market'
- (3b) → Mu--shi--iro mu--leer-uungwa--mwo eshitaBo neende esie
 LOC-cl.7-market LOC-bring-PSV-LOC sfx book by I
 'In the market is brought book: by me'

Passivized sentences similar to the above in which the LOC subject prefix and/or LOC sfx do not agree with the subject LOC NP are ungrammatical, as are sentences without the LOC sfx. 2.2. Tough-movement. The Tough-movement rule (henceforth TGH) in OluTsotso moves objects of embedded verbs to subjects of higher verbs, as in the following example:

- (4a) Oxu--leera eshi--taBo ni oxw---aangu
 cl.15-bring cl.7-book be cl.15-easy
 'To bring a book is easy'
- (4b) → Eshi-taBo ni eshi--angu shi--oxu--leera
 cl.7-book be cl.7-easy cl.7-cl.15-bring
 'A book is easy to bring'

LOC NP's can also be moved by TGH, as in the following examples with /angu/, 'easy', and /tinu/, 'hard':

- (5a) Oxu--tuuxa haa--n-zu ni oxw-aangu
 cl.15-arrive LOC-cl.9-house be cl.15-easy
 'To arrive near the house is easy'

- (5b) → Haa-n-zu ni aha-angu ho--oxu-tuuxa---ho
 LOC-cl.9-house be LOC-easy LOC-cl.15-arrive-LOC sfx
 'Near the house is easy to arrive'
- (6a) Oxu-leera eshitaBo muu-n-zu ni oxu-tinu
 cl.15-bring book LOC-cl.9-house be cl.15-hard
 'To bring a book in the house is hard'
- (6b) → Muu-n-zu ni omu-tinu mw-ooxu--leera-mwo eshitaBo
 LOC-cl.9-house be LOC-hard LOC-cl.15-bring-LOC sfx book
 'In the house is hard to bring a book'

Notice that again the LOC prefixes and sfx'es must agree with the LOC NP. Sentences without agreement, and (b) sentences without the LOC sfx'es, are ungrammatical.

2.3. Dislocation. The rule of dislocation(henceforth DISL), moves NP's to the left and leaves an agreement element, the object prefix, on the verb. The dislocated noun is often followed by a demonstrative adjective, as in the following:

- (7a) Keeya a-lol--aanga aBa--saatsa
 K. cl.1.1-see-T/A cl.2-man
 'Keeya sees the men'
- (7b) → aBa--saatsa yaaBo Keeya a--Ba--lol--aanga
cl.2-man dem. K. cl.1.1-cl.2-see-T/A
 'Those men, Keeya sees(them)'

When LOC NP's are dislocated, LOC object prefixes and LOC sfx'es appear:

- (8a) Lii-nōni li-pulushil-aanga xu--mu--saala
 cl.5-bird cl.5-fly-T/A LOC-cl.3-tree
 'The bird flies on-to the tree'
- (8b) → Xu--mu--saala yuxwo lii-nōni li--xu-pulushil-aanga-xwo
LOC-cl.3-tree dem. cl.5-bird cl.5-LOC-fly-T/A-LOC sfx
 'On to the tree on-there, the bird flies on-to(there)'

2.4. Movement and LOC-be-shift. Rather than merely listing the rules which condition the appearance of the LOC sfx, it might be proposed that the LOC sfx appears whenever the LOC NP is moved. This hypothesis would be confirmed by the evidence from a rule of LOC-be-shift, in which a LOC NP following the locational verb 'to be' becomes the subject:

- (9a) aBa--saatsa Ba--li xu--mu-saala
 cl.2-man cl.2-be LOC-cl.3-tree
 'The men are on the tree'
- (9b) → Xu---mu--saala xu--li---xwo aBa--saatsa
 LOC--cl.3-tree LOC-be-LOC sfx cl.2-man
 'On the tree are the men'

Verbal subject agreement must be with the LOC NP in the (b) sentence, and the LOC sfx must appear.

2.5. Against movement alone. Data from three additional syntactic processes will be used to argue against the claim that mere movement of the LOC NP conditions the appearance of the LOC sfx.

2.5.1. Focus movement. There is a rule which moves post-verbal LOC NP's within a clause under circumstances involved with emphasis or focus. The LOC NP can be moved from its unmarked position after object NP's to a position immediately after the verb:

- (10a) a-leer-aanga eshitaBo muu-n--zu
 cl.1-bring-T/A book LOC-cl.9-house
 'He brings a book in the house'
- (10b) → a-leer--aanga muu--n-zu eshitaBo
 cl.1-bring-T/A LOC-cl.9-house book
 'He brings in the house a book'
- (11a) em-bax---aanga Keeya ama-fuura muu--n--zu
 I-smear-T/A K. cl.6-oil LOC-cl.9-house
 'I smear Keeya with oil in the house'
- (11b) → em--bax-aanga muu--n--zu Keeya ama-fuura
 I-smear-T/A LOC-cl.9-house K. cl.6-oil
 'I smear in the house Keeya with oil.'

These data disprove the claim that the LOC sfx appears whenever a LOC NP is moved, since no LOC sfx may appear in the (b) sentences above.

2.5.2. Cleft-question formation. A second type of movement rule which does not condition the appearance of the LOC sfx is a cleft-question formation rule (henceforth CQF). From the more basic question-formation sentence like (12a), sentence (12b), a CQF sentence may be formed:

- (12a) Keeya a-tsiits--aanga he--ena (</ha--ina/)
 K. cl.1--go--T/A LOC--which (<LOC-which)
 'Keeya goes where?'
- (12b) → Ni he--ena aha Keeya a-tsiits--aanga
 be LOC-which LOC,Rel. K. cl.1--go--T/A
 'It is where Q where_{Rel.} Keeya goes?'

Note that the LOC NP has been moved in this CQF sentence (12b), but that no LOC sfx appears on the verb.

2.5.3. A third case involving movement of a LOC NP is A-raising. In the following example, the non-LOC NP aBasaatsa, 'men', is raised to subject position from the underlying semantic representation of (13a):

- (13a)

aBa-saatsa	-kwa	-tsiililil-
cl.2-man	-fall	-continue-
- (13b) → aBa-saatsa Ba--tsiililil--aanga oxu--kwa
 cl.2-man cl.2-continue-T/A cl.15-fall
 'The men continue to fall'

When LOC NP's are moved by A-raising, no LOC sfx appears:

- (14a) Muu--n--zu -Bala -tsiililil-
LOC-cl.9-house -be warm- -continue-
- (14b) → Muu--n--zu mu--tsiililil--aanga oxu---Bala
 LOC-cl.9-house LOC-continue-T/A cl.15-be warm
 'In the house continues to be warm'

The LOC sfx does not appear after the underlyingly embedded verb /Bal/, 'be warm', although the LOC NP has been moved by the rule of A-raising. ⁵

These facts about A-raising, combined with the data from focus-movement and CQF, provide counter-evidence to the claim that the LOC sfx appears on a verb whenever the LOC NP is moved.

2.6. Grammatical status change. To summarize, we have seen that the rules of PSV,TGH,DISL, and LOC-be-shift condition the appearance of the LOC sfx, whereas the rules of focus-movement, CQF, and A-raising do not. A crucial distinction between these two sets of rules involves changes in the grammatical status of the LOC NP's involved. The rules of PSV,TGH,DISL, and LOC-be-shift have the effect of promoting the LOC NP's to a higher grammatical status. PSV,TGH, and LOC-be-shift promote LOC NP's to subject, while DISL has the effect of promoting a LOC NP to direct object (I shall return to this point below). In contrast, the rules of focus-shift, CQF, and A-raising do not affect the grammatical status of the LOC NP, but simply move the NP. Therefore, rules which promote the grammatical status of a LOC NP condition the appearance of the LOC sfx, but movement rules which do not affect the grammatical status of a LOC NP do not condition the insertion of the LOC sfx.

3. Some Implications for Relational Grammar. In this section, I shall discuss some implications for the theory of relational grammar that are raised by the behavior and the analysis of LOC NP's in OluTsootso.

3.1. Relation-changing problems. In the theory of relational grammar proposed by Johnson (1974), rules are distinguished in terms of relation-changing(Rc) and non-relation changing(non-Rc). Specifically, cyclic rules are Rc and non-cyclic rules are non-Rc. There is, however, evidence from OluTsootso LOC NP's that suggests that DISL, usually considered non-cyclic, is in fact Rc. This is demonstrated by the following. Consider first that true direct objects (both underlying and derived) govern object agreement when they are pronominalized (pronominalization involves a feature-copying and deletion process). Compare sentence (15a) with the pronominalized sentence of (15b):

- (15a) John a---lol-----aanga in---zu
J. cl.1---see---T/A cl.9-house
'John sees the house'

- (15b) → John a---yi---lol---aanga
 J. cl.1-cl.9-see--T/A
 'John sees it'

If an NP is not an object, it may not be pronominalized with feature copying, object prefix, and deletion. In sentence (16a), ama-fuura, 'oil', is not the object, and cannot be pronominalized as in (16b):

- (16a) esie em--bax--aanga Keeya ama---fuura
 I I-smear-T/A K. cl.6-oil
 'I smear Keeya with oil'
 (16b) → *esie en---ga---Bax---aanga Keeya.
 I I--cl.6--smear-T/A K.
 'I smear Keeya with it'

Similarly, when post-verbal LOC NP's are pronominalized and deleted, an object prefix agreeing with the entire LOC NP does not appear:

- (17a) Keeya a--tsiits--aanga ha--shi--iro
 K. cl.1-go--T/A LOC-cl.7-market
 'Keeya goes near the market'
 (17b) → *Keeya a--ha--tsiits--aanga--ho
 K. cl.1-LOC-go--T/A---LOC sfx
 'Keeya goes near--there'

A sentence similar to (17b) without the LOC object prefix would be grammatical: Keeya a--tsiits--aanga--ho, 'Keeya goes near--there'. Thus, the failure of the LOC object prefix to appear in pronominalized sentences like (17b) is evidence that the LOC NP, much like the NP amafuura in sentence (16a-b), is not a direct object of the verb.

But now recall that, as in sentence (8b), the LOC object prefix does appear when the underlying post-verbal LOC NP undergoes DISL. The conclusion is that the LOC NP bears a new grammatical relation (of direct object) to a verb when DISL applies, and that therefore DISL is a relation-changing rule.

It should also be pointed out that it is impossible to distinguish rules which condition the appearance of the LOC sfx on the basis of relational change. As the analysis and data of previous sections show, a change in the grammatical status, but not a change in grammatical relation, of a LOC NP conditions the appearance of the LOC sfx. This can be shown by considering that A-raising is a rule which changes grammatical relations, but since it is not a rule which changes the grammatical status of a LOC NP, it does not condition the appearance of the LOC sfx. Thus, there may be some advantage and insight to be gained by a dichotomy of syntactic processes along the parameter of relation-change, but the overlapping (but non-congruent) distinction in terms of status-changing rules must still be incorporated into an explanatory theory of grammar.

3.2. LOC underlying subjects. It has been claimed that LOC NP's which surface as subjects of active verbs are represented in underlying structure as 'objects' (or non-subjects) of verbs. This would mean that something like the following would underlie sentence (18b) in OluTsootso:

- (18a) _____ -Bal- _____ muu--n---zu
 -be warm- LOC-cl.9-house
 (18b) → Muu--n--zu mu--Bal--aanga
 LOC-cl.9-house LOC-be warm-T/A
 'In the house is warm'

Notice that this proposal would claim that LOC NP's change their grammatical status from non-subject to subject. But as we have seen, rules which change the grammatical status of LOC NP's also condition the appearance of the LOC sfx. Therefore, the absence of the LOC sfx in examples like (18b) should be taken as evidence that no change in the status of the LOC NP takes place. This in turn seriously weakens the case for a semantic representation like (18a), and for the proposed rule which would move the LOC NP into subject position. And in fact there is no evidence in OluTsootso suggesting that the correct underlying representation of sentence (18b) is anything which differs greatly from its surface form. These considerations argue against deriving sentences like (18b) from semantic representations like (18a).

3.3. Extraction. Some examples in which the noun of the LOC NP is extracted from the locative expression are given below. For convenience, these (c) sentences correspond to previous examples in which the entire LOC NP underwent the rule in question:

- (2c) → Omu--chela ku--tsii--Buungwa--ho neende aBa-xasi
 cl.3-river cl.3-go-PSV,T/A-LOC sfx by cl.2-woman
 'The river is gone near by the women'
 (3c) → Eshi--iro shi--leer--uungwa--mwo eshitaBo neende esie
 cl.7-market cl.7-bring-PSV,T/A-LOC sfx book by I
 'The market is brought-in the book by me'
 (5c) → In--zu ni in---aangu yi--oxu--tuuxa--ho
 cl.9-house be cl.9-easy cl.9-cl.15-arrive-LOC sfx
 'The house is easy to arrive near'
 (6c) → In---zu ni in--dinu yi--oxu--leera--mwo eshitaBo
 cl.9-house be cl.9-hard cl.9-cl.15-bring-LOC sfx book
 'The house is hard to bring in book.'
 (8c) → Omu--saala yukwo lii--noñi li--ku--pulushil--aanga---xwo
 cl.3-tree dem. cl.5-bird cl.5-cl.3-fly--T/A ---LOC sfx
 'That tree, the bird flies onto(it)'

It seems reasonable to claim that when the noun of the LOC NP is moved out of the LOC NP, the LOC prefix cliticizes on to the verb as the LOC sfx. But there is also some evidence to suggest that

when a noun is extracted from a locative expression, there is promotion of that extracted noun. The evidence for this comes from a consideration of the following sentences involving pronominalization:

- (19a) Keeya a---tsiits---aanga ha---shi--iro
 K. cl.1-go---T/A LOC--cl.7--market
 'Keeya goes near the market'
 (19b)→ Keeya a---shi---tsiits---aanga---ho
 K. cl.1--cl.7--go-----T/A----LOC sfx
 'Keeya goes near-it'

The class 7 object prefix shi may optionally appear on the verb when the LOC NP has been pronominalized (the LOC sfx must appear). Since, as we have seen, only objects may govern object agreement, it would seem that an optional rule promoting the noun eshi-iro, 'market' to object status applies, followed by normal object pronominalization (feature copying and deletion) which inserts the class 7 object prefix -shi- before the verb. The LOC prefix ha- again cliticizes onto the verb as the LOC sfx.

If it is true that extraction cum promotion of a noun of a LOC NP is a possible rule, it might be used to account for the limited cases in English where intransitive verbs are passivized:

- (20) This bed has been slept in by royalty.
 (21) The bridge was just flown under by the Red Baron.

From underlying representations in which the entire LOC NP follows the verb, an extraction cum promotion rule would make the extracted nouns objects, after which passive could apply. And there is some intuitive appeal to extraction cum promotion, since once the noun is extracted from the locative preposition in English, the noun no longer carries evidence of its prior status as a non-term.

4. Summary and Conclusion. In conclusion, it has been demonstrated that LOC NP's in OluTsootso can undergo the syntactic processes of PSV, TGH, DISL, LOC-be-shift, A-raising, CQF, and focus-shift. Certain of these processes involved the appearance of the LOC sfx. It has been claimed that whenever the status of the LOC NP is promoted by rule, the LOC sfx appears. The notion of 'status' change cross-cuts the distinction maintained in relational grammar between relation-changing and non-relation-changing rules, since a rule may affect a grammatical relation but not affect grammatical status. (as in A-raising). Evidence has been adduced to show that DISL is a relation-changing rule in OluTsootso, because non-object LOC NP's are promoted to objects. The claim that LOC NP's which are subjects of active verbs are derived from a representation like (18a) has been weakened by the discussion of section 3.2. Finally, there is evidence that the extraction of nouns from locative expressions may involve a concomitant promotion, which may in turn be useful in accounting for some English data as well as for certain pronominalization facts of OluTsootso.

NOTES

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²The regular class prefix is reduced when the LOC pfx precedes: /eshi/--> -shi-; /iN/--> -N- ; /omu/--> -mu-. Cf. Dalgish (1976a) and (1975).

³The continuous/habitual marker /ngV/ conditions vowel copy and vowel lengthening processes. See Dalgish (1976a) and (1975) for further discussions of the vocalic phenomena illustrated but not discussed in examples of this paper.

⁴Some discussion of the notion of transitivity is found in Dalgish (1976b), as well as a more complete discussion of passivized locatives.

⁵The LOC sfx does appear on the lower verb if PSV applies on the lower cycle prior to A-raising:

	Tsisiimba	-injl-	muunzu		-tsiililil-
	lions	-enter-	in house		-continue-
(PSV)→	Muunzu	-injl-u-	neende tsisiimba		-tsiililil-
	in house	-enter-PSV-	by lions		-continues-

(A-raising)

→ Muunzu mu--tsiililil--aanga oxw-iinjl-u-a neende tsi-
siimba
 in house LOC-continue-T/A cl.15-enter-PSV-T/A by lions

'In the house continues to be entered(in) by the lions'

⁶It might still be maintained that (18a) underlies (18b), but that the rule inserting the LOC sfx is not sensitive to the rule which moves the post-verbal LOC NP to subject (perhaps the latter rule is quite abstract). My point is that there is no evidence in favor of such a proposal.

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ANALOGUE GRAMMAR IN THE AMERICAN SIGN LANGUAGE

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I present in this paper certain facts which have been both troubling and exciting to me. They are facts from American Sign Language (ASL), and with them I intend to seduce you. That is, I intend to coax you into doing something you might not ordinarily do, namely, change some of the ideas I suspect you have concerning the ways a language can work. I will do this in the following way: First, I will present and describe two sentences in Sign representing a paradigm. I will also show that these sentences can be immediately analysed in a standard reasonable, standard fashion. Then, I will present and describe a story, a very short one, in Sign. There are signs I use in the story which are related, both in form and meaning, to the paradigm. The realization of these signs in the story will not, however, be accounted for by any standard, reasonable analysis, or at least I hope that they won't. And, of course, I talk about why such analyses won't work. Finally, I will suggest and discuss ways one might come up with a proper analysis.

Let me begin my description of the two Sign sentences with the sign for GIRL (I will use the convention of glossing signs with their nearest English equivalents in all upper case type). This sign is formed by drawing the ball and side of the thumb, which is extended from a closed fist, across the cheek, starting from a position near the ear and stopping at a position off the face near the mouth. Most Sign researchers have adopted a framework wherein a sign is described in terms of four parameters, namely, hand configuration, orientation of the hand, movement of the hand, and the place on the body, or in the space in front of the body, where the sign is made (that is, hand configuration, orientation, movement, and place of articulation). It has also been claimed widely that these parameters are distinctive (see Stokoe, Casterline, and Croneberg [1965], and Friedman [1974] for discussion and description of Sign parameters). Thus, with GIRL, the configuration can be contrasted with an open palm, holding other parameters constant such that BEE is formed. If we change the place of articulation to, say, the nose, we have the sign POLISH. If we change the movement to a bumping motion against the cheek, we have the sign MENSTRUATE. If we change the orientation such that the point of the thumb draws across the cheek, we sign SURGERY- or CUT-ON-THE-CHEEK.

Next, I will describe an indexical anaphor. I can point with my index finger to, say, my right. By doing this, I place a point in space which stands for (in this case) GIRL, and any further reference to the girl will be made by referring in various ways to that point. This

sequence (GIRL INDEX-RIGHT), then, might be translated as something like 'there was this girl'.

There is a sign made by extending the index and middle fingers from a closed fist with the two fingers spread in a V-like shape. In citation form it is moved from the eye to a position somewhere in front of the body, or from a position somewhere in front of the body to the eye; it can be glossed LOOK or LOOK-AT. The difference in the beginning and ending points in the movement parameter of the sign is quite important, for if the movement starts at the eye and ends off the body, the sign is I-LOOK-AT-SOMETHING, whereas the reverse of that movement, that is, from off the body to the eye, is SOMETHING-LOOKS-AT-ME.

I have thus presented all of the necessary elements of a Sign paradigm:

- (1) GIRL INDEX-RIGHT I-LOOK-AT-RIGHT
'I looked at the girl'
- (2) GIRL INDEX-RIGHT RIGHT-LOOK-AT-ME.
'The girl looked at me'

The problem in this paradigm is, of course, predicting the direction of the fingers (outward from the signer or inward toward the signer) and the beginning and ending points of the movement associated with LOOK-AT. Actually, there is a large class of directional verbs of this sort which have been most recently discussed in print by Friedman (1975). She chooses to account for these verbs within a case framework, claiming that a proper analysis specifies movement in these verbs from agent to patient. This is a reasonable way of handling these verbs; we might mark each nominal element or pronominal element with a case marking and then postulate a rule in the grammar which maps movement from agent to patient. There are other ways of handling these data, but the simple analysis above can epitomize a class of possible analyses all of which will involve a rule generating the movement in the sign such that the rule will mention some sort of discrete markers like case markers or markers defining grammatical relationships such as subject and object.

Now, I will describe (with some difficulty) a story in Sign. Imagine that I sign GIRL with my left hand. I then move my hand to a position about one foot in front of my body at the level of my chest. My hand has the index finger extending from a closed fist such that the index finger points upward. This sign is another sort of anaphoric marker, a substantive anaphor (see Mandel in this volume), which stands for the girl. I have thus far signed something like 'There was a girl, and to talk about her, I'll put her here (in front of my body)'. Next, I sign ME by pointing to my chest with my right hand (the left hand is being held in the substantive anaphor), and then move my hand to a mirror image place of articulation, configuration, and orientation of the left hand. At this

point, I have signed something like 'There was this girl, and I was located to the right of her'.

Now, imagine further that I change the configuration of both hands from that of the substantive anaphor to the extended finger of LOOK-AT, with the extended fingers of both hands pointing outward from my body. I then begin simultaneously changing the orientation of both hands by changing the direction that the fingers are pointing, say, slightly leftward with my left hand and slightly rightward with my right, and then slightly rightward with my left hand and leftward with my right. I am also changing the horizontal plane of movement in both hands such that the extended fingers of both hands are continuously describing small circles and ellipses in space. What I am doing is signing a particular variant of LOOK-AT which might be glossed as LOOK-AROUND. Thus, at this point, my story could be translated as 'There was a girl (at some as-yet-unspecified time and place), and I was located to the right of her. We were both looking around in a sort of aimless fashion.'

I will interrupt my story here with a short digression. Notice that the form of LOOK-AROUND begins to present some difficulty for the analysis of the LOOK paradigm presented above. That is, there is no particular position in space that the fingers are pointing to, and there is no movement of the configuration from some starting point to some ending point as there was in the paradigm case. We can preserve the analysis of the paradigm case by postulating a special case variant of LOOK-AT which is outside the domain of the movement/orientation rule governing the paradigm. Actually, I have implicitly chosen such an alternative by glossing the variant LOOK-AROUND; as the reader will see below, however, there are conclusive arguments against such a choice.

I now continue my Sign story by having the extended fingers of the left hand point directly at the right hand, which is continuing its circular/elliptical motion, and hold that position. The fingers of the right hand then cease their movement, stopping at such a position that the extended fingers of the right hand are pointing directly at the extended fingers of the left. The left hand immediately twists counterclockwise, such that the extended fingers no longer point to the extended fingers of the right. The left fingers begin again to circle while the right fingers remain pointing to the left hand for a few moments. Then, the right fingers too begin again to circle. This cycle is repeated three times, except that on the last cycle the right fingers do not resume circling as before, but rather hold the position pointing to the left hand. The left fingers slowly cease circling until they end up pointing directly at the right fingers; both hands change to the substantive anaphor configuration (index fingers pointing upward) with the palms facing each other; and, finally,

the right hand moves slowly, and with some hesitation, toward the left hand until the two hands are touching at the thumb and closed fingers. The story ends, and what I have signed can be translated into English as something like the following: 'There was this girl, and I was located to the right of her within seeing distance. We were both looking around rather aimlessly, not taking particular note of each other. Then, the girl noticed me and began to stare at me. I noticed her looking at me, but when my eyes met hers, she immediately averted her gaze and started looking around again. I continued looking at her for a moment, but then I, too, went back to looking around. After a few moments, she started to stare at me again, but when I noticed this, and again caught her eye, she looked away as she did before, as if she didn't want me to know that she had been looking at me. I started looking around again, and she again started looking at me, but this time when I looked back at her, and she averted her eyes, I continued to stare at her. She finally stopped pretending to be just looking at the sights, and directed her eyes toward me. Our eyes met and held, acknowledging our interest in each other, and then I went up to her.'

The problem in this story is again predicting the direction and movement of the signs for looking, seeing, staring, and so forth. I trust that the reader has no difficulty in seeing that the question is a good deal more complicated than the case analysis of the paradigm would suggest. As it turns out, the movement, orientation, and place of articulation in the sign LOOK can take an unlimited range of values, though the hand configuration remains constant. And furthermore, each value has semantic import; each time the sign is made in a different way, it is different in meaning, or refers to a different sort of event in the referent world.

What do we want our grammar to do with these facts? Well, first we want our grammar to be able to capture the fact that all tokens of the LOOK sign are related, that they are indeed the same sign. We also want it to be able to state how each token is different, and how that difference is correlated to meaning differences. Suppose we choose to extend the case analysis which worked so nicely in the paradigm case where different case relationships were postulated to account for different movements and orientations of the sign. I can see at least three possibilities in this regard, each of them unsatisfactory: 1) We could postulate an unlimited set of cases or case relationships correlated by rule with the unlimited set of possible meaningful changes in movement and orientation in the sign. Since I assume agreement that one of the minimum requirements for a proper grammar be that it comprise a finite set of theoretical terms and rules, this possibility must be discarded. 2)

We could postulate a finite set of cases or case relationships which will account for gross differences, and an unlimited set of adjustment rules, perhaps prosodic in nature, to account for the other differences. This possibility must be discarded for the same reason that the first one was. 3) We could assume that with each difference in movement, orientation, and place of articulation, we have a different lexical item, a distinct sign within a single semantic domain. As far-fetched as this third possibility seems, it is, in a somewhat weaker and less explicit form, the position taken by most Sign researchers, such that one can find discussion of the identity relationship of I-LOOK-AT-SOMEONE and SOMEONE-LOOKS-AT-ME (that is, a single sign transmuted by rule) along side discussion of signs glossed as, say, GLANCE, LOOK-AT-EACH-OTHER-LIKE-LOVERS, WATCH, and so forth, as distinct signs. This alternative not only denies us the ability to state systematically within the grammar the semantic identity of all tokens of the 'looking' sign, but also denies us the ability to place boundaries on our lexicon.

Moreover, none of these alternatives captures in any way the really simple thing that is going on in the data I have presented. The data I have presented were chosen for their transparency; as I imagine the reader has surmised, the hand configuration in LOOK represents the lines of vision from the eyes of the perceptor outwards. Once this translation principle is established, then each of the tokens of the 'looking' sign can be understood in terms of the direction and trajectory of vision in the perceptor. That is, this manual, gestural representation of the eyes can do pretty much what eyes in the real world can do.

If I were to analyse the written or vocal rendition of the Sign story above, I would find myself accounting for the distribution of elements in my vocal language, or its written representation, in discrete terms. That is, I would talk of noun phrases, verb phrases, phrase markers, case markings, morphemes, and all the other discrete terms in the vocabulary of ordinary modern linguistic theory. I would also talk of rules which operate on these discrete elements. And, for the most part, I would be well justified in doing so. This notion of discreteness of language structures constitutes a strong principle of grammar, and as long as we can see vocal language as we do, comprising psychologically isolable elements, it is only reasonable to state its regularities in terms of rules operating on discrete elements.

If I were to analyse the Sign rendition of my story, on the other hand, I would immediately notice, as I hope the reader did, that the surface representation was not at all discrete, indeed, could not even be described in discrete abstractions as we do with, say, phonetic representations. So I am left with the question of whether I am

to account for my signs, their form, distribution, and behavior, in terms of discrete underlying structures. And actually, there is no question involved; it is impossible to exhaustively describe the movement and orientation of the 'looking' signs in terms of a finite set of discrete movement and orientation values, for the changes were continuous, the possible number of value assignments unlimited.

Suppose that we give up the sort of semantic or syntactic representations which are composed of discrete units, noun phrases, features, case markings, and so forth, at least within certain domains. Suppose instead we have some sort of visual representation of real world or possible world events. If I have some sort of device or set of devices for creating for you that visual image, it is possible for me to convey to you the picture in my mind, and allow you to figure out what it all means in the same way that I originally formed an interpretation of the actual event. Let me make this point more clear with a concrete example. Imagine that I sign GIRL with my left hand and then sign a substantive anaphor, just as I did in the beginning of the Sign story. Next, I sign BOY (formed by touching the tip of the thumb, which is extended from the closed fist, to the forehead, and then moving the hand outward a short distance from the face) with my right hand and then sign another substantive anaphor. Notice that I now have the two actors placed in space. If I bring my two hands together such that they are touching along the thumbs and folded fingers, I have said that the boy and the girl met. If I pass the two hands in space such that my hands end up with the left hand to the right of the right hand, I have said that the boy and the girl passed each other without saying hello or otherwise acknowledging each other. If I do the same thing, but with my head tilted upward and to the side, I have said that the boy and the girl passed each other while pretending not to see each other. And we can have them meet in secret, just miss each other, have one trip over the other, and so forth, simply by changing the behavior of the substantive anaphors. What happens is that the anaphoric markers for the actors in the event trace in the signing space an analogue of the trajectory of the actors in the event in the referent world. The function of this sort of device is to enable the addressee in the Sign communication to reconstruct the scene in order to infer the relationships holding between the actors.

I have thus far offered two concepts I feel necessary to a proper understanding of American Sign Language. One is the notion of a mental, visual image; the other is the notion of an analogue construction of that mental, visual image in the signing space using gestural devices. What I need now is some mechanism for matching up particular mental visual images with particular sign visual images. That device is an analogue rule. I conceive of an analogue rule

as a rule type which maps one continuum onto another. That is, in the examples I have given, I suggested the mapping of movements and trajectories of both actors and lines of sight onto movements and orientations of articulators in the signing space. We might conceive of an analogue rule as a statement of the following sort:

- (3) Map the points of P onto the points of C (where P represents some continuous property of the mental image and C some continuous feature of the code).

Another way of stating this sort of rule might be

- (4) For every point of P, there exists a corresponding point of C.

The mapping would be done in terms of angle equivalencies, matching proportions, and so forth.

This sort of rule, it should be noted, allows us to specify continuous values of Sign parameters without reference to any sort of discrete underlying markings like cases. They need only refer to some property of the visual representation, such as a line, a direction, a distance, a time duration, and so forth.

It's as simple as that. I have only given examples of movements and trajectories, but it should not be assumed that it is only in the domain of movements and trajectories that analogue rules come into play. I quote below what I take to be the substance of an analogue rule taken from Friedman (1975). Here, she is discussing the indexical reference to location far from the signer.

"An index for a locative referent which refers to location of a previously indexed and established referent, is made in the general direction of the nominal referent (i.e. RIGHT, LEFT) but with the superimposition of the feature UP on the index. . . The relative distance of a locative referent from the signer in the real world is indicated by the relative angle of the extended finger in relation to the ground (up to but not including 90°) and the higher the arm is raised and the greater the length of the extension of the arm, the further the distance of the locative referent is from the signer [pp. 30-1]."

Friedman is talking about this sort of result. If someone were to ask me where John went, I might answer by signing OAKLAND, and then pointing in the general direction of Oakland, or by signing MEXICO, and then pointing in the general direction of Mexico; however, in pointing to Oakland, my arm would be less extended, and finger pointed in line forming a smaller angle in relation to the ground, than would the extension and angle be in my pointing to Mexico. As I have already shown, we cannot refer to some n-ary feature UP in order to properly account for the facts in Friedman's description. The continuum of distance is mapped onto the continuum of hand angle, arm extension, and height. This is

the content of an analogue rule, though I do not imagine Friedman intended it as such.

I could continue giving examples of areas where analogues come into play in ASL. Rather than do that, I would prefer to discuss why it is that I took up study of such a strange aspect of a strange language. One overwhelming aspect of Sign literature is researchers' constant assurance that Sign language is just like 'real' language, that it manifests the design features posited for vocal language, reflects the non-phonological universals of acquisition, fulfills the sociological functions of vocal language, and so forth. On the other side were those people who pooch-pooched Sign language by saying that Sign, well, it is just iconic, pantomimic, and not at all in the same category as vocal language. It seems clear to me that the linguist, intrigued as I was by this weird object, Sign language, wanted to feel justified in studying it, but that in order to do this, first had to argue against those pooch-pooch linguists, to first bring Sign language into the domain of natural languages. It is equally clear to me that this situation precipitated a pseudo-issue, with the vocal language linguists claiming that Sign language was iconic, and therefore non-arbitrary, and must be ruled out of the domain of natural language linguistics, and the Sign linguists claiming that Sign language is only incidentally iconic, but in all important respects arbitrary and conventional. The mistake has occurred in contrasting iconicity with arbitrariness, in making them polar opposites. The real case is that language, even vocal language, can be arbitrary and iconic at the same time. Take, for example, the notion of stress and intonation in English. I would like for the reader to take the following sentence of English and play with the stress and intonation contour over the underlined word 'fat':

(5) John is fat.

Notice that greater degrees of stress, and more convoluted intonation contours, are associated with greater degrees of the referred to 'fatness'. The fact that those different stress values indicate increasing 'fatness' values is arbitrary, established by convention. And yet the way in which degree of stress functions as an analogue of degree of fatness is iconic, in a not too abstract way. That is, all we need to know is the principle, or analogue rule if you will, that maps degree semantics onto degree of stress; then, we can do all sorts of iconic things along those lines.

It is just that in looking at vocal language, one can do a hell of a lot while ignoring its continuous properties; in looking at Sign language, analogues are central and basic.

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Palatalization: a persistent rule of English

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It is not unusual to find in a language certain recurrent types of rules that operate with similar effects at different points in the grammar (and historically, at different points in time). Such rule persistency provides an indication as to what constitutes natural processes. It is important, however, to differentiate between universal phonetic tendencies - which are present in all languages and at all stages of a given language-, and more fundamental processes, which are part of a language- phonology, and interact with other phonological rules. All languages have low-level, assimilatory processes, reduncancy rules which apply at any point in a derivation whenever their structural description is met. For example, all languages have a certain degree of vowel-nasalization before a nasal consonant, or a slight consonant-fronting before a front vowel: Modern English has phonetic nasalized vowels, as in [wɪ̃Dr] winter. The back stops /k/ and /g/ have two allophonic variants: a palatal stop as in key, geese, and a velar stop as in cool, goose. The same palatal allophones are evidenced in Modern French qui [k'i], gui [g'i], as opposed to cou, gôû. But in some languages, such universal phonetic statements become phonological processes: nasalized vowels are phonemic in French (but not in English). In English, certain consonants in the fronting environment have undergone a more fundamental palatalization which results in affrication and/or spirantization.

In this paper, I will focus upon the latter process, which yields morphophonemic alternations as evidenced in create/creation, allude/allusion. I will point out various instances of palatalization in English, and determine to what extent the scope of palatalization and the conditions triggering it have changed from Old English to Modern English. Finally, it will be shown that the directionality of palatalization, as well as of other similar processes is best characterized by incorporating the notion of phonological strength as a significant parameter in a theory of language change.

1. Palatalization in Old English.

In Old English,¹ palatalization affected the velar stops /k/ and /g/ and their geminates in the environment of a front vowel or glide, changing the geminates respectively to the voiceless and voiced affricates [ç] and [j], the voiceless stop /k/ to the voiceless palatal affricate, and the voiced /g/ to a voiced palatal glide [y]. OE palatalization appears furthermore to be both a prevocalic and a postvocalic process, in the sense that it may be conditioned by a preceding or a following segment. Examples of word-initial (prevocalic) palatalization are:³ ċeorl 'churl', ċirice 'church', ċiese 'cheese', ġeard 'yard', ġiefan 'give',

geolu 'yellow'. However, there are forms opaque to palatalization, as shown in ges 'geese', cyning 'king', gylden 'gilt', in which the velar is followed by a non-historical front vowel, that is, a vowel derived by i-umlaut - which is another productive process of Old English phonology.

The two OE synchronic rules which account for the above-mentioned items may be formulated as follows:⁴

Palatalization:

$$\begin{bmatrix} +\text{obst} \\ +\text{back} \\ \alpha\text{voice} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{back} \\ -\alpha\text{strid} \\ \alpha\text{cont} \end{bmatrix} / \sim \begin{bmatrix} -\text{cons} \\ -\text{back} \end{bmatrix}$$

(a velar stop is palatalized [k → č; g → y] in the environment of a front vowel or glide)

i-Umlaut:

$$\begin{bmatrix} -\text{syll} \\ +\text{back} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{back} \end{bmatrix} / -\text{C} \begin{bmatrix} -\text{cons} \\ -\text{back} \\ +\text{high} \end{bmatrix}$$

(a vowel is fronted if a high front vowel or glide occurs in the following syllable)

A counterfeeding order is clearly required to hold between Palatalization and Umlaut, so as to prevent palatalization in the case of cyning < *kuning, ges < *gosi or gylden < *guldjan.⁵ The same ordering accounts for the occurrence of word-medial palatals, although the conditioning element has been lost in most cases. A necessary condition for the ordering Palatalization-Umlaut is that the glide or vowel which triggers both rules be lost after those rules have applied. This is illustrated in the following derivations.⁶

	/kuning/	/gōsi/	/sōkyan/	/bōki/
Palat	---	---	sōčyan	bōči
Umlaut	kūning	gōsi	sōčyan	bōči

[kining] 'king' [gēs] 'geese' [sečan] 'seek' [bēč] 'books'

(after i/y deletion and vowel-unrounding)

The same derivation accounts for OE šyncan/Got. punkjan 'seem', OE drenc < *dranki 'drink', OE sengan < *sangjan 'sing', as well as for the absence of palatalization represented in such items as OE locian 'look' from /lōko-ja-n/ to which Palatalization is not applicable, although Umlaut is, which yields /lōki-ja-n/, then [lōkian].

There is thus clear evidence as shown in opaque forms like locian, ges, cyning, that in OE, Palatalization is not a synchronically persistent rule in the sense of Chafe (1968), i.e. it does not apply at several points in the derivation, whenever its structural description is met. On the contrary, Palatalization appears to be crucially ordered with respect to i-Umlaut.⁷

On the other hand, there are items in which Palatalization definitely seems to be a postvocalic process, i.e. conditioned by a preceding front vowel, as in faeġr 'fair', regn 'rain', daeġ 'day', maeġ 'may', iċ 'I', hwilċ 'which', halig 'holy', bregdan 'move swiftly'. In all of those words, no following underlying front vowel may be postulated.⁸

Another peculiarity of OE palatalization should be noted, namely that /g/ palatalizes after any front vowel (bregdan, daeġ), whereas /k/ does only after a high front vowel (iċ, hwilċ).⁹ Thus /g/ and /k/ offer a variable sensitivity to palatalization: /g/ is clearly more 'palatalizable' than /k/, and /i/ is more likely to trigger palatalization than other front vowels. Finally, it is important to stress again that only velars were affected by palatalization in OE. That OE dentals (or alveolars) and labials were not, is evidenced in the following set which show the Gothic forms (including a conditioning glide) and the Old Saxon forms (in which the stem-vowel has been umlauted, but the glide preserved), beside the Old English cognates (where Umlaut has applied across all consonant-types, with subsequent loss of the glide):

Gothic	OSaxon	OE	
skapjan	skeppjan	scieppan	'create'
satjan	settjan	settan	'set'
gramjan	gremmjan	gremman	'irritate'
saljan	selljan	sellan	'give'
but			
rakjan	rekkan	reċċan	'reach'
lagjan	leggjan	leċċan	'lay'

The hierarchical pattern evidenced in OE palatalization may be summarized as follows:

1. only velars are palatalized
2. /g/ is more palatalizable than /k/
3. /g/ becomes a glide [y] or is deleted, whereas /k/ becomes an affricate.
4. /g/ is palatalized after any front vowel, whereas /k/ is affected only after /i/
5. /i/ or /y/ are more likely to trigger palatalization than other front vowels.

2. Modern English palatalization

Although Old English velars were the only segments to be affected by palatalization, the process has been extended to alveolars in Modern English. The palatalization of alveolars in Modern English has proceeded in a series of chronological steps: as early as the fifteenth century, there is orthographical evidence that alveolar fricatives become palatalized, first medially, as in sesschyonys 'sessions', conschens 'conscience', ishu 'issue', condishon 'condition', then initially (late sixteenth and middle seventeenth century) as in sheute 'suit', shur 'sure', shugar 'sugar', as in assume assure, consume.¹⁰ In all cases, the following front glide, mostly derived from French [ü] as [yu], or from [ỹ] conditions this palatalization. Furthermore, there is evidence in the spelling that the conditioning glide is lost after it has triggered palatalization, in the same way as in OE. Later, in the seventeenth century, palatalization spreads to the voiced alveolar stop before a glide in soldier (written sawgears in Machyn, sogers in Verney Memoirs, 1642), tedious (teges), Indian (injan). In twentieth-century English, palatalization is very productive in morphological alternations. It yields alternations between final alveolar stops or fricatives and palatal fricatives before certain derivational suffixes underlyingly including a high front glide. It follows that all apparent instances of the modern regular palatalization process occur in medial position, as shown in the following pairs:

t/ʃ	act/action	d/ʒ	explode/explosion
	promote/promotion		decide/decision
	create/creation	d/ʝ	Canada/Canadian/Cajun
t/ʃ	innate/nature		creed/credulous
	right/righteous	s/ʒ	regress/regression
		z/ʒ	aphasic/aphasia
			seize/seizure

Clearly, palatalization affects alveolars in Romance borrowings. Labials remain unaffected, as illustrated in incipient, Albion, Arabian, opium, aviation, devious, amphibious, ruffian.

As to velars, they hold an interesting double status: there are cases of phonetic palatal/nonpalatal alternations similar to those involving alveolars; for example, a [g]/[ʝ], alternation obtains in rigor/rigid, regal/regicide, analogous/analogy, and a [k]/[ʃ] alternation in delicate/delicious, music/musician. On the other hand, a number of items (which do not alternate morphologically) show no evidence of palatalization, e.g. figure, speculate, peculiar, secular, articulate. At closer look, it appears that the first set of items, those which show g/ʝ or k/ʃ alternations, were borrowed from Romance as items with a palatal/nonpalatal alternation already there: g/ʝ (cf. Modern French rigueur/rigide [riɡœr] / [riʝid], analogue / analogie [analog] / [analoʝi]), or with a k/s alternation [cf. Modern French délicat / délicieux [delika] / [delisyø], musique / musicien [müzik] / [müzisyẽ]. The English k/ʃ (from French k/s) alternation is a

case of alveolar palatalization (similar to what happens in regression. The items in the second set were not palatalized when borrowed (cf. French figure [figür], spéculer [speküle], ambigu [äbigü]), and were not in English subsequently. The obvious conclusion is that in Modern English velars appear to be resistant whereas alveolars seem to be particularly sensitive to that very same process. This is clear because even items which were borrowed from French alveolar stops were palatalized in English (cf. Engl. credulous [kreʃʊlas]/French crédule [kredül], Engl. nature [neʃðr]/Fr.[natür], Engl. creature [kriʃðr]/Fr.[kreatür].¹¹ Finally, it is worth noting in this brief outline of Modern English palatalization that the process under consideration typically occurs after a stressed vowel in standard dialects. Compare for example associate, where it is optional to palatalize [a'sosyet]~[a'soʃet], and association - where palatalization does not occur, in pretonic position. See also induce, reduce, produce.., and of course the set of words with word-initial alveolars which precede a stressed vowel, e.g. due [dyu]~[du], tune [tyun]~[tun]. To summarize the conditions governing Modern English palatalization:

1. Only alveolars are actively palatalized, but not velars or bilabials.
2. Palatalization has affected alveolar fricatives in medial and initial position, but alveolar stops only in medial position, after a stressed vowel.
3. Palatalization is conditioned solely by the high front glide /y/.

3. Palatalization as weakening.

An implication pattern appears to pervade the diachronic spread of palatalization in English. To summarize the major differences: In OE palatalization is restricted to velars. In Modern English, the rule affects alveolars, but is restricted to single prevocalic consonants, and furthermore appears to be constrained by certain suprasegmental properties- namely it applies only after a stressed vowel at least in standard dialects. We may wonder at this point if there is anything systematic motivating this pattern. In other words, is this pattern attested in other types of change?

Palatalization, as outlined above, is basically a type of assimilation of a consonant to a high front vowel-- e.g. a consonant gradually acquires the properties of the adjacent vowel. In this case the consonant not only acquires the cavity features of the vowel., i.e. its nonhigh, nonback value, but also its major-class features. (Continuancy, then nonconsonantal value, and the ultimate development is deletion.) This is indeed what happened in Middle English in fægr > fair, stiġan > stien > stien 'ascend', twiġa(es) > twies 'twice', leoġen > leien 'to lie down'. This kind of development is characteristic of lenition, or consonantal weakening. Palatalization is merely one of the ways in

which a consonant may weaken. A parallel process, widely productive in OE, too, is labialization, which is conditioned by an adjacent back round vowel, and also restricted to velars and leads to a development including $g > \gamma > w > \emptyset$, as in *dragan* > *drayen* > *drawen* 'draw, or *fugol* > *fuyel* > *fuel* > *fou(e)l* > 'fowl' or again *folgian* > *folyen* > *folwen* > 'follow'. Thus the development of palatalization in English, as well as in many other languages, can at least partly be explained if reference is made to hierarchies of strength relations between segments. In this sense, the concept of phonological strength should not only be considered as a parameter of a theoretical system, but also as a determinant in the directionality of diachronic change.¹² In other words, strength refers to the degree of resistance offered by a given segment to a particular phonological process, whereas the reverse notion of 'weakness' refers to the tendency of a segment to undergo a given phonological process. According to most hierarchies proposed so far, weakness or strength can be measured in terms of (1) major class features, (2) environment, (3) cavity features. (1) Major class features. It is posited that fricatives are weaker than stops: Note that in Middle English, palatalization has affected the alveolar fricatives before the alveolar stops. (2) Environment. An intervocalic environment favors lenition. Most of the original environments in which palatalization occurred were intervocalic, although they later overtly appeared as final, following flecational loss. An additional feature promoting weakening is, at least in English, the presence of stress in a preceding syllable. As noted above, in standard varieties of Modern English, alveolars are palatalized after a stressed vowel and before the glide /y/. In fact the rule applies across a morpheme boundary, but interestingly enough is extended to apply also across word-boundaries in allegro tempo speech. For example *bet you*, *bless you*, *just yet*, *last year* may be realized as, respectively, [bɛʃu], [b lɛʃu], [læsʃɔr]~[læsɪr] [jʌsʃɛt]. In all cases, an underlying glide /y/ triggers the palatalization of the preceding consonant across a word-boundary. Thus, the rule becomes purely phonologically conditioned. Finally, an interesting question involves the behavior of velars and alveolars in word-initial position in Modern English. Clearly, as mentioned above, a glide-deletion rule follows palatalization in a counterbleeding order in the case of intervocalic velars and alveolars as shown in *Indian*/indyɔn/ → /inʏɔn/ → [inʏɔn] and *betcha* /bɛtʃya/ → /bɛtʃyð/ → [bɛtʃð]. Some dialects of English (British and American) and fast speech varieties have extended both rules to apply to word-initial consonants. For example, the older forms which I set up as the underlying forms in all dialects are /dyu/ and /tyun/ for *due* and *tune* - there are now dialectal forms like [ɕyun] or [ɕun] for *tune*; [jyu] or [ɕy] for *due*, which alternate in British and American dialects with [tyun], [dyu] and with [tun], [du] - the latter having become standard in American English. When [tyun] and [dyu] occur phonetically, they are opaque to both Palatalization and Glide-Deletion, as these

two rules are no longer restricted to apply across morpheme boundaries. I noted earlier their generalization to interlexical sequences as in betcha. If those rules are no longer morphologically conditioned, there is no reason for initial consonants not to be affected - thus the two developments observed in certain dialects - namely initial affrication ([ʧun]), or glide deletion ([tun]), may be interpreted as an effort to reduce opacity. In the first development, Palatalization counterbleeds Glide-Deletion to yield [ʧun]; but in other dialects, Glide-Deletion bleeds Palatalization to yield [tun] as shown below.

	/tyun/		/tyun/
Palat	ʧyun	Gl-del	tun
Gl-del	ʧun	Palat	---
	[ʧun]		[tun]

If it is true that the form [tun] is innovative with respect to [ʧun] (and [tyun]), then this implies a reordering from a counterbleeding to a bleeding order with no gain in transparency (since both forms [ʧun] and [tun] are transparent, as opposed to [tyun]). This type of reordering conflicts with Kiparsky's principle of minimization of bleeding orders (Kiparsky 1968, 1972). We may wonder what may have motivated this marked reordering. I suggest that the marked relation which holds between Glide-Deletion and Palatalization can be explained in terms of the structural strength of certain positions, and in particular by reference to the resistance of word-initial consonants to weakening processes. Thus, if it is true that a word-initial position is a strong position, one of the ways in which this strength may be exerted would be by reordering a pair of rules from the unmarked order to the marked order, so as to bleed the rule promoting weakening. This is presumably what happened earlier in the 19th century to word-initial velars: There is evidence of the phonetic palatalization of both velar stops in initial position in the 18th and 19th centuries (Dobson 1957:952, Wyld 1956:310). This phonetic palatalization was reflected in the presence of the glide [y] following a velar stop. Thus kind, can, get, begin were pronounced [kyæynd], [kyan], [gyet], [bəgyin]. This pronunciation is still attested in Jamaican English [kyat] for cat, [gyadɪ] for garden. However [ky] and [gy] were 'expelled' in the late 19th century, which formally implies the loss of the postvelar glide, so as to prevent further reduction of the velar by palatalization. New sequences of [ky], [gy] as in cue, cute, curious, gules as well as initial labials (few, pew) do not show evidence of such a constraint, which seems to confirm that in Modern English, palatalization is an active process only with respect to alveolars.

(3) Cavity features. In most analyses, velars are considered to be the weakest, thus the most prone to reduce, either by

palatalization, or labialization, or any other way. This proves true in OE, but also widely in the Romance languages, in which both processes are restricted to velars and dentals (cf. Latin fu-gire 'flee', Rum. [fuʃi], It. [fuʃfire], Port. [fuʒir], Fr. [fʏir], Spanish, huir) as well as in Faroese, Turkish, Dravidian, in Finno-Ugric and Samoyed languages, in Tahitian etc.... It is also true that, for English at least, labials seem to be the strongest segments, since in Modern English, both velars and alveolars, but not labials have undergone palatalization. In French and Spanish, velars and dentals have deleted in intervocalic position, but not bilabials. However, it is usually implied that if a weakening process spreads - say, first to velars, then to alveolars, it will continue to affect velars while affecting alveolars -- this is where the English data involving Palatalization show an unexpected diachronic strengthening of velars as opposed to alveolars. There is further evidence that in English, alveolars are particularly sensitive to weakening, the D-Flapping rule is a case in point (see writer [rayDr] in which the intervocalic stop is weakened to the voiced glide [D]). Can it be then, that a language may change in terms of the inherent strength of its segments? The development of palatalization in English suggests that it may. In any event, it seems that the concept of phonological strength should be incorporated in any theory of language change---in the form of hierarchies of segments and environments for example -- because it can sharpen the notion of "persistency" by explaining the varying frequencies and conditions in the occurrence of certain well known persistent rules. For example, it has been shown that a marked reordering which removes and prevents palatalization in initial position can be explained in terms of the inherent strength of initial segments, which thus blocked weakening in this manner. This device occurred at least twice in the development of English. On the other hand palatalization as weakening spreads freely in intervocalic position (as does Flapping) which is thus a weak position. Finally there is evidence suggesting that the inherent strength of certain segment classes can change in the course of a language history. Velars which were the weakest in OE (subject to extensive palatalization and labialization) are now stronger than alveolars. Research in the histories of other languages should indicate whether this shift of inherent strength is a common phenomenon.

FOOTNOTES

*I am grateful to Larry Mitchell for discussing this paper with me. I alone, however, am responsible for whatever error may occur here.

1. See Campbell (1959), Wright (1905) Lass and Anderson (1975) among others, for general information.

2. There is no clear evidence as to the exact phonetic status of < g > in Old English. It is often assumed that Germanic < 3 > was in OE a palatal spirant [y] or a velar spirant [ɣ], depending on the environment. But then a later rule is required to despirantize [y] or [ɣ] in initial position (geese, goose). In this analysis, I assume for clarity of exposition that the historical segments /g/ and /k/ are underlying in a synchronic grammar of OE.
3. < ċ > is the traditional graphemic representation for OE [ç], and < ġ > stands for [ɣ]. Gothic < j > also refers to [y]. The OE grapheme < y > represents the front rounded vowel [y]. I will use phonetic symbols (between brackets) whenever it is crucial to represent the output of a given rule. Otherwise, I will use graphemic forms, as usually given in the literature.
4. See Lass and Anderson (1975) for a similar formulation.
5. The underlying forms are historical forms (Gothic for example) or reconstructed forms (*).
6. Various traditional statements of OE palatalization wrongly imply an ordering paradox in OE by assuming that medial palatals were conditioned by a preceding front vowel, derived or not by i-umlaut, whereas initial velars were not affected by a following umlauted vowel. See for example Campbell's statement (1959:174): "k and g were palatalized after OE front vowels, including those due to i-umlaut..."
7. Another possibility in this case would be to allow Palatalization and Umlaut to apply simultaneously. But deciding on the issue of ordering is not crucial to the point under consideration.
8. The possibility of postvocalic palatalization is represented in the rule given above by the notation ~ $\begin{bmatrix} -\text{cons} \\ -\text{back} \end{bmatrix}$, which implies that the glide or vowel may precede or follow.
9. This further detail is incorporated in the rules given by Lass and Anderson (1975).
10. Wyld (1963:210) who mentions various sources: Marg. Paston (1469); Thos. Pery (1539); Sir Thomas Seymour (1544); Cooper (1685); Alleyne Papers (1593); Jones (1701); Walker (1801) ...
11. The various alternations (t:ʃ/č; d:ž/ĵ) are also accountable in terms of the original status of the borrowed items. Items borrowed with French [s] or [z] later had [ʃ] or [ž] reflexes in English, and French [t] and [d] became [č] and [ĵ] in the palatalizing environment.
12. See Foley (1970), Hooper (1974), Escure (1975) for a discussion of hierarchies in relation to historical change.
13. Grammont (1902), Jakobson (1942), Zwicky (1972), Foley (1970), Escure (1975).

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Push comes to drag: the reflexive
replacement in English

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Many Germanic languages mark reflexivization in the third person by means of a special pronoun: Old High German sih (whence Modern German sich), Old Norse sik, Gothic sik, etc.¹ Presumably, these descend from a pronoun, call it *sik, which served this function in Proto-Germanic. This pronoun makes no appearance whatever in the history of English, Frisian, and Old Saxon. In modern English, the function of marking reflexive coreference has been taken over by the compound pronouns of the himself type. But Pre-English must have had a reflex of the old pronoun *sik at one time. In this paper I will speculate on the mechanism by means of which English lost this simple pronoun and replaced it with the compound pronoun.

Marking intra-clause coreference is a function definable independently of any particular syntactic strategy. Thus, what we want to investigate is the loss of one strategy and its replacement by another of comparable function. The terms push-chain and drag-chain, originally introduced into the study of diachronic phonology by Martinet, can be adapted to the analysis of this replacement. A possible claim is that the himself reflexive somehow came into being to mark reflexive coreference, and that the *sik reflexive, being now redundant and hence pulling no functional weight of its own, withered away. This could be described as a push-chain, in the sense that the independent development of the compound pronoun pushed the simple pronoun into functional redundancy and then oblivion. Alternatively, we could claim that for some reason the *sik reflexive began to be dropped, leaving the function of reflexive coreference unexpressed. The himself reflexive was then developed to fill the need. This would be a drag-chain.² Can we tell which of these processes is responsible for the reflexive replacement in English?

Since there are no written records documenting any stage of English in which the pronoun *sik was still present, our method must be necessarily indirect and inferential. We will search for other languages for which a similar process of the replacement of one reflexive strategy by another can be documented. To clarify the nature of the process we are looking for, I will first summarize a few facts about reflexive

strategies in general.

Subject-object coreference can be marked either by intransitivizing the verb^b or by using a special NP-filler as object. Clearly, both the defunct *sik and the current himself are of the NP-filler type. It happens that reflexives of this type universally cluster into two subcategories, the characteristics of which are summarized in (1):

- | | | | |
|--------|-----------------------------|--|--|
| (1)(a) | Morphology: | Simple pronoun | Compound NP |
| (b) | Antecedent NP: | Must be subject | Need not be subject |
| (c) | Occurrence in oblique NP's: | Must occur in all oblique NP's in the clause | Does not occur in certain oblique NP's |

The compound forms consist at least of a morpheme specifically denoting reflexivization and a separate pronominal element. See Faltz 1976b for a discussion and justification of this typology.

Now, *sik and himself exemplify the two subclasses. Thus, himself pronouns are compound forms all having in common the morpheme self to mark reflexivization. The antecedent need not be a subject, since

- (2) John_i talked to Bill_j about himself_{i/j}

is ambiguous, and

- (3) I talked to Bill_i about himself_i

is possible. And himself is not normally used in certain oblique NP's, such as the one illustrated in (4):

- (4) John_i saw a snake near him_{i/j}

even when that NP is coreferent with the subject of its clause.

That *sik belonged to the other subclass is seen by looking at its modern descendents, such as German sich. Clearly sich is not morphologically a compound. It requires its antecedent to be a subject, so that

- (5) Hans_i sprach mit Fritz_j über sich_{i/*j}
 ("Hans talked to Fritz about himself")

is unambiguous. And it must appear in all oblique NP positions when coreference with the subject of the clause is intended, so that German has two equivalents

of (4), strictly controlled by the reference:

- (6) Hans_i sah eine Schlange neben $\begin{cases} \text{sich}_{i/*j} \\ \text{ihm}_{*i/j} \end{cases}$

Other descendants of *sik exhibit this kind of syntax as well. We assume that this common syntax reflects the situation in Proto-Germanic, making *sik a typical example of a simple reflexive pronoun.

We can therefore specify the English reflexive replacement more narrowly: a simple pronoun reflexive was replaced by a compound reflexive. For the rest of the paper we restrict our attention to cases of this sort.

Now, languages exist in which simple and compound reflexives coexist, a fact which suggests that replacement of one by the other is in progress. One such language is Spanish.⁵ There is a strategy in Spanish which consists of placing the word mismo after an NP. Apparently, this was done originally to signify emphatic attention to the identity of the referent of that NP. However, in certain oblique positions, it has become virtually obligatory when that NP is a pronoun coreferent with another NP in the same clause, as in (7):

- (7) Juan_i le habló a María_j de sí_i $\begin{cases} \text{mismo} \\ \text{?}\emptyset \end{cases}$
 ("Juan spoke to Maria about himself.")

In (7), sí is already a reflexive pronoun. Analogous to Germanic *sik, it appears in the third person only, and requires its antecedent to be a subject. In (7), however, the mismo strategy must also be used, at least in the colloquial style of my informant's dialect. It clearly belongs to the same subclass of reflexive marking that himself does. Morphologically, the resultant NP is a compound form with the fixed morpheme mism- indicating reflexivization. The antecedent is not required to be a subject:

- (8) Juan_i le habló a María_j de ella_j misma
 ("Juan spoke to Maria about herself.")

Finally, mismo is not normally used in certain oblique NP positions, such as the one shown in (4) for English; but we will examine the Spanish for this in a moment.

Sentence (7) illustrates that two reflexive strategies, one from each subclass of NP-filler reflexives, exist in Spanish. But more than that, (7) illustrates

a syntactic context in which the two strategies have applied simultaneously to indicate a single piece of coreference. Such an overlapping context suggests that we are witnessing a push-chain in progress. To determine the direction of the shift, note that the two strategies are not equally weighed. Colloquially, mismo is required in (7), but the reflexive pronoun sí can be replaced by the ordinary nonreflexive él:

- (9) Juan_i le habló a María_j de él_i mismo

Thus, in the context illustrated by these sentences, the mismo strategy is more central to the expression of reflexive coreference than the sí strategy. Clearly, the reverse must have been true earlier; for we know that in Latin times the primary and probably the only expression of the reflexive was the ancestor pronoun of sí, and that this pronoun was obligatory. In fact, the Latin situation was analogous to the one in contemporary German. Therefore, it would appear that in Spanish we have an example of an ongoing push-chain in which a compound strategy (mismo) is ousting a simple pronoun strategy (sí).

In French, a similar process may be seen to have occurred. The ouster of the simple reflexive pronoun has gone farther, though. The French equivalent of (7) would be, in the current language:

- (10) Jean_i a parlé à Marie de { lui-même;
 ? *soi(-même)

the simple reflexive soi being relegated, in oblique NP's, to contexts of coreference with an unspecified subject (and certain other special cases) such as

- (11) On veut toujours parler de soi
 ("One always wants to talk about oneself.")

We can imagine this process continuing still further. The simple reflexive pronoun in French and Spanish might be eliminated entirely if and/or when the compound pronouns take over in all syntactic positions. We would guess on the basis of what we have seen so far in French and Spanish that this is just what happened in English; that is, the suffixation of self became a reflexive strategy which completely pushed *sik out of existence.

However, closer examination of French and Spanish reveals a serious difficulty with the idea that a push-chain is in progress. Namely, there are NP's in which neither the simple reflexive pronoun nor the compound pronoun are used, even though that NP is coreferent with the subject of its clause. The Spanish equivalent of (4) is a case in point:

(12) Juan_i vio una culebra cerca de él_{i/j}

A parallel example can be constructed for French:

(13) Jean_i a vu un serpent près de lui_{i/j}

Another French example is

(14) Jean_i est monté chez lui_{i/j}
("John went up to his place.")

The use of mismo or même in (12) - (14) is not ungrammatical, merely unreflexive. In these cases, the original function of these words reappears: they are used when the speaker wishes to particularly emphasize the identity of the referent. That they do not function as reflexive markers here is not surprising, since we expect compound reflexives not to appear in all oblique NP's (see (1c)). But the absence of the simple reflexive pronoun si or soi is problematic. Recall that such reflexives typically are required in all oblique NP's of a clause when coreferent to the subject, as illustrated in (6) for German. Yet the corresponding pronouns have been dropped in Spanish and French in the oblique positions illustrated above. This cannot have been due to a push-effect from the mismo/même strategy, since these latter do not appear as reflexives in these positions at all. Thus, the problem raised by sentences (12) - (14) has two aspects: (a) a universal of reflexive-type is violated, and (b) the simple pronoun disappeared without being pushed.

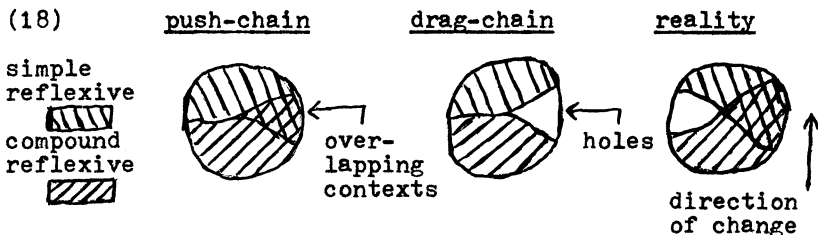
The one clear piece of evidence furnished by Old English data is that functional holes such as were illustrated for Romance in (12) - (14) existed in English as well, and in an even bigger way. Namely, the simple reflexive pronoun has already been lost entirely; yet, the strategy which is to replace it (the suffixation of self to the ordinary pronoun) has not yet taken up full residence in the grammar. The new strategy is either optional or else controlled by unclear conditions, even

in the case of coreference between subject and direct object:

- (15) ic me (selfne) claensie "I purify myself."
 (16) hie forseodh hie (selfe) "They scorn themselves."
 (17) eadmodgiadh eow (selfe) "Humble yourselves!"

The presence of such holes, that is, contexts in which neither strategy has to apply, suggests a drag-chain, of course. If the simple reflexive pronoun disappeared of its own accord, the language would then be in a state of inability to mark reflexive coreference, so the emphatic suffix would be impressed into service to fill this functional vacuum.

But claiming that the replacements in English and Romance are drag-chains raises the symmetrically opposite problem from the one raised by the push-chain hypothesis. Namely, just as push-chains do not leave holes, drag-chains do not lead to functional overlaps, that is, contexts in which the two strategies both apply simultaneously to mark a single function. But functional overlaps do exist, as we saw in (7) for Spanish. The situation is summarized by the diagrams in (18). Push-chains create overlaps, drag-chains create holes, but the situation as actually exhibited in Romance involves both.



A way out of this dilemma is to claim that the replacement began as one of the two processes and then afterwards shifted to the other. Since both processes will have been in effect during part of the replacement, the presence both of overlapping contexts and of holes will be explained.

Now, there are two possibilities. One is that the simple reflexive pronoun began the issue by disappearing on its own in some contexts. A drag-chain effect encouraged the compound reflexive to be developed for use in a subset of these contexts. Then, the spread of

the compound reflexive picked up analogic momentum, causing it to overtake the receding simple reflexive in other contexts where the latter was still used. The second possibility is that the compound reflexive started things off by appearing spontaneously in some oblique NP's, causing the now redundant simple reflexive to be dropped there, in push-chain fashion. Then, it is the disappearance of the simple reflexive which gathers momentum, causing it to recede more quickly than the oncoming compound reflexive. Comparing these two possibilities, we see that we must choose between two sources initiating the change: the loss of the simple reflexive and the development of the compound reflexive. Such a choice can only be highly speculative here, but there are some considerations which can help decide our guess. One is that the overwhelming majority of the world's languages have strategies for marking reflexive coreference. We conclude that reflexives are natural, functionally desirable strategies. It seems unlikely that an established strategy marking such a common function would start to disappear of its own accord without something else already there to take its place. On the other hand, the initial shift of a reference-emphasis strategy to marking reflexive coreference in oblique NP's can be motivated functionally: the coreference marked by a reflexive in oblique positions like the ones in (2), (5), and (9) is pragmatically unusual, hence an emphasis strategy is natural there. We can easily imagine that the association of an emphasis strategy with the reflexive coreference which occasioned it by virtue of its unusualness could be reinterpreted as a primary form-function relationship; that is, the reflexive coreference replaces the emphasis as the function associated with and carried by the strategy. Once reinterpreted in this way, the erstwhile emphasis strategy is free to appear in other reflexive NP's even when no particular emphasis is desired.

I propose, then, that the reflexive replacement in French, Spanish, and English began by the reinterpretation of an emphasis morpheme (French même, Spanish mismo, English self) as a reflexive in certain oblique NP's. The next step is the shift, in those NP's, from the simple reflexive pronoun being the primary mark of the reflexive to the newly adapted emphatic morpheme being the primary mark of the reflexive. This is quite natural: the ex-emphatic has a higher cognitive profile than the more syntacticized simple pronoun. We actually saw such a shift documented for Spanish; re-

call (7) and (9), illustrating the primacy of mismo over si in marking the reflexive. But once the simple pronoun has become redundant, we can presume it began to be optional, and ultimately to be dropped. Now, I further claim that the dropping of the pronoun as a mark of reflexivity in oblique NP's was extended analogically to the dropping of the pronoun as a reflexive marker in other contexts, even where the ex-emphatic was not used.

The evidence from Romance indicates that the loss of the simple reflexive may have progressed by steps along certain lines of weakness. For example, the oblique NP illustrated in (4), namely, a locative phrase with a verb of perception, is never marked for reflexivity by a compound strategy. If such an oblique position is relatively safe from invasion by an oncoming compound strategy descended from an emphatic, it is perhaps because it is a position in which, for some reason, reflexive marking is the least salient. This being so, a simple reflexive pronoun on the wane may be expected to be dropped there before it is dropped in more easily reflexivized NP's. This has already happened in Spanish, as we saw above in (12). We have noted that the non-appearance of si in (12) is exceptional. We can now explain this exception as a result of the stagewise loss-in-progress of that pronoun. French exhibits a more advanced stage of loss, of course. But for Old English it is necessary to postulate that the analogic dropping of the simple reflexive eventually extended to all its contexts of occurrence, and this well before the compound reflexive marked by self was really established firmly. Extreme as this may appear, in the absence of evidence from earlier periods, this scenario seems to be a plausible one.

I close now with two final comments on the scenario proposed here for reflexive replacement. Firstly, in French and Spanish, soi and si are clearly on the way out. However, the reflexive pronoun as object of the verb remains strong and vigorous. Can we really believe that the Pre-English *sik could have been analogically dropped even as object of the verb? I think the key to this matter lies in the fact that verbal object pronouns in Romance are clitics, whereas object pronouns of prepositions are not. The clitic-hood of French se and Spanish se isolates these forms sufficiently from soi and si to protect them from the analogic lever which is otherwise wiping out the simple reflexive. All we need note for Old English is that there was no clitic-non-clitic distinction in the personal pronoun system, so

even reflexive objects of verbs were not immune from loss.⁹

Secondly, there is evidence that self was used as a reflexive marker in prepositional phrases earlier than it was so used in objects of the verb. Sentence (19):

- (19) nu ic thaes tacen wege sweetol on me selfum
("I now carry a sign of it visibly on myself.")

is cited in Visser (1963, Vol I p. 420) as typical of the earliest extant documents, in that self is appended to a pronoun object of a preposition. However, the earliest documents never show self used as a reflexive marker on direct objects; rather, we find the bare personal pronoun used reflexively, as in

- (20) tha getrymede ic me "Then I strengthened myself."

Only later in King Alfred's time do we find optional self with direct objects, as in (15) - (17). This confirms our idea that the shift from emphasis to reflexivity occurs naturally in certain oblique NP's first, and only later spreads to objects of the verb.

Footnotes

1) The forms cited are the accusative case forms. In the dative case we find Gothic sis and Old Norse sér, reflecting Proto-Germanic *siz. Old High German lacked a dative reflexive; the nonreflexive dative personal pronouns were also used reflexively. Thus, Old High German partook of the beginnings of the loss of *sik, which loss, carried to completion in English, is the subject of this paper. But later, High German generalized the accusative reflexive sich to the dative as well.

2) We should note that the situation in syntax is not the same as in phonology. In the study here, there is no question of a distinctive opposition being threatened by encroachment, as there is in the case of a vowel drifting towards another vowel. Rather, the push-effect is that of forced redundancy, resulting in the eventual loss of the strategy made redundant. Similarly, the drag-effect is the filling of a functional vacuum rather than a drift due to the removal of the need to maintain a distinctive opposition.

3) As an example of verb-intransitivization as a reflexive strategy, consider the following sentences from Lakshota:

- (i) John Mary aeyokas'in "John peeked at Mary."
- (ii) John aeyoic'ikas'in "John peeked at himself."

The morpheme -ic'i-, put in the appropriate slot of a transitive verb-complex, makes that verb syntactically intransitive and semantically reflexive.

4) There is some evidence for a historical hierarchy; (i) compound reflexive, (ii) simple pronoun reflexive, (iii) verbal reflexive. A strategy more towards the head of the list tends to push a lower one out of existence. The replacements discussed here all exemplify one of the possibilities of this. Further discussion may be found in Faltz 1976b.

5) I wish to thank Andrés Gallardo for the Spanish data, and Michèle Gans for assistance with the French data.

6) The form mismo is masculine singular. This automatically rules out María as an antecedent in (7). However, if we change María to Pedro, (7) remains unambiguous, due to the subject-antecedence property of si.

7) There may be a way of listing oblique NP's according to how difficult it is for a compound reflexive to appear in them. In general, compound reflexives appear very easily in about-phrases, as in (10); they never appear in locative phrases with verbs of perception, as in (12). The directional phrase in (14) is intermediate.

8) The use of sí instead of él in (12) is still acceptable, but considered bookish. The loss is thus not quite complete.

9) It is interesting to note that before the syntactic conditions controlling the clitic-nonclitic distinction in French pronouns became frozen, it was possible to get compound reflexives (optionally) as direct objects. An example (Thirteenth Century):

- (i) les fames honissent et avilenissent eles meismes
et tout lor lignage
("The women dishonor and degrade themselves and
their whole estate.")

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EQUI-SUBJECT CLAUSE UNION

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Many languages (generally labeled "polysynthetic") exhibit complex verbs in which the subjects of the underlying predicates realized in the verb complex must be understood as coreferential. Examples from a few languages follow:¹

Micmac (Algonkian)

- (1) getu-liey-Ø 'I want to go.'
 want-go-1
- (2) getu-lie-n 'You want to go.'
 want-go-2

Blackfoot (Algonkian)

- (3) nít-ssáak-a'po'taki
 1 - try - work 'I tried to work.'

Southern Tiwa (Tanoan)

- (4) te-nakiani-beow-a
 1 - arise-want-pres 'I want to get up.'

Japanese [Kuno 1973.138]

- (5) John wa nihongo o hanas-e-ru
 J. topic Japanese obj speak-able-pres
 'John can speak Japanese.'
- (6) Boku wa gohan o' tabe-ta - i
 I topic meal obj eat-want-contin
 'I'm anxious to eat a meal.'

Túbatulabal (Shoshonean) [Voegelin 1935]

- (7) wá'hay-íba'-át
 work-want-pres 'He wants to work.'

Eskimo [Webster 1968]

- (8) tautuk-kumiñak-tupa
 see -able- indic:1 'I can see.'

Lahu (Tibeto-Burman) [Matisoff 1973]

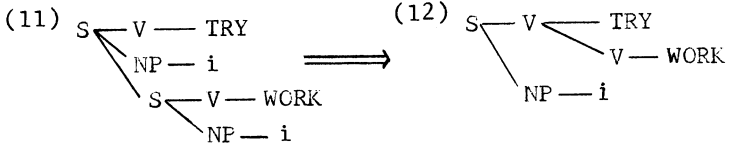
- (9) mâ- tǝʔ -e- gâ
 neg-out-go-desid 'I don't want to go out.'

Capanahua (Panoan)

- (10) haa ta ho - kaci'ki -ipi- š -ki
 3 decl come-want-past- 3-decl
 'He wanted to come.'

There is generally good reason to derive such

single-clause structures from complex underlying structures which contain a sentential complement. For example, Blackfoot (3) is assumed to arise from a structure like (11):



(12) then arises by deletion of the downstairs subject by Equi-NP deletion (henceforth 'Equi'), followed by predicate raising and pruning to give a single clause structure with a complex verb.

Recently, relational grammar (RG) has replaced predicate raising by clause union, which consolidates clauses in one step. However, it has still been assumed, I believe, that Equi applies in a structure such as (11) before the union is formed.²

However, of the languages from which the illustrations above are drawn, those with which I have had some experience show no evidence for the operation of Equi into complements other than those which are consolidated with the matrix clause. Here I distinguish between a structure-affecting rule of deletion (Equi) and the constraint against repetition of coreferential NPs that is the functional equivalent of obligatory pronominalization. Thus while (13) has only one occurrence of *nóta'sa*, there is no more reason to say that an NP has been deleted in the complement of (13) than to say one has been deleted in the purpose clause of (14) or the "adverbial" clause of (15):

- (13) *iikstaa-wa n-óta's -a m-aáxk- sooy'-ssi*
 want - 3 my-horse-3 3-might-eat - conj
 'My horse wants to eat.'
- (14) *nit-sstsipíss-aawa n-óta's-a m-aáxk-it-okska's-si*
 1-whip-3 my-horse-3 3-might-then-run-conj
 'I whipped my horse so he would run.'
- (15) *iixt-omatap-okska'si-wa n-óta's-a nit-sstsipíss-*
 result-begin-run-3 my-horse-3 1-whip-3
 aa-xsi
 conj
 'My horse began to run because I whipped him.'

Observe that in all three examples (13)-(15), the subordinate verb still agrees with the third person NP *nóta'sa*.³ The lack of repetition of *nóta'sa* in (14) and (15) is the Blackfoot functional equivalent of

English pronominalization (Frantz 1971:127), and the same constraint accounts for the single occurrence of nóta'sa in (13).

Because languages like Blackfoot make no use of Equi in sentences such as (13), we are forced to restrict application of Equi to just those derivations in which the following step is clause union. On the other hand, if we make the collapsing of coreferential subjects a consequence of clause union, no such special constraint need be added to the grammars of these languages. Thus I propose that in addition to other changes clause union accomplishes, it collapses coreferential subjects into one,⁴ the resultant NP functioning as subject of the resultant verb complex. In what follows, I will use the term Equi-subject Union to refer to such clause unions.

Variations on Equi-subject Union (ESU)

When comparing the output of ESU in different languages, we find at least two important ways in which they differ. First of all, the component predicates may combine to form one surface structure word, as in (1)-(10), or remain separate words as in the Zuni example which follows:

- (16) ho' ido-n iha
 1:subj eat-sub want/intend:pres
 'I want to eat.'

(The claim that the derivation of (16) involves clause union rather than simple Equi is based primarily on differences between such examples and those with complements which clearly retain their clause status in Zuni.⁵ Hopefully, it will not be necessary to recognize a "quasi-clause" (Postal 1974) status in Zuni.) This difference between combining the two verbs as one word or leaving them as two words is, of course, paralleled in causative unions; cf. Turkish (17) and French (18) causative unions (examples from Aissen 1974):

- (17) Hasan kasab-a et-i kes-tir- di.
 H. butcher-dat meat-accus cut-caus-past
 'Hasan had the butcher cut the meat.'

- (18) J'ai laissé chanter l'hymne à Jean
 I:have let sing anthem dat J.
 'I let Jean sing the anthem.'

And if I am correct in considering Zuni (16) to be an example of clause union, then we cannot even say that any given language will treat all clause unions alike with respect to one-word vs. two-word verb output, for Zuni causative unions give a single word complex verb:

- (19) Aktsek'i bitsu:di-ya' mi'l ido-k'ya-kkya.
 boy pig-obj corn eat-cause-past
 'The boy caused the pig to eat the corn.'

The second and heretofore largely unrecognized way in which the output of ESU can differ from language to language involves a set of properties which can perhaps all be lumped under the question, "Which predicate remains 'live'?" According to Perlmutter (lecture, summer 1975), the downstairs predicate in causative constructions such as the French example (18) above has become a 'dead' verb; among other things, this is said to be responsible for the fact that the clitic le in (20) cannot immediately precede boire but must precede the 'live' verb laisserai, even though the same clitic can immediately precede boire in (21) which has not undergone clause union:

- (20) Je le laisserai boire à Claude.
 'I will let Claude drink it.'

- (21) Je laisserai Claude le boire.
 [same meaning as (20)]

I am reasonably confident that for causative clause unions, the upstairs predicate (CAUSE, ALLOW, etc.) will universally be live after union. And I think the terminology ('live' vs. 'dead' verb) is useful even for those cases where the two predicates combine as one word, as we shall see next.

To show this, we concentrate on one major feature of clause structure, transitivity, in two representative languages, Micmac and Southern Tiwa. Each of these languages has both transitive and intransitive inflectional paradigms. Looking first at Micmac, we compare a few forms of an intransitive verb (22), and a transitive verb with animate object (23):

- | | | |
|------|----------|-----------------|
| (22) | liey | 'I go' |
| | lien | 'you go' |
| | liet | 'he goes' |
| (23) | pema:lk | 'I carry him' |
| | pema:lul | 'I carry you' |
| | pema:lit | 'he carries me' |

And we find that when such verb roots are combined with getu- 'want' the resultant complex verb retains the transitivity of the downstairs verb; thus (24) shows intransitive inflection and (25) has transitive affixes:

- (24) ketu-liey-Ø 'I want to go.'
 want- go-1

- (25) ketu-pma:1-k
want-go-1:3 'I want to carry him.'

Turning now to Southern Tiwa, we first compare an intransitive verb (26) with one that takes affixes from the transitive set (27):

- (26) te-iani-hi
1-arise-future 'I'll get up.'
(27) ti-diru - tuwi-hi⁶
1:3-chicken-buy-fut 'I'll buy a chicken.'

But when we combine these with 'want', the resultant clause union has an intransitive verb in both cases, at least with regard to the affixes it takes:

- (28) te-nakiani - beow - a
1 - arise - want-pres 'I want to get up.'
(29) te-diru-kum- beow-a⁷
1 -chicken-buy-want-pres
'I want to buy the chicken.'

A check on sentences containing beow 'want' without clause union indicates that it always takes the intransitive set of affixes; e.g. (30):

- (30) te-nabeow- a i a-diru - tuwi -hi-'i
1-want-pres 2 2:3-chicken-buy-fut-sub
'I want you to buy the chicken.'

So it is the upstairs predicate, in this case beow, which determines transitivity in the Southern Tiwa clauses formed by ESU. (And so far as I have been able to determine, this is true of all cases of ESU in the Tanoan family.)

We can account for this difference in output of ESU, i.e. upstairs verb determines transitivity in some languages (e.g. Tanoan) while the downstairs verb determines union transitivity in others (e.g. Algonkian), if we say that in the former the upstairs verb remains live, while in the latter the downstairs verb remains live.

Of course there will be other properties of live verbs as opposed to dead ones, especially when they remain as separate words. For example, referring back to Zuni (16), we see on the basis of which verb is marked for tense, ESU leaves the upstairs verb live in that language.

Surface Order

The kinds of derivations and surface relations that arise within RG offer hope that surface word order can be predicted by both language particular and uni-

versal ordering principles which make reference to RG concepts such as subject, direct object, indirect object, *chômeur*, dead verb, etc. (Perlmutter lecture, summer 1975).

Of the languages represented in (1)-(10), all but Micmac and Blackfoot are verb-final languages, and so an expected correlation of greater scope with 'later' in the sentence (i.e. there is an inverse relation between linear precedence and scope) would correctly predict that an upstairs predicate would occur later in the sentence than a downstairs predicate. In Algonkian languages, as in English, higher scope generally is directly related to linear precedence. Thus we would expect on this basis to consistently find the upstairs predicate occurring earlier in the sentence than the lower predicate; and this is what we found in Blackfoot (3) and Micmac (1), (2), (24), and (25). So thus far it looks as if the relation between scope and order is universally preserved after clause union.

However, Blackfoot causatives are an exception to this statement, as we see in (31):

- (31) nít-sooy-áttš-aawa n-oxkó-wa
 1 - eat-cause- 3 1-son-3
 'I made my son eat.'

Recall that it is apparently universally true that in causative unions the upstairs predicate remains live, while in Algonkian ESU the downstairs predicate remains live. And for Blackfoot, at least, this difference between causative and Equi-subject unions corresponds to a difference between surface orderings which have the upstairs predicate following or preceding the downstairs predicate. Thus it looks as if a general principle for Blackfoot can account for both the ESU and causative union verb orderings: a dead verb is positioned to the left of, and attached to, the live verb.⁸

The intersection of ESU and causative union

Thus far I have discussed ESU in contrast to causative union. But certainly causative sentences which meet the equi-subject constraint are semantically possible:

- (32) 'I made myself work.'
 (33) 'He made himself eat.'

Yet the expected Blackfoot equivalents are unacceptable:¹⁰

- (34) *nít-á'po'taki- áttš-ooxsi
 1 - work-cause - reflex

- (35) *á-ooyi- áttis- ooxsi-wa
dur-eat-cause -reflex-3

I have been unable to elicit any reflexive causatives in Blackfoot. This could conceivably be due to some aspect of the meaning or presuppositions of *-attsi* which I do not understand, but if not, the lack of reflexive causatives in Blackfoot might be explainable in terms of a conflict between two principles proposed in this paper. I have said that with causative unions, the upstairs predicate remains live, while with ESU the downstairs predicate remains live in Blackfoot. But with a causative that involves coreferential upstairs and downstairs subjects, the two principles require conflicting outputs. The Blackfoot resolution of this conflict may just be that there is no acceptable output (and hence such situations must be expressed in Blackfoot by other than the causative construction).¹¹

Summary of tentative conclusions

Unlike causative clause unions, in which the upstairs predicate (CAUSE) universally remains the live verb, Equi-subject unions will leave either the upstairs or downstairs predicate live, on a language-specific basis. The relative surface order of this live predicate and the dependent dead predicate will be determinable by general principle for a given language. The syntax (transitivity, inflection,⁹ behavior with regard to subsequent syntactic processes, etc.) of the resultant clause will be a function of the live predicate.

NOTES

1 Greg Thomson has contributed indirectly to this paper through discussion of its topic with me, especially where Blackfoot is concerned, as well as directly by comments on the paper itself.

The sources of data are indicated by accompanying reference, or were generously provided by the following researchers: Micmac from Watson Williams; Southern Tiwa from Barbara Allen; Capanahua from Eugene Loos; Zuni from Curtis Cook. Blackfoot data are from my own and Greg Thomson's research. Abbreviations used in the glosses include: obj = objective case; dat = dative case; accus = accusative case; 1 = speaker; 2 = addressee; 3 = third person; decl = declarative; indic = indicative; neg = negative; desid = desiderative; sub = subordinator; pres = present tense; fut = future; contin = continuative.

2 This was the course followed in Frantz 1971, where

a rule called "proposition consolidation" was preceded by the equivalent of Equi.

3 The conjunct (conj) inflection is used in non-suppositional subordinate clauses (Frantz 1971.26-28); coreference plays no role in its distribution.

4 I would make the same kind of claim for unions in which the downstairs subject is coreferential with the upstairs object, but they are beyond the scope of this paper.

5 Unlike complements of iha, complements of predicates without the 'like-subject' constraint: 1) can be extraposed; and 2) show no evidence of Equi when upstairs and downstairs subjects are coreferential.

6 Non-human object noun incorporation is apparently obligatory. But note that the verb still requires transitive prefixes agreeing in class and number with the object (Allen and Gardiner, in preparation).

7 A number of verbs have suppletive allomorphs when combined with other verb roots; in this case tuwi ~ kum 'buy'. This is how I choose to treat beow ~ nabeow in (29) and (30), though it is possible that the na of (30) is an incorporated dummy (note that the object complement is extraposed).

8 This is reminiscent of a more general proposal made by Greg Thomson (personal communication) before he had heard of RG's clause union rule. An alternative hypothesis, also proposed by Thomson (about 1973), which could account for the position of the causative suffix in Blackfoot is that all (but not only) morphemes which are of derivational effect are stem-final in Blackfoot.

9 A methodological note: Where number is signalled by suppletion in the verb, this is not a reliable test of whether or not that verb is live, for current research in Zuni and the Tanoan languages indicates that such verb allomorphy makes reference to the arguments (terms) of a predicate before union or any other process affects the underlying grammatical relations.

10 Some reflexives of causatives do however seem to be understandable, in the sense that hearers can tell me in English what I seem to be trying to communicate. E.g. on hearing (34), one person responded with "You mean you employed yourself?".

11 After this paper was completed, Greg Thomson found that his informant accepts reflexive causatives as possible Blackfoot constructions. So for that speaker at least, the causative union principle takes precedence

over ESU.

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STRUCTURE AND FUNCTION IN PHONOLOGY - A SYSTEMS VIEW
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Romuald Schild of the Polish Academy of Sciences and a scholar of Stone Age prehistory of Europe has recently pointed out the increasing contemporary need for the integration of all scientific knowledge. (Schild, p. 100). Roman Jakobson has specifically emphasized that 'the relationship between linguistics and the adjacent sciences awaits an intensive examination' and notes that this idea had already been expressed by Edward Sapir in 1928. Jakobson comments that the 'problem of interrelation between the sciences of man appears to be centered upon linguistics' because of the 'unusually regular and self-contained patterning of language and to the basic role it plays in the framework of culture.' He further remarks that since linguistics is recognized as the 'most progressive and precise among the sciences of man,' it stands as a methodological model for the social disciplines. (Jakobson, pp. 25ff).

In addition to the close relationship between linguistics and such disciplines as anthropology and psychology, Jakobson notes the striking similarity between the structures of language as an informational system and the genetic code as an information-carrying system: both are based on discrete components 'which, by themselves, are devoid of inherent meaning but serve to constitute the minimal senseful units, i.e., entities endowed with their own, intrinsic meaning in the given code.' (Jakobson, p. 50). These structural similarities are attributed to the consistently hierarchical design of the respective messages as their fundamental integrative principle. Jakobson's observation is a stimulating one: if the similarities between the genetic and the linguistic codes are due to the hierarchical design of their respective messages and not to the physical structure of the messages themselves - as must be the case since the genetic code is chemically defined and the linguistic code is ultimately acoustically defined - then we must be concerned with the properties of hierarchical structure and organization as such, without reference to specific structural details of the systems we are comparing.

Although Jakobson claims that the scientific study of linguistics lies at the intersection of the physical/biological sciences on the one hand and the social sciences on the other, i.e., that linguistics serves as the interface between them, the proliferation of studies into the nature of hierarchies and complex systems has not centered specifically around linguistics. Rather, the consensus of opinion which is rapidly forming with respect to the general systems theory of hierarchical organization has by-passed linguistics and has been developing instead in the areas of subatomic and astro-physics, chemistry, biology, sociology, economics, computer science, education, and psychology. For instance, a symposium on hierarchical structures was held in November, 1968, at the Douglas Advanced Research Laboratories in Huntington Beach,

California, and included scientists from the areas of astro-physics, biology, philosophy, sociology, computer science, and education. The science of linguistics was not represented. Other examples of the lack of participation in current dialogues involving hierarchical or general systems theory by linguists can be mentioned, even though scientists in other disciplines regularly use linguistic terminology to convey their ideas. If linguistic science is to lead the way in theory and methodology for all the other sciences, we must see to it that it hurries to the head of the line and finds out where everybody is going.

Hierarchy or general systems theory concerns the questions of how complex systems are organized, the relation between structure and function of the same system, and the properties of complex systems in general. Although hierarchical organization of linguistic structures has been recognized for some time, I believe that the currently developing theories regarding the relationship of structure and function in complex systems is of immediate and fundamental importance to linguistic theory, particularly in the field of phonology.

One of the most important conclusions that general systems theory has come to is that the structure of any system cannot be derived from a knowledge of its functions nor the functions from a knowledge of its structure. A simple analogy or two should make this clear: if we confine a gas in a closed chamber, we can measure the pressure of the gas, yet the force we define as pressure is not the result of adding together the individual pressures of the gas molecules since each particle as such does not have pressure, only random motion. Again, suppose that you are caught in a traffic jam. You cannot define a traffic jam except in terms of the interactions of a number of vehicles taken as a whole; the traffic jam does not exist as a trait of the individual driver or vehicle nor of the interaction of any two vehicles such that the sum of these traits would equal the 'traffic jam.' The traffic jam is a property of the entire collection of vehicles which emerges when a particular level of vehicle interaction occurs.

The most common and concrete concept associated with hierarchical organization is the concept of discrete but interacting levels. We may conceptualize this idea by using Herbert Simon's metaphor of a set of Chinese boxes of a particular kind: 'opening any given box in a hierarchy discloses not just one new box within, but a whole small set of boxes; and opening any one of these component boxes discloses a new set in turn, but while the ordinary set of Chinese boxes is a sequence, or complete ordering, of the component boxes, a hierarchy is a partial ordering - specifically, a tree.' (Simon, p. 5). The problems associated with the levels concept include: what generates these levels? Why are the levels discrete? What separates the levels? What couples them together? In sum, what is the character of the interface between levels, how does it function, and how does hierarchical control operate between levels? We must be particularly interested in these questions since, as pointed out by Benveniste, 'a

linguistic unit may be conceived as such only insofar as one can identify it within a higher unit.' (Quoted in Jakobson, p. 51).

The problem of structure and function can be stated as one of alternate descriptions of the same phenomena, analogous to the equations of quantum physics where the position and the velocity of a particle cannot be simultaneously determined but the relationship between these two possible descriptions is expressed by the Heisenberg Uncertainty Relations. The nature of alternate descriptions can, therefore, be restated as static and dynamic descriptions of the same phenomena which are complementary.

The dynamic description of a system which is self-maintaining defines the relationships of the first-order components of that system; that is, the set of boxes we see when we open one of our Chinese boxes. The first-order components themselves, while each may contain another set of boxes, are necessarily treated as stable units. We may call this a single level of organization. The relationships of the first-order components, however, require adaptive interaction to qualify as a system. Their interactions are conservative in that their constant mutual adaptation results in an equilibrium which allows stable properties of the system as a whole to emerge. The maintenance of these stable properties allows the system to be treated as a stable unit, functioning as part of the internal mutually adapting structure of the next higher level of organization in a complex system composed of nested systems. In this way, an element can be treated as an independent integrated system at one level and simultaneously as an adaptive part of the internal structure of another system at the next higher level of organization.

If the first-order components exceed two in number, their interrelationships in terms of mutual adaptation in the context of the entire system can only be understood mathematically in terms of pairwise interactions. In fact, it has been shown that a set of differential equations representing the changes in the internal interactions of a system cannot be added together to arrive at the pattern of change in the system as a whole. That is, it can be mathematically shown that the system considered as a whole is not reducible to the simple sum of the properties and functions of its parts since the equation which describes the changes in the system as a whole is different in form from the set of equations for the changes in the internal interactions. (Laszlo, 1974, p. 212).

The description of the dynamic interactions, then, constitutes the dynamic description of a system while the description of the properties of that system taken as a whole represents the static description of the system.

To make these abstract statements clearer, let us consider the analogy of a marriage. Within a marriage the relationship of the two partners in terms of dominance may vary, depending on circumstances, but will reach a stage of relative equilibrium and we can speak of a 50-50 marriage, a 60-40 marriage, or even a 90-10 marriage. At all times the sum of the dominance percentages is equal to 100% but the properties of the marriage taken as a whole

cannot be derived from knowing the ratio of dominance. A master-slave relation such as the 90-10 marriage may be a peaceful one or an angry one but we can't predict which it will be.

The fact that we add together the relative dominance percentages to arrive at the total of 100% or unity reflects the reason for the cohesiveness of such a relationship: the mutual adaptations which result in equilibrium are undertaken in terms of a larger unit whose integrity must be maintained. If each partner did as he or she liked without reference to the other, we would not have a mutually adaptive relationship, that is, no real marriage would exist. The familiar phrase, the 'give-and-take of marriage' reflects the common understanding of this kind of internal structure of an external unity.

The static description defines the properties of the whole system in terms of which it may participate as part of the structure of the next higher level of organization. For example, our married couple may be considered by the law as a unit for tax purposes: the total income of a marriage may be taxed at a rate different from that for the total income of a single person. At this level of organization, the law ignores the internal relationships established by the marriage partners in terms of which earned more money than the other. If the law could not ignore such details of structure, it could not organize its tax system hierarchically since every income-earning individual would have to be considered simultaneously in terms of his or her financial interactions with every other individual in the system which the tax law governs.

Hierarchical organization involves two kinds of structure: internal structure or the relationships between components at a single level, and external structure or the relationships existing between levels. Hierarchical organization allows the progressive integration of many simpler systems into fewer and fewer but more and more complex systems and presupposes at every level the stability of the units which make up its nested internal systems. Such an organizational scheme allows for partial internal restructuring without destroying the entire complex system. Thus, when we have opened the lowest level of Chinese boxes, we will have a great many elements but the integration of these elements into larger and fewer sets will contribute to the stability of the system as a whole since we can decompose a box at any level into its component boxes without destroying the system.

For example, if our married couple decides to dissolve their marriage, they have in effect decomposed the marriage unit into its component parts, two individual people, which we may regard as the lowest level of organization in terms of the law. However, the dissolution of a marriage - that is, a loss of a level of organization - will not destroy the social system which the law governs since the decomposition of the marriage into its component parts affects only that subsystem, and its component parts merely descend to the next lower level and increase that level's population and their interactions.

If we must consider that a change of any component at any level of a complex system will directly affect every other component, we do not have a hierarchical complex system at all but a simple one with a great many interacting components at one level of organization. The more levels of organization within a complex system, the more stability it will have. In fact, the stability of the American political system can be attributed to the many levels of organization it contains: city, county, district, region, state, and nation.

A component of any system may simultaneously function as a component of other systems and will be constrained to adaptive interaction in those other systems. For instance, the husband of our married couple may simultaneously be a member of a professional organization, an office worker, a community leader, and a father. In all of these situations, he must make adaptations in order to maintain relationships. We will require different system descriptions for each activity that the husband engages in. This kind of simultaneous participation in a variety of separate distinguishable activities in separate distinguishable systems is characteristic of biological systems with their stratification into many levels of organization (Rosen, p. 59), and reminds us of the similarities which Jakobson and others have observed between biological and linguistic structures.

It may appear from the foregoing that I am stating the obvious and that linguistic theory has incorporated the insights of hierarchy theory, especially in the generative approach to linguistic analysis. It is certainly true that transformational grammarians propose a tree structure as a model for representing the grammatical relationships in a sentence and each bifurcation can be understood as an organizational level. However, the only structure that is considered is the external one, i.e., the relationships between levels, and does not provide for a way of understanding and representing the relationships of components which interact at the same level of organization.

Langacker has recently noted that transformational theory regards all the clauses in a tree structure as comparable in function. He has, accordingly, proposed the concept of functional stratigraphy which claims 'that the clauses or propositions of a sentential structure differ in function in a way that correlates with their relative depth of embedding, or stratigraphic layering.' (Langacker, p. 2). Langacker's proposal for a hierarchically organized semantic structure is appropriate since external descriptions can only be functional ones, not structural. (Rosen, p. 51).

Similarly in phonological theory the generativists do not allow for considering the interrelationships of elements at the same level of organization nor the possibility of systematic hierarchical structuring of the phonological component. The theory of natural classes based on the intersection of the distinctive features does form a hierarchy but only a taxonomic one since it merely postulates a system of elements held together by the inclusion relation and does not consider the aspects of dynamic interaction which

must be present by definition if a true system exists. The Chomsky/Halle approach to phonological analysis assumes a simple set of fundamental components, the distinctive features, and describes their distribution by means of phonological rules which may be read as either process statements or distribution statements. The device of the abstract underlying representation reflects the resolution of conditioned and unconditioned elements to the unconditioned member, and the ordering of the phonological rules is an attempt to combine the methodology of internal reconstruction which infers chronology in sound change with the effects of analogical restructuring, even though these two kinds of phonological change take place on entirely different bases: true sound change takes place on the basis of phonetic interactions while analogical change takes place on the basis of morphological functions.

When generative grammar was first proposed, it was assumed that a parallelism in structure existed between the syntactic component and the phonological component: each included a base or deep structure level which was related to its surface structure level by a set of ordered rules. Apparently in the interests of what was considered to be an appropriate index of simplicity, it was proposed that the number of significant linguistic levels should be reduced to two: the base or underlying level and the surface level. All intervening levels that might be created by the actions of the rules were specifically designated as linguistically insignificant. The interfaces between the semantic component, the syntactic component, the phonological component, and the phonetic component were not elegantly thought out and the difficulties of locating the division between semantics and syntax are currently of major interest. In phonology the readjustment rules which appear to function as the interface between syntax and phonology are also a source of difficulty. The most famous result of abolishing levels of organization in the phonological component was the destruction of the autonomous phoneme. Since all later phonological theories which have been proposed are derivatives of the Chomsky/Halle hypothesis, it will be useful to consider the basic assumptions of that theory.

The first basic assumption that distinctive features may be determined on the basis of acoustic and/or articulatory criteria without reference to a specific language system is equivalent to saying that the function of a particular kind of speech sound can be determined from its structure alone. This assumption contradicts the findings of every other scientific discipline, all of which agree that structure and function are incomparable and the one may not be derived or inferred from the other. In general, the error of this assumption has not caused major difficulties in analysis although a number of scholars have observed that various aspects of the distinctive feature theory are inadequate or force the writing of unnecessarily inelegant and clumsy rules. It is more likely that the distinctive feature system as proposed has instead limited the kind of phonological problems which can be solved with it. Y. R. Chao in his famous 1934 article has clearly

presented the arguments against assuming that there can be distinctive speech elements - whether phonemes or distinctive features - which can be determined independently of any specific language system.

Although generative phonology when it was first proposed seemed to offer an elegant and fruitful method for understanding and solving phonological problems, it has come under increasing attack from a number of scholars. Where the difficulty lies is not at all clear: the problem has been sought in the depth of the underlying representation, in the nature of rule ordering, in the formalism proposed, and in the nature and number of distinctive features. These difficulties indicate that the theory as a whole has a more basic flaw. Unless we can locate that flaw and remedy it, we are in danger of seeing phonology as a field of inquiry dwindle into a sterile and trivial exercise.

Chomsky and Halle's assumption that simplicity of structure, that is, reduction of levels, is equivalent to simplicity of organization is again equivalent to saying that the function of any entity can be derived from a knowledge of its structure. The device of organizing a set of components by means of ordered distribution statements is a particularly inefficient method of accounting for relationships. This was the early method employed in computer programming when it was thought to be the most economical approach to the problem of information storage and retrieval. However, it became increasingly clear that a more efficient method must be developed and computer programming is now being done on a module basis, essentially a hierarchical organization of components which can be partially decomposed and reprogrammed without having to search through the entire set of ordered instructions and having to consider the interrelations of all those instructions at one time. This new approach is called 'structured programming.' From this example, we may suspect that a far more efficient way of organizing the phonological component would be to postulate as many intermediate levels of organization as possible in order to allow for partial restructuring without endangering the system of relations as a whole and in order to ensure the greatest possible stability of the system. One of the continuing complaints, in fact, has been that generative phonology does not provide a way of accounting for the syllable and the disyllabic sequence as phonological units, both of which would represent progressively integrated intermediate levels of organization. (Grundt, Lehiste)

One way of demonstrating the need for assuming intermediate levels of organization in the phonological component would be to show that the assumption of self-maintaining subsystems with internal structure in equilibrium and external adaptation to co-occurring subsystems will allow the solution of formerly insoluble problems and can integrate and account for sound changes which were thought to be unrelated and unmotivated.

I have argued at length elsewhere (Grundt 1973, 1974, 1975a, 1975b) that open syllable lengthening in Germanic languages was

motivated by the need of a disyllabic sequence to maintain its integrity as a speech timing unit by means of compensatory internal durational adjustments: when the second vowel of the disyllabic unit was shortened and reduced, the first vowel increased in duration in proportion, thus changing the internal structure of the disyllabic sequence but allowing the maintenance of the sequence as a timing unit. In other words, the durational ratio between the vowels changed by compensatory mutual interaction of co-occurring entities at the same level of organization. At the same time the lengthening vowel considered as a unit with particular functional properties was in danger of losing its functional ability to contrast with the old long vowels in open syllables, a function required by the morphological system. But the means by which the change in durational ratio with the second vowel was implemented, that is, by the formation of a falling centering diphthong, also functioned as a means of differentiating the lengthening vowel from the old long vowels. The old long vowels, in their turn, reacted simultaneously to the lengthening vowels by mutually adapting reciprocal formation of rising diphthongs. This can be analyzed at every point as a set of pairwise interactions, each of which has two different aspects: in terms of the first change, the second change is a reaction, but in terms of the third change, the second change is an innovation; and this chain of interactions can continue until an equilibrium within a larger system is established. Also, at every point the changes can be defined in terms of both dynamic interactions and functional contrast, thus satisfying the general systems hypothesis that every system has two descriptions, a structural and a functional one. Furthermore, since the final vowels in disyllabic sequences were reduced to schwa, they thus lost their contrastive function in that position. But the morphological system required that contrast of short vowels in final position since its inflectional system was based on it. The loss of this functional ability to contrast in final position was catastrophic in English: during the Middle Ages the entire grammar changed, all inflectional morphemes except consonantal ones were lost and word order became far more rigid in compensation, thus illustrating that every higher organizational level must have stable units comprising every lower level in order to remain stable.

Another reason to suppose that the short vowels and the long vowels form related but self-maintaining subsystems within the vocalic component is the fact that, when the morphological system no longer required the old contrast of long and lengthened vowels in open syllables, they merged in the long system. However, the lengthened vowels did not merge with the long vowels to which they corresponded in former long-short alternations as in wild/wilderness, ride/riden but with those vowels which were one vowel height lower. Acoustic studies in modern Faroese and Cologne German have shown that the short vowels are not merely slightly lower and centered versions of the long vowels but actually coincide in their formant patterns with the long vowels one degree

lower: /i/ = [e], /e/ = [ɛ], /ɛ/ = [æ]. This means that the long and short vowels which had the same function in their respective systems had drastically different phonetic realities: the iso-functional members were not phonetically equivalent and, therefore, the functional and structural descriptions of the same set of formant frequencies were different.

It is clear that this analysis agrees with the general systems theory of hierarchical organization in complex systems since the changes were motivated by the need to maintain the integrity of a larger unit, they were implemented by mutually adapting interactions, the functional and phonetic descriptions of the same phenomena were different, and finally the changes can be analyzed as pairwise interactions at every point. This approach allows the motivation and interrelation on both phonetic and functional grounds of open syllable lengthening, long vowel diphthongization, and vowel height exchange. Neither the motivation nor the interrelatedness of these changes can be accounted for in generative phonological theory because that theory does not provide for intermediate levels of organization nor any means of understanding and describing the interrelations of components occurring at the same level of organization. It is obvious that, if a particular entity has a different description for its structural and its functional correlates, it cannot be described with one system of distinctive features. Such features can only describe the functional aspect. The phonetic reality of these functional features must be separately determined and specified. Historical linguists have always assumed this to be true.

The assumption of intermediate levels of organization and adaptive interrelated subsystems at each level will account for all the changes that are accounted for in generative phonological theory, will restore the autonomous phoneme to a respectable place in the hierarchy, and can account for and interrelate sound changes that have been unrelated and unmotivated before. It also demonstrates the crucial need to keep functional and structural descriptions distinct since each element has a functional and a structural description which are different and non-comparable. The ignorance of this fundamental fact is the source of all the difficulties with the generative theory: in distinctive features, in reduction of levels, and in the theory of rule ordering.

Finally, the general systems theory of hierarchical organization satisfies the scientific criteria of simplicity since the organizational principle is very simple, yet can result in ordered and highly complex systems. The principle is essentially this: in conservative self-maintaining systems, the systems functioning as wholes on one level function as parts on the higher levels, and the parts of a system on any level (with the exception of the lowest or 'basic' level) are themselves wholes on lower levels. (Laszlo, 1972a, p. 51). The interfaces between the levels are discrete because the means of forming more and more complex organizational levels are themselves discrete.

Jakobson has commented that natural languages share with biological systems the characteristics of structural regularities, dynamic equilibrium, and cohesive power. (Jakobson, p. 53). The similarities in structure are due to a common principle of organization of hierarchical complex systems, and the cohesiveness of such systems is due to the dynamic equilibriums which must be maintained at each level in order to ensure the stability of the whole. It would appear that Romuald Schild's call for the integration of all scientific knowledge can best be implemented by the use of the one principle that all current research indicates the sciences have in common: hierarchical organization of complex systems.

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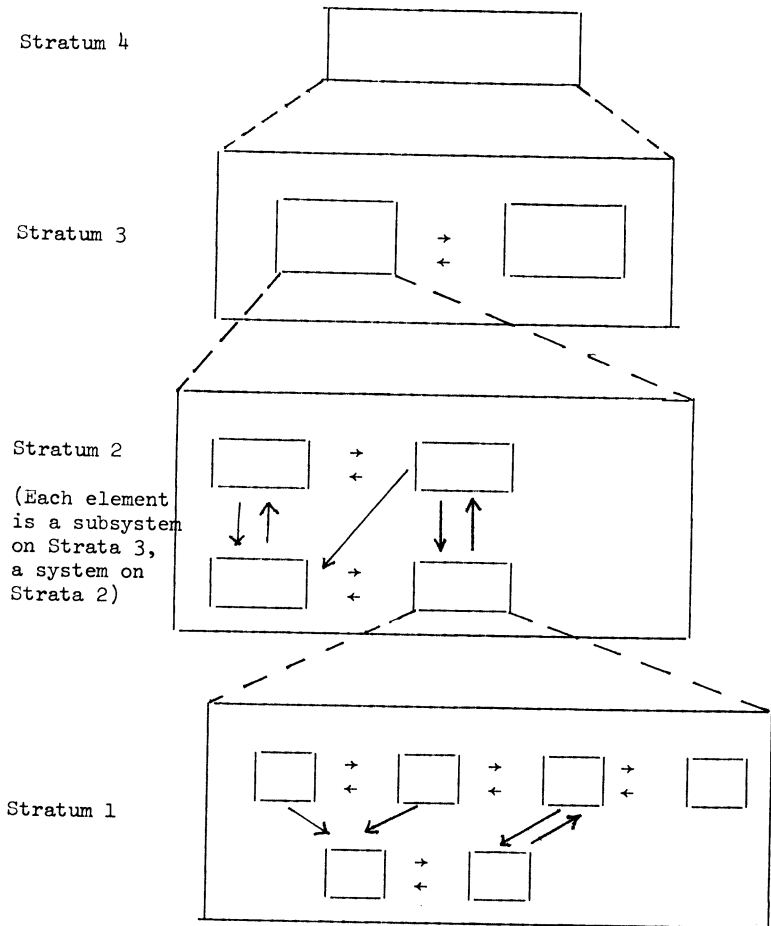
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STRUCTURE AND FUNCTION IN PHONOLOGY - A SYSTEMS VIEW
 By: Alice Wyland Grundt, Univ. of Calif., San Diego

Model of a Multi-Strata (Multi-Level) System:

(Taken from: Mesarović, M. D. and D. Macko. 1969. Scientific theory of hierarchical systems. In: Hierarchical structures, Whyte, Wilson and Wilson, eds. American Elsevier Publishing Co. 29-50).



Structure and Function in Phonology - a systems view
 Alice Wyland Grunert, UCSD

Mesarović and Macko, p. 34. 'On any given stratum, the behavior of the corresponding systems are studied in terms of their internal operation and evolution, while the question of how these systems interact so as to form a higher stratum system is studied on that higher stratum....this object-system relationship between descriptions on various strata leads to a hierarchy of appropriate description languages. Since for each stratum there is given a different set of concepts and terms to be used for the description of the system on that stratum, there exists in general a different language.'

Germanic vowel changes: open syllable lengthening, final vowel reduction, long vowel diphthongization
 vowel height exchange

Stage 1 $V_1 \rightarrow V_2 / \#C_C_ \#$ (stable vowel duration
 ratio maintained)

Stage 2
 (e.g., /e/
 is lengthened)

a. $V \rightarrow [ə] / \#CVC_ \#$ }

b. $\left\{ \begin{array}{l} /e/ = [\epsilon] \rightarrow [éə] / \#C_Cə\# \\ /e:/ = [e:] \rightarrow [æé] \end{array} \right\}$

c. $\left\{ \begin{array}{l} /e:/ = [e:] \rightarrow [æé] \\ /ε:] = [ε:] \rightarrow [éi] \end{array} \right\}$

d. $\left\{ \begin{array}{l} /ε:] = [ε:] \rightarrow [éi] \end{array} \right\}$

Note: 2-a is an innovation with respect to 2-b but a reaction with respect to an earlier change not considered here.

2-b is a reaction with respect to 2-a but an innovation with respect to 2-c.

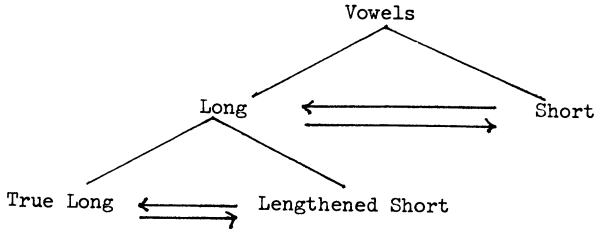
2-c is a reaction with respect to 2-b but an innovation with respect to 2-d.

At 2-d it is assumed that equilibrium of the long and lengthened vowel subsystems has been established.

This analysis is supported by reflexes in the Soest dialect of Low German. (Holthausen, F. 1886. Die Soester Mundart. Diedrich Soltau's Verlag).

Structure and Function in Phonology - a systems view
 Alice Wyland Grundt - UCSD

Vowel Subsystems in Soest (Westphalian) Dialect of Low German



Old long vowels:

UI	IU
ɔɛ	ɛɔ
aɛ	ao
ɛ:	ɔ:

Lenthened short vowels:

iə	yə	uə
ea	öa	oa
	a:	

Short vowels:

I	Y	U
ɛ		ɔ
	a	

Sources:

MLG

i:, ü:
 u:
 e:
 ɛ:, ä
 a:
 ɔ:, ö
 o:, ö:

Soest

UI
 IU
 aɛ
 ɔɛ, ɛ:
 ɔ:
 ɛɔ, ɔɛ
 ao, aɛ

ANTIPASSIVIZATION: A FUNCTIONAL TYPOLOGY

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0. General

Antipassivization (ANTI) is a transformation by which TO (transitive object) is deleted or demoted to a minor case while TS (transitive subject) becomes surface IS (intransitive subject). The term was suggested by Michael Silverstein, but the transformation has also been discussed under different names by Kurylowicz, William Jacobsen, R.M.W. Dixon, and others.

My point is that ANTI can have vastly different functions in different languages and even within one language. We may minimally distinguish the following types: INDEFINITE, which deletes or demotes an indefinite, obvious, or insignificant TO; PROMOTIONAL, by which TS becomes IS in order to participate in a later transformation which applies to IS but not TS; COREFERENTIAL, which directly indicates that the TS is coreferential to a NP in another clause; COMPOUNDING, where the TO noun stem is incorporated into the verb, which is then inflected intransitively; CATEGORY-LINKED (e.g., tense-linked), which applies only in given tense, aspect, and/or modal categories; HIERARCHY-LINKED, triggered by a particular TS-TO relationship with reference to a hierarchy of features such as person and animacy; and NONSYNTACTIC, which involves "transformational" rearrangement of bound-pronominal complexes but does not affect the status or case-marking of independent substantives nor the operation of other transformations.

These labels are not mutually exclusive; Basque ANTI is category-linked, hierarchy-linked, and nonsyntactic. An ANTI rule may have different functions in different environments (e.g., promotional in subordinated clauses, indefinite in main clauses). Some languages (e.g., Dyirbal) have two or more ANTI rules, fulfilling partly or entirely different functions.

An adequate characterization of a given ANTI rule should include a labelling according to this typology or a refinement thereof. This should include specification of functional variability in different contexts. It is also necessary to indicate whether the underlying TO is permitted to occur on the surface in a minor case. A general indication of the productivity of the rule, including mention of restrictions on the set of verb stems affected, is desirable. The following sections present brief descriptions of ANTI in several languages; readers should consult the primary sources for further details and to correct errors in my interpretation.

1. English

Indefinite-object deletion in the type He drinks can be considered an ANTI rule. Here the TO ("liquor") is deleted because it is obvious in context, rather than because of indefiniteness. On the other hand, in the type Speed kills the deleted TO is indefinite rather than obvious. Since English ANTI is expressed solely by the deletion of the TO, it is of course impossible for the TO to remain on the surface in any form.

English ANTI is used somewhat sparingly, but if a suitable context is found almost any transitive verb can undergo it. For example, since break can be used intransitively in mediopassive sense (It broke), and in a sort of metaphorical mediopassive sense (The suspect is about to break under questioning), one would expect that transitive break could not be antipassivized. However, it can be in the right context: Minnesota Fats is about to break (i.e., is about to make the first shot in a game of pool).

English ANTI is functionally indefinite (in a broad sense) rather than, say, promotional. It is triggered by clause-internal factors rather than by the syntactic relationship of the clause to other clauses. Since TS and IS are already syntactically equivalent in most respects, the conversion of TS into IS has no important syntactic consequences. Note also that since English has accusative morphology, ANTI results in less severe restructuring than in ergative languages, because the TS remains in nominative case as surface IS.

2. Uto-Aztecán (UA)

These languages have accusative case morphology, and in all important respects IS and TS are syntactically equivalent. Several UA languages have an "indefinite-object" verb form with prefix *t̥i- (Langacker ms.). For example, note Shoshoni t̥i-koitsol-mnuh "washed something" (Miller ms.). I consider most such forms to have been antipassivized ("washed, did the washing"), since it appears that no independent NP representing the TO is permitted. As in English, UA ANTI is indefinite rather than promotional.

3. Dyirbal

There are two ANTI rules in Dyirbal. ṇay-ANTI, the most important, is coreferential in function. In the first of several (potentially) linked clauses in a "topic chain" this transformation optionally applies to indicate that the TS but not TO is coreferential to a NP (TS, TO, or IS) in the following clause. Thus "The man saw the woman, the man went" can be expressed by the surface structure man(IS) saw-ṇay woman(Dative), went. The TO ("woman") is demoted to dative or instrumental

(indistinguishable from ergative) case, and is usually not deleted. The coreferential NP ("man") in the second clause is deleted by a later EQUI transformation. The ANTI suffix -nay is added to the verb of the clause which is antipassivized.

This "anticipatory" nay-ANTI in the first clause of a topic chain is optional. This is because the speaker may have to utter the first clause before he has formulated the structure of the following clause. If, when the speaker comes to the second clause, he discovers that the two-clause sequence is a structure such that nay-ANTI should have applied in the first clause, he can add the suffix -nura to the verb of the second clause. This indicates that a NP in the second clause which is about to be deleted by EQUI is coreferential to the TS (not TO) of the preceding clause.

In the second and all subsequent clauses in a topic chain, nay-ANTI is "retrospective" rather than anticipatory. That is, it indicates that the TS but not the TO is coreferential to a NP (IS, TS, or TO) in the preceding (not following) clause. It is obligatory when its structural description is met. Thus "The man went, the man saw the woman" becomes man(IS) went, saw-nay woman (Dative). The second clause has been reshaped by retrospective nay-ANTI, with its TS ("man") becoming surface IS. Then this IS is deleted by EQUI under coreferentiality with "man" (also IS) in the preceding clause.

nay-ANTI is normally not applicable to a clause in isolation. It is not triggered by clause-internal factors, rather by the referential relationships of its NP's to NP's in juxtaposed clauses.

Dyirbal Relative-Clause Formation permits relativization only of IS, TS, or TO (not, e.g., dative) in the lower clause. If the lower clause is transitive, then nay-ANTI applies to indicate that the coreferential (relativized) NP is the TS rather than the TO. Thus "the man who speared the kangaroo" is man(X) spear-nay-Rel(X) kangaroo(Dative). Here X is whatever case "man" happens to be in in the higher clause, and a copy of this case-marker is added to the relativized verb (which can be considered a surface adjective).

If we think of Relative-Clause Formation as requiring an IS or TO (not TS) as lower-clause coreferential NP, then this use of nay-ANTI can be taken as promotional, converting TS into IS so it can be relativized. On the other hand, if we take Relative-Clause Formation as directly relativizing IS, TO, and TS, then this use of nay-ANTI is coreferential in function. The latter view agrees better with the functions of nay-ANTI elsewhere.

ṇay-ANTI also has interesting uses in habitual participles with suffix -muna. In theory, any major NP (IS, TS, TO) can be relativized with such a participle, but in practice the great majority of verbs do not allow TO to be relativized in such forms for semantic reasons. IS is relativized in ḡanay-muna "(always) standing." TS is relativized in balgal-ṇay-muna "(habitual) murderer." Note that balgal- "to kill" has been ṇay-antipassivized before the addition of -muna. This emphasizes that the relativized NP (i.e., the NP coreferential to the covert head) is the underlying TS, not TO. However, since this verb, like most others, does not allow relativization of the TO with -muna, ṇay-ANTI here is redundant and hence functionally inert. Consequently, it may be dispensed with, resulting in surface forms like balgal-muna which in strict theory ought to mean "one habitually murdered" but which in fact are synonyms of forms like balgal-ṇay-muna "(habitual) murderer." Functional inertness has led to sporadic applicability.

The second ANTI rule in Dyirbal is the "false reflexive" construction. The suffix -riy and its allomorphs are semantically reflexive in many instances, but in others indicate ANTI. Dixon suggests that false reflexive forms like waḡay-mari-nu "be spearing" are syntactically like ṇay-antipassivized forms, and differ chiefly in that false reflexives suggest potential activity while ṇay-forms suggest actualized activity. While this difference is undoubtedly found in some contrasting forms, I am inclined to take it as a secondary one. The main difference seems to be that ṇay-ANTI is strictly coreferential in function, whereas the false reflexive is primarily indefinite and thus triggered mainly by clause-internal factors. Textual examples show that the false reflexive can occur in isolated sentences, while ṇay-ANTI applies only within topic chains. Although the false reflexive form allows the underlying TO to occur on the surface in dative or instrumental case, as does ṇay-ANTI, textual examples suggest that preservation of the TO is less frequent with the false reflexive than with ṇay-ANTI. Although the false reflexive may occasionally have coreferential function, this seems to be secondary.

Anyone seriously interested in morphosyntactic case theory should read and reread Dixon (1972), especially Chapters 4 and 5, and should also look at the texts. The Dyirbal data are of fundamental importance to this theory and there has been some controversy about its interpretation. My own reanalysis, criticizing the view that the language has "ergative syntax," will be presented elsewhere in more detail.

4. Warndarang, Nunggubuyu, Ngandi (Australia)

In Warndarang, most "verbs" are uninflected roots followed by an AUX which takes pronominal prefixes and inflectional suffixes. "They sang it" is (1) war ara-ga-ñi, with war "sing", prefix (g)ara- (3Pl→3Sg), transitive AUX -ga-, and suffix -ñi. Similarly, "They picked it up" is (2) warj gar-ira-yi, with the same prefix (g)ara- and a different transitive AUX -ira-.

There are two ANTI processes. One is to simply use an intransitive AUX instead of an expected transitive one, as in (3) warj gala-mi-Ø "They picked up" with 3Pl prefix (g)ala-. In theory any transitive verb can be antipassivized in this fashion, but in practice this ANTI is rare. A handful of verbs have a false reflexive ANTI similar to that of Dyirbal. Adding reflexive -i- to ex. 1, we get (4) war ala-g-i-ma "They sang."

Nunggubuyu verbs are directly inflected. The only ANTI process is the false reflexive type with the same suffix -i-. It occurs with only two or three stems. An example is -maga- "to tell" (nanu-maga-ñ "I told him"), false reflexive ANTI form -mag-i- (na-mag-i:-ni "I told, I spoke"). Other stems take -i- in reflexive sense.

Warndarang and Nunggubuyu are morphologically neither accusative nor ergative since Nominative -Ø is used with IS, TS, and TO and since word-order is free. There are no important syntactic rules based on the categories IS or TS (or TO), so ANTI has no promotional functions. It is strictly indefinite, and the TO is always deleted.

Ngandi, an adjoining language, has similar syntax but shows ergative morphology for independent substantives. There are two or three examples of the false reflexive with -i-. However, the usual ANTI process consists of deletion of the TO and of the object-marker in the verb. Thus contrast (5) naya-tu nagu-doni "I(erg.) chopped it" with (6) naya-Ø na-doni "I(nom.) chopped." The pronoun is naya, the verb -doni. Ex. 6 resembles Warndarang ex. 3 above, but the Ngandi process is more productive.

Ngandi and Nunggubuyu have productive rules incorporating noun stems, including some representing TO, into the verb complex. In Nunggubuyu we get forms like nawu-lal-nani "I saw the country(-lal-)." Literally this is "I country-saw it" and the surface form is transitive. One can even say nawu-lal-nani ana-lal "I country-saw it, the country." In Ngandi, some compounds are of this type, but in several cases a surface intransitive results, as in na-nal-geykdi "I spit" ("1Sg-saliva-threw"), not transitive *nagu-nal-geykdi with prefix nagu- (1Sg→3Sg). Ngandi, but not Nunggubuyu, has compounding ANTI.

Grammars of these languages will be published soon in Australia.

5. Eskimo

This section is based on Woodbury's excellent study (1975). The principal ANTI process involves adding the ANTI suffix -si-, -i-, -nnig-, etc. to the verb, which is then inflectionally intransitive and has only a subject-marker. The TS (ergative) becomes surface IS (nominative, "absolutive" in Eskimological parlance), while the TO is deleted or demoted to instrumental, as in (7) arnag-Ø nigi-mik niri-nnig-puq "The woman ate meat." This is literally "woman-Nom meat-Instr eat-ANTI-3Sg." In main clauses ANTI is functionally indefinite.

In certain subordinated clauses ANTI can be promotional. This is not the case in gerundial-type adjuncts like the so-called "infinitive" since here IS and TS are already syntactically equivalent. However, in relative-like clauses (including some participles) and in causative clause-union ANTI can be promotional.

The "active participle" (AP) is essentially an agentive nominal. Unlike agentives in many languages, this form affects only underlying TS, not IS. The nominal is itself nonfinite, but a possessor can be added to mark the TO. Verbs with final vowel and some others are directly nominalized, as in ajuqirsur-ta-a "his teacher" ("teach-AP-his"). Others, including all ending in t, must first be antipassivized, as in tuqut-si-sa-a "his killer" ("kill-ANTI-AP-his"). Because the AP form can only relativize underlying TS, ANTI has no disambiguating function here, accounting for its sporadicity.

The "locative relative" (LOCREL) participle ("place where...") can only be formed from intransitive clauses, so if the clause is transitive it must first be reflexivized or antipassivized, as in nirli-i-vvi-a "place where he feeds" ("feed-ANTI-LOCREL-his"). Here the surface possessor represents the underlying TS.

The usual causative of transitive "The woman ate the meat" would be man(Erg.) meat(Nom.) eat-Caus-3Sg → 3Sg, with "woman" deleted or demoted to a minor case. Note that "meat," TO of the lower clause, is surface TO of the causativized verb. The underlying TS "woman" can become surface TO if the lower clause is antipassivized, as in anut-ip arnag-Ø niri-nni-tip-paa ("man(Erg.) woman (Nom.) eat-ANTI-Caus-3Sg → 3Sg"), with optional expression of "meat" as an instrumental NP.

In such examples it is difficult to determine whether ANTI is triggered by clause-internal factors and merely happens to influence the operation of later transformations, or is explicitly designed with these transformations in mind. Most causative and LOCREL instances of ANTI can be interpreted as primarily indefinite and "accidentally" promotional. However, in the AP examples ANTI (though redundant) is promotional; that it is not indefinite is

shown by the frequent occurrence of the underlying TO as surface possessor.

English He drinks (vs. He drinks it) is paralleled by Eskimo agiar-puq "He rubs" vs. agiar-paa "He rubs it." The only formal difference is that -puq is an intransitive 3Sg ending while -paa is transitive 3Sg → 3Sg. Woodbury calls such ambivalent stems "nominative verbs," and takes the intransitive form as basic (the transitive is derived by advancing an oblique NP into TO position). However, in many instances it seems equally possible to take the transitive form as basic, in which case the intransitive form is derived by another ANTI rule. Since passives and reflexives for other transitive stems are formed in the same way as agiar-puq (i.e., by using intransitive endings like 3Sg -puq), we can view agiar-puq as analogous to false reflexives in Dyirbal, etc.

6. Basque

Basque independent substantives, and pronominal affixes in the verb which cross-reference them, are marked as nominative (IS or TO), ergative (TS), dative, etc. In the example (8) ni-k gizon-a-Ø hil d-u-t "I have killed the man" we have ni-k "I-Erg.," gizon-a-Ø "man-Def-Nom.," and verb complex with hil "to kill" followed by AUX -u- with 3Sg Nom. prefix d- and 1Sg Erg. suffix -t. The same prefix occurs in intransitive ethorri d-a "He has come." Inflected verbs (including AUX's) in what may be called the "nonpast system" (including d-u-t and d-a) clearly distinguish nominative prefixes for IS and TO from ergative suffixes for TS.

However, consider what happens in the "past system" example (9) ni-k gizon-a-Ø hil n-u-en "I killed the man." The inflected AUX -u- has been antipassivized, with 3Sg Nom. d- being deleted, whereby the 1Sg Erg. suffix -t becomes 1Sg Nom. prefix n- to fill the obligatory Nom. prefix slot. This ANTI applies in the past system when the TS is first or second person and the TO is third person (it can also be thought of as applying, vacuously, to 3 → 3 combinations, but this is unnecessary). It thus is category-linked (basically, tense-linked), and since it depends on a hierarchical TS-TO imbalance it is also hierarchy-linked. Note also that the independent pronoun ni-k remains Erg. and the noun gizon-a-Ø is still Nom. in ex. (9) as in ex. (8), so ANTI here is nonsyntactic (it affects only the bound pronominal affixes in the verb). Finally, note that the "antipassivized" AUX n-u-en is still the transitive AUX -u-, not an intransitive AUX like -iza- or -edi-.

I expect to deal more fully with Basque ANTI and related problems in another paper.

7. Chinook

My source is Silverstein (in press). The verb has up to three pronominals specified as ergative, nominative (IS), accusative, and dative. Nom. and acc. are merged for most pronominal categories. The dat. is identical with the acc. (except for 3Pl) but is always followed by a "postposition."

A transitive main clause is antipassivized by dropping the TO and its pronominal, adding ANTI morpheme -kʔi- to the verb, and converting the erg. pronominal into dat. (not nom.!). Thus gal-i-kʔi-tina-x "He customarily killed" has 3Sg dat. -i-, with -kʔi- acting as a sort of postposition, and stem -tina- (we may disregard gal- and -x). ANTI here is indefinite, and indicates customary activity.

ANTI is also involved in a (customary) agentive nominal, characterized by dropping adverbial prefixes like gal-. Underlying IS or TS becomes surface genitive, which is much like a dative with postposition -a-. A transitive verb undergoes ANTI, perhaps to get the TS pronominal into dat. case where it can be easily converted into genitive.

All nouns must have a prefix marking their gender and number (and person), and this applies to agentives as well. Intransitive agentives simply use 3Sg prefix i- as a dummy morpheme in this slot, even in forms like i-i-a-ga-lal "they who fly about" (3Pl genitive -i-a-). However, transitive agentives use the prefix to indicate the underlying TO: t-i-a-kʔi-dina-x "he who kills them" (3Pl acc. t-, 3Sg gen. -i-a-).

This obligatory indication of the TO shows that this application of ANTI is not indefinite. Its main function is to "promote" an erg. pronominal into dat. case, where it can be easily genitivized (since the dat. and gen. are very similar). Also, the occurrence of -kʔi- with an acc. pronominal is a (partially redundant) indicator that an agentive nominal is at hand.

Independent NP's have no case-marking; their case is determined by associating them with a pronominal in the verb. There are no transformations (outside of rearrangements of elements in the verb complex) which involve categories like IS and TS, so except in agentives ANTI has no promotional functions and has little effect on inter-clause syntax.

8. Georgian

Georgian has case-marking both for independent substantives and for cross-referencing pronominals in the verb. I will deal here only with the former; a full discussion would also deal with the latter.

Georgian transitive verbs have an erg.-nom. (TS-TO) case-frame in the aorist (punctual) system. The present (durative) system has nom. TS and dat. TO (there is no distinct acc. case). The perfect (resultative) system puts TS in the dat. and TO in the nom. If we take the aorist system as basic, the present system shows category-linked ANTI with obligatory retention of the TO, while the perfect system shows category-linked Passivization with obligatory retention of the TS. (There are also other Passivization processes.) I know of no transformations involving IS or TS which are affected by these category-linked changes.

Note that Georgian ANTI occurs in the durative system, just as Chinook ANTI indicates customary action.

For Georgian data see Vogt (1971, p. 17ff.).

9. Conclusions

What follow are miscellaneous conclusions, hypotheses, speculations, and musings about ANTI.

1) As indicated at the beginning of the paper, ANTI can have vastly different functions in different languages. It is absurd to think, for example, that there is much in common between Dyirbal and Basque ANTI.

2) ANTI, especially the indefinite type, can occur in languages with accusative morphology as well as those with ergative morphology, though it is more common in the latter. ANTI need not have any promotional functions, and of course cannot if TS and IS are syntactically equivalent.

3) Often an ANTI process is functionally indefinite in main clauses, but promotional (or partly indefinite, partly promotional) in subordinated clauses. Chinook shows a sharp polarity between ANTI in main clauses and ANTI in agentive nominals; Eskimo shows some polarity but not to the same extent.

4) Promotional and indefinite ANTI are radically different from coreferential ANTI and cannot be combined with it. Coreferential ANTI is automatically triggered by a particular cross-clause coreferential relationship, and cannot have any secondary functions or constant ambiguity would result. Coreferential ANTI, which indicates coreferentiality of TS with a NP in another clause (normally the preceding one), cannot of course indicate anything about the reference of the IS of an intransitive clause, and thus presupposes the existence of another mechanism (e.g., EQUI) to indicate referential relationships of IS. In fact, pay-ANTI in Dyirbal can only function efficiently in the context of an elaborate transformational apparatus, including pura-Insertion as well as EQUI, where each process complements the others

functionally.

5) Category- and hierarchy-linked ANTI never have promotional function. Basque ANTI is nonsyntactic and does not affect independent NP's; Georgian ANTI affects their case-marking but not their syntactic privileges.

6) Retention of TO on the surface is uncommon or impossible with indefinite ANTI. Retention is often possible and may be obligatory (Chinook agentives) with promotional ANTI. Retention is regular or obligatory in coreferential ANTI (Dyirbal) and normally in category- and hierarchy-linked ANTI. Basque deletes the TO pronominal but can retain an independent NP as TO, so it is not a counterexample. Compounding ANTI deletes independent TO's but has a TO noun stem in the verb.

7) Indefinite ANTI is often restricted to, or particularly common with, a small set of stems (English, Nunggubuyu, etc.). It may thus be possible to collapse ANTI formally with another intransitivization, usually the reflexive (hence false reflexives). If only a few stems allow the ANTI sense, there may be no ambiguity, but if both senses are productive it may be necessary to have an optional disambiguating mechanism; Dyirbal and Eskimo both have a way of marking an independent IS as specifically reflexive IS. Promotional, coreferential, and category- and hierarchy-linked ANTI show no restrictions on the set of verb stems affected.

8) A highly restricted indefinite ANTI rule could be substituted for by lexical means, e.g. Choctaw -apa- "to eat(trans.)" vs. -i:pa- "to eat(intr.)." We might call this PRELEXICAL ANTI.

9) Promotional ANTI is redundant in agentive nominalizations, since only TS or only TS and IS can be relativized. Hence ANTI may be sporadic or irregular here (Dyirbal, Eskimo).

10) ANTI is often considered the "mirror image" of passivization. This is misleading, since there is only partial functional parallelism. Passivization is almost always indefinite or hierarchy-linked (English has both functions), rarely or never systematically promotional or coreferential.

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The effect of aspiration on the fundamental
frequency of the following vowel

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In this paper we will be concerned with the effect of aspiration on the fundamental frequency of the following vowel. More precisely we will be interested in comparing the F_0 values after voiceless aspirated vs. voiceless unaspirated stops. This study will hopefully bring new insights into issues such as the timing of the articulatory gestures involved in the production of these stops and the development of contrastive tones from consonant mergers.

1. Introduction

The process by which a language can develop two tones (or multiply by two the number of its tones if it already has a tone system) from the loss of a voicing distinction in prevocalic position is rather well understood (Haudricourt, 1961; Hombert, 1975; Hyman, forthcoming; Matisoff, 1973). When such a development occurs, the intrinsic differences in the onset fundamental frequency of vowels following voiced vs. voiceless stops are reinterpreted and used extrinsically; that is they become contrastive after the loss of the voicing contrast as shown in (1):

(1)	Stage 1		Stage 2		Stage 3
	pa	>	pa [˥]	>	pa [˥]
	ba	>	ba [˨]	>	pa [˨]

It should be pointed out that the reinterpretation of the F_0 shapes from stage 2 to stage 3 is not fully understood. When three series of stops (voiced, voiceless unaspirated and voiceless aspirated) are involved in a tone development, the picture is not clear, although there may be a tendency for the voiceless aspirated series to develop a higher tone as attested, for example, in the Siamese dialect of the Trang Province (Egerod, 1961; Haudricourt, 1961). If it is in fact the case that historically higher tones develop after voiceless aspirated stops rather than after voiceless non aspirated stops, we should be able to see and quantify this effect by looking at languages in which these two series of stops (voiceless aspirated and voiceless aspirated) have not merged.

2. Phonetic Data

In an earlier study (Hombert, 1975), Korean data were used to illustrate the fact that intrinsically voiceless aspirated stops lead to a higher Fo onset of the following vowel. Korean has a three way contrast of voiceless stops in word initial position: aspirated, unaspirated and "strong" series. This "strong" series will not be considered for the moment since it involves an extramuscular activity irrelevant for our present discussion. The following two tables show the voice onset time (v.o.t) and the Fo onset of the following vowel associated with these two series of Korean stops.

Table 1. Voice onset time associated with unaspirated and aspirated stops in Korean (in msec)

				p ^h	t ^h	k ^h
				p	t	k
Lisker and Abramson (1964)				7	11	19
				91	94	126
Han (1967)	S1	27	33	62	129	133
	S2	20	23	42	105	107
	S3	17	21	27	66	73

Table 2. Onset values of fundamental frequency of vowels following unaspirated and aspirated stops in Korean (in Hz)

				p ^h	t ^h	k ^h
				p	t	k
Han (1967)	S1	144	161	162	185	205
	S2	266	312	309	341	334
Kim K. (1968)				277	282	282
				300	304	300

From these data it is clear that, other things being equal, a longer v.o.t (corresponding to the aspirated series) lead to a higher Fo onset. These data suggest that if a tone development occurs in a language as a result of the merging of the voiceless aspirated and the voiceless unaspirated series, there will be a tendency for higher tone to develop after historical voiceless aspirated stops rather than after their unaspirated counterparts. Unfortunately other data from Korean do not give full support to this hypothesis. Kagaya (1974) found that one of the two Korean subjects he used had an average Fo onset about 8% higher (162 Hz vs. 150 Hz) after the voiceless unaspirated series than after the aspirated series (data based on 12 tokens for each series). A similar situation is found in other languages besides Korean.

Hindi has a contrast between four series of stops (voiced, breathy voiced, voiceless unaspirated and voiceless aspirated. Kagaya and Hirose (1975) found an average Fo onset about 5% higher (188 Hz vs. 178 Hz) after the unaspirated series (data based on 1 speaker, 12 tokens per series).

Danish has two series of stops, both voiceless, in word-initial position. One series is aspirated, the other is unaspirated; that is a situation very similar to English stops.

Eli Fischer-Jørgensen reports that the differential effect of these two series of stops on the Fo of the following vowel is very small (1968a) or non-existent (1968b). The situation is not clearer in Standard Thai (Bangkok dialect). Ewan's data (forthcoming) indicate that Fo is higher after the aspirated series by about 5% (131 Hz vs. 124 Hz) (data based on 1 speaker, 90 tokens per series). However, Gandour's data (1974) show the opposite pattern; he found that the unaspirated stops led to a Fo onset 8% higher than the aspirated series. These data were also based on 1 subject and 90 tokens/series. Out of a sample of 11 speakers, Erickson (1975) found that 7 of them produced higher Fo after voiceless aspirated stops than after voiceless unaspirated. The other 4 speakers exhibited the opposite pattern¹. It is not clear from these three studies on Thai whether these differences in the effect of voiceless aspirated vs. voiceless unaspirated can be attributed to slight dialect differences or should be considered speaker specific.

In historical data on one Wu dialect (Wufang), Ballard (1975) reports that aspiration caused a tone lowering resulting in a merger. In another Wu dialect (Wuchiang), the voiceless aspirated and voiceless unaspirated have split phonemically in certain tones, the aspirated initial syllables having generally lower tones than the unaspirated initial syllables (Ballard, personal communication). All these data from Korean, Hindi, Danish, Thai and Wu do not support the hypothesis of a clear direct relationship between v.o.t. and Fo onset of the following vowel. The explanation generally provided to support this theory is based on the interaction between rate of airflow and width of glottal opening upon stop release. Other things being equal a higher rate of airflow will lead to a higher rate of vibration of the vocal folds. Considering the number of contradictory examples from different languages this explanation has to be reconsidered. In order to bring new data which hopefully will help clarify this issue, we decided to investigate the two series of stops in French and in English. The major reason which dictated our choice of these two languages is the well-known difference in the nature of the contrast between the two series of stops in these two languages. The main difference between the two English series is, in word-initial position at least, an aspiration difference, the voiceless series is voiceless aspirated and the so-called voiced series is often voiceless un-aspirated. In French, the contrast between the two series of stops is

¹These data are based on 8 repetitions of CV utterances with C=[u]. The number of tones used in this experiment is not mentioned.

an actual voicing contrast; the voiced series is generally fully voiced during stop closure and the voiceless series has a very small v.o.t (that is, almost no aspiration). Fischer-Jørgensen's data (1968a,b) indicate higher Fo after French voiceless unaspirated stops than after French voiced stops. A number of studies (Hanson, 1975, Hombert, 1975; House and Fairbanks, 1952; Lehiste and Peterson, 1961) indicate that in American English, voiceless aspirated stops lead to a higher Fo onset than the so-called voiced series. What we are interested in here is comparing the French voiceless unaspirated series with the American English voiceless aspirated series. Since these two series differ only in aspiration, we will be able to isolate and quantify the effect of aspiration. We mentioned earlier that the two series of American English stops often differ only in aspiration; however since the CV test words read by our speakers (see next paragraph) were put within a frame, the voiced series was in fact sometimes voiced. We decided to keep our test-words within a frame in order to get a more natural intonation pattern and consequently a more natural laryngeal behavior. Our study will involve Fo measurements of vowels following orthographic "p, t, k" and "b, d, g" in American English and in French as well as glottal width and airflow measurements; we will report here only on the first stage of our investigation.

3. Experimental procedure

Two American English speakers (1 Female and 1 Male) and two French speakers (1 Female and 1 Male) were used in this experiment. They spoke 6 CV nonsense words where C= [p,t,k,b,d,g] and V= [i]. The word list consisted of 10 tokens of each test word arranged in random order. Each test word was uttered in the frame "Say ___ louder". No special instructions were given with respect to the speed of reading. The recording was done in a sound treated room. The speech waveform was sampled at an effective rate of 20000 Hz. Since most Fo extractor methods perform poorly in determining the Fo during the first few cycles and since these measurements were crucial in our study, we decided to make our measurements directly on the digitized waveform. In order to get maximum accuracy in locating similar points on each consecutive period, high frequencies were filtered out (above 1 KHz).

4. Results and discussion

The v.o.t. and Fo values are presented in Table 1 and Figure 1.

Table 1. Voice Onset Time values (in msec) in French and English (10 tokens/consonant/subject)

		p		t		k	
		Av. S.D.		Av. S.D.		Av. S.D.	
French	F	18	4	29	6	51	8
	M	13	8	34	6	53	14
English	F	57	6	66	6	87	10
	M	35	4	64	9	85	6

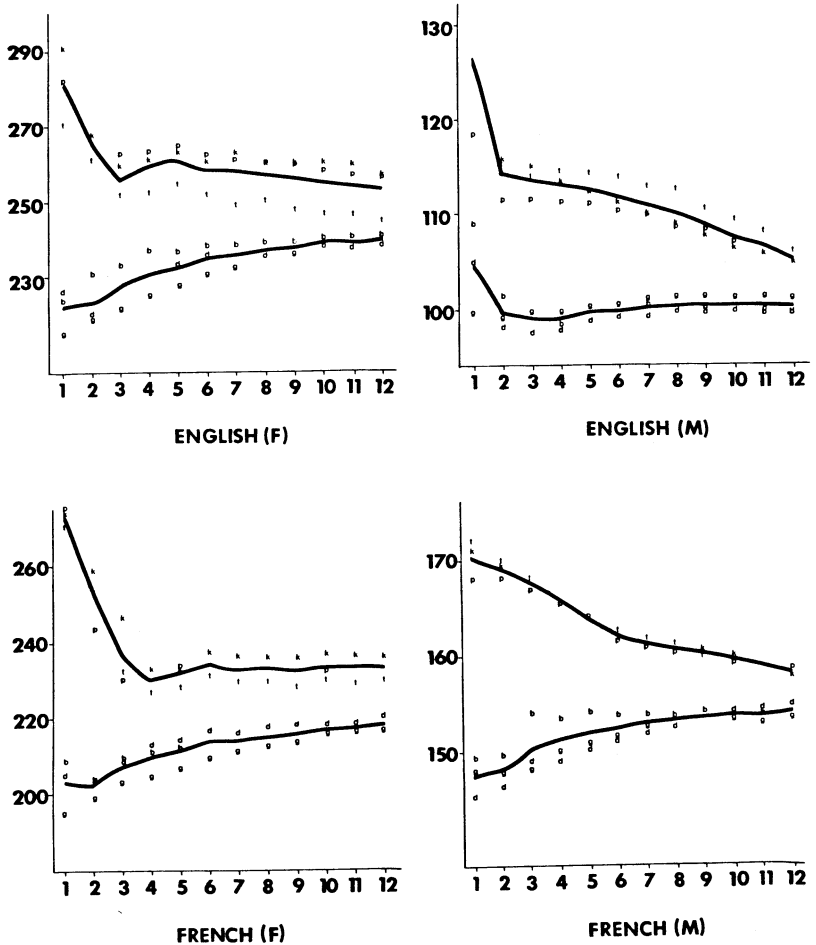


Fig. 1. Fundamental frequency measurements (vertical axis) of vowels following ptk and bdg (orthographic) as a function of glottal period (horizontal axis) for two American English speakers (1 female and 1 male) and two French Speakers (1 female and 1 male). The upper curve represents average F_0 measurements after ptk, the lower curve represents average F_0 measurements after bdg.

In Figure 1, Fundamental frequency (vertical axis) is plotted as a function of successive vocal folds cycles (horizontal axis). The upper line represents the average F_0 after voiceless aspirated stops in American English and after voiceless unaspirated in French; the lower line corresponds to the two other series (voiceless unaspirated or "voiced" in American English and voiced in French). Values corresponding to each individual stop (p,t,k,b,d,g) are represented by corresponding letters on the graph (with the usual orthographic convention).

By comparing the two upper curves from the French Female and from the American English Female, it becomes clear that there is no direct correlation between longer v.o.t and higher F_0 onset since the two curves are very similar despite the fact that one curve represents the F_0 of a vowel after a voiceless aspirated series and the other after a voiceless unaspirated series. However, by comparing the upper and the lower curve from the American Male who was producing devoiced bdg (probably because of a short pause before the test-word), it is also clear that v.o.t does play a role since the only difference between these two series is a longer v.o.t for the aspirated series.

From these data it seems reasonable to conclude that longer v.o.t does affect F_0 onset but not in a direct fashion. Other factors such as glottal width, rate of airflow and muscular tension interact and affect the determinant factor of F_0 onset. Looking back at the Korean data now, it is possible that the differences in F_0 onset were not only due to different v.o.t. In fact, E.M.G. data (Hirose et al, 1974) indicate that the muscular activity involved in producing the unaspirated stops is lower than in producing the aspirated ones; this difference in muscular activity could account for part of the F_0 onset differences.

5. Conclusions

In summary, the data presented here disconfirms the simple but naive view claiming a direct correlation between longer v.o.t (aspirated series) and higher F_0 onset. This position was mainly based on a too hasty interpretation of the Korean data. On the other hand, these data help us understand the untidy patterns observed in a number of languages with respect to the non-systematic effect of aspiration on the F_0 onset of the following vowel. In other words, these data are disappointing in the sense that they show that intrinsic F_0 effects and consequently phonetically motivated tonal changes cannot be predicted from a vague phonetic characterization of the segments involved such as aspirated or unaspirated. But one can also take the following optimistic view, that these data show that some of the tonal developments that we consider unexpected or unexplainable may just be the result of our lack of knowledge of the accurate phonetic characteristics of the segments involved in these historical developments.

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Drift versus Diachronic Universals
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This paper will re-examine and contrast the concepts of Drift and Diachronic Universals as predictive mechanisms for language change. I will demonstrate that instances of historical change previously characterized as drift can more insightfully be analyzed as applications of diachronic universals, or as resulting from rule changes which also have broader or parallel effects elsewhere in the grammar.

The concept of drift was introduced by Sapir to describe general trends of historical development in modern European languages, in particular English. Although he discusses a variety of specific changes, he is primarily concerned with three major drifts: the leveling of subject and object cases; the development of fixed word order; and the drift toward the invariable word. According to Sapir, language changes are random phenomena "like the waves of the sea, moving backward and forward in purposeless flux." Linguistic drift operates like a selection process, defining the direction of the historical trend. The drift of a language is constituted "by the unconscious selection on the part of its speakers of those individual variations that are cumulative in some special direction." The drift is unconscious, in that it cannot be discovered from the examination of a synchronic grammar, and it is retrospective rather than predictive in that it is recoverable only by looking at changes in the syntax or phonology over a period of time.

Drift, as Sapir conceived of it, makes no universal claims. It is a language-specific phenomenon, since it is the result of selections made by its speakers at a given point in time. Several related languages might in principle participate in the same drift, but the history of Indo-European languages reveals several conflicting drifts. In inflection, the range is from highly synthetic (Lithuanian, Tocharian) to highly analytic (Italian, Modern Persian). All three major word order types are represented: SVO, the most common type in European languages with the exception of Celtic; SOV (Indic, Iranian); VSO (Celtic).

Although Sapir gives examples of drift, he never defines it or describes in detail how it operates. Drift can perhaps be considered as a succession of changes, perhaps gradually affecting, for example, a sequence of morphological categories. Changes establish channels for the occurrence of other changes, and diachronic processes become habitual. A speaker can perhaps sense that case marking is on the way out; then, for no phonological reason, additional distinctions are given up. This is imprecise and is not predictive, since Sapir himself warns that the direction of drift can shift unpredictably.

Robin Lakoff described drift as a metacondition on the way the grammar as a whole can change. For example, "if there is a choice between a rule and a lexical item to produce a surface structure containing independent segments, as opposed to one containing morphologically bound forms, pick the former". This metacondition is as difficult to characterize as Sapir's drift. It is not part of the

synchronic rules, nor can it be identified or learned by the speaker. Lakoff proposes that it may act as a linguistic pendulum.

Vennemann proposes two purportedly new explanations of drift. One is the word order change XV or VX, according to his principles of natural serialization. These are merely a restatement of Greenberg's "Some Universals of Grammar", according to which Vennemann correlates the loss of subject/object case marking with the word order change which took place in most European languages. He fails, however, to motivate the word order change itself, beyond proposing an intermediate stage TVX, in which the topic material precedes the verb. Another objection to his strategies is that they account for only one direction of change (reduction of a morphological system by phonological change, followed by a word order change XV to VX), when clearly others are possible: a language can renew its morphological system without changing its word order (Ossetic); a language need not require rigid word order, even if subject and object are not explicitly distinguished (Isthmus Zapotec); a language can change its word order without obliterating its morphological system (Uralic).

Drift can then be observed to have the following limitations. It is a description of events, not a prediction of them. It provides a direction of change, but no motivation. Thus it is teleological but not predictive. It is necessarily language specific, so there are no universal applications. The weakness of the concept of drift is indicated by the fact that no specific drift can be disproved by counterexamples. The drift may or may not continue beyond an arbitrary point of time, and may or may not be found in neighboring or genetically related languages.

A diachronic universal may be formulated as an implication of one of the following types: if conditions x and y are satisfied, then change z (or the addition of rule z to the grammar) is either (a) likely to take place or (b) may take place. It is a weak form of universal, because it stipulates conditions, but does not guarantee the change at any given time, or ever. A stronger form of the universal is the resumptive form: if a state q of the language is known to exist, and a state p at an earlier period, then change z must have taken place, and preconditions x and y must have been fulfilled. This form of implication is stronger because it is specifically predictive and hence positively verifiable.

For example, consider the formulation of analogy as a diachronic universal. Analogy is a term which has been used to describe a variety of linguistic processes; in the diachronic context it properly refers to the use of a proportion to explain the motivation or direction for historical change. If one assumes an analogic proportion of the type: $a:b=c:x$, and the forms a and b stand in a certain relationship, then a new form (or pattern) x can be developed from c on the model of the relationship of a and b. Thus if a language has a and b in the above relationship, and if it has c, then the prediction is that it will develop x by the same process z which produced b from a.

The phonological and morphological changes connected with the loss of case markers in the development from Late Latin to early Romance and the concomitant syntactic changes have been the most frequently discussed examples of drift. In particular the loss of final

-m and the changes in the timbre of the resulting final vowels collapses the singular of the first and second declensions; final -s of the nominative plural is preserved in Western Romance (French and Spanish) where it develops into a plural marker. Final -s is lost in Eastern Romance (Italian and Rumanian); in these languages the number distinction is marked by a vowel contrast which roughly approximates the predicted reflexes of the final Latin vowels; the evidence of the consonant stems indicates that the accusative was adapted as the base form.

Prepositions, which already existed in Latin, were extended to specify the grammatical relations, some of which had been designated by case suffixes alone, others by combinations of case markers and prepositions. Two types of explanation have been offered for this course of development. One asserts a drift tying the phonologically-conditioned loss of case affixes to the expansion of the role of prepositions. The second relates change of word order to loss of inflection, claiming that loss of case marking entails a shift of SOV order to SVO.

In respect to the phonological changes and the collapse of the nominal paradigm, Brøndal's principle of compensation can be restated as a diachronic universal to account for the morphological developments. Specifically, the principle states that the unmarked member of a pair preserves more categorial distinctions than the marked one. Therefore, if a distinction is lost in the unmarked member, it will also be lost in the marked; if it is restored (or if a new one is introduced) this will occur, at least initially, in the unmarked member. Thus the loss of case markers in the singular precludes their maintenance in the plural, and the plural case markers may be eradicated by non-phonological means. On the other hand, it can be predicted that the marked member of an opposition is likely to have a form which is more overt and more highly characterized. Thus if a phonological change produces zero in both a marked and an unmarked member of a declensional set, it can be predicted that, if a new highly characterized form is introduced, it will be in the marked member.

Other cross-linguistic predictions which will account for changes that have been attributed to drift include the following: (1) If a language has adpositions (and all languages appear to) their grammatical range will be extended to express the grammatical relations for which the case markers have been lost. Latin ad + the accusative case (whose affix is itself later lost), which is a directional phrase, appropriately becomes the indirect object marker; de + the ablative case, indicating partitivity, or in a Jakobsonian sense quantification, becomes the genitive marker. These changes can be observed in the syntax of Late Latin, and are finalized in Romance. (2) New cases can be derived from adpositions only if the word order in the Noun Phrase is Modifier Noun Postposition. This implication is supported by the fact that most languages with productive case affixes tend to be primarily suffixing, and that if independent lexical items are reduced to affixal status, they will normally be conjoined to the independent word to which they are contiguous; thus it is unlikely that Latin, whose case markers are exclusively suffixes would have developed

new case markers from its prepositions. (3) Many languages have, or had at an earlier stage, a tripartite system of number marking, that is a singular, a plural and a dual. There is a well-known tendency among languages which possess or possessed this system, to reduce it to a two member, singular/plural system. The predictability of this change follows from the markedness of the three terms, by which the dual, being the most highly characterized, is the first to be lost. Thus, implicationally, if a language has a dual it also has a plural, and conversely, if a language has lost its plural, it has also lost its dual. (4) Another application of the same diachronic universal is to the categories of the pronoun and the noun. Since the pronoun is unmarked relative to the noun, the categories of number, gender, and case are preserved longer in the pronoun than in the noun, according to the extension of the principle of compensation. So if these categories are eliminated from the pronoun, they will also be from the noun. (5) Among nominal categories case is less stable than gender or number. There is no indication, however, that the Uralic and Altaic languages, which have maintained and renewed extensive case systems, ever expressed gender as a morphological category. Thus if a language has lost its number and gender marking, it will also have lost its case marking (but not necessarily vice versa). Consider the development from Latin to Western Romance whereby the declensional system developed from one in which case, gender, and number were synthetically indicated to one in which only the singular-plural distinction is expressed by suffixes on the noun. (6) The development of the definite and indefinite articles has been analyzed as part of the "drift toward the invariable word" (Sapir). At best, this is a description of linguistic events, not an explanation of them. Many linguists have commented on the close relationship which is known to hold near universally between the definite article and the demonstrative on the one hand, and between the indefinite article and the numeral one on the other. This developmental relationship exists for example in respect to the

Definite article: Indo-European, Semitic, Bantu

Indefinite article: Indo-European, Altaic, Semitic

There is a general type of development that can be observed in both of these syntactic adaptations. That is, as the demonstrative and numeral develop into definite and indefinite articles, their functional characteristics as demonstrative and numeral are weakened. In Aramaic, as Greenberg has pointed out, the demonstrative gradually develops, first into a definite article, then into a generic article, and finally into the mark of the noun itself as a part of speech. In the Western Romance languages, the demonstrative develops into a definite article which is an independent word also marking the gender of the noun. In Rumanian, the definite article was suffixed, producing a new declensional pattern which distinguished direct and oblique cases.

Rumanian	Masculine		Feminine	
	sg.	pl.	sg.	pl.
Nom./Acc.	domnul	domnii	casa	casele
Oblique	domnului	domnilor	casei	caselor

The development of the indefinite article shows a similar gradual semantic shift away from the scope of the numeral; this development is well documented in the Romance languages, and has also been described by Givón (1976) for Modern Hebrew. In Turkish the same form serves as indefinite and numeral. (Probably originally a numeral, as other Altaic evidence indicates, for example the common Altaic postposition bilán "together with" whose stem has been etymologized by Raasonen as a nominal derived from the numeral one.) Turkish differentiates the indefinite and numeral constructions by word order:

bir iyi adam 'one good man' versus iyi bir adam 'a good man'. Because of the near universality of these two developments, they are perhaps better to be described by an implicational universal than as part of the "drift toward the invariable word". Such a universal might be stated: if a language has developed a definite or indefinite article, its likely source will be the demonstrative or numeral one, respectively. (7) As a final foray into comparative methodology, consider a problem of historical phonology: the loss of final consonants and the development of tone in Sino-Tibetan. The loss of final consonants and the concomitant development of tone in Sino-Tibetan has been considered by some to be a drift in these languages. The former existence of these lost final consonants may be deduced from the rimes in the Shi-Ching and by comparison with related languages such as Tibetan. Various scholars such as Karlgren, Li, and Pulleyblank, in their analyses of the origins of tone have proposed various final consonants whose loss precipitated specific tones. For example, Karlgren has proposed that the loss of final -b/-d/-g has given rise to the Ancient Chinese departing tone. (Greenberg has proposed a similar origin of tone in West African languages, namely that a voiced consonant produces a low tone through the intermediate stage of voiced aspirate or breathy voice.) Note, however, that the feature of tone was not developed in Yenisei-Ostyak, a Sino-Tibetan language spoken in Northern Siberia. This might lead us to conclude that the development of tone in Sino-Tibetan was not a language-specific family drift at all, but rather an areal feature of East and Southeast Asia, possibly originating in the Miao languages. The type of diachronic universal one would like to postulate to explain these developments would be the following: if a consonant, or loss thereof, produces tones, then a voiced consonant would tend to produce a lower tone and a voiceless consonant a higher tone. The well-known splitting of the four Ancient Chinese tones into upper and lower registers depending on the voicing of the word-initial consonant may be taken as further evidence for this tentative universal.

Conclusions. These examples suggest that it is unnecessary, and in fact counter-productive, to predict (or explain) language change using statements which are language specific, or limited to specified, genetically-related language families. It is such statements which (with some tightening of variant terminology) we refer to as invoking drift to describe language change. Prior research has focused on affirmative drift statements -- that is, statements which select particular types of rule changes (or ultimate impacts of rule changes on the structure of the language) as being particularly likely to occur in stipulated language-specific contexts. It is interesting that most or

almost all past effort aimed at formulating such drift statements has been focused on Indo-European historical phenomena.

Examination of the same primary body of data gave rise, in other hands, to a conceptual apparatus and body of theoretical insights which, via Jakobson and others, have passed into more modern and integrated theories of linguistic process. At the same time, broadening historical studies have achieved wider validation of findings first encountered in the Indo-European context. These include the concept of markedness and its implications, the principle of compensation, and the so-called 'laws of analogy.' Greenberg's elucidation of synchronic and diachronic universals provides a general model for the evaluation of such statements, and the development of new ones.

A diachronic universal can be viewed as a statement of the relative likelihood of particular rule changes. These statements admit contexts which refer to the synchronic state of the grammar, or its antecedent diachrony. However, unlike statements of drift, they do not admit language or language-family restrictions in their contexts. A diachronic, like a synchronic, universal is useful if its predictions are valid with better than chance frequency. Diachronic universals are explicitly selective and relative: they are not limited to prescription of particular changes that are predicted to occur, but embrace contrasts between relatively probable versus improbable changes.

The utility of the concept of the diachronic universal is already well established. The burden of this paper has been to demonstrate that, using such universals, we can formulate statements which address the same historical phenomena that have been previously treated by the positing of 'drifts', achieving explanations which are more general, insightful and economical than those arrived at by reference to 'drift'. When this is done, the focus shifts to the question of whether there are, in fact, any instances in which 'drift' provides the best available explanation of historical developments. If not, the notion might well be abandoned. In any case, it would appear that effort can most productively be directed at this stage to further refinement and systematization of diachronic universal findings, particularly those which embody or derive from antecedent assertions of 'principles' of language change.

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Reference Restricting Operators in Universal Grammar

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In a standard logic (SL) the logical structure we assign to a sentence like he hit himself is roughly xHx , in which the identity of reference of the two referential positions is guaranteed by using the same variable in both positions. I will propose in this paper however an Extended Logic (EL) in which the two referential positions in logical structure (LS) are represented by distinct variables and an overt identity operator is used to force their coreference. Thus the LS for he hit himself will be $(Ix,y)xHy$, read as "identifying x and y , x hit y ."

We shall support our claims for EL over SL using the five criteria below in terms of which the adequacy of a proposed LS is to be evaluated.

1. Primary Logical Adequacy. LSs for natural language sentences (Ss) must correctly determine the logical properties of such Ss. Roughly this is done as follows: The notions true and false in a state of affairs are formally defined on the LSs for Ss. Then one LS is said to be a logical consequence of another just in case it is true in every state of affairs in which the first is true. So to satisfy the criterion of Primary Logical Adequacy it must be the case that whenever one sentence is judged to follow from another then its LS must be true in every case in which that of the other is true. If this fails then the LSs we are using are not adequate. E.g., if the LS we assigned to John is dumb were not true whenever the one we assigned to John is rich and dumb was, then this assignment of LSs is not adequate, since, pretheoretically, John is dumb must be true if John is rich and dumb is true.

As regards logical presupposition,¹ we say that a LS Q is a presupposition of a LS P just in case it is true whenever P or its logical negation, $\neg P$, are true. Thus if Q is not true then neither P nor its negation are true, and P is then neither true nor false but has a third value (or perhaps is left undefined in this case). Intuitively, the presuppositions of a sentence are that part of the meaning of a sentence which is not affected by denying (or questioning) it. E.g. the student who cried was sad presupposes some student cried since the latter is true if either the former, or its natural denial, the student who cried wasn't sad, are true. In formulating the EL I am not concerned with how presuppositions are to be represented, it is sufficient that we distinguish in some way between what part of the information in a sentence (or LS) can be affected by negation and what part can't.

Clearly then the basic logical properties of a S are determined by the truth and falsehood conditions of the LS we assign it. Let's compare then these conditions for the two LSs proposed for he hit himself. In SL, xHx is true just in case the thing ' x ' denotes is in the H relation to itself. It is false if it isn't. In EL, $(Ix, y)xHy$ is true just in case x and y

denote the same object and that thing is in the \underline{H} relation to itself. The LS is false if ' \underline{x} ' and ' \underline{y} ' denote the same object, but that object is not in the \underline{H} relation to itself. Otherwise, i.e. if ' \underline{x} ' and ' \underline{y} ' do not denote the same object, the LS is assigned the third value (or left valueless).

The principle difference in the two LSs is that that of EL allows for the possibility that the two referential positions do not corefer, and in that case treats the LS in the same way it treats others whose presuppositions fail.

In SL however there is no way that the two positions can fail to corefer, since they are filled by the same referential expression (RE). Nonetheless, in both LSs coreference of the two REs is presupposed since in each case if the LS is either true or false the two REs must corefer. EL has only the very slight advantage over SL in that it makes the statement of the presupposition more explicit. Furthermore, in addition to representing the major presupposition of he hit himself both proposals would seem to represent the same consequences, since if either LS is true the two REs must corefer and the object referred to must be in the \underline{H} relation to itself. We will assume then that there are no consequences or presuppositions of he hit himself which can be shown to obtain using one of the LSs proposed but not the other.

The two LSs do not so much differ with regard to basic logical adequacy then as they do with regard to the means used to express the presupposed coreference of the two referential positions. SL uses repetition of REs, and EL uses distinct REs and an explicit operator which identifies their reference.

We consider now criteria to use in choosing between LSs of the same degree of logical adequacy. First however we should justify why we want to make such a choice. We do, because we are interested in making generalizations concerning the logical expressive power of natural languages. Several such generalizations have been offered in Keenan [1973 and 1975]. E.g. it was shown that languages which present personal pronouns in positions relativized (e.g. the man that Mary saw him, rather than the man that Mary saw) permit the formation of a larger class of relative clauses than languages which do not present such pronouns. And we explained this on the grounds that pronoun retaining languages presented in surface more of their logical structure than pronoun deleting languages. But it is obvious that to make such generalizations rigorously we need a well defined set of logical structures expressible in any given language.

2. Criteria for Choosing Between LSs of the Same Degree of Logical Adequacy.

2.1 Simplicity. While this criterion is notoriously hard to apply in many cases, both in logic and in syntax, it does seem intuitively clear that the SL representation of he hit himself, \underline{xHx} , is simpler than the EL one, $(\underline{Ix,y})xHy$ since the former needs only a binary predicate symbol and two REs, whereas the latter needs all of this plus a new (relative to SL) category of sentence

operator--one which forms sentences from sentences by constraining the reference of REs which otherwise might have their reference interpreted independently. Clearly we must justify using a new category of logical operator to do something we can do without it.

And the justification is basically that, independently of representing the coreference in he hit himself, we need a class of operators of which the identity one is but a special case. Adding the identity operator then does not increase the types of logical categories we need.

Consider the LS need for sentences like (1) from Mojave (Pam Munro, pers. comm.):

- (1) a. $n^y a-$ iva:- $\begin{Bmatrix} k \\ m \end{Bmatrix}$ yaamo:m- k
 b. when-arrive+3sg- $\begin{Bmatrix} ss \\ ds \end{Bmatrix}$ drunk+3sg-past
 'When he_i arrived $\begin{Bmatrix} he_i \\ he_j \end{Bmatrix}$ was drunk'

In (1a) the use of the 'same subject' marker -k in the subordinate clause forces the interpretation that the person who arrived and the one who was drunk are the same. And in (1b) the 'different subject' -m marker forces the interpretation that they are different. (The marking remains the same when either clause takes full NP subjects as well.)

The problem for SL here is how to represent the LS of (1b) where the two REs incorporated into the verb must have different reference. Merely using distinct variables in the relevant referential positions in LS does not, and cannot in principle, force non-coreference. Distinct variables simply refer independently, and may, by accident so to speak, be assigned to the same individual. In fact, in SL there are LSs in which necessarily distinct variables are interpreted as the same individual. E.g. $(\forall x)(\forall y)(x = y \text{ and } zHw)$.

We might consider using a LS with distinct variables, conjoined with the LS which states that the variables differ in reference. Then the LS of (1b) above would be roughly:

- (2) $(x \neq y)$ and (when x arrived y was drunk)

But (2) is not logically adequate because it explicitly asserts the non-coreference of x and y , which is presupposed in (1b). If it were merely asserted in (1b) then its natural denial, (3), could be true merely if x and y referred to the same object and when x arrived y was drunk was true. But in fact the non-identity of reference is not affected by negation. (3) still requires that the one who arrived and the one who was drunk be different, and states merely that y was not drunk when x arrived.

- (3) $n^y a-$ iva:- m , yaamo:m- mpotc
 when-arrive+3sg-ds, drunk+3sg-neg
 'When he arrived he wasn't drunk'

In EL however it is easy to represent the LSs of sentences like (1b). We merely use a reference restricting operator (RRO) which stipulates that two REs must be assigned different referents in order for the sentence operated on to be either true or false. Somewhat more formally then, $(Nx, y)S$ will be true just in case x and y refer to different things and S is true; it will be false just in case x and y refer to different things and S is false. Otherwise it is third valued (or valueless). In EL then the LS of (1b) will be roughly $(Nx, y)(\text{when } x \text{ arrive, } y \text{ was drunk})$.

Now since SL seems to provide no logically adequate way to represent presupposed difference in reference, EL is to be preferred to it on the grounds of primary logical adequacy. Thus we have independent motivation for a class of RROs, and using simply another one to stipulate positive (rather than negative) co-reference does not increase the basic complexity of the logic.

We should further insist that marking negative co-reference is by no means an isolated phenomena across languages. It is common in Yuman languages like Mojave [Munro, 1974; Jacobsen, 1967; Winter, nd] as well as certain Uto-Aztecan languages like Hopi [Keenan, 1975]. It is further a typological trait of the Eastern New Guinea Highlands languages e.g. Fore (4), Scott [1973].

- (4) a. kana- $\begin{Bmatrix} \text{ogá-} \\ \text{nta-} \end{Bmatrix}$ na wa-tá' y- e
 b. come- $\begin{Bmatrix} \text{ds 3sg past} \\ \text{ss 3sg past} \end{Bmatrix}$ - 3sg go-past-3sg-indic
 'He_i came and $\begin{matrix} \text{he} \\ \text{he}_i^j \end{matrix}$ went'

Note further that many languages, e.g. Turkish, Swedish, Finnish, distinguish reflexive from non-reflexive possession. Thus in Turkish (5a) [Eser Erguvanli, pc] the person hit must be someone's friend other than Ali's, whereas in (5b) it is Ali's friend who was hit.

- (5) a. Ali o- nun arkadaş-i- na vur-du
 Ali 3sg-3sg gen friend- 3sg poss-dat hit-past
 'Ali hit his (\neq Ali's) friend'
 b. Ali (kendi) arkadaş-i- na vur-du
 Ali (self) friend- 3sg poss-dat hit-past
 'Ali hit his (own) friend'

Finally note the many languages e.g. Yoruba (6) mark both positive and negative coreference between subjects of verbs of thinking and saying and subjects of their sentential complements.

- (6) Ojo_i ro pe $\begin{Bmatrix} \text{on}_i \\ \text{o}_j \end{Bmatrix}$ mu sasa
 Ojo thinks that $\begin{Bmatrix} \text{he (=Ojo)} \\ \text{he (\neq Ojo)} \end{Bmatrix}$ is clever

2.2 Maximizing Generalizations Concerning Logical Expressive Power of Natural Languages. Other things being equal we should adopt those LSs which permit a natural statement of generalizations concerning the relation between LSs and the syntactic means used to express them. Now by representing both positive and negative coreference as special cases of RROs we can naturally state the following generalization: 'If two referential positions are in the domain of a negative RRO then they are also in the domain of a positive RRO'. That is, if a language can stipulate negative coreference between two positions then it can always stipulate their positive coreference as well. On our approach then we are stating that there is a conditional dependency between two members of a given class of LSs. This type of dependency is already known to be natural (e.g. if verbs agree with subjects in gender then they agree in number, etc.). On the other hand, if the LSs of positive and negative coreference are unrelated it seems much more arbitrary that there should exist any dependency relation between them.

The generalization relating positive and negative coreference suggests a simplification of our notation in which positive coreference is treated as the unmarked case. Henceforth, instead of writing $(I_{x,y})$ we shall simply write (\underline{x},y) , it being understood that when no overt RRO symbol is present then identity of reference is intended. Negative coreference of course will still be noted as $(N_{\underline{x},y})$.

There is a second generalization we can make on RROs: Namely, any RRO always includes main clause subjects among the REs with respect to which the reference of other REs can be restricted. That is, subjects are always among the controllers of any type of reference restriction.²

2.3 Generality. If distinct Ss have a logical property in common then, other things being equal, this property should be represented in the same way in logical structure.

Here we would like to exhibit several other cases of positive coreference which can all be expressed by RROs of the sort we are proposing but which, in SL, would either be represented differently or not at all.

Case 1. Consider the positive coreference which obtains between full NPs and pronominal markers on verbs, as in Kinyarwanda (7) [Alexandre Kimenyi, pc].

- (7) abanyeshuuri ba- rasoma igitabo
 the students they-read book
 'the students are reading a book'

In traditional terms such pronominal forms are considered to be agreements with the subject, and transformationally are thought to be introduced by a rule which copies certain features of the (possibly derived) subject onto the verb. On our approach however we consider such "agreements" to be independently generated pronominal forms, and the full NPs they corefer to₁ be operators which

place restrictions on their reference. Namely, they force the pronoun to refer to a specific person in the case where the full NP is e.g. a proper noun, or they constrain the pronoun to take its reference within a certain class in the case of a common noun. Thus the LS we propose for John drinks (ignoring tense) is (J, x)(x drink), read as "identifying x with John, x drinks." Similarly a (specific) man drinks will be represented as (M man, x)(x drink), which will be read as "restricting x to the set of men, x drinks." That is, the LS is true just in case x drink is true, where x refers to some object in the set of men. All men drink on the other hand will be represented as (All men, x)(x drink), which is true just in case x drink is true, where x is an arbitrarily chosen man. Analogously, some men drink is represented as (some men, x)(x drink).

If our analysis of agreements as pronominal forms is adopted we can explain several otherwise unexplained facts. Notably:

1) In languages in which the "agreements" are explicit (i.e. morphologically segmentable, and their form varies with the noun they corefer to or with the inherent properties of the referent, rather than with the verb subclass) they can function alone in main clauses as independently referring elements. Thus while the subject and object agreements in (8), from Swahili [Jean Tremaine, pc] might be argued to be copied from the full NPs, they cannot be so argued in (9) since there are no full NPs. But (9) can easily be used in a situation in which the hitter and the hittee are visibly present to speaker and hearer even though they have not been previously mentioned in context.

- (8) Juma a- li- m- piga Ali
Juma he-past-him-hit Ali
'Juma hit Ali'

- (9) a- li- m- piga
he-past-him-hit
'he hit him'

2) Verb "agreements" may code semantic features about their referent not present in the full NP and hence not obtainable by copying. A common case is where verbs "agree" in gender with a full NP which is not marked for gender either overtly or covertly (like proper names in English). Thus from Russian, Sasha pila = Sasha drank (fem), whereas Sasha pil = Sasha drank (masc). Hebrew and Avar provide further examples of this sort. More striking perhaps are cases where the verb "agreement" differs in number from the NP it corefers to. This is illustrated in (10) from Walbiri [Hale, 1973], (11) from Daga [Murane, 1974], and (12) from Spanish [Alfredo Hurtado, pc].

- (10) ngarka-Ø ka- na puḷa- mi
man- abs pres-I shout-pres
'I (a man) am shouting'

- (11) oanenapan war-apen ta-inton...
 people get-inf do-lpl past
 'We people were trying to catch (the pig)...'
- (12) a. los mujeres protestamos pero...
 the women complain-lpl but...
 'We women complain but...'
- b. los lingüistas tenéis una terminología muy poco
 the linguists have-2pl a terminology very little
 elegante
 elegant
 'You linguists have a very inelegant terminology'

A third type of case concerns the semantic relations which NPs bear to their verbs. Thus in Hadza (13) [Keenan, 1972] is ambiguous according as the lion killed the buffalo or the buffalo killed the lion. But the pronominal affixes on the verb are not ambiguous. The final "agreement" unequivocally refers to the agent, the preceding one the patient.

- (13) sesame-ko //o-ta- kwa nak'oma-ko
 lion- female kill-her-she+past buffalo-female
 'the lioness killed the female buffalo' or
 'the female buffalo killed the lioness'

Adopting our analysis of verb agreements as pronominal forms, then many simple sentences in many languages evidence positive coreference between full NPs and pronominal forms. This coreference is naturally represented in our logic by using further instances of RROs, as indicated above. In SL this coreference is not generally represented at all. Our logic appears more general than SL then, since coreference in a diversity of structure types is expressive in the same way.

Case 2. In SL the device of indicating positive coreference by repeating REs, even in simple reflexive cases, does not extend to the full range of such structures. Thus while we might represent John hit himself as jHj , this repetition will not work directly for sentences like Everyone hit himself, since the LS of Everyone hit everyone does not express the right truth conditions. In our system however the same identifying operators we need for simple cases apply without modification to these more complex ones. Thus the LS for John hit himself will be $(John, x)(x, y)xHy$, read as "identifying John with x , identifying x with y , x hit y ." Similarly Everyone hit himself will be $(All\ person, x)(x, y)xHy$, read as "restricting x to people, identifying x with y , x hit y ."

Case 3. Clearly the coreference expressed in a sentence like he hit only himself and only he hit himself is basically the same as that of he hit himself. But this is difficult to represent in SL since the two REs, the subject and object of hit, are the same RE and hence it is difficult to have an operator like only operate on one of them independently. In our system however the minimal

meaning of only is easy to represent. (only x)S, read as "only x is such that S" is true just in case S holds of x and is false of anything different from x.⁴ Otherwise it is valueless (or third valued). Assuming this logical analysis of only we can represent only he hit himself as (only x)(x,y)xHy, read as "only x is such that identifying x with y, x hit y." And he hit only himself will be (x,y)(only y)xHy, read as "identifying x with y only y is such that x hit y." Similarly we can naturally distinguish the LSs of Nixon likes only himself, (n,x)(x,y)(only y)(xLy), and Nixon likes only Nixon, (n,x)(n,y)(only y)xLy, as well as Only Nixon likes only himself, (n,x)(only x)(x,y)(only y)xLy, and Only Nixon likes only Nixon, (n,x)(n,y)(only x)(only y)xLy. We note that logically adequate structures for these sentences can be provided by SL, but they are highly unnatural by our criterion in 2.4.

Case 4. Since RROs may restrict the reference of two REs, it is easy to represent the double binding in Bach-Peters sentences like the man who slapped her really loved the woman who insulted him, where the reference of the two NPs the man who slapped her and the woman who loved him is not independent one from the other. Further, this type of double binding is more prevalent across languages than has previously been realized. Note the 'Janus construction' in Turkish (14) [Eser Erguvanli, pc]. This construction is also present in Luiseño [Pam Munro, pc] and Persian [Galust Mardirussian, pc].

- (14) vali_i-si_j köy_j-ü-nü_i metetti
 mayor_i-3sg poss_j village_j-acc-3sg poss_i praised
 'Its mayor praised his village'

In (14) the reference of its must be to village, and the reference of his must be to mayor. Thus the reference of its mayor and his village cannot be determined independently of each other. Note further that the pattern of coreference is presupposed. If we deny (14) we obtain (15) in which the pattern of coreference is not changed.

- (15) vali_i-si_j köy_j-ü-nü_i met et-me-di
 mayor_i-its_j village_j-acc-his_i praise-neg-past
 'Its mayor didn't praise his village'

Note further that this type of double binding may extend across clause boundaries (at least in underlying structure).

- (16) vali_i-si_j köy_j-ü-nün_i güzül
 mayor_i-its_j village_j-acc-his(gen)_i beautiful
 ol-dug-u- nu soyle-di
 be-nom-acc-poss say- past
 'Its mayor said that his village was beautiful'

The LSs we provide for such sentences are as follows: (14) = $(w,y)(x,z)(w's\ mayor, x)(z's\ village, y)(x\ praise\ y)$. The truth conditions of (14) are, informally: "x praised y, where x is identified with w's mayor and w is identified with z's village, and z in turn is identified with x, the mayor."

Since representing double binding has been problematic in SL but requires no additional operators in EL we conclude that EL is more general than SL.

2.4 Correspondence Principle (Naturalness). We would like to argue that certain LSs are more natural than others in that their formal properties correspond more closely to the surface syntactic properties of the natural languages Ss which express them. What constitutes a closer correspondence will doubtless be problematic in many cases, but some cases seem to us clear enough to constitute an argument in favor of EL over SL. The following correspondence principle (CP) covers many of these cases: "LSs are more natural according as distinct elements of the LS correspond to distinct elements in surface, and identical elements in LS correspond to identical elements in surface."

The reason why CP is natural is that speakers do make inferences i.e. assess logical consequences, on the basis of information provided in surface structure. If the LSs we use to represent the surface forms have many formal properties in common with the surface form we have at least some hope that we have represented properties of surface forms which speakers actually use in coding their logical properties.

Consider e.g. a trivial instance of CP. Suppose that even within SL one were to propose (17c) as a LS for (17a) rather than the more usual (17b).

- (17) a. Socrates is a man
- b. $man(s)$
- c. $(man(s) \text{ and } ((\exists x)Horse(x) \text{ or not } (\exists x)Horse(x)))$

Since (17c) is the conjunction of (17b) with a tautology it follows that (17b) and (17c) always have the same truth value and hence have the same degree of primary logical adequacy as representations for (17a). But CP states clearly that (17b) is the more natural representation of the two since (17c) contains many distinct elements e.g. Horse, or, etc. which are not present as distinct elements in (17a).

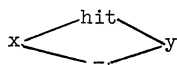
Consider now our two proposals for representing positive coreference. The SL one expresses the coreference in he hit himself or John hit himself by repeating the subject RE in object position. If this were natural by CP we would expect to find across languages that reflexives sentences were expressed literally as he hit he or John hit John. But in fact this never happens. No language expresses positive coreference in this environment by using identical NPs in the subject and object slots. Even if the subject and object are both proforms, they are probably always distinct in some

way. Hence SL is unnatural by CP since its LSs present identical elements in places where natural languages use distinct elements. By the same token, our logic is in this respect more natural since it uses distinct elements in the referential positions.

Furthermore many languages (but far from all) distinguish in surface the coreferential expression from the identity binding element. Thus in the switch reference cases cited earlier the marker of same reference or different reference is distinct from the REs whose reference is restricted. And even in many simple reflexive constructions we can often distinguish the referential element from the identity element. Thus in many languages, e.g. Basque (18), Georgian, Berber (Tamazight), Tera, Hebrew, etc. John hit himself is literally something like John hit his head, his bone, his self, etc. where head, etc. represent the referential element, and the possessive adjective or pronoun represents the identity operator.

- (18) Gizona-k bere burua jo zuan
man-erg his head hit he-had

On the other hand our LSs appear unnatural in that no language normally renders He hit himself as "identifying he with him, he hit him." That is languages do not have repeated occurrences of the subject and object proforms. This suggests that we modify our logical notation so that two REs be directly related by two or more relational symbols--the main one, and the 'logical' one of identity or non-identity. Thus we might use something like



which would indicate that x bears both the hit and the identity relation to y. This seems to us a real possibility, but the notation would have to be formally worked out before it could be taken seriously.

We also should mention that many languages do not present two surface REs in simple reflexive constructions--rather the verb takes a reflexivity marker and no object proform appears. By CP this type of reflexive should have a different LS than the ones we have been considering, and this seems to us correct, although space prevents us from arguing the point.

Finally, consider the naturalness of the LSs we propose for simple non-reflexive sentences like John hit Bill, namely (j,x)(b,y)xHy. We have already indicated that in many languages the variables attached to the predicate show up as 'pronominal agreements' on the verb. It further happens, to a surprising extent, that full NP subjects and objects also carry pronominal indices which match those on the verb making them look extremely similar to the LSs we propose. E.g. (19) from Swahili [Alex. Kimenyi, pc].

- (19) wa- naume wa- li- m- piga m- ke
 they-man they-past-her-hit she-woman
 'the men hit the woman'

From Avar [Anderson, nd], who notes, pc, that this matching is not synchronically productive).

- (20) v-as v-eker-ula
 -boy -run-pres
 'the boy runs'

From Genoese [B. Vattuone, 1975?]

- (21) A Katayni a vende i pesi
 3sg fem Catherine 3sg fem sells 3pl fish
 'Catherine sells fish'

It appears then, that at least for certain simple structures in many languages, EL appears more natural than SL. And overall then, the criteria in 2.1-2.4 largely argue in favor of our analysis of RROs over the analysis of SL.

Footnotes

¹For some discussion of logical presupposition see Keenan [1972], Karttunen [1973] and Van Fraassen [1969].

²A possible counterexample: Angaataha [Huisman, 1973] is cited as having switch location markers, both positive and negative, but not switch subject markers. That is, if the location of the action of an early clause is changed in the next clause the verb takes a certain marker; if no change then the verb marking is different.

³In fact, we would be inclined to propose as underlying structures simply a set of REs expressions and a non-logical predicate, together with the various relations which the REs bear to the predicate (e.g. agent of, patient of, etc. as well as to each other (e.g. identity, non-identity).

4. It is false if S holds of x and something different from x.

APPENDIX

FORMAL SEMANTICS OF REFERENCE RESTRICTING OPERATORS

We assume a definition of interpretation similar to that in Keenan [1972]. Essentially an interpretation of the formal language specifies a universe of discourse, provides a unique discourse name for each object in it and allows these names to occur in the same positions as free variables, and gives an interpreting function *f*, which interprets sentences as truth values, variables and proper nouns as members of the universe of discourse, and common noun phrases as subsets of the *U* of *D*. We shall refer to the

FOREGROUNDING REFERENTS: A RECONSIDERATION
OF LEFT DISLOCATION IN DISCOURSE

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I. GOALS AND ORIENTATION

In this paper we discuss a set of verbal constructions found in spontaneous conversational discourse. These constructions have in common the following format: Referent + Proposition. That is, some referent is specified initially and is then followed by a proposition relevant in some way to this referent.

(1) GTS4-1

(K has been talking about fact that his car
radio was taken from his car)

REF

K: They cleaned me out. And my father oh he's
PROP

//he's fit to be tied.

R: Tell Daddy to buy you some more.

For example, in (1), "And my father oh he's-//he's fit to be tied." represents such a construction. Here the referent expressed by "my father" is semantically related to the subsequent proposition "he's-//he's fit to be tied."

Constructions of this type have been previously described as left-dislocations (Chafe 1975, Gruber 1967, Gundel 1975, Ross 1967 for example). Left-dislocation represents a transformation that moves an NP within the sentence. The term left-dislocation is not entirely appropriate to the constructions considered in the present analysis. First, although the proposition following the initial referent usually contains a coreferential pronoun, it sometimes does not. Example (2) illustrates such a case:

(2) Two Girls; 8

(in discussion about reading required for courses)

REF

B: ohh I g'ta tell ya one course, ((pause))

A: (incred-)

REF

B: The mo-the modern art the twentieth century
PROP

art, there's about eight books.

Secondly, left-dislocation is a formal operation that transforms one sentence into another. However, many of the constructions in our data look more like discourses than sentences. That this has not been previously appreciated is due to the failure to examine these constructions in their context of use.

In the discussion to follow we consider the communicative work being performed in utterances of the form: Referent + Proposition. This involves first familiarizing the reader with the discourse contexts in which such utterances are employed. In particular, we turn our attention to the role of the initial referent in the discourse. What is the relation of the initial referent to the discourse history, for example? What is the relation of the initial referent to subsequent discourse? We argue that the status of the initial referent as definite /new or given/new (Chafe 1975) needs further clarification. Specifically it will be argued that a critical factor is the need of the speaker to provide appropriate old information, i.e. old information relevant to the main point expressed about the referent.

After assessing the function of these constructions in the discourse at hand, we present alternative strategies for carrying out the same communicative work. These strategies involve a sequence of two or more utterances. In the first utterance, a referent is introduced into the discourse. In the subsequent utterance(s), propositions relevant to that referent are expressed. We argue that Referent+Proposition constructions share many of the properties of these sequences.

II. DATA BASE

Our analysis is based primarily on transcriptions made by G. Jefferson of five group therapy sessions (GTS) in which several adolescents took part (approximately 500 pages). Material on children's use of the constructions under study is drawn from transcriptions of the conversations of twins recorded over the period of a year. (33 mos. - 45 mos.) (Keenan 1974).

III. ROLE OF REFERENT + PROPOSITION IN THE DISCOURSE HISTORY

A. BRINGING REFERENTS INTO DISCOURSE:

What is the speaker doing when he produces utterances of the form "Referent+Proposition", as expressed in example (1)? As a first step in answering this question, we construct a series of hypothetical discourses. Imagine the following dialogues:

Interlocutor A

- * (A) What happened to Tom?
- ? (B) What happened to Tom?
- (C) What happened to Tom?

Interlocutor B

As for

Concerning Tom, he left.
Tom, he left.
His car, it broke down,
and he's depressed.

Each of these dialogues varies in its degree of acceptability. Dialogue (A) appears the most awkward, and in fact, we did not find any instances in the data in which as for X, concerning X, appeared following an immediately prior mention of X. (B) as well is odd. The most natural way to utter such a sequence is to utter the second "Tom" with a question intonation, indicating that perhaps he had not heard the speaker, e.g. "Tom? He left". We can imagine, however, that such a discourse is possible if a long pause separates the two utterances and/or if the addressee(B) repeats "Tom" in the course of searching for an adequate response.

Discourse (C) is by far the most natural of the three presented here. And in fact, constructions of the form "Referent + Proposition" appear most often in precisely this sort of discourse environment, namely, an environment in which the referent does not appear in the immediately prior discourse. Chafe (1974) discusses the fact that may or may not be presently in the consciousness of the hearer. If a referent is in the consciousness of the hearer, the referent is said to be "foregrounded". In English foregrounded information may be syntactically marked by the speaker by use of the definite article, anaphoric pronoun, relative clause and the like. We would like to claim here that in producing constructions of the form "Referent + Proposition" speakers are performing work of precisely the opposite sort: Rather than presenting information that is already in the foreground of the listener's consciousness, the speaker brings a referent into the foreground of the listener's consciousness (See also Sankoff & Brown 1975). With respect to the interactional history of the interlocutors, the referent is usually not currently a "center of attention" i.e. not usually the current "topic" (in the sense described by Li and Thompson 1976). In producing constructions of this sort, the speaker makes the referent a "center of attention" (See also Payne 1974).

Typically, the initial referent is some entity known to or knowable by the hearer from the non-verbal context of the utterance from some prior background experience. In other words, it is some entity that the hearer can identify or recognize. The referent may or may not have been discussed at some point in the current discourse participated in by the interlocutors:

1.) In many cases, the speaker uses the "Referent + Proposition" construction to INTRODUCE discourse-new referents. Examples (2) (3) & (4) exhibit this work:

(2) GTS4:15

REF

PROP

K: Uh Pat McGee. I don't know if you know him, he
-he lives in//Palisades.

J: I know him real well as a matter of fa(hh)
 (he's) one of my best friends

K: He-he used to go to the school I did// an' he-
 J: No, no(hh)

K: He was in the dorm with me, and I was over him-
 and he-he had a room/ An' he-

J: No! (hh)// heh heh

K: -he despised me.

(3) GTS1:97

REF

L: yeh, that c'd b e, cawss my sister, 'hh she
 PROP

en her boy friend jus broke up becawss he ast
me tu me tuh go out with um:

(4) GTS3:62

(Adolescents discussing how parents treat them)

K: Yeah// Yeah! No matter how old// you are

L: Yeah. Mh hm

REF

L: Parents don't understand. But all grownups
 PROP

w-they do it to kids. Whether they're your
 own or not.

2.) On the other hand, some referent may have been in the foreground of the interlocutor's mind at some prior point in the conversation but feel to the background subsequently. In these instances, the speaker may use the "Referent+Proposition" construction to REINTRODUCE a referent into the discourse. It should be emphasized here that a referent may fall into the background rapidly after its first mention. It sometimes happens that a referent must be reforegrounded after one turn or even after one utterance within a turn. Example (5) illustrates a re-introduced referent:

(5) GTS3:37

K: An' I got a red sweater, an' a white one, an'
 a blue one, an' a yellow one, an' a couple
 other sweaters, you know, And uh my sister
loves borrowing my sweaters because they're
pullovers, you know, an' she c'n wear a blouse
 under'em an' she thinks "Well this is great"
 (pause)

REF

PROP

K: An' so my red sweater, I haven't seen it since

I got it.

B. FUNCTIONS OF FOREGROUNDING:

Once the global function of these constructions, i.e. to bring into the foreground or focus on some referent (c.f. Sankoff & Brown 1975), is understood; more particular functions of this phenomenon make sense.

1) ALTERNATIVES: In many cases, the speaker uses this construction to bring in a different referent from one previously specified with respect to some particular predication. The speaker in these cases suggests a ALTERNATIVE to that produced in a prior utterance or turn. Example (4) illustrates this usage. We avoid the term "contrast" to describe this function, as "contrast" usually implies that the referent brought in in "contrast" is an alternative considered (with varying degrees of certitude) by both hearer and speaker (Chafe 1975, Kuno 1972). The way in which many of these "Referent + Proposition" constructions is used is much broader than this treatment of contrast. In the data at hand, the speaker may bring in a referent that the hearer has not yet entertained as a viable alternative. For example, in (4) the referent "all grownups" is not a set that was under consideration by those listening to L.

2) PARTICULAR CASES: The "Referent + Proposition" construction is used to draw the listener's attention to a particular case of some general phenomenon under discussion or to some particular member of a previously specified set. For example, in (5) the speaker is isolating "my red sweater" from a previously mentioned list of items. Perhaps the most common use of this construction is to introduce referents that further illustrate the current topic of discussion. (Note that the referents in themselves do not constitute topics of discussion (discourse topics) but rather are important arguments in a proposition or set of propositions (discourse topic) under consideration in discourse. (c.f. Keenan and Schieffelin 1976)) For example, the discourse in (2) is preceded by a discussion about people who do not like one another. The introduction of "Pat McGee" initiates a case history relevant to the current topic or concern of the interlocutors. Similarly, in (6) below, the interlocutors have been talking about students falling asleep in class and K can't resist bringing in a relevant anecdote:

(6) GTS5:35

REF

PROP

K: Uh:: this guy, you could yell "Hey Jo:hn, hey Joh-" 'n you c'd go over an'tap him on the shoulder

R: So he's gotta//good imagination

PROP

K: That's the only way you c'd snap him out of it.

It isn't always the case that the introduction of novel referents as particular cases involves speaker change. In many cases, a speaker may bring up a certain point and use the "Referent + Proposition" construction to illustrate his/her own point. For example in (7) below, there has been some discussion about how parents never treat their children as mature individuals (see also example (4)) and L. brings up the point that her parents are exceptions to this generalization. By way of illustration, L. describes an incident in which her mother plays a major role:

(7) GTS3:63

L: Well my parents are different. I- it isn't my
 parents that do it to me, cause my my
 REF₁ REF₂ PROP₂
mother, like my little sister, she had a party.
 PROP₁
So she says to the girls, "Just don't get pregnant
 (pause)

D: heh heh heh

Notice here that we have a case of a complex "Referent + Proposition" construction in which one Referent + Proposition is embedded in another. The "Referent + Proposition" construction "like my little sister, she had a party" is embedded in the Referent + Proposition construction "my mother,....so she says to the girls, 'Just don't get pregnant'".

3) SPECIAL EMPHASIS: In some cases, the "Referent + Proposition" construction may be used neither to introduce nor re-introduce a referent but to mention again a referent currently in the foreground of the interlocutors' minds. We argue that this use is secondary rather than basic to such constructions. In these cases, the speaker is using the basic function of focussing the listener's attention on some referent to amplify the attention paid to some referent under discussion. In other words, the speaker uses the basic focus function to give SPECIAL EMPHASIS or importance to a particular entity. Example (8) illustrates this use.

(8) GTS1-43

(discussing younger siblings)

L: T'know some of 'em are darfn tall and
 goodlooking they could pass for (t)-
 nineteen.// A twelve year old guy comes
 over I say who's y-older brother is he?
 He's not he's in the A7.
 R: But they don't-
 R: But they don't have a brain to go with it
 hehhh

L: REF PROP
These kids I don't believe it they're
six foot.

This use of "Referent + Proposition" appears infrequently (6.6% of adult corpus, f=3) in the data under consideration.

C. FOREGROUNDING AND THE TOPICALIZATION HIERARCHY

If our suggestion is correct, that is, if the primary function of Referent + Proposition constructions is to bring into the discourse a referent that the speaker believes is not currently in the foreground of the listener's consciousness, then one would expect that frequently mentioned or discussed referents would appear infrequently in these constructions. That is, referents that are high on the sentence topic hierarchy (Li and Thompson 1976) should be low on the foregrounding referent hierarchy. To a large extent, this is, in fact, precisely what occurs.

In this speech community co-conversationalists usually talk about themselves (Sacks 1968, Hawkinson and Hyman 1974). Overwhelmingly, conversations orient themselves to the speaker and/or the hearer. In terms of the sentence topic hierarchy, then, referents for "I" and "you" appear at the top. In the Referent + Proposition constructions collected, we found a number of cases of indirect reference to speaker or hearer, reference to others through the speaker or hearer, but direct reference to the speaker or hearer appeared only once (2% of adult data). Our data suggest that these referents are less likely to be foregrounded or "topicalized" through such constructions. We can explain their infrequent appearance as due to their near constant presence in the discourse history.

<u>SENTENCE TOPIC</u>	<u>REF + PROP CONSTRUCTIONS</u>	
SPEAKER/HEARER	INDIVIDUALS OTHER THAN SPEAKER/HEARER	HIGH LIKELIHOOD
INDIVIDUALS OTHER THAN SPEAKER/HEARER	SPEAKER/HEARER	LOW LIKELIHOOD

This observation should be taken into account in comparing topic constructions across languages. Constructions of the Referent + Proposition format have been treated as comparable to topic constructions in other languages (Li & Thompson 1976). For example, they often appear as glosses for topic constructions in other languages. It is not clear at this point however, just how such constructions operate in the discourse of different languages. We need to examine the discourse of languages

We need to examine the discourse of languages such as Chinese, Japanese, Korean, Lahu and so on to assess the extent to which the informational status of the topicalized referent(s) is the same. In this way we can assure that constructions that appear similar on formal grounds are similar functionally as well.

IV. FOREGROUNDING, DEFINITENESS, AND SUBSEQUENT DISCOURSE

Thus far, we have discussed the initial Referent in Referent + Proposition constructions in terms of its status as piece of GIVEN information in the discourse (Chafe 1976) and as a sentence topic. We turn now to a discussion of its status as DEFINITE. We use the terms GIVEN and DEFINITE in the sense expressed by Chafe (1976). "GIVEN refers to referents that the speaker assumes to be in the consciousness of the addressee at the time of the utterance." (Chafe 1976:7) DEFINITE refers to referents that the speaker believes the hearer knows you can identify. The hearer may know the referent through the discourse history or through the non-verbal context or through prior shared experience with the speaker, general knowledge of the world and so on. A piece of information, then, may be definite but not necessarily given. For example a referent may be mentioned in discourse for the first time but may be identifiable by the hearer from other sources.

We find that the initial referent in Referent + Proposition constructions normally is not given information, but it is normally definite. However, in looking over these constructions, we find that the distinctions between given/definite/new are still not sufficient for understanding the status of the initial referent and the form of the Referent + Proposition construction. We find that from the speaker's point of view, what is important is that the hearer know certain background information that is critical to assessing the subsequent proposition. That is, the hearer must not only recognize or know who the speaker is talking about. The hearer must know certain facts about the referent, facts that are relevant to the main predication the speaker wants.

We find that many of the constructions in the data perform just this task. We find that in many cases an initial referent will be expressed; it is then followed by one or more propositions that provide more information about the referent; and this in turn is followed by a major predication relevant to the referent. Examples (9), (10) and (11) illustrate such a construction: Referent + Background Proposition + Main Proposition.

- (9) GTS3:70
 (In discussion about attitudes towards young siblings)
 REF BACKGROUND PROPS
 L: My sister when we were up in camp when she was twelve. And all the guys were sixteen, (pause) and fifteen. They don' wanna do out with twelve year olds. So I let everyone know
 MAIN PROP
that she was thirteen and a half, almost fourteen.
- (10) GTS3:47
 REF BACKGROUND PROPS
 K: Y'know, the cops if they see you, and they think
 MAIN PROP
"Well, he's 18," A lotta time they'll letcha by, quicker than a 16 year old or a 17 year old.
- (11) GTS3:64
 (L has been talking about how her car broke down)
 REF
 K: Oh-oh wait. In Mammoth my Jeep I've got surf
 BACKGROUND PROPS
stickers all over the back windows you know?
 L: Mm//hm
 K: An' up there they hate surf. Surf is the lowe//st
 thing, in the world. An' all the adults frown upon it, the kids hate 'em, they see me, an' they used to throw rocks // you know? An' I was avoiding rocks. So I finally decided this
 MAIN PROP
 isn't for me y'know, I took razor blades, took all my surf stickers off? So it looked like just a normal everyday Jeep...

See also example (2).

In these cases it appears that the speaker refers to some entity then realized that he must provide additional information. For example, in (11) K has to provide information about his Jeep and about the atmosphere in Mammoth so that the addressee can understand the activity described in the major predication, i.e. that K had to take stickers off the windows of the Jeep in Mammoth. Similarly in (2), K had to provide further information concerning Pat McGee, i.e. that he lived with K, so that the hearer would understand the relevance of the referent to the topic under discussion.

These observations indicate that the Referent + Proposition construction is a form of "unplanned" speech. In more planned modes of speaking, the interlocutor might present such background information as a non-restrictive relative clause or adverbial clause embedded in a matrix clause. Or the interlocutor might present this information in a sequence of well-formed sentences that anticipate the major predication to be made. Before

developing further the role of Referent + Proposition constructions, we turn to this latter alternative, discourse, as a means of getting a referent known to an intended listener.

V. ALTERNATE FOREGROUNDING STRATEGIES

A. "ABOUT" QUESTIONS:

A speaker may draw the listener's attention to a particular referent in ways other than by the bald presentation of that referent as in "Referent + Proposition" constructions. For example, the speaker may introduce/re-introduce the referent through the use of an "about" question: "How about X?" "What about X?", where X represents some object, event, etc. (See also Gundel 1975). The response to this question provides a proposition relevant to X (the referent). Here, then, two or more separate utterances convey what is conveyed in "Referent + Proposition" utterances. For example, in (12) an individual named "Hogan" is introduced by J in an "about" question. He is identified in the subsequent three turns, at which point J is able to convey the relevant proposition ("he's a real bitchin' guy").

(12) GTS4:21

REF

J: How about a guy named Hogan?

K: Bill Hogan?

K: Bill Hogan

K: Yeah I know him real well.

PROP

J: I do too he's a //real bitchin' guy.

In example (13), D asks his listeners to consider a particular type of person (rather than some specific individual):

(13) GTS5:37

(Talking about self-conscious people)

REF

D: Well what about the guy gets up on the dance floor, who feels that he can't dance.

PROP

R: -He's scared.

B. DIRECTIVES TO LOCATE REFERENT:

One extremely common strategy for bringing a referent into the discourse either as an Alternative or as Particular Case is for the speaker to request that the listener locate the referent in memory or in the non-verbal context. Here the speaker makes use of one or more LOCATING VERBS, for example "look at" "see" "consider" "turn to" "watch out for" "remember" "know" "return to"

"check out" "take a glance at". Certain of these verbs are used to locate referents in both memory and visible environment of the talk taking place. For example, one can ask a listener to "look at" some individual not present, using "look" in a metaphorical sense and of course one can ask the listener to "look " at some object present in the physical setting.

Locating Verbs appear in a number of sentence modalities. For example, they may appear in an interrogative sentence, as in example (14):

(14) GTS4:28

REF

K: (D ju remember) Kouhalan?// (Fat kid two oh nine?)

J: Oh God, yeah, I know that guy.

PROP

K: Did Mc//McGee hates him.

J: That guy's insane we're drivin' down the freeway...

(15) GTS1-73

REF

L: Whaddya think of Paul

K: Paul the //quiet guy?

PROP

L: He was the quiet one who never said anything.

More widespread in conversational discourse is the use of a Locating Verb in the imperative mode. By far the most commonly used is the verb "look" or "look at".

(16) GTS4:12

REF

T: ... Look, if I have - for example Picasso.

PROP

I think he's an individual, who w-you may classify him as being neurotic or I don't know what, but I don't think he is, I think he's.....

REF

J: (Lookit) the guy who cut off his ear

R: That's another man

T: That was Van Gogh

PROP

J: Well, he was nuts, wasn't//he?

The Locating Verb "know" does not appear as such in the imperative, i.e. as "know X!". We find, however, that the texts are littered with the construction "you know" (y'know). We argue that "you know" sometimes operates as a directive to the listener to put himself in the state of knowing X, where X is some referent or proposition conveyed. That is, the speaker is directing the listener(s) to search in memory or in the immediate context for some

known/knowable X. In example (17), we find this use of "you know" intermingled with other locating verbs used to the same end.

(17) GTS1-73

(In discussion of picking fights in downtown Los Angeles)

A: I think-

R: Yeah that was much better man, You know an'
REF

-Lookit these people come walkin down the street (Y'know dey oughta be-) Y'see dis executive, y'know wid his wife y'know

PROP

ou' come up t'him an 'chose'im off, he
PROP

doesn't know what de hell's happened

Here we find the speaker making use of the Locating Verbs "know", "lookit", "see".

If the speaker feels that the listener may not know the information he wishes to convey, he may use "know" in either of two ways: He may ask if the listener knows the entity, proposition to be discussed. This does the work of making the listener aware that there is something that he does not in fact know and puts him in a state of readiness to receive the information (Heringer, pers. communication). In many cases, the speaker does not expect that the listener does know the bit of information he will convey. Indeed often the speaker makes it impossible for ~~the~~ listener to know the information at the time of the "Do you know?" information request. The speaker may simply ask "Do you know what?" or "Know what?". Here the listener is being informed that there is something he does not know. He is obliged to respond with the request for information "What?" or "No, what?" This in turn obliges him to attend to the subsequent response (Sacks 1966). The question "You know what?", then, is a powerful tool for a speaker who wishes to control the direction of the listener's attention. The question operates in much the same manner as the use of the "summons-response" adjacency pair (Schegloff 1972). A summons or calling out of someone's name is usually responded to with some query such as "Yes?" "What is it?" "What do you want?". Having asked this question the party summoned is obliged to attend to its response. Given that "you know" questions are such effective attention-getters, it is not surprising that they are employed to shift to a novel topic or introduce anecdote. Examples (15) and (16) illustrates such uses. Example (18) illustrates a not altogether successful use.

(18) GTS1:10

(in course of joke-telling session)

L: You know what a cute one is? You wanna hear what a cute one is? What's purple and goes bam bam bam bam. A four door plum.
(pause)

K: Terrific.

(19) GTS1:54

(K tasting something)

K: Aahh! ((whispered)) This is good.

L: You know what my father keeps down in the basement? Cases of champagne.

A: What?

(K): (I din't hear.)

L: Cases of cham//pagne.

A second alternative available to a speaker who feels the listener may not know what/who he is talking about is to assert that he, the speaker, knows this information, i.e. "I know X". Example (20) illustrates this strategy.

(20) GTS1:20

(In discussion of going to a psychiatrist at an early age)

K: Oh he is a young'un hhh

R: Maybe younger I don't really remember

L: (If you think-) I know this guy who has been going since he was eight years old and he's even worse off than he-when he started.

R: I thought you were going to say worse off than me hehhhehh

The use of Locating Verbs to direct the listener's attention to something the speaker wants to talk about is common to two sets of speakers other than adult speakers of English. First of all, we find this strategy heavily employed by young children acquiring English. Atkinson (1974) reports that children at the one-word stage use verbs such as "see" and "look" to secure the attention of some co-present individual. Once the attention of the individual is captured, the child may go on to predicate something of the object of attention. This behavior is highly characteristic of the twins' conversations recorded by Keenan (1974). The transcripts from 33 months to 37 months are laced with demands and (later) requests that the conversational partner look at some object in the room. Often the speaker would repeat the directive over and over until the other child complied. (Keenan and Schieffelin 1975) Example (21) illustrates the character of such communications.

- (21) T: D,
 (T and D have been talking about a scratch on
 D's back when D abruptly notices a book on
 the floor)
 D: See it/ A B C/ See it/ See/ A B C / Look!/
 T: Oh yes/
 D: A B C in 'ere/

A second group of communicators who employ Locating Verbs in imperative and interrogative utterances to this end are users of American Sign Language. Friedman (1976) mentions that the sign equivalent for "know" can be used to establish a referent as a "topic" (ibid: 28). The sign - equivalent for the sentence "There's a train that runs between San Jose and San Francisco" begins with the sequence YOU KNOW-THAT/ TRAIN /. Similarly English sentences containing relative clauses may be glossed in sign by initially asking or telling the addressee to "remember" or "know" some referent and then predicating something of that referent, eg. "I saw the man who bought the dog" may be glossed in sign: REMEMBER MAN BOUGHT DOG? SAW HIM (INDEX). (Brandt, personal communication).

VI. LEFT -DISLOCATIONS OR DISCOURSES?

The strategies presented above represent discourse strategies for getting the listener to attend to and know a particular referent. The referent is introduced in one utterance, usually a directive. Subsequent utterances provide one or more predications concerning the referent. The major predication may or may not be preceded by background information relevant to the referent and its role in the predication.

We argue that Referent + Proposition constructions perform very similar communicative work. The uttering of the initial referent functions as a directive to attend to that referent. Subsequent propositions provide background information and/or a major predication concerning the referent. In this sense, the Referent + Proposition constructions look more like discourses (a sequence of communicative acts) than a single syntactically bound communicative act. In fact, it is possible to paraphrase many of the Referent + Proposition constructions by placing a locating verb before the initial referent. For example,

"But all grownups w-they do it to kids" = But (look at,
 consider) all grownups
 w-they do it to kids

Further support for an underlying locating verb is seen in cases in which a pronoun appears as the initial referent.

The pronoun appears in the objective case in English in these context (e.g. me, him, us, etc.). In these cases as well, the construction could be paraphrased with a locating verb:

Me, I don't wear stockings = (Look at) me, I don't wear stockings.

Him, he never studies. = (Look at him), he never studies.

That the Referent and Proposition function more like a discourse than a single construction is supported by formal characteristics as well.

1) PROSODIC BREAKS BETWEEN REFERENT AND PROPOSITION

We find that in most examples of Referent + Proposition that there is an intonational break between Referent and Proposition. In most cases, the referent is uttered with a slight rising intonation (represented by comma in transcript). This is then often followed by a pause or by a hesitation marker (e.g. uhh). In other cases the referent is expressed with a falling intonation followed by a brief pause.

2) INTERRUPTIONS

Another feature that supports the sequential nature of these constructions is the presence of interruptions between referent and subsequent propositions. We find interruptions of two sorts. First, there may be interruptions from a listener (Example (6)). Second, and more interesting, there may be self-interruptions. For example, we may consider the cases in which the speaker expresses the referent and then inserts background information about the referent before the main point as self-interruptions. (See examples (6), (7), (9), (10), and (11))

3) LOOSE SYNTACTIC TIES

The initial Referent is not tightly tied to the subsequent proposition in the same way as sentential subjects are. (Keenan 1976). The initial referent does not control verb agreement for example. Further even the presence of a coreferential pronoun is not always manifest (example (2) (11)). We find several cases in which the initial referent is linked to the subsequent proposition simply by juxtaposition. For example:

(22) GTS3:62

(L has been talking about how her grandmother treats her father as small child)

L: Oy! my fa- my my-// my grandmother.

My father comes in the house "OH

MY SON MY SON"

In (22) the referent of "my grandmother" is linked to the subsequent proposition as utterances in a discourse are linked, i.e. by the maxim of relevance (Grice 1968).

We link the two expressions because they follow one another in real speech time and because we assume that speakers normally make their utterances relevant to prior talk, and because it makes sense to link them (given their content and our knowledge of the world). In such constructions, then, referents and propositions are linked pragmatically rather than syntactically.

In this paper we have displayed many of the discourse properties of Referent + Proposition constructions. We have argued that formally and functionally the expression of the initial referent and the expression of subsequent predications constitute more or less independent communicative acts. We say "more or less" because these constructions vary in the extent to which they are formally integrated. For example, (1) is prosodically and syntactically more cohesive than (22). But we may say the same for relations between separate utterances within a stretch of discourse. They may be more or less formally bound through the use of conjunctions, adverbs, anaphora and the like. When we contrast discourse with sentence, we are speaking of a continuum. Along this continuum, communicative acts are morpho-syntactically or otherwise formally linked to varying extents.

We may use such a continuum to characterize properties within and across languages. For example, written and spoken (particularly informal, spontaneous) modes of a language may differ with respect to discourse or sentential strategies for communicating (Duranti and Keenan, forthcoming). Furthermore, languages may differ from one another in the extent to which they rely on sequences rather than single sentences to convey information (c.f. Foley 1976). For example, topic -prominent languages (Li and Thompson 1976) may turn out to be discourse -oriented languages, whereas subject-prominent languages may turn out to be more sentence-oriented. Finally, the continuum may be useful in assessing changes over time within a language. For example, ontogenetic development of English is marked by a move away from discourse strategies for communicating towards greater reliance on sentences (i.e. greater reliance of syntax) (Keenan and Klein 1975, Keenan and Schieffelin 1976, Scollon 1974). Similarly diachronic changes may be marked by syntactization of earlier discourse constructions (c.f. Sankoff and Brown 1975).

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SUBJECTIVIZATION RULES IN KINYARWANDA*

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In this paper we present 3 subject-creating rules, namely (i) passivization, (ii) stativization and (iii) object-subject reversal. These rules are illustrated in (2) a, b and c respectively.

- (1) a. Umugóre a-teets-e ibiryo.
woman she cook asp. food
'The woman is cooking food.'
- (2) a. Ibiryo bi-teets-w-e n'umugóre.
food it-cook-pass.-asp. by woman
'The food is cooked by the woman.'
- b. Ibiryo bi-ra-téets-e.
food it-pres.-cook-asp.
'The food is cooking.'
- c. Ibiryo bi-teets-e umugóre
food it-cook-asp. woman
'The food is cooked by the woman.'

An investigation of these rules lends support to Keenan's view of Grammatical Relations as being a matter of degree. In fact we show that all these rules appear to meet the definition of Passive in Relational Grammar, but that they differ significantly, however, in terms of the extent to which the full complement of subject properties is assigned to the derived subject.

Properties of Basic Subjects

In Kinyarwanda, terms (subject of, direct object of, indirect object of) are distinguished from non-terms (oblique NPS: locative, instrumental, manner, temporal and goal) by the transformations that the latter cannot undergo. Only terms passivize, cleft, pseudo-cleft, undergo Wh-questioning, allow insertion of existential and exclusive... (for detail, see Kimenyi in Preparation). In turn subjects are easily distinguished from other terms by their characteristic properties, given below:

- (i) Subjects immediately precede the verb.
(ii) Subjects are always definite or generic.
(iii) Only subjects trigger verbal agreement.
(iv) Only subjects trigger reflexivization.
(v) Only subjects control deletion under identity.
(vi) Only subjects undergo subject-to-object raising.
(vii) Only subjects allow dummy-insertion (ha-).

1. Passivization

1.1 Passivization, as claimed by Relational Grammar, is a process that promotes objects to subject status.

- (3) a. Umwāana a-ra-som-a igitabo.
 child he-pres.-read-asp. book
 'The child is reading the book.'
 b. Igitabo cyi- ra -som-w-a n'umwāana.
 book it- pres.- read-pass-asp by child
 'The book is read by the child.'

Objects that are being passivized have to be either definite or generic; indefinite or unspecified NPs cannot be passivized. Oblique cases, locatives excepted, cannot be directly passivized, but have to be objectivized first, to undergo this kind of transformation, as shown in (4).

- (4) a. Umugabo a- ra - andik-a ibarúwa n'ikaramu.
 man he-pres.-write-asp. letter with-pen
 'The man is writing a letter with the pen.'
 b. *Ikaramu i- ra -andik-w -a ibarúwa na
 pen it-pres.-write-pass.-asp. letter with
 n'umugabo.
 by man
 'The pen is used to write a letter with by the man.'
 c. Umugabo a-ra-andik-iisha-a íbarúwa íkaramu.
 man he-pres-write-instr.-asp. letter pen
 'The man is writing a letter with the pen.'
 d. íkaramu i-ra-andik-iish-w-a íbarúwa n'umugabo.
 pen it-pres-write-instr-pass-asp letter by man
 'The pen is used to write a letter by the man.'

Recipient and benefactive NPs are passivizable also:

- (5) a. Umugabo y-a-haa-ye umugóre igitabo.
 man he-past-give-asp woman book
 'the man gave a book to the woman.'
 b. Umugore y-a-haa-w-e igitabo n'umugabo.
 woman she-past-give-pass-asp book by man
 'The woman was given the book by the man.'

In Kinyarwanda cognate objects can passivize and the subject doesn't have to be an agent for the object to passivize.

- (6) a. Iki gitabo gi-pim-a ibíro bîne.
 this book it-weigh-asp kilo four
 'This book weighs four kilos.'
 b. Ibíro bîne bi-pim-w-a n'iki gitabo.
 kilo four they-weigh-pass-asp by this book
 'It's this book that weighs 4 kilos.'

1.2 Constraints

Certain types of incorporated pronouns such as reflexive pronouns or recipient pronouns don't get passivized or let the other objects of the verb--incorporated or full NPs--undergo passivization. Thus the direct object of a reflexive pronoun or a recipient pronoun cannot passivize as shown below.

- (7) a. Umugabo y-a-m-haa-ye igitabo.
man he-past-me-give-asp book
'The man gave me the book.'
b. *Igitabo cy-a-m-haa-w-e n'umugabo.
book it-past-me-give-pass-asp by man
'The book was given to me by the man.'
- (8) a. Abahungu b-iy-erets-e amashusho.
boys they-refl.-show-asp. pictures
'The boys showed pictures to themselves.'
b. *Amashusho y-iy-erets-w-e n'abagabo.
pictures they-refl-show-pass-asp. by boys
'The pictures were shown to the boys by themselves.'

One might argue that the impossibility of passivizing direct objects of incorporated pronouns is due to the Relational

Annihilation Law. In fact the Promotional Analysis claims that the recipient (indirect object) has been advanced to 2 (direct object) and has ousted the initial 2, which has become a chomeur. This analysis isn't correct, because Kinyarwanda doesn't have a rule that advances 3 (indirect object) to 2 (d.o.); and further, as observed in Kimenyi (in preparation) and as argued convincingly by Gary & Keenan (1976) in what they call the Two Object Analysis (TOA), there is no formal difference between the Direct Object and the Indirect Object in Kinyarwanda. We see in fact that when the recipient is a full NP passivization applies.

- (9) a. Umugabo y-a-haa-ye umugore igitabo.
man he-past-give-asp woman book
'The man gave a book to the woman.'
b. Umugore y-a-haa-w-e igitabo n'umugabo.
woman she-past-give-pass-asp book by man
'The woman was given the book by the man.'
c. Igitabo cy-a-haa-w-e umugore n'umugabo.
book it-past-give-pass-asp woman by man
'The book was given to the woman by the man.'

Moreover, other syntactic transformations such as relativization, clefting, Wh-questioning,...still apply to the object of the reflexive and the recipient pronoun, which shows that the object of this type of construction is not in fact en chomage. We have relativization in (10) and

exclusive insertion in (11):

- (10) N-da-som-a igitabo umugabo y-a-m-haa'-ye.
I-pres-read-asp. book man he-past-rel-me-give-asp.
'I am reading the book that the man gave me.'
- (11) Nta mashusho abahuungu b-iy-érets-e.
no pictures boys they-refl-rel-show-asp.
'The boys didn't show themselves any pictures.'

We don't have an explanation yet as to why incorporated recipient pronouns and reflexives don't allow passivization. If the verb has two incorporated pronouns only the recipient can passivize.

- (12) a. Umugabo y-a-ki-mw-éerets-e.
man he-past-it-him-show-asp.
'The man showed it to him.'
- b. Y-a-cy-eerets-w-e n'umugabo.
he-past-it-show-pass-asp by man
'He was shown it by the man.'
- c. *Cy-a-mw-eerets-w-e n'umugabo.
it-past-him-show-pass-asp by man
'It was shown to him by the man.'

If the recipient is a reflexive, none of these pronouns passivizes.

- (13) a. Umugabo y-a-k-ii-haa'-ye.
man he-past-it-refl-give-asp
'The man gave it to himself.'
- b. *Cy-ii-haa-w-e n'umugabo.
it-refl-give-pass-asp by man
'It was given to the man by himself.'
- c. Y-a-gi -haa-w-e n'umugabo.
he-past-it-give-pass-asp by man
'Himself was given a book by the man.'

If the verb has more than two infixes, none of them can be passivized.

- (14) a. Abagabo b-a-ki-mu-gu-he'-er-eye.
men they-past-it-him-you-give-ben-asp
'The men gave it to him for you.'
- b. *W-a-ki-mu-he-er-ew-e n'abagabo.
you-it-him-give-ben-pass-asp by men
'You were given it for him, by the men.'
- c. *Cy-a-mu-gu-he-er-ew-e n'abagabo.
it-past-him-you-give-ben-pass-asp by men
'It was given to him for you by the men.'
- d. *Y-a-ki-gu-he-er-ew-e n'abagabo.
he-past-it-you-give-ben-pass-asp by men
'He was given it for you by the men.'

The impossibility of passivization in the case of multiple pronouns is due to their strict word order. For details, see Kimenyi (in preparation).

1.3 Properties of Derived Subjects

NPs subjectivized by passivization keep all the properties of terms, such as relativization, clefting, Wh-questioning, and they acquire also the properties of initial subjects: they are definite, they trigger agreement on the verb, they allow dummy-insertion (ha-). The only properties of basic subjects that they don't acquire are (a) reflexivization, (b) raising to object position, and (c) coreferential deletion. The coreferential deletion never applies, since its structural description is never met: in Kinyarwanda this transformation is only fed by raising. Reflexivization and raising are illustrated in (15) and (16) respectively.

- (15) a. Umugóre y-eerets-e umwáana_x umwáana_x mw'íifoto.
 woman she-show-asp child child in picture
 'The woman showed the child the child in the picture.'
- b. Umwáana_x y-eerets-w-e umwáana_x mw'íifoto
 child he-show-pass-asp child in picture
 n'umugóre.
 by woman
 'The child was shown the child in the picture by the woman.'
- c. *Umwáana y-iy-eerets-w-e mw'íifoto n'úmugóre.
 child he-refl-show-pass-asp in picture
 by woman
 'The child was shown himself in the picture by the woman.'
- (16) a. Umwáalimu y-a-tegets-e kó abanyéeshuúri
 teacher he-past-order-asp that students
 ba-sóm-a ibitabo.
 they-read-asp books
 'The teacher ordered that the students read the books.'
- b. Umwáalimu y-a-tegets-e kó ibitabo bi-sóm-w-a
 teacher he-past-order-asp that books they-
 n'abanyéeshuúri.
 read-pass-asp by students
 'The teacher ordered that the books be read by the students.'
- c. Umwáalimu y-a-tegets-e abanyéeshuúri gusoma
 teacher he-past-order-asp students to read
 ibitabo.
 books
 'The teacher ordered the students to read the books.'
- d. *Umwáalimu y-a-tegets-e ibitabo gusomwa
 teacher he-past-order-asp books to read-pass
 n'abanyéeshuúri.

'The teacher ordered the books to be read by the students.'

The impossibility of reflexivizing derived subjects is just due to the formal constraint on this rule which applies only if the objects are coreferential to the basic subject of the same clause, whereas that of raising is a functional constraint. In fact, raising in Kinyarwanda, a property of manipulative verbs only, creates a direct interaction between the agent subject and the raised subject. Derived subjects cannot raise, since they are passive, incapable of performing any activity.

1.4 Properties of Demoted Subjects

As predicted by the Relational Annihilation Law, initial subjects lose their grammatical relations to the verb when passivization applies. The demotion is effected by either one of the following side-effect rules: (i) the demoted subject is marked by the preposition na ('by') or (ii) the demoted subject is deleted.

The demoted subject is marked by na if the speaker wants to stress or contrast the agent.

- (17) a. Igitabo cy-a-som-w-e n'umugore.
 book it-past-read-pass-asp by woman
 'It's the woman who read the book.'

The demoted subject is deleted (i) if it is unspecified, (ii) if it is well-known by both speaker and hearer, or (iii) if the dummy *ha-*, which creates a cleft meaning, is inserted. When the dummy is inserted the subject shifts to the right of the verb.

- (18) a. Umuhuungu y-a-som-ye igitabo.
 boy he-past-read-asp book
 'The boy read the book.'
 b. Igitabo cy-a-som-w-e n'umuhuungu.
 book it-past-read-pass-asp by boy
 'The book was read by the boy.'
 c. *H-a-som-w-e igitabo n'umuhuungu.
 it-past-read-pass-asp book by boy
 'It's the book that was read by the boy.'
 d. H-a-som-w-e igitabo.
 it-past-read-pass-asp book
 'It's the book that was read.'

Non-agent subjects or initial subjects of verbs that have cognate or abstract objects cannot be deleted by demotion.

- (19) a. Umwáana a-rwaa-ye ínkóróra.
 child he-be sick-asp cough
 'The child has a cough.'
 b. *Inkóróra i-ra-rwaa-w-e.
 cough it-pres-be sick-pass-asp

'The cough is had by somebody.'

2. Stativization

2.1 Stativization is a process that gives a passive reading to a sentence by putting a definite or a generic Object in the Subject position. The former subject is deleted and the verb takes the perfective aspect marker -ye.

- (20) a. Umugóre a-kubuu-ye inzu.
 woman she-clean-asp house
 'The woman has just cleaned the house.'
 b. Inzu i-rá-kubuu-ye.
 house it-pres-clean-asp
 'The house is cleaned.'

2.2 Constraints

Stativization is a property of direct objects only, oblique cases cannot be stativized. Animate objects (human, animal) cannot be stativized.

- (21) a. Abaantu b-íib-ye ibaáŋki.
 people they-rob-asp bank
 'People robbed the bank.'
 b. Ibaáŋki i-r-íib-ye.
 bank it-pres-rob-asp
 'The bank is robbed.'
 (22) a. Abaantu b-íib-ye umucuruuzi.
 people they-rob-asp businessman
 'People robbed the businessman.'
 b. Umucuruuzi y-íib-ye.
 businessman he-rob-asp
 *'The businessman is robbed.'

This is due to the fact that animate subjects of transitive verbs are usually interpreted as agents. From this observation it follows that reflexive pronouns and recipient pronouns cannot be stativized because they are always animate.

Direct objects of verbs whose subjects are not agents, such as emotional or perceptual verbs (think, know, hope, love, like, hate, hear, feel, see..) cannot be stativized.

- (23) a. Umwáana a-shaats-e íbíryo.
 child he-want-asp food
 'The child wants food.'
 b. *Íbíryo bi-ra-shaats-e.
 food it-pres-want-asp
 'The food is wanted.'

If the functional role of stativization is to show the state in which the agent subject has put the object, it is

understandable why objects of these constructions cannot be stativized: in fact, the subject never controls them. If the verb has 2 objects, a recipient and a patient or a benefactive and a patient or a patient and an oblique object, stativization doesn't apply.

- (24) a. Umugabo y-a-andik-iish-ije ibaruwa ikaramu.
 man he-past-write-instr-asp letter pen
 'The man wrote the letter with the pen.'
 b. Ibaruwa i-ra-andik-iish-ije *ikaramu.
 letter it-pres-write-instr-asp pen
 'The letter is written with a pen.'
 c. Ikaramu i-ra-andik-iish-ije *ikaramu.
 pen it-pres-write-instr-asp pen
 'The pen is used to write the letter.'

Objectivized oblique objects (locatives, manners, goals, possessives), instrumentals excepted, cannot undergo stativization.

- (25) a. Umugore a-kor-e-y amafaraanga.
 woman she-work-ben-asp money
 'The woman has just worked for money.'
 b. *Amafaraanga a-ra-kor-e-ye.
 money it-pres-work-ben-asp
 'The money is worked for'.

In this case, stativization seems to be a property of basic objects only. Instrumentals differ from other oblique NPs -- maybe because they are promoted by derivational causativization, as argued in Kimenyi (in preparation), and not by normal advancement rules.

2.3 Properties of Derived Subjects

Subjects derived by stativization acquire almost all the properties of initial subjects: definiteness, verbal agreement, dummy insertion. They keep their term properties: relativization, clefting, pseudo-clefting, Wh-questioning, exclusive insertion, existential insertion, etc. But like subjects derived by passivization, they cannot control co-referential deletion, since its structural description is never met. They cannot trigger reflexivization and they cannot raise to object position, since they indicate an activity, whereas stativization shows the state of the object.

3. Object-Subject Reversal (O-S)

3.1 Object-subject reversal is a syntactic process that gives a passive reading to a sentence by just reversing the object and the subject as shown in (26).

- (26) a. Umuhuungu a-ra-som-a igitabo
 boy he-pres-read-asp book
 'The boy is reading the book.'
 b. Igitabo cyi-ra-som-a umuhuungu
 book it-pres-read-asp boy
 'The book is being read by the boy.'

As in the normal passive rule, oblique NPs, except locatives, cannot directly undergo this kind of transformation, they have to be objectivized first.

- (27) a. Umwáalímu a-ra-andik-a n'íikarámu.
 teacher he-pres-write-asp with pen
 'The teacher is writing with the pen.'
 b. *Íkaramu i-ra-andik-a n'umwáalímu.
 pen it-pres-write-asp by teacher
 'The pen is used to write by the teacher.'
 c. Íkaramu i-ra-andik-íish-a umwáalímu.
 pen it-pres-write-instr-asp teacher
 'The pen is used to write by the teacher.'

3.2 Constraints

Incorporated pronouns, whether subjects, objects or reflexives, cannot be reversed: perhaps because of the fixed word order imposed on them.

- (28) a. Abaantu ba-ra-kí-bon-a.
 people they-pres-it-see-asp
 'People see it.'
 b. *Gyi-ra-bon-a abaantu.
 it-pres-see-asp people
 'It is seen by the people.'
- (29) a. B-a-som-ye igitabo.
 they-past-read-asp book
 'They read the book.'
 b. *Igitabo cy-a-ba-som-ye.
 book it-past-them-read-asp
 'The book was read by them.'

Subjectivization never applies if the verb has two objects (i.e. pronouns of full NPs), or when there is an oblique NP in the sentence.

- (30) a. Umuhuúngu y-a-haa-ye umukoóbwa igitabo.
 boy he-past-give-asp girl book
 'The boy gave the book to the girl.'
 b. *Igitabo cy-a-haa-ye umukoóbwa umuhuúngu.
 book it-past-give-asp girl boy
 'The book was given to the girl by the boy.'

If the object and the subject are in the same semantic category, such as human or animal, this rule doesn't apply.

- (31) a. Umugabo y-a-som-ye umugóre.
 man he-past-kiss-asp woman
 'The man kissed the woman.'
 b. Umugóre y-a-som-ye umugabo.
 woman she-past-kiss-asp man
 'The woman kissed the man.'

It is possible, however, for this transformation to apply if the pragmatics are well-defined. For instance, verbs such as *-hóz-* ('console'), *-vuur-* ('cure'), *-roongor-* ('marry'), *-twaar-* ('rule'), and *-tégek-* ('rule') allow O-S reversal, since people who perform these activities in Rwandan society are specific individuals. Only women and children are allowed to cry. Only doctors cure and only such personages as chiefs and the king, rule.

- (32) a. *Umugaanga a-vuur-a abarwáayi.*
 doctor he-cure-asp sick people
 'The doctor cures sick people.'
 b. *Abarwáayi ba-vuur-a umugaanga.*
 sick people they-cure-asp doctor
 'Sick people are cured by the doctor.'

The reason O-S reversal is not allowed when the subject and the object are in the same semantic class, yet applies with the verbs given above, is that the subject of transitive verbs is most of the time interpreted as the agent.

As in other instances of subjectivization rules, outcast subjects lose their grammatical relations to the verb, they cannot undergo any kind of transformation whatsoever. The derived subject, besides taking subject position and triggering agreement on the verb, doesn't acquire any of the behavioral properties of initial subjects--contrary to expectation. This process is completely frozen, since the derived subject is somehow demoted, losing even its term status properties of relativization, clefting, pseudo-clefting, topicalization, etc.

The constraints imposed on derived subjects are the only formal ways to distinguish initial subjects from derived ones, because we observed that the derived structures of sentences generated by the stativization rule and the O-S reversal rule resemble those of basic subjects very much.

Discussion

We have shown that subjectivization rules are properties of direct objects only, and that objects undergoing these rules are either definite or generic. All derived subjects cannot raise to object position, they can't control coreferential deletion, nor can they trigger reflexivization. Moreover, subjects derived by stativization and O-S reversal cannot undergo certain transformations, since if they did, they would change the meaning of the basic sentence. In this respect, derived subjects are easily distinguished from basic ones and this obviously contradicts the Relational Succession Law which claims that NPs that take over the position of another NP by a promotion rule assume the Grammatical Relations of the outcast NP.

These observations on subject-creating rules in Kinyarwanda support Keenan's Promotion to Subject Hierarchy (PSH), (1975, p.324), given below:

(33) Coding Properties } Behavioral & } Semantic
 } Controlling } Properties
 } Properties }

Within this hierarchy, Keenan suggests that derived subjects won't take the full range of basic subjects' properties, but are likely to take those properties higher in the hierarchy. This is confirmed by the data we have presented. The 3 rules take on all the coding properties (subject position; verbal agreement), yet fail to acquire some transformations that basic subjects undergo. The rules are differentiated from each other by the PSH also. For instance, the passive rule gets almost all the behavioral properties of basic subjects. The stativization rule bears less transformations than Passive, and O-S reversal has more constraints than other subjectivization rules--neither does it get any of the behavioral properties of basic subjects.

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HEADLESS RELATIVE CLAUSES IN MODERN JAPANESE AND THE RELEVANCY CONDITION

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It has generally been assumed that 'a relative clause [in Japanese], whether restrictive or nonrestrictive, consists of a truncated sentence' followed by the head noun phrase it modifies. (McCawley 1972) Recently I discussed headless relative clauses in classical Japanese. (Kuroda 1974) Sporadic mention has been made to headless relatives in modern Japanese without identifying them as such. (E.g. Mikami 1957, Mathias 1974) But there has not been a systematic treatment of this phenomenon.¹ Formally, a headless relative in modern Japanese takes the following form:

- (1) ((..... V-u)S-no)NP

where V is a predicate (i.e. verb, adjective, etc.), u is a mark for the ending of a predicate traditionally called the rentai (ad-nominal) form and no is a nominalizing complementizer. The form (1) can be embedded in another sentence and occupy a noun phrase position in the sentence; typically it is followed by a case-marker. A noun phrase (or, in the case of a split pivot, a set of noun phrases-- see below example (32)) contained in the embedded S of (1) assumes, in the matrix sentence, the grammatical function determined by the noun phrase position that (1) occupies, typically predictable from the case marker attached to the end of (1). This noun phrase (or, set of noun phrases) contained in S may be called the pivot, or semantic head, of the headless relative clause. For example, from the sentence:

- (2) ringo ga sara no ue ni atta.
apple plate on be (p.)
'There was/were an apple/apples on a plate/plates.'

one may form²

- (3) Tarô wa ringo ga sara no ue ni atta no o totte, poketto ni
ireta. (totte 'take, pick up', ireta 'put in')
'Taro picked up an apple which was on a plate and put it in
a pocket.'

A difficulty with the headless relative construction in Japanese, however, is that if one freely applies the general formula and constructs a sentence with a headless relative clause, one is likely to end up with a sentence that the native speaker would not accept. For example, take

- (4) Hanako ga kinô ringo o katta.
'Hanako bought an apple/apples yesterday.'

and embed this into the matrix of (3):

- (5) Tarô wa Hanako ga kinô ringo o katta no o totte,...

This form should mean 'Tarô picked up an apple which Hanako had bought yesterday and...' but it would be a piece of fortuitous good luck if one's informant accepted it. Kuroda (1974) did not have to face this problem of frequent unacceptability, since there is no way of extrapolating from the existing literature in classical Japanese to possible unacceptable examples. For modern Japanese I simply made a vague reference to 'marginality, in a certain sense,' of headless relatives. But I now believe that there is a fairly good way to characterize the acceptability of headless relatives in modern Japanese. My claim is that for a headless relative clause to be acceptable, it must satisfy what I will call the relevancy condition:

- (6) THE RELEVANCY CONDITION: For a headless relative clause to be acceptable, it is necessary that it be interpreted pragmatically in such a way as to be directly relevant to the pragmatic content of its matrix clause.

For example, in (3) the relative clause gives a sufficient condition for an apple to be found at some place from where Tarô could pick it up, but in (5), the content of the relative clause does not have this kind of direct relationship with the meaning of the matrix sentence. In contrast, headed relativization is not subject to such a semantico-pragmatic constraint. With the same matrix as (3), (4) as well as (2) yield perfect sentences if headed relativization is used instead of headless relativization:

- (7) Tarô wa sara no ue ni atta ringo o totte, ...
(8) Tarô wa Hanako ga kinô katta ringo o totte, ...

I will discuss several examples to justify the relevancy condition, and comment on some consequences from the existence of this condition.

Note that in order for the above justification for direct relevancy of (2) in (3) to be valid, it is necessary that (2) be interpreted as 'simultaneous' with the time reference of the matrix clause. In fact, the following sentence is not acceptable:

- (9) ~~#~~Tarô wa kesa, ringo ga kinô sara no ue ni atta no o totte, ...
(kesa 'this morning')

In contrast, (7) with a headed relative clause does not require 'simultaneous' interpretation of the constituent and the matrix clauses; (7) is potentially ambiguous in this respect, and there is nothing wrong with

- (10) Tarô wa kesa, kinô sara no ue ni atta ringo o totte,...
'Taro picked up this morning an apple which had been on a plate yesterday, and...'

Next, compare the following two sentences:

- (11) Tarô wa Hanako ga ringo o sara no ue ni oita no o totte,...
(oita 'put')
'Taro picked up an apple which Hanako had (just) put on a plate.'
(12) #Tarô wa Hanako ga kinô ringo o sara no ue ni oita no o totte,...
'Taro picked up an apple which Hanako had put on a plate yesterday.'

(11) is acceptable, but only with 'simultaneous' interpretation. The constituent verb is interpreted with the perfective aspect with respect to the time reference of the main verb. In (12) such 'simultaneous' interpretation is blocked due to the presence of the time adverb kinô in the constituent clause. In (11) the constituent and the matrix clauses express two subevents of a continuum of events, while in (12) such intrinsic connection does not exist between the two events represented by the constituent and the matrix clause; Hanako's having put apples on a plate yesterday does not guarantee that they remain there until today, ready to be picked up by Tarô. Headed relativization does not impose 'simultaneous' interpretation on us. Hence

- (13) Tarô wa Hanako ga kinô sara no ue ni oita ringo o totte,...
'Tarô picked up an apple which Hanako had put on a plate yesterday and...'

is a natural sentence, and

- (14) Tarô wa Hanako ga sara no ue ni oita ringo o totte,...
'Tarô picked up an apple which Hanako had put on a plate, and...'

is open to 'simultaneous' and 'nonsimultaneous' interpretation.

But 'simultaneous' interpretation of the constituent and the matrix clauses is not in general a necessary consequence of the relevancy condition, or put it differently, 'simultaneous' interpretation is not a necessary precondition for the relevancy condition to be satisfied. This point will be clear from our subse-

quent examples. What (3) and (11) show is that the particular semantic content of their constituent clause imposes 'simultaneous' interpretation on us in order to interpret them in conformity with the relevancy condition.

Now, compare unacceptable (12) with

- (15) Tarô wa Hanako ga kinô ringo o sara no ue ni oite oita no o totte,...

'Tarô picked up an apple which Hanako had put on a plate yesterday with some later usefulness in mind which would result from her doing so.'

The surface difference between (12) and (15) is that we have oite oita in (15) instead of oita in (12). Here unfortunate homonymy, inessential to our main topic, is involved, which may be somewhat confusing for those who are not familiar with Japanese. Oita in (12) means 'put' (past or perfect), but oita in (15) is a semiauxiliary homonymous with this verb with an enigmatic semantic connotation, as the student of Japanese knows well. For the present purposes this connotation may be approximated by 'do something with later usefulness, convenience, etc. in mind.' The oite of oite oita in (15) is the conjugated form of the verb 'put' required by the semiauxiliary oita. Thus, the semantic difference between (12) and (15) is the semantic connotation of this semiauxiliary oita, however it might be characterized or translated. But this difference makes (15) acceptable. A natural interpretation of (15) suggests that Hanako put apples in a plate as she was aware that the effect of her act would later be beneficial for Tarô in some way or other. Perhaps Tarô takes an apple with him everyday for lunch, etc. Thanks to the semiauxiliary oita such a connotation is easily read in with (15), and that makes the constituent of (15) directly relevant to the matrix. The event represented by the former is purposively related to the event expressed by the latter.

A purposive connection like this is not an absolute necessity for (15) to be accepted, however. Simply the possibility of such a connection provides us with an 'easy' way to accept (15), thus making us feel immediately that (15) is a perfectly 'acceptable' sentence. A more elaborately fabricated pragmatic assumption on the individuals involved may also make (15) acceptable in a different, 'less natural' way. Hanako might have put an apple on a plate with her own later convenience in mind, and Tarô, knowing it, might have picked it up and removed it on purpose, as he was always mean to Hanako. In this interpretation the event corresponding to the relative clause, or Tarô's knowledge of it, gives him a motivation for his action represented by the

matrix clause; the former is motivationally related to the latter.

In contrast, the sentence with the corresponding headed relative clause:

- (16) Tarô wa Hanako ga sara no ue ni oite oita ringo o totte,....

does not, I believe, require any such direct relationship between the two events in question. The fact that Hanako put apples on a plate may be mentioned only for the purpose of identifying those apples.

The semantics of oita precludes the possibility of 'simultaneous' interpretation of the relative clause in (15) as well as (16). However, (15), but not (16), requires 'co-positional' interpretation. By this I mean that the two events represented by the constituent and the matrix clause involve the same physical location. Thus, in acceptable interpretation of (15) Tarô must have picked up an apple from the plate Hanako had previously put it on, but not necessarily so with (16). This is another consequence of the way the relevancy condition makes (15) acceptable.

Mere possibility of colocationality, however, is not sufficient to make a headless relative acceptable. Recall the unacceptable (12).

The sentence

- (17) ?Tarô wa Hanako ga (kinô) ringo o katte oita no o totte,....
'Taro picked up an apple which Hanako had bought yesterday with some later use of it in mind.'

seems to sound more acceptable than (5), but not so good as (15). The relative clause can be purposively or motivationally related to the matrix clause in (17) as in (15), but neither simultaneity nor co-locationality may be established with (17). Apparently intentional and physical connections between the two events involved in (15) reinforce each other to make it 'very' acceptable.

Let us observe some more examples. Compare (18) and (19):

- (18) Tarô wa Hanako ga osoikakatte kita no o nejihuseta.
 approach-to-attack floor-and-hold-down
'Tarô floored and held down Hanako, who had approached him to attack.'
(19) #Tarô wa Hanako ga harubaru tazunete kita no o nejihuseta.
 a-long-way visit come
'Tarô floored and held down Hanako, who had come a long way to visit him.'

Being attacked gives you a natural motivation to floor and hold down the attacker; someone's having come a long way to visit you is not likely to give you a good motivation for a violent re-

action. (19) sounds unacceptable. It can perhaps be made acceptable only, if at all, with fabrication of an elaborate pragmatic assumption about the personal relationship between Tarô and Hanako. In contrast to (19),

- (20) Tarô wa Hanako ga harubaru tazunete kita no o
 genkan de opparatta.
 house-entrance turn-away
 'Taro turned Hanako away at the entrance of his house, who
 had come a long way to visit him.'

sounds natural.

In the preceding examples the two events represented by the relative and the matrix clause constitute, so to speak, a superordinate event either in the physical world, thanks to simultaneity or colocationality, or in the consciousness of a protagonist in the sentence, thanks to purposiveness, motivation etc. But the two events may only be related by the speaker/hearer from outside the world described by the sentence. For example, consider

- (21) Tarô ga Hanako ga ringo o katte oita no o tabete shimatta.
eat complete
 'Tarô ate up the apple which Hanako had bought for some
 purpose.'

Tarô may not know that the apple he ate had been bought by Hanako for some specific purpose, and Hanako may not know that Tarô ate the apple. Only the speaker/hearer knows/understands that Tarô's action interfered with Hanako's intention.

The relevancy condition for headless relatives in modern Japanese is another example of the general phenomenon that pragmatics may be involved in acceptability judgement of sentences. The rôle of pragmatics in acceptability is, however, especially remarkable in this case, because of the minimal formal contrast between headless and headed relative clauses. Syntactically each of them is characterized as a relative clause by the fact that (the referent of) a noun phrase in it (the pivot) assumes double grammatical functions, one determined inside the relative clause and the other by the noun phrase position of the matrix sentence, the position in which the relative clause is embedded. No other syntactic device or element of possible semantic import, for example, a conjunction, is involved in connecting the constituent and the matrix sentence. The only formal difference between headed and headless relativization is that in the former the pivot noun phrase is overtly recognizable as identical with the head and its grammatical function inside the relative clause recoverable from the truncated slot, while in

headless relativization the pivot is not syntactically marked, and consequently, as will be illustrated later, ambiguity may result as to which noun phrase contained in the relative clause is its pivot. No special morpheme or grammatical mark is involved in headless relativization whose semantic content might be assumed to be responsible for pragmatic peculiarity of headless relative clauses.

The relevancy condition requires a headless relative clause to be interpreted as related to the matrix sentence with, one may say, some adverbial relation. A headless relative clause may hence be said to function at the same time as a noun phrase and as an adverbial clause of a sort. But the particular adverbial connotation one reads into on each specific occasion is neither inherent to the headless relative construction, nor can it even be determined solely from the semantic contents of the constituent morphemes. Pragmatic knowledge about the individuals involved in the represented events can be indispensable for determining the nature of this adverbial connotation.

In the respect that in the process of semantic/pragmatic interpretation a syntactic construction can be loaded with a variety of adverbial meanings or connotations of a sort not necessarily (at least easily) made distinct, the Japanese headless relative construction may be compared with the gerund construction in English. Thus, for example, compare (3) and (15) with the perhaps permissible

- (22) An apple being on a plate, John picked it up, ...
 (23) Mary having put an apple on a plate for later use, John picked it up. . .

Once the nature of the acceptability condition of headless relative clauses is exposed, we do not have to worry about their 'marginality' of an uncertain kind hinted at in Kuroda (1974). We can assume that formula (1) represents a productive, general syntactic process in modern Japanese, and can now safely embark on the descriptive study of this process. Here I will only briefly mention three properties characteristic of headless relative clauses.

First, a headless relative clause can in principle be ambiguous as to which noun phrase contained in it is interpreted as its pivot, i. e. as its semantic head. Consider:

- (24) Sono omawari wa gakusei-tachi ga CIA no supai o kumihuseta
 the cop students spy hold-down
 no o uchi-koroshita.
 shoot-and-kill

'The cop shot and killed the { students who held down the
CIA spy.' }
held down.'

As the translation suggests, either the subject (the students) or the object (the CIA spy) of the constituent sentence can be the object of the matrix verb.

As in other cases of ambiguity, this ambiguity inherent to the headless relative construction is often dissolved in actual occurrences of this construction thanks to syntactic, semantic, and/or pragmatic constraints. So, for example,

- (25) Tarô ga ringo o katte oita no ga têburu no ue ni aru.
'On the table there are apples which Tarô bought for some purpose.'

illustrates syntactic disambiguation; the matrix verb aru requires an inanimate subject and as a consequence ringo, but not Tarô, can be the pivot of the headless relative clause in (25). Or consider:

- (26) Wareware wa ryôshi-tachi ga sakana o hune de oikonde
we fishermen fish boat drive-in
kita no o teibo no ue kara tsutta.
come embankment from fished-for
'From the embankment we fished for the fish which
the fishermen drove in with boats.'

The object of the verb 'fish' must be fish, not fishermen; the pivot of the relative clause of (26) cannot be ryôshi. This is a case of semantic disambiguation. Next

- (27) Wareware wa Tarô ga tai o tsutte kita no o minnade tabeta.
red-snapper all
'We together ate redsnapper which Taro had caught.'

is pragmatically disambiguated, as we eat redsnapper but would not eat Tarô, even though semantically possible. Headed relativization with the head Tarô thus results in pragmatic anomaly:

- (28) Wareware wa tai o tsutte kita Tarô o tabeta.
'We ate Taro, who had caught redsnapper.'

Now consider

- (29) Tarô wa Hanako ga bimbô na gakusei o shôkai site kita no
poor student introduce
o yatoi-ireta.
hire

The strongly preferred, if not the only possible, interpretation of this sentence takes 'poor student' as the pivot, i. e., as the object of 'hire': 'Tarô hired a poor student who Hanako sent over to him with her recommendation.' However, if we convert the headless relative clause of (29) into a headed one with Hanako as its head, the resulting sentence:

- (30) Tarô wa bimbô na gakusei o shôkai site kita Hanako o
yatoi-ireta.
'Tarô hire Hanako, who had sent a poor student over to him
with her recommendation.'

does not, I believe, show pragmatic anomaly as (28) does. Hanako could have introduced the student to Tarô sometime ago, or she could have introduced the student to Tarô with whatever possible aim in mind other than getting him hired. For (30) to be interpreted, no inherent connection between Hanako's action of introducing a student to Tarô and Tarô's action of hiring her is required. In contrast, for (29) to be acceptable, the two events must be understood as components of a superordinate event. Thus, although it might be possible to fabricate a context in which (29) can be accepted with Hanako as the pivot, the only natural way to accept (29) in isolation is to take 'poor student' as the object of 'hire', because usually A sent B to C with A's recommendation for the purpose of B's (and not A's) getting hired, or because usually A's recommendation of B to C is supposed to give C a motivation to hire B. Thus, in the practical sense, (29) is disambiguated by the relevancy condition for headless relative clauses. This fact is the second point I want to note as a characteristic of headless relativization.

Incidentally, this disambiguating effect of the relevancy condition can be weakened or annulled with small change in lexical items involved. Thus,

- (31) Taro wa bimbô na gakusei ga kirei na onna no ko o shôkai
pretty girl
site kita no o yatoi ireta.

In a sexist, capitalist society little imagination is required to come up with a situation in which (31) is understood with 'poor student' as the pivot, and another in which 'pretty girl' is taken as the pivot.

The third and final fact that I would like to note here about a headless relative clause is that it can have a 'split pivot.' In the following example both the subject and the object of the relative clause assume the grammatical function 'the subject of' the matrix verb. The 'floating' quantifier hutaritomo 'both two'

makes this point clear:

- (32) Junsu ga dorobô o kawa no hô e oitsumete itta no ga
 policeman thief river toward track-down want
 ikioi amatte hutaritomo kawa no naka e tobikonda.
 power exceed both-two river in jump-in
 'A policeman was tracking down a thief toward the river,
 who both, losing control, jumped into the river.'

I must leave detailed discussions of these facts and others that have interesting implications for the description of related areas of Japanese syntax for later occasions.

NOTES

1. Except for Wenck (1974), which I have had occasion to see only recently and with which, I regret to say, I am not yet sufficiently familiar to make definitive comments. Our notion 'headless relative clause' (or, in the terminology of Kuroda 1974, pivot-independent relative clause) must be compared with Wenck's 'nachgestellte Attributivsatz.' But the range of phenomenon to be conceived under Wenck's NA is both narrower (since for NA's the pivot is in principle at initial position, though Wenck recognizes a certain type of exception--I must quickly add, however, that this limitation could well reflect the reality in classical Japanese that we can reconstruct from the existing literature) and broader (because I now believe that the construction with the particle no must be treated separately--in this respect my own former treatment of classical Japanese also deals with a broader range) than the range here intended to be covered by the notion 'headless (or, pivot-independent) relative clause.' The term 'nachgestellte Attributivsatz' seems also to imply a grammatical analysis different from mine even where the same data are in question.

2. I believe it's appropriate to state that headless relative clauses are 'nonrestrictive' in a certain semantic sense, which, however, does not coincide with the formal sense generally understood in English grammar; an English relative clause without 'comma' intonation can be nonrestrictive in our sense when its head is an indefinite noun. See Kuroda (1974) 1.1.3. The reader of Kuroda (1974) should also note that I now believe we should exclude the construction with no from the headless (pivot-independent) relative clause--the construction which I assumed to be 'restrictive' in classical Japanese. Cf. also note 1.

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CONSTRAINTS ON THE ORDERING OF IF-CLAUSES

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This paper discusses the problem of the ordering of if-clauses. For sentences containing an if-clause and a main clause, both orderings of the clauses are grammatical. The question is how the speaker chooses one order, that is, what constraints operate on the construction of such sentences in real time.

To study this question, we must examine the sentences within a discourse context, so as to be able to do more than speculate about what factors operate as constraints. The discourses of this study are taken from a series of interviews with middle class New York City housewives. They include narratives of personal experience, pseudo-narrative accounts of daily routines --cooking dinner, getting the family off to work in the morning, describing the layout of an apartment, and explanations, including a series of explanations of the rules of a baby-sitting co-op. Questions eliciting these discourse units were included in the interview because each of these units requires the speaker to produce a fairly complex organization of spatial, temporal, or propositional items. In this data, the sentences containing if-clauses are almost entirely non-past sentences, expressing actual alternatives as background conditions or necessary conditions for the propositions expressed in the main clauses of the sentences. As we would expect from the nature of the discourse units, counterfactuals are extremely rare. They occasionally occur in past-tense narratives. They do not occur in pseudo-narrative accounts of daily routines, which present a conventionalized or idealized account of sequences of events. In order to elicit counterfactuals, a request for some reinterpretation of past events would probably be best, some form of "If you had it to do all over...."

In this body of data, there are 34 sentences containing if-clauses. 27 of these are preposed to the main clause and 7 are postposed. That is, 80% of these sentences have the if-clause preposed. A figure like this strongly suggests that the speakers' choice of position for the if-clause cannot be unmotivated. (The hypothesis of unmotivated choice, that is, syntactic free variation, is always suspicious. It is most unlikely that speakers will maintain two patterns as pure synonyms without any functional differentiation.) The most general statement of the constraint on ordering is that the order of clauses will not reverse the order of events in real time. Of the sentences with preposed if-clauses, we find two relations between the times of the events reported in the two clauses. One is that the event reported in the if-clause precedes that of the main clause--9 cases; the other is that the event of the if-clause includes or is simultaneous with the time of the event reported in the main clause,--13 cases. (1) and (2) are examples of the first; (3) (4) and (5) are examples of the second.

- (1) If you baby-sit for somebody, they pay you in timecards.
- (2) So if I ever get pinched, which has happened, I just take the baby over there and leave her until I get things cooked and go back and get her.
- (3) If I'm doing pickled beets or something like that, the day before I'll mix up onion and vinegar and whatever and put stuff in a jar to cool in the refrigerator.
- (4) And if it's a Saturday it's easy, cause my husband takes the kids and I just spend the whole day arranging things.
- (5) I mean, if you're going to be sitting in a playground with somebody, you may as well be sitting in a playground with somebody who you feel you have something in common with, somebody who's interesting.

There are two possible relations of two events in time--linear order and inclusion. The constraint on if-clauses predicts that only one ordering of each of these will occur: the preceding event or the including event will be mentioned before the following event or the included event. Thus, although sentences like (6) and (7) are clearly grammatical, they are not produced.

- (6) They pay you in timecards if you baby-sit for them.
- (7) You take it off the stove if it starts to boil.

At first glance, it is quite startling that unimpeachably grammatical sentences like these are not produced. However, previous studies of discourse have shown that real-world configurations can have an almost categorical effect on the production of sentences, so that apparently grammatical sentences do not occur. (Linde 1974a, Linde and Labov, 1975) Also, the constraint on if-clauses is, in effect, a local instance of an extremely general principle of the organization of discourse: the reported order of events will mirror the actual order. On a discourse level, this is the defining property of narratives, and by extension, of pseudo-narratives. (Labov 1972, Wald, 1976) The analysis of narratives requires a division of clauses into two types, distinguished not exclusively by syntactic form but by the type of proposition expressed, as well. Narrative clauses express events, and are in general constrained by the putative real-world order of these events. Free clauses express either background information for orientation or evaluative material, and are not as strongly constrained in their ordering. Similarly, the analysis of apartment layout descriptions, a form of pseudo-narrative, requires a selection of the information to be conveyed, from all the information the speaker has about his apartment. This information is

then ordered. The description is in the form of an imaginary tour, and the ordering of the mention of rooms is constrained by the order in which they would be encountered during the imaginary tour. Although additional constraints operate to impose order in cases where the tour would allow a choice, the fundamental principle is that if possible, the ordering of information follows the temporal order established by the choice of a tour strategy. Indeed, it appears to be the case that in the description of any discourse unit, the ordering problem is one of the two major operations necessary before the actual choice of syntactic pattern and lexicon can be described. The first operation is the choice of information, which may be arrayed as an unordered network. The second stage orders the information, using the temporal ordering principle if possible, if not, then the most accessible ordering principle. (Linde, to appear)

We can see, then a relation between a very general principle of discourse ordering and a particular, sentence level ordering problem. A similar relation appears to hold between the principle of temporal ordering and the interpretation of conjoined sentences--the problem of asymmetric conjunction. The problem is too complex to be reviewed here, but the strategy of interpretation seems to be that if two clauses can be interpreted as being temporally ordered, they will be. (Schmerling, 1975)¹

We see then that there are extremely general principles influencing the preposing of if-clauses. And yet the preposed order is not categorical; there are seven cases in which the if-clause is postposed. The question is, under what circumstances do speakers produce sentences like following.

- (8) She gets upset if she doesn't see me in the morning.
- (9) I stick to pretty traditional meals, like, you know, you have to have fish or meat if I can afford it.²
- (10) There are benches that are obstructing you if you have to run.
- (11) And so it turned out it was one of those very involved New York situations where they, the people who had the apartment, wanted to get another apartment and they could only do it if they rented theirs.

With one exception, these examples all involve either negatives or modals, both of which can be analyzed as irrealis elements.³ Negatives are used to deny an expectable or plausible possibility. Modals are used to postulate the possibility but not the actual occurrence of some possibility. It is clear then that clauses containing either a negative or a modal are exempt from the general constraint on temporal ordering, since such clauses do not refer to events which are to be taken as being in the time stream.

It is important to note that an irrealis clause is not always postposed; there are preposed ones also, for example, (12) and (13).

- (12) If he can't, if he's away or something, I take her.
- (13) If Eric's home in the morning, which has been happening the last couple of months, which has been very nice, I don't have to bother getting Jonathan dressed.

It is not yet apparent what factors influence the ordering of irrealis clauses, if the temporal ordering principle does not apply.

The structure of the conditioning of the two choices is the same as the organization of discourse constraints which we have come to expect. The recurring structure is that there is one or more marked syntactic patterns, which are constrained in their use, and an unmarked pattern, which may occur everywhere, including the conditioning environment of the marked patterns. Often, as in the case of preposition of if-clauses, the unmarked pattern is the most frequent. But if there are enough different marked patterns, this may not be the case. An example of this is the use, in apartment layout descriptions, of sentences containing a locative, a copula, and a designation of a room with or without the dummy *there*, locative existential sentences. Examples are (14), (15), (16) and (17).

- (14) To the right is my bedroom.
- (15) My bedroom is to the right.
- (16) There's my bedroom to the right.
- (17) To the right there's my bedroom.

(14) is the unmarked pattern; it may be used under all conditions, while (15), (16) and (17) have constraints on their use. While sentences like (14) are the single most frequent type, they are less frequent than the sum of the marked patterns. Here, clearly, markedness must refer to complexity of conditioning, rather than to simple statistical frequency. (Linde 1974)

Syntactic patterns are marked only within a specific discourse type. The status of the locative existential sentences discussed above is their markedness within apartment layout descriptions; this is the result of the organization of information peculiar to this discourse type. Similarly, the conditioning on if-clauses holds in discourses whose organizing principle is temporal ordering. It is not apparent *a priori* exactly what the constraints would be in discourses which must be organized by some other principle.

Even within the discourse types we have been examining, the informational status of a pattern is not static; it can easily be

changed. For example, as we have seen, single irrealis clauses are exempt from the temporal ordering principle. But it is quite possible to get a sequence of irrealis clauses, which may then form an embedded narrative, itself subject to the temporal ordering principle. The underlined portion of (18) is an example.

- (18) And he was like home about forty-five minutes after he had left. Then we got worried because we thought Jan couldn't find him and she'd be worried that he couldn't find his way home and she was supposed to baby-sit at four o'clock and it was like three o'clock then. So Bob went down and looked for her.

Jan's being unable to find him, at a pre-arranged meeting point, occurs before her being worried. (It is interesting to note that the report of her worry itself contains a further irrealis embedding.)

This case of an embedded irrealis sequence raises extremely complex problems. It must be distinguished from flashbacks, meanwhile-back-at-the-ranch cases, in which a sequence of narrative clauses referring to the same stream of events as the rest of the narrative has been displaced out of actual temporal order.⁴ The important point is that in analyzing constraints on the use of a pattern, it is necessary to consider not only the form and meaning of the conditioning factor itself, but also its functioning within a discourse type.

FOOTNOTES

0. I am extremely grateful to Michael Cole, Joseph Goguen, Ray McDermott, Geoffrey Nunberg, Chiahua Pan, and Benji Wald for pointing out to me, in the various states of the writing of this paper, what I was talking about. Remaining unclarity and errors are my own.

1. The discussion of this problem has been complicated by a failure to differentiate between conjoined sentences with coreferential surface subjects and those with conjoined VPs. Conjoined VPs are much more likely to be interpreted as simultaneous, while conjoined sentences are more likely to be interpreted as temporally ordered. This is particularly the case when the sentences are conjoined with and then, a form of conjunction which does not occur with conjoined VPs, although it is perfectly grammatical. (Linde 1975)

2. The variation in pronoun choice in this sentence may be confusing. It appears to be the result of emotional stress: the speaker is afraid that because of financial difficulties, she is not feeding her son adequately. In general in these discourses, it seems to be the case that emotional disturbance produces syntactic disruption of a kind not otherwise found.

3. The exception seems to involve an afterthought, signalled by the use of Oh.

- a. Oh in the meantime you put in the rice and make the salad, if you're having a salad.

4. On-going research on flashbacks indicates that they are most commonly used for events unknown to the narrator at the time of their occurrence. These events are inserted in the sequence at the point of their becoming known to the narrator. However, crucial problems remain with the analysis of multiple-protagonist narratives, which necessarily involve continuous parallel streams of events.

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DIMENSIONS OF ICONICITY IN AMERICAN SIGN LANGUAGE^{1,2}

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

Part of de Saussure's definition of language is that the relation between the symbol and the referent is arbitrary. That is a truism among linguists with regard to oral language³, which is all that de Saussure had in mind: There is nothing doglike, say, about [ʃjɛ] or [ki] or [dɔg], and those few words which do in some way resemble their referents are considered an exceptional class, onomatopoeias. Likewise in American Sign Language (ASL), and in many other sign languages of the world, there are many signs whose formation bears no obvious relation to their meaning.⁴ But there are also many signs in these languages that are based partly on visual images that exist independently of the language. Visual imagery is in general far more important to ASL than auditory imagery is to oral languages. It is much more heavily used in the lexicon, and it can regularly be part of the structure of the sentence as well. ((See DeMatteo, in this volume.)) Icons-- those signs and constructions which are based on underlying visual images⁵-- are related to those images in different ways, whose variation is reflected in their potential use in the language. I intend to describe some of the dimensions along which this relationship may vary.

One dimension that is bound to come up in any discussion of icons and imagery is metonymy ((discussed by Schlesinger et al. and by Battison)). An icon whose image is not of its referent, but of something that is in some way associated with its referent, is called metonymic, after the rhetorical figure exemplified by the use of the word "big-mouth" for someone who talks too much, or "the White House" for the President's staff. Some examples in ASL are OLD⁶ (pull the fist down from the chin), based on the image of a beard (but it is not the sign for a beard); HOSPITAL (draw a cross on the opposite upper arm), based on the red cross on a uniform sleeve; and KID (forefinger and pinky extended, wiggle side of forefinger on upper lip), based on wiping a runny nose. Metonymy is a fuzzy, uncertain characteristic both in speech and in sign⁷. Fortunately for my purposes, metonymy does not involve the relationship between an icon and its underlying image, and so does not enter the scope

of this study. Metonymy in ASL is a relation holding between an icon's image and its referent: the image 'beard' metonymically represents the referent 'old'⁸ (relationship b in the figure), but the relationship between that image and the formation of the sign OLD (a) is a direct one. The


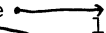

sign-----	(a)-----	image-----	(b)-----	referent
(OLD)		(beard)		('old')



dimensions of iconicity that I will explore are concerned only with the sign and its underlying image, no matter how that image is related to the sign's referent.

The first of these dimensions involves the use of time and motion in the articulation of the icon. In HOUSE the signer moves his flat hands first diagonally down and apart, and then straight down parallel to each other, , tracing in the air the traditional simple shape  that means 'house' in our society, a pointed roof and a wall on each side.⁹ But at no time is the whole shape visible; it exists only in the mind of the signer as he thinks of and forms the sign, and in the mind of his addressee when he has seen the diagonal motion of the 'roof' and the vertical motion of the 'walls'; and mentally assembled them into a unit. -- In TREE, however, the signer's upright forearm becomes the trunk of the tree, so to speak, and his fingers become its branches waving in the breeze. They are branches even when they are not moving (as I will demonstrate), and the motion that they have in the sign corresponds analogically (in DeMatteo's sense) to the motion that the branches have in the real tree of the image. By contrast, the motion of the hands in HOUSE does not correspond to any motion of a real house; it belongs exclusively to the sign, and is part of the making of the sign from the image. The 'house' image, existing only by virtue of the signer's and viewer's memory, may be described as "virtual", in distinction to what may be called the "substantive", physically present, image of the tree. Substantive icons are easier to manipulate in time. The sign TREE can be shown as waving in the breeze, being chopped down (no longer waving), and being hauled away, all without losing its basic shape. Nothing of the kind can be done with the sign HOUSE. If you want to say, for example, 'They moved Jack London's house from the Yukon

to Oakland', you have to do something like this (here with a sign that can be approximately glossed as PICK-UP-AND-MOVE):

THEY PICK-UP-AND-MOVE (from left; up, right, down)
 j-a-c-k l-o-n-d-o-n HOUSE (at left)
 y-u-k-o-n (at left) PICK-UP-AND-MOVE (as before)
 o-a-k-l-a-n-d (at right)

That is, the house is signed at a place in the signing space corresponding to its original location, and the verb moves from that place to the place corresponding to the new location. You can't move the house while you're forming it because the two kinds of motion, virtual  for the house and substantive  for the moving, get irrecoverably mixed . ¹⁰ There may be some other sign language with conventions for keeping them distinct, or perhaps an invented sign language could do so; or maybe a species with different perceptual apparatus from ours could sign virtual and substantive motion simultaneously; but ASL doesn't.

This temporal limitation of virtual icons means that the image underlying a virtual icon must be a sort of snapshot, shape without motion, while the image underlying a substantive icon can be, and frequently is, like a movie covering some span of time. Every sign in ASL has a movement as one of its obligatory formational parameters ((as Stokoe, Casterline, & Croneberg [1965], Friedman [to appear], and many others have observed)), and in substantive icons this movement is often a characteristic movement of the imaged object. TREE waving is one example; others are BOOK opening (the flat hands, palm-up and fingertips pointing forward, and "hinged" along the pinky edge), AIRPLANE flying  thumb, forefinger, and pinky extended from palm-down fist, moving forward high in signing space-- about chin high or higher), and BIRD opening and closing its beak (with thumb and forefinger pointing out from the mouth or chin.) 

Virtual icons, on the other hand, have greater freedom in space than substantive icons. A substantive icon is limited to the capabilities in size and shape of the human articulators, which in ASL are just the hands and arms (with a few minor exceptions). A virtual icon is limited only by the

signer's reach and by the complexity of shape that he and his addressee can produce and perceive virtually. Virtual motion is used productively in ASL to describe shapes with much more precision than is possible in English; in fact, this is its primary synchronically productive use. One time an informant, having been asked to describe a fairly intricate colored geometric pattern, began by sketching it in the air with his forefingers (a common way of describing two-dimensional shapes) and then filled in the colors by signing them with one hand while pointing with the other to the appropriate area of the outline he had just drawn. The same informant, describing a picture of a tall, narrow house, began by signing HOUSE, but modifying the sign to the proportions of the house in the drawing. He also made it large enough so that he could fill in the windows and doors by signing them in their proper places.

Another dimension of iconicity applies only to substantive icons: What sort of physical object does the articulator represent? For instance, in TREE the articulator (in this case, the forearm and hand) represents a complete object, which does not change its location during the period of the image (the length of the movie, so to speak). In BOOK each hand represents part of such an object, one "half" of the open book. In WALKBB ¹¹ the flat, palm-down hands represent a person's feet. In MEET the vertical forefingers extended from the fists each represent an entire, independently mobile person. And in WASH the hands simply represent themselves: the sign is conventionalized, but it is based on a pantomime of washing the body, the face, the hair, or other things. In fact, substantive iconicity and pantomime involve the same relation between icon and image, that of presenting to the viewer a visible representation of the object imaged (which can be the human body engaged in some activity), as opposed to the representation involved in virtual iconicity, which exists only in the signers' minds.

I think that lexicalized pantomimic signs, such as WASH, are more easily integrated with improvised pantomime than are such non-pantomimic signs as RUN (with forefingers representing running legs, but often signed in a "linked" form in which the iconicity has mostly disappeared) or MEET. For example, one can sign "I washed my hair last night" and

gradually turn the sign WASH-HAIR into a detailed pantomime of discovering a tangle and attempting, first casually and then with increasing annoyance and pain, to straighten it out.

We can construct a spectrum of object represented. At one end the body represents itself: such icons, WASH, for example, are pantomimic in origin, though they may be conventionalized or metonymic, and they may have lost their functional iconicity (see below). In the next part of this spectrum parts of the body represent other parts--often, one may suppose, because of the diachronic tendency of ASL signs to become more conventional and less pantomimic in form, and limited from the rest of the body to the hands. ((See Frishberg 1975.)) Some examples are WALKBB and YES (fist nods on wrist like head nodding on neck). And at the other end of the spectrum the articulators can represent objects that are not parts of the body at all: either the whole object, as in TREE, or part of it, as in BOOK. These objects can even be people, as in MEET or GANG-UP-ON (spread-out thumb and fingers of one hand converge on and seize vertical forefinger of the other hand). Notice that in GANG-UP-ON one articulator represents a whole group of people; such plural elements are fairly common ((see Mandel 1975, section on "markers"-- i.e., such mobile elements as the "people" in GANG-UP-ON and the AIRPLANE)). -- A single sign can span this spectrum. In COKE (cocaine or Coca-Cola, calquing English) the stiff forefinger becomes a needle shooting into the opposite arm, which represents itself. In LOOK-AWAY-IN-DISDAIN, one hand represents the eyes and their line of vision ("V-for-Victory" hand), while the other represents a person as in MEET ((Frishberg & Gough 1973)).

A third dimension of iconicity is that of scale: How big is the object or action involved in the image, and how big is the sign itself? Some signs¹² exaggerate the size of their images, such as SURPRISE, in which the index finger and thumb represent the eyes opening wide, and perhaps the eyebrows shooting upwards. Others, such as HOSPITAL and (bank) CHECK (thumbs and forefingers draw a rectangle), are pretty much life-size. Pantomimic icons, of course, are among these. And many icons reduce the image from some macroscopic scale to the size of the signing space: CAR3 (the hand moves as the car is being said to move, with thumb

up and first two fingers pointing "forward", i.e. toward the front of the car), MEET, SIT (with fore- and middle fingers representing legs), and in general a whole open-ended, productive set of models which are a regular grammatical device for describing physical relationships. The signer can establish his referent objects as being located in different parts of the signing space, either simply to express their relative positions or to use them as reference points for the movement of one or more other referent objects or actions.¹³ Once they are so established, the signer may also refer to them grammatically, with the deictic devices that ASL uses as pronouns, as if the referents were actually in those places in the signing space. --This type of icon is also used in a purely grammatical way without reference to real spatial relationships, simply to refer pronominally to people who are not present.

DeMatteo has pointed out ((1975)) that the synchronic iconicity of a sign can be judged by its behavior, i.e., by whether and how the signers of the language manipulate it. If the meaning of a sign can be productively modified by modifications in its formation, mediated by analogical modifications in its image, then that sign's image is undeniably psychologically real and functional for the signers. For instance: The modification of WALK_y (first and middle fingers "walk" like legs) into OBESE_y (thumb and pinky "waddle" forward, other fingers folded down) tells us that the image of legs in WALK_y was productively functional for ASL signers at the time OBESE_y was coined. In fact, the great variety of signs in the language today using the image of the first two fingers as legs leaves no doubt that the image is still very much alive.

This feature of iconic manipulability varies from icon to icon. Some icons are so highly manipulable that no particular lexical sign can be singled out as basic; the V-legs morpheme is an example. Some have a relatively unmarked, basic form: CAR₃, compared with PARK (move the car forward and set it down on the upturned opposite palm) and TRAFFIC-JAM (hands alternate in lining up cars one behind the other). Some signs have only one or two iconic derivatives, such as MEAT (thumb and forefinger grasp fleshy pad between thumb and forefinger of opposite hand). The only other use I

know of for this image (that fleshy pad = meat) is the verb CHOP-MEAT; the verb CHOP in ASL always incorporates its object, and in CHOP-MEAT the 'chopping' is applied to the fleshy pad. There are also many signs of iconic origin which have become petrified and which have no modified forms; one such is COFFEE (imitative of the motion of the hands in grinding coffee in an old-fashioned hand coffee mill), whose image is used only in this sign and is no longer productive. Some signs are known to have had iconic origins, but have moved away from them through linguistic change in their formation. An example is TOMATO, formerly a compound of RED + a form of SLICE, but now assimilated into a unit containing neither of the original components ((Frishberg 1975)).¹⁴ And some signs look as though they should be iconic, but they have no derivatives and different signers have different etymologies for them: e.g., AMERICA (fingers laced, move joined hands in a small horizontal circle), explained both as "log cabin" and "rail fence". (Such folk-etymologies seem to be popular in the culture of American signers, possibly because of a persistent belief, correct or not, that most signs are iconic.) These last three classes of signs--petrified icons, changed icons, and might-have-been icons-- are in fact effectively no longer iconic, if indeed those of the last class ever were. Perhaps their iconicity could be revived in a special context which made the image clear, but such reiconization would probably be synchronically more like the poetic device of blending, and establishing relationships between, signs which are not historically related. An example of this process occurred in a signed version of the song "Happy Talk" that I saw performed by Lou Fant and Betsy Ford: First they made the sign sometimes



"GEARS" sign
(as seen by
signer looking
down)

called "gears": both hands in front of the signer with palms toward chest, fingers spread and relaxed and meshed like gears, with fingertips angled toward signer where they cross; hands swing up and down from wrists, in unison, staying meshed like gears. Then the hands moved together to mesh completely, with the fingers "inside"-- between the palms-- rather than "outside", as they usually are when you lace your fingers; the result was a form of the

sign SWEETHEARTS, with the thumbs "flirting" with each other like lovers' heads. But SWEETHEARTS is normally signed with the two fists pressed together rather than with fingers meshed. Making it develop in this way from the "gears" sign, which normally means something like 'cooperate' and here could be translated loosely as "we go so well together", gave SWEETHEARTS an added nuance of closeness and togetherness. ((See also Klima & Bellugi 1975.))

You may notice that I have not distinguished between synchronically productive manipulation of an iconic sign (or synchronic use of an iconic morpheme) and historical relation between a set of signs involving related underlying images. Such a distinction cannot always be drawn clearly, nor is it always necessary. JUMP-UP-AND-DOWN (first and middle fingers, as 'legs', bending and straightening while moving down to and up from the upturned opposite palm) is both an established sign and a valid derivative of the V-legs morpheme. It follows from the analogical nature of icons ((DeMatteo)) that they can in principle be subjected to a wide and subtle range of modification while still being thought of as "the same sign". It is difficult, and perhaps not even worthwhile, to attempt to determine just at what point a particular often-used form of a sign itself achieves the lexical status of a sign. But it is certain that synchronic iconic modifiability varies from sign to sign.

Notice that both substantive and virtual icons are subject to synchronic iconic modification and manipulation. Manipulation of shape is usually restricted to virtual icons, although there are exceptions (such as OBESE_Y).¹⁵ Manipulation in time to show motion in the image is possible only with substantive icons, and in fact is probably the most important use of substantive iconicity. ^{productive}

Summary: I have presented a number of dimensions of variation among the icons of American Sign Language, i.e., those lexical signs and other elements of the language which are based on a visual image which exists independently of the language itself. Concentrating on the relation between the sign and the image, I have presented the following dimensions:

== The use of time and motion: virtual icons, such as HOUSE, in which the shape is never visible, but exists only as a mental construct of the signer

and viewer; versus substantive icons, such as TREE, in which the articulators take on the approximate shape of the image. Virtual iconicity permits the depiction of a great variety of shapes ('skinny house', the geometric pattern), while substantive icons can be manipulated in time (TREE...CHOP-DOWN ...HAUL-AWAY).¹⁶

== The relationship between the articulator in a substantive icon and the physical object it represents. This can range from self-representation (as with the hands in WASH) to representation of a separate, independent object (such as the people in MEET). The more pantomime-like signs along this range are probably easier to integrate into improvised pantomimes.

== The proportion between the size of the image and the size of the icon. This can range from the mild exaggeration of SURPRISE, through the life size of pantomimic icons and many others (such as GIVE and CHILD [hold flat hand palm-down about four feet from the ground]), to the extreme condensation possible with models such as MEET, AIR-PLANE, and improvised descriptions of spatial relationships.

== Manipulability. Some icons, such as the V-legs morpheme, have an apparently open-ended range of synchronic manipulability, which is not clearly separable from the large number of lexical signs in which they appear (for V-legs: WALKy, STAIRS, JUMP-UP-AND-DOWN, FALL, DANCE, and many others). Other icons have more restricted ranges of manipulability, extending down to icons which cannot be manipulated at all, like COFFEE, and those whose iconicity is only historical, with even the possibility of iconic revivification destroyed by change in their form (TOMATO from RED + SLICE).

I have presented these dimensions of iconicity and some of their interactions with each other and with the structure of the language. I hope this analysis will prove helpful to other workers and will stimulate further linguistic study of American Sign Language.

NOTES

1. Work reported in this paper was partly supported by a Graduate Fellowship from the National Science Foundation.
2. American Sign Language is the language of the

American deaf community. It is not derived from English, and in fact has a very different structure, some aspects of which are explored in this paper and in DeMatteo (in this volume). For further information see Stokoe, Casterline, & Croneberg (1965), Friedman (to appear), or the other works in the Bibliography.

3. Or was, until Ross (in this volume) and related works.

4. For a more detailed examination of arbitrariness, see Frishberg (1975) and Mandel (1975).

5. This is my definition of the term. There is no generally agreed-on terminology among ASL linguists for analog and iconic phenomena. Perhaps "visual analogies" or something like that would be a better term semantically, but "icon" seems to be the easiest to use syntactically and morphologically.

6. The notation used for the linguistic description of ASL signs--developed by Stokoe (1960; also with Casterline & Croneberg, 1965), and modified in Friedman (to appear)--is cumbersome to read and write, as well as being unfamiliar to most linguists. It is customary to refer to lexical signs by completely capitalized English words or phrases (e.g., TOMORROW, WASHING-MACHINE, 2-PEOPLE-APPROACH-ONE-PERSON). These glosses are generally merely convenient approximations of part of the semantic area covered by the sign, and should be looked on as a kind of hieroglyph or ideogram. I will describe signs in prose and occasional drawings, in enough detail to make the example's iconicity clear (though not necessarily enough for a complete "phonological" description). Fingerspelled segments--i.e., strings of the 26 forms used for some names, English words, etc.--will appear l-i-k-e t-h-i-s. The position or direction of a sign, where relevant, will be superscript, in parentheses.

7. For instance, what is the referent of "Canada" in these examples?: "Canada has exchanged ambassadors with Communist China." "Canada covers nearly ten million square kilometers." "Canada is very friendly to tourists."

8. Which may be extended by a further metonymy, as in English, to refer to 'age' generally, as in "four years old" -- OLD FOUR.

9. That is the citation form of the sign. In conversation it is often reduced to a form of the 'roof' alone. I'm not claiming that signers are always aware of the image in this sign, only that

they can become aware of it and use it, and sometimes do.

10. "Virtual motion", used to form a virtual icon; "substantive motion", used with a substantive icon to represent motion in the image.

11. The subscripts, based on the notational description of the sign, are an ad hoc device to distinguish signs which might have the same gloss. Here the flat hands ("B-hands"), palms down and fingertips forward in front of the signer, move up and down alternately like walking feet.

12. I don't think that there are many signs that are larger than their images. But a tiny object may be blown up to a signable size to describe its shape.

13. For instance, a multi-directional verb may incorporate one or more of these points; that is, a verbal sign whose direction and/or orientation depend on its arguments. See Fant (1972), Friedman (1975, and to appear).

14. Reliable historical data on some signs is available from some old sign language manuals and other sources. Frishberg (1975) describes her sources.

15. It was pointed out in the discussion following the presentation of this paper that the productive use of virtual iconicity is mostly limited to describing the shapes of particular objects.

16. There are actually two other kinds of icon in ASL that I have not touched on at all in this paper. One simply shows a physical dimension, as with the American (spoken) sentence "He's about yea tall," or in the sign CHILD (described below). The other is based on pointing to a token of the referent, as in FACE (point index finger to your own chin and trace periphery of face-- actually just a circular motion at the wrist). But I think the dimensions of variation of virtual and substantive icons are more interesting.

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RAISING IN TURKISH
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0. Introduction

The rule of Raising was first proposed by Rosenbaum (1967) to account for (1) the promotion of the subject of a subject complement to the main clause subject: [[Mary succeeded] happened] = [Mary happened [to succeed]; and (2) the promotion of the subject of an object complement to a main clause object: [John believed [the snake was poisonous]] = [John believed the snake [to be poisonous]].

Turkish will be used, in this paper, to refute this and other misconceptions about the rule of Raising.

1. The Impersonal Construction

This section will show that the rule of Subject-to-Subject Raising (SSR) serves to personalize the impersonal (=subjectless) passive in Turkish and Malagasy by allowing a nominal to raise and become the subject of a subjectless predicate.

1.1 Turkish

1.1a Nominalization

When sentences are embedded in Turkish, they are generally nominalized, as exemplified in (1).

- (1) Bu adam ban-a [Ayse-nin kitab-ı o adam-a
this man I -dat -gen book -acc that man -dat
ver-diğ-i] -ni söyle-di.
give-nom-3Sposs-acc tell -3Spast
'This man told me (that) Ayse gave the book to than man.'

which has the following sentence embedded in it:

- (2) Ayşe kitab-ı o adam-a ver-di.
book -acc that man -dat give-3Spast
'Ayşe gave the book to that man.'

Here it appears that the tense is replaced by the participle suffix, -DIK, the subject is marked with the genitive marking -(n)In (the initial n occurs after vowels), and the nominalized predicate is marked with a possessive suffix which agrees with the subject in person and in number. Furthermore, if such an embedded clause is the direct object of a verb, the embedded verb shows the accusative marking -(n)I (the n appears after vowels). The remaining constituents (kitab-ı, adam-a) retain their case-markings as in the 'finite' clause, (2).

1.1b The Passive

The passive construction, in Turkish, is a fully productive process. Corresponding to an active S like;

- (3) Hırsız-lar ev -i yak -tılar.
 thief -plural house-acc burn-3Ppast
 'The thieves burned the house.'

we find the passive S, with the verb marked by the passive suffix -Il and the underlying subject followed by tarafından 'by' (as in (4) or deleted (as in (5)):

- (4) Ev hırsızlar tarafından yak -ıl -dı.
 house thieves by burn-pass-3Spast
 'The house was burned by the thieves.'
- (5) Ev yak-ıl-dı.
 'The house was burned.'

Usually under the passive,¹ only the accusative of an active may become the derived subject. In the absence of an accusative, none of the other constituents become the subject, and the passive is then an impersonal (=subjectless) construction based on a third singular predicate.

- (6)a. Çocuk adam-a vur-du.
 child man -dat hit-3Spast
 'The child hit the man.'
- b. Çocuk adam-lar -a vur-du.
 man -plural-dat
 'The child hit the men.'
- (7)a. Adam-a çocuk tarafından vur-ul-du.
 b. Adamlar-a çocuk tarafından vur-ul-du.
 c. * Adamlar-a çocuk tarafından vur-ul-dular.
 d. * Adamlar çocuk tarafından vur-ul-dular.

Sentences (c) and (d) show the verb vur-ul-du marked for the third person plural by -lar as if adamlar 'men' was intended as the subject. Sentence (d) is grammatical, not in the sense of 'hit', which governs the dative, but in the sense of 'shoot', which governs the accusative.

What is noteworthy about this impersonal construction - and is directly relevant to the topic of this paper - is its form when it contains an embedded sentence. A sentence like Biz masum idik 'We were innocent.' can be the dative complement of a verb like inanmak 'to believe':

- (8) (Onlar) [(biz-im) masum ol-duğ-umuz] -a inan -dılar.
 they we -gen innocent be-nom-1Pposs-dat believe-3Ppast
 'They believed we were innocent.'

Now consider the passives;

- (9)a. [(Biz-im) masum ol-duğ-umuz] -a inan -ıl -dı.
 we -gen innocent be-nom-1Pposs-dat believe-pass-3Spast

- 'It was believed that we were innocent.'
- b. * (Biz) masum ol-duğ-umuz-a inan-ıl-dık.
- c. * (Biz-im) masum ol-duğ-umuz-a inan-ıl-dık.

Construction (9.a) is simply the passive of (8), without the agentive phrase, onar tarafından 'by them'. Sentences (b) and (c) show the verb inan-ıl-dı marked for the first person plural agreement as if biz or biz-im were the subject. So we see that the passive verb cannot agree with biz, the subject of the embedded S.

However, (9.a) may be further embedded, as in (10):

- (10) (Sen) [(biz-im) [masum ol-duğ-umuz] -a inan -ı
 you we -gen innocent be-nom-1Pposs-dat believe-pass
 -d_g-ı-mız] -ı bil -iyorsun.
 nom-1Pposs-acc know-2Spres
 'You know we were believed to be innocent.'

where biz-im shows a double relation to ol-duğ-umuz-a and inan-#1-diğ-imiz-i. So in (10), the subject of the deepest S, biz-im, has been raised to provide a subject for the embedded impersonal predicate, inanmak. What we see here for inanmak is perfectly regular in Turkish and also holds for predicates which do not govern the dative.

The generalization is thus: In an embedded impersonal passive, the subject nominal of the governed clause may raise to become the subject of the embedded impersonal predicate.

Though it seems strange that the passive is required to be embedded for SSR to occur, upon closer examination we see that if it were not embedded a genitive would be left dangling without something to possess. In (9.a), the embedded subject biz is marked with the genitive marking, since it occurs in a nominalization. But if biz were raised, it would have to move into a non-embedded sentence where the predicate isn't marked possessive and so it could not appear with a genitive ending. In contrast, in (10), the sentence into which biz is raised is embedded and nominalized, so that the impersonal predicate is marked possessive and biz is able to retain its genitive marking when moving from one embedded sentence to another. So, the restriction may be stated thus: If the embedded subject is marked for genitive then it may raise and become the subject of an impersonal passive predicate if the predicate is marked possessive (i.e. nominalized).

1.2 Malagasy

Keenan (forth coming) describes a process of Subject-to-Subject Raising in Malagasy, which applies only to subjects of sentential subjects as illustrated in (11).

- (11)a. Nantenain-dRabe [sfa nanasa lamba Rasoas].
 +pass +act
 hoped by -Rabe that washed clothes Rasoas

- 'It was hoped by Rabe that Rasoa washed clothes.'
 [Keenan (115.a)]
 b. Nantenain-dRabe [_Sfa nanasa lambag] Rasoa.
 'Rasoa was hoped by Rabe to have washed clothes.'
 [Keenan (115.b)]

To justify this reorganization of the constituent structure, Keenan shows that Rasoa in (11.b) behaves as the subject of the matrix verb. For example, it can be clefted, take a question particle, or even raise to object.

As Keenan points out, the problem is that SSR only operates when the clause is a derived subject as it is via Passive in (11.a). When it is an underlying subject as in;

- (12) Tsara [_Sfa efa lasa ny mpianatra].
 good that already left the students
 'It's good that the students have already gone.'
 [Keenan (120.a)]

SSR cannot apply since nu mpianatra 'the students' cannot relativize, cleft, question, or raise to object, as a subject of an entire sentence should.

Keenan suggests that maybe the embedded sentence in (12) is in fact a subordinate clause introduced by fa in its meaning of 'for, because'. Then the clause would not be in a subject relation, and SSR would not apply to it.

However, there is an interpretation of Keenan's data which explains why SSR applies to derived sentential subjects but not to underlying ones; Sentential objects don't fully become derived subjects and thereby give an impersonal character to the Passive in Malagasy. SSR then occurs to personalize this impersonal construction.

Keenan states that the clause marked S in (11.a) does satisfy some of the requirements of subjecthood in that (1) it occurs in sentence final position; (2) it can be questioned, whereas the active counterpart of (11.a) cannot have its object clause questioned; and (3) it undergoes what-clause formation. He further notes, though, that many of the subject tests either do not apply when the subject is sentential or else give new results. For example, sentential subjects cannot be relativized, cleft, or raised to object, and the PRO-forms for sentential subjects (izany 'that') are not marked for case and occur equally well as subjects or objects.

It seems, then, that in Malagasy sentential objects acquire a few subject properties when they undergo the Passive, but fewer properties than might otherwise be expected for the derived subject of a passive. This lack of a well-defined subject in these constructions implies that they should be recognized as typologically distinct from a canonical passive and that they are impersonal. So when the clause is an underlying subject as in (12), it is really a subject, and precludes SSR. Whereas in (11.a),

Object Raising.

4. Another Impersonal Construction in Turkish

Finally, it will be shown that in Turkish, the personalizing of an impersonal passive by SSR is not an isolated instance, but characteristic of Turkish impersonals generally. To do this, let's consider the construction involving the postposition gibi 'as if/like'. For example

- (20) Ban-a [bütün develer su iç -erler] gibi görün -üyör.
I -dat all camels water drink-3Ppres like appear-3Spres
'It appears to me like all the camels drink water.'

Turkish postpositions - suffixes and independent words - follow noun phrases and govern them much as English prepositions govern the noun phrases which they precede. Among the postpositions, gibi belongs to the class which allows no suffix on any preceding noun phrase except for tense and subject-verb agreement. So in (20), the clause which precedes gibi, is not nominalized, but shows only tense and subject-verb agreement as in the 'finite' clause Bütün develer su iç-erler. 'All camels drink water.'

4.1 The Non-Subjecthood of the Gibi-Clause

When a noun phrase + gibi appears in a sentence where there is no overt subject (as in (20)), it can be shown that it does not act as the subject and further that the subject nominal of the clause governed by gibi may raise to become the subject of the impersonal predicate.

First, it should be noted that the subject is always unmarked (as opposed to, for example, the accusative which is unmarked only when indefinite: 'Mehmet made money.' Mehmet para kazandı; 'Mehmet made the money' Mehmet para-yı kazandı). Thus if the clause marked by gibi were the subject, then it would be an exception to the rule that the subject is always unmarked.

Turkish interrogative particles provide further evidence of this. For example, ne is a particle that may be used to question subjects. Sentence (21.b) is an acceptable answer to the question (21.a):

- (21)a. Ne doğru?
what be true
'What is true?'
b. [Hasan-ın Mehmet-i vur -duğ-u] doğru -dur.
-gen -acc shoot-nom-3Spos be true-3Spres
'It is true that Hasan shot Mehmet.'

However, ne may not be used to question a clause governed by gibi. So (22.a) is not an answer to question like (22.c) but is rather an answer to a question like (22.b):

- (22)a. Ban-a (sen) pasta-yı kes-tin gibi görün -üyör.
 I -dat you cake -acc cut-2Spast like appear-3Spres
 'It appears to me like you cut the cake.'
 b. San-a nasıl görün -üyör?
 you-dat how appear-3Spres
 'How does it appear to you?'
 c. * San-a ne görünüyor?

The interrogative particle ne provides another demonstration that the clause governed by gibi is not the subject in (20).

As a last piece of evidence, let's consider a process in Turkish whereby a Nominalization + Verb may become a Verb + ki-clause. For example, when the nominalization is marked for the accusative, or for the dative (as in (23.a)), it can occur un-nominalized in a ki-clause (23.b):

- (23)a. (Ben) (sen-in) masum ol-duğ-un -a inan -ıyorum.
 I you-gen innocent be-nom-2Sposs-dat believe-1Spres
 'I believe in your innocence.'
 b. (Ben) inan -ıyorum ki (sen) masum idin.
 I believe-1Spres that you innocent be-2Spast
 'I believe that you were innocent.'

A clause governed by gibi may also occur in a ki-clause, with the pronoun öyle 'so/thus' left in its place:

- (24)a. Ban-a Hasan Mehmet-e vur-du gibi görün -üyör.
 I -dat hit-3Spast like appear-1Spres
 'It appears to me like Hasan hit Mehmet.'
 b. Ban-a öyle görün-üyör ki Hasan Mehmet-e vur-du.
 so/thus
 'It appears to me that Hasan Hit Mehmet.'

However, this alternation of Nominalization + Verb and Verb + ki-clause is not allowed when the clause is a subject:

- (25)a. Hasan-in Mehmet-e vur-duğ-u doğru -dur.
 -gen -dat hit-nom-3Sposs be true-3Spres
 'It is true that Hasan hit Mehmet.'
 b. * Doğru-dur ki Hasan Mehmet-e vur-du.

Therefore, since gibi does allow a ki-clause alternative, the noun phrase governed by gibi can not be the subject in (20), and hence, (20) is an impersonal construction.

4.2 Formulation of the SSR Constraint

Returning to the issue of personalizing an impersonal predicate by SSR, consider the following sentences:

- (26)a. San-a [biz süt iç -tik] gibi görün -dü.
 you-dat we milk drink-1Ppast like appear-3Spast
 'It appeared to you like we drank some milk.'
- b. Biz san-a [süt iç -tik] gibi görün -dük.
 we you-dat milk drink-1Ppast like appear-1Ppast
 'We appeared to you to have drunk some milk.'

In the previous section we showed that (26.a) is an impersonal construction. In (26.b), biz, the subject of the clause governed by gibi has raised to become the subject of the impersonal predicate.

This process, which holds for a considerable number of verbs, also occurs when (26.a) is nominalized and embedded.

- (27) O [biz-im san-a [süt iç -tik] gibi görün -düg-
 he we -gen you-dat milk drink-1Ppast like appear-nom
 ümüz]-ü bil -iyor.
 1Pposs-acc know-3Spres
 'He knows we appear to you to have drunk some milk.'

Here biz shows the genitive marking that corresponds to the possessive marking on göründüğümüzü.

From this discussion and what was observed in Section 1.1, the constraint on SSR may be stated as: The subject nominal of an embedded clause may become the subject of an impersonal predicate. But if the embedded subject is marked for the genitive, then it may only become the subject of an impersonal predicate which is marked possessive.

In Turkish, SSR is, very narrowly, the relinquishing of a nominal for the sake of a subjectless predicate. While there is nothing odd about a nominal that lacks a determiner, there is something odd about a predicate which lacks a subject. SSR corrects this irregularity.

4.3 The Functional Succession Principle

Section 4.1 showed that the NP governed by the postposition gibi does not act as a subject in the absence of an overt subject, while in Section 4.2 it was shown that the subject nominal of the clause governed by the postposition may become the subject of the impersonal predicate. Thus, in this construction, an NP is being raised to a subject position from a clause which does not act as a subject.

This is a direct violation of the Functional Succession Principle (Perlmutter and Postal, 1974) which states that if one NP can be raised out of another then it assumes the grammatical relation previously borne by the other. The Turkish evidence shows that the Functional Succession Principle must be revised to account for constructions such as noun phrase + gibi.

Footnotes

I wish to thank Mr. Cemal Kemal, U.C. Santa Barbara, for providing the Turkish data.

¹For a few verbs, some Turkish speakers also allow the dative to become the subject of a passive; e.g., San-a bak-tım. 'I looked at you.' alongside Sen bak-ıl-dın 'You were look at.'

²Subject-to-Object Raising only applies with a small class of matrix verbs; e.g. sanmak 'to believe', zannetmek 'to assume'.

³In arguing for the cycle in Turkish, Aissen claims that the rules Passive and SOR apply in the order Passive (on the lower S), SOR, Passive (on the higher S). Pullman (1975), though, shows that step is invalid. It seems that SOR can raise a subject that has been derived by Passive, but for some reason Passive may not then apply to the derived object to yield an ordering of Passive, SOR, Passive. However this is only evidence against the cycle and has no bearing on the fact that when SOR and Passive apply to the same S, SOR must precede Passive.

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On the Form of Negative Sentences in Kawaiisu¹
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Simple negative sentences in Kawaiisu, a language of the Southern Numic sub-family of Uto-Aztecan, have a number of unusual characteristics which make them look remarkably like embedded clauses. In this note I will summarize the data on simple negatives in Kawaiisu, examine the morphological and syntactic similarities between such sentences and some Kawaiisu subordinate clauses, and discuss why these similarities might exist.

Kawaiisu negative sentences include the negative marker yuwaati, which always appears in first or second position in the sentence, and differ from the corresponding affirmatives in several ways. Two of the most important of these are that the logical subject of a negative sentence appears in object rather than subject form and that the verb carries the "Series II" tense endings, rather than the "Series I" endings which generally are used on the verbs of affirmative main clauses.² In addition, there are special word order restrictions on negative sentences, and conjoined subjects take an unexpected form in the negative. The following pair of sentences exemplifies some of these differences:³

- (1a) ta?nipuzi pikee-kidiina momo'o-na 'The man saw
 man see-past=SI=3anim woman-obj the woman'
 b) yuwaati ta?nipuzi-a pikee-keeneeneena momo'o-na
 neg man-obj see-past=III=3anim=3anim woman-obj
 'The man didn't see the woman'

In (1a), the subject 'man' is unmarked (nominative) and the verb has a Series I ending. In (1b), 'man' is objective (there are a number of nominal object endings, the most common of which is -a), yuwaati occurs in initial position, and the verb has a Series II ending.

The basic forms of the two series of tense endings are⁴

	Series I	Series II
present/immediate past	-di(-) [rarely -ri(-)]	-na-
past	-kidi(-)	-keena-
future	vaadi(-)	-vaana-

The Series I endings may be used alone or with following object clitics (which may change the quality of an ending's final vowel: for instance, in (1a), past -kidi plus third-person animate invisible -ina yields -kidiina). The Series II endings, however, virtually always occur with both subject and object clitics: e.g., in (1b) past -keena- is followed by two third-person animate invisible clitics: -keena- plus -ina- plus -ina- yields -keeneeneena. The pronominal clitics which mark subject and object in these forms are the same as those which may be suffixed to noun stems to show possession. (Independent noun or pronoun possessors appear in Kawaiisu

in the object form along with the possessed noun and its suffixed possessive clitic.) It should be noted that the various two-clitic combinations occur in set orders, regardless of the grammatical relations in the sentence: thus third-person visible plus first person is always -ana-ni (3anim-1), for instance, regardless of whether 'he' or 'I' is the subject.

Here is a contrastive paradigm of affirmative versus negative sentences:

(2)

ni?i abigi-di 'I'm talking'	yuwaati abigi-na-ni 'I'm not talking'
I talk-SI	neg talk-SII-1
ni?i abigi-kidi 'I talked'	yuwaati abigi-keena-ni 'I didn't talk'
ni?i abigi-vaadi 'I'm going to talk'	yuwaati abigi-vaana-ni 'I'm not going to talk'

Notice that independent pronouns are used to indicate the subject of affirmative sentences; these may be deleted, however, if the context is clear.⁵

There appear to be a few exceptions to the rule that negative sentences always take Series II endings. Most if not all of them, however, are negative sentences whose affirmative versions do not take Series I endings. There appears to be a generalization that if the predicate of a sentence is nominal (as exemplified below), it takes essentially no ending in the affirmative and only pronominal clitics in the negative.⁶

This rule holds, for instance, for predicate nominals. A nonnegative copular sentence consists simply of two unmarked nouns, but its negative counterpart is much more complicated. The predicate noun appears in unmarked (non-object) form followed by the clitic which corresponds to the subject of the sentence (which, however, since it is the subject of a negated sentence, shows up in the object form):

- (3a) ni?i pohagadi 'I'm a doctor'
I doctor
- b) nigaya yuwaati pohagadi-ni 'I'm not a doctor'
me neg doctor-1
- (4a) sumana kuhma-ni 'That's my husband'
that husband-1
- b) yuwaati sumana-ya kuhma-ana-ni 'That's not my husband'
neg that-obj husband-3anim-1 husband'

(Note that the possessive clitic follows the subject clitic in (4b).)

- (5) yuwaati Rochelli-ana sumana-ya 'That's not Rochelle'
neg Rochelle-3anim that-obj chelle'⁷

'Have' sentences also appear to be basically predicate nominal in character, and similarly do not take the standard endings. The affirmative 'have' construction includes the possessed noun

plus the possessive suffix -gadi, which is essentially a nominalizer (meaning something like 'possessor'---it also shows up in derived nouns like pohagadi 'doctor'---cf. Southern Paiute poa 'supernatural power'), so 'I have a dog' might be more literally translated as 'I am a dog-haver'. -gadi is not used in negative 'have' sentences (which are probably existential: 'I don't have a dog' means 'My dog doesn't exist'):

- (6a) niʔi kahni-gadi 'I have a house'
 I house-haver
 b) yuwaati kahni-ni 'I don't have a house'
 neg house-l
 (7a) niʔi kuhma-gadi 'I have a husband'; 'I'm married'
 I husband-haver
 b) yuwaati kuhma-ni 'I don't have a husband'; 'I'm not
 neg husband-l married'

Postpositional phrases are another group of nominal-like predicates which take neither Series I nor Series II endings, but which do take subject clitics in the negative:

- (8a) oovi kahni-paana 'The salt is in the house'
 salt house-in
 b) yuwaati oovi-ta kahni-paaneeka 'The salt isn't in
 neg salt-obj house-in=3inan the house'
 (9a) puguzi natiʔi-weʔe kahni-paana 'The dog and the cat
 dog cat-with house-in are in the house'
 b) puguzi-a natiʔi-weʔe yuwaati kahni-paana-ami
 dog-obj cat-with neg house-in=3pl
 'The dog and the cat aren't in the house'

The characteristics which distinguish negative from non-negative main clauses---the form of the subject noun, word order restrictions, and the use of the Series II verb endings with accompanying subject clitics---all indicate that Kawaiisu negative sentences look like embedded clauses.

It is typical, for example, for the subjects of almost all embedded clauses in Kawaiisu to appear in object form. Consider the following pairs of non-embedded and embedded clauses:

- (10a) taʔnipuzi paykwee-kidi 'The man left'
 man leave-past=SI
 b) pucuzogi-kidiika taʔnipuzi-a paykwee-neena
 know=past=SI=3inan man-obj leave-SII=3anim
 'I know that the man left'
 (11a) Cecilia churchi-vadokwee-kidi 'Cecilia went to
 Cecilia church-go=to-past=SI church'
 b) niʔi pucugi-riika Cecilia-ya churchi-vadokwee-
 I know-SI=3inan Cecilia-obj church-go=to-
 keena-ana 'I remember that Cecilia went to
 past=SII-3anim church'

- (12a) ta?nipuzi osorini-di 'The man is snoring'
 man snore-SI
- b) ni?i ku?usubigi-diika ta?nipuzi-a osorini-na-ana
 I like-SI=3inan man-obj snore-SII-3anim
 'I like men who snore'; more literally, 'I like (it
 for) a man to snore' [Note that 'like', like 'know'
 in (10b) and (11b) is marked for an inanimate (sen-
 tential) object.]

In each case, the subject of the embedded clause appears with an object ending--just as it would if it were the subject of a simple negative sentence.

Word order restrictions also make negative sentences look like affirmative main clauses. In a simple nonnegative transitive sentence, the order of subject, object, and verb is extremely free--any of these three elements may begin a sentence, and, in fact, all six possible orders of these elements have been recorded in response to elicited sentences with normal English word order. But while the order of the elements of a negative sentence following the negative yuwaati appears to be moderately free, only the logical subject noun phrase of a negative sentence may come before yuwaati. The order yuwaati S is, I think, the source for the more complex order SUBJECT yuwaati REST-OF-S; the subject-first order apparently is functionally motivated--it occurs most commonly when the grammatical role of the object-marked subject noun might not be clear because of the presence of some other object-marked (object) noun in the negated sentence. On the other hand, the subject is seldom preposed in intransitive negative sentences, in which the subject is the only object-marked noun. The fact that the subject is the only element of a negative sentence (other than yuwaati) which may occur in initial position means that the word order in simple negative sentences is greatly restricted, compared to that in simple affirmative sentences. But this restriction makes negated sentences seem like embedded clauses, for elements of embedded clauses may not freely be moved out of their clauses. The fact that only the subject of a negative may be moved before yuwaati, and then, apparently, mainly only to avoid potential ambiguity, suggests that the limits of a negated clause are strictly marked in the same way that those of an embedded clause are.⁹

The use of the Series II endings is another indication that the negated verbs on which they occur are more like the verbs of embedded or nominalized clauses than the verbs of nonnegative sentences marked with Series I endings. For Series II endings are characteristic of a large number of types of Kawaiisu embedded clauses--all the embedded (b) sentences in (10)-(12), for example, have verbs with Series II endings. In fact, a negative embedded clause may look very similar to a negative main clause.¹⁰

Series II endings are often associated with sentence embedding or nominalization, I believe, because the -na- which these endings contain may be identified with the reconstructable

Southern Numic nominalizer *-na-.¹¹ (The Kawaiisu Series II -na- appears as -nee- in combination with a following third-person invisible clitic (-ina- animate; -ika- inanimate)--the change of ai to ee is very common in Kawaiisu (and Numic generally).)

If the Series II -na- is a nominalizer, we would not expect Series II endings to be used on any main clauses. These endings do not often show up on nonnegative main clauses, but there are a few puzzling exceptions--for instance, they are used with certain adjectival predicates:

- (13) ^vpisaa-neena 'She's pretty'
pretty-SII=3anim
(14) hi?i-neeka... 'It's good that...'
good-SII=3anim

Another case in which Series II endings appear on the verbs of main clauses is when those verbs are reflexive in some way. True reflexives (in my data, with either the reflexive verb prefix ni- or the independent reflexive pronoun niwayi) may apparently occur with either Series I or Series II verbs, although in my data the Series I form is more common. The same is true for sentences using the special reflexive pronoun nanosu 'by oneself; alone'. (15) shows the two possibilities for verbs with prefixed ni-:

- (15a) ni-vikee-di ni?i 'I looked at myself'
refl-see-SI I
b) ni-vikee-neena 'He looked at himself'
refl-see-SII=3anim

The third case I have discovered in which Series II endings are generally used on apparent main clauses is in texts--one example is sentence (16):

- (16) niwiziriki^vzi ni?itii-neena hopakidii-paana...
wild=canary make=fire-SII=3anim hole-in
'Wild Canary made a fire in a hole...'

It is hard to see why the Series II endings show up in these three cases. There is no indication that any of the Series II-marked main clauses in (13)-(16) is "embedded"¹² (consider, for instance, that the subject of (16), 'wild canary', is unmarked--i.e., in main-clause subject form). On the other hand, it is striking that so few main clauses take Series II verb endings, while so many subordinate clauses do. (No subordinate clauses appear to take the regular set of Series I endings.¹³) On the whole, the use of Series II endings on the verbs of negated main clauses is compatible with the theory that these clauses look morphologically nominalized, even though the appearance of these endings does not provide conclusive proof for the theory.

If the Series II endings do include nominalizing -na-,

two further facts about these endings and Kawaiisu negative sentences are explained. First, the reason that the *-na-* of the Series II ending does not show up when the sentence has a nominal predicate of some sort (cf. sentences (3)-(9)) is of course that such predicates have no need of any additional nominalization.

Also, it is clear why the subject of a Series II-marked verb is indicated by a pronominal clitic--a clitic of the same shape as those which mark objects on both Series I and Series II-marked verbs. The appearance of an extra object clitic to mark the subject of a nominalized verb is correlated with the use of the object form of an independent noun or pronoun subject of such a verb. Recall that the object case of an independent noun or pronoun may be used to express a possessor, and that possessed nouns are followed by possessive clitics of the same shape as the object clitics. It is very common, in Uto-Aztecan and cross-linguistically, for the subject of an embedded or nominalized clause to appear in possessive form.

The object-marked subject noun phrases of negative and embedded clauses in Kawaiisu are not always exactly like object-marked object noun phrases. Conjoined subject noun phrases of negative and embedded clauses are similar, but are different from conjoined object noun phrases. This similarity provides another piece of evidence that Kawaiisu negative sentences look embedded.

There is no word 'and' in Kawaiisu, so a comitative construction is used to express conjunction. A conjoined subject noun phrase has the first noun in the unmarked (subject) form, with the second noun followed by the postposition *-we?e* (sometimes *-waa?e*) 'with'.¹⁴

- (17) ta?nipuzi momo?o-waa?e pikee-kidi-mi-ni
 man woman-with see-past=SI-pl-1
 'The man and the woman saw me'
- (18) pahna po?o-waa?e kahni-paana 'The bread and the wa-
 bread water-with house-in ter are in the house'

When the conjoined noun phrase serves as the object of the sentence, the first noun is marked as an object, and the second is followed by the object form of the postposition 'with', *-waako*:¹⁵

- (19) ni?i ta?nipuzi-a pikee-kidiina momo?o-waako
 I man-obj see-past=SI=3anim woman-with=obj
 'I saw the man and the woman'
- (20) ni?i ka?a-kidi pahna-ya po?o-waako 'I ate bread
 I eat-past=SI bread-obj water-with=obj and water'

When a conjoined noun phrase (first noun plus second noun and suffixed 'with') serves as the subject of a negated sentence, there is a strong preference for having the second noun marked with the subject rather than the object form of 'with' (even though the first noun appears in object form, as is usual for the subjects of negative sentences):

- (21) *yuwaati* su?uru kahni-paaneeka pahna-ya po?o-we?e
 neg that house-in=3inan bread-obj water-with
 [...*po?o-waako] 'The bread and the water are
 *water-with=obj not in the house'
- (22) *ta?nipuzi-a momo?o-we?e* [...(*/?)*momo?o-waako*]
 man-obj woman-with=subj woman-with=obj
yuwaati pikee-keena-ami-ni 'The man and the woman
 neg see-past=SII-3pl-1 didn't see me'

This tendency is shared by conjoined noun phrases which serve as the subjects of nonnegative embedded clauses:

- (23) *hi?i-neeka* kahni-paaniina-ami *ta?nipuzi-a*
 good-SII=3inan house-in-3pl man-obj
momo?o-we?e [...**momo?o-waako*] 'It's good that the
 woman-with *woamm-with=obj man and the woman
 are in the house'
- (24) *sumara kahni ta?nipuzi-a momo?o-we?e* [...**momo?o-*
 that house man-obj woman-with=subj *woman-
waako] *pu-vaana-ami* 'That is the house that the man
 with=obj rel-in-3pl and the woman are in'; lit. 'That
 house is the one in which the man and the woman are'

Therefore, the subjects of negative and embedded sentences in Kawaiisu, although superficially similar to object noun phrases, systematically differ from object noun phrases in the same way.

Supposing we accept the claim that negative sentences are quite similar in many ways to embedded clauses, or the stronger claim that negative sentences "are" (somehow) embedded clauses. What does this mean?

One possible reason for a sentence to show up in embedded or nominalized form as part of a "simple" sentence is that it is actually the complement of some "higher" verb. The only candidate for this higher verb in Kawaiisu negative sentences--the only part of these sentences which is not part of the nominalized sentences in question--is the negative *yuwaati*. However, *yuwaati* is invariable, and thus doesn't inflect like a normal Kawaiisu verb. If it was a verb, we would expect it to show up at least some of the time in final position in the sentence (the position in which Kawaiisu verbs are probably generated, and certainly a frequent position for the verb of a declarative sentence), which it does not. Therefore, *yuwaati* is probably not a verb, and Kawaiisu negative sentences probably do not have a structure in which the negated sentence is the complement of a higher verb.

A second case where a nominalized sentence might show up in an apparently simple main clause would be as part of an N N predicate nominal construction (like (3a) and (4a) above).¹⁷ There is evidence that the Kawaiisu *yuwaati* S negative construction might be analyzable as a string of two noun phrases. The negated sentence, as I have shown, is morphologically a nominalization. The invariable negative *yuwaati* can also be analyzed as a nominal:

the ending -ti- is a common Numic participial suffix which is often used as a nominalizer (e.g., on some adjectives and color terms in Kawaiisu).¹⁸

I have suggested (in Munro 1974b) that Northern Uto-Aztecan negatives may all derive (historically) from an [N N]_S structure in which the first N is a nominalized negative and the second is a nominalization of the negated sentence; such sentences would translate literally as emphatic negations something like 'Untrue is the fact/claim that S'. The Kawaiisu data does lend support to the reconstruction of such a structure; the problem, however, is that Kawaiisu yuwaati is not cognate with other Northern Uto-Aztecan negatives, which reconstruct as something like *ka-y-ti.¹⁹ So although Kawaiisu may retain the archaic negative construction virtually unchanged, the lexical negative yuwaati seems to be a Kawaiisu innovation. It appears to have originated as a -ti- participle meaning roughly 'being not', with yu- from *yi 'be' and -waa- apparently cognate to the Southern Numic negative verb suffixes Southern Paiute -ywa?ai- and Chemehuevi -wa?ay- (-wa? in final position).²⁰ These suffixes follow verbs negated by a preceding first or second-position negative from *ka-y-ti, as in this example from Chemehuevi:²¹

- (25) kacu-?uŋwa-n ki?i-wa? 'He/it didn't bite me'
neg₁-3anim-1 bite-neg₂

Apparently the negative force of Kawaiisu yuwaati comes from the presence of this element -waa-, even though the cognate forms like the -wa? in (25) do not by themselves carry negation.

Hopefully more work on the synchronic grammar of Kawaiisu will help reveal why Kawaiisu negatives have the form they do, and how this typologically unusual structure evolved.

Footnotes

1. This paper is based on fieldwork done in Tehachapi, California, with Mrs. Lida Girado and the late Mrs. Bertha Goings, who provided most of the data, and with Mr. Andy Greene, who offered some useful confirmation. I am grateful to all of these people, and to Professor Maurice Zigmund, who generously introduced me to Kawaiisu and to his consultants, and who helped me with some of the examples in this paper (including the etymology of pohagadi 'doctor', below). I would also like to thank Wick Miller, for giving me copies of his notes on Kawaiisu and of the analyzed text "Wild Canary and Coyote", which I quote below, and Talmy Givón and Edith Moravcsik, who made helpful comments on earlier versions of this paper.

2. I do not know whether the terms "Series I" and "Series II" are due to Miller or to Zigmund; I learned them from Miller's notes. My discussion of verbal morphology here is based on Miller.

3. Kawaiisu sentences are presented roughly as transcribed, except that when the quality of a final vowel that was deleted in speech is known, it has been reinstated here. Since many

Kawaiisu morphemes change their shape when in the environment of certain other morphemes, I have not fully segmented all the words in the examples. -'s correspond one-to-one between the Kawaiisu and the gloss underneath it. Separate components of the gloss are separated by ='s. The abbreviations used in the glosses in this paper are SI = Series I verb; SII = Series II verb; 1 = first-person subject, object, or possessor; 3 = third-person subject, object, or possessor; anim = animate; fut = future; inan = inanimate; neg = negative; obj = object; pl = plural; refl = reflexive; subj = subject. I have not indicated third-person visible/invisible distinctions in the glosses, primarily to save space.

4. I have omitted the remote past endings -pidi(-) and -pi- from this table because they are so seldom used in speech.

Note: the plural clitic -m̄(-) may follow Series I-marked verbs with plural subjects.

5. Independent object pronouns sometimes show up in negative sentences (e.g. (3b), (4b), and (5) below), possibly for emphasis.

6. The full Series II ending plus clitic sequence is also shortened in a few other cases, somewhat sporadically, apparently by deletion of inanimate object clitics.

7. Consonant-final English names like Rochelle appear to end in -i in the (underlying) form in which they are used in Kawaiisu sentences.

8. Another way in which postpositional phrases behave like nominals in Kawaiisu is that some of them are distinguished for subject and object case. See the discussion of conjoined subjects and objects below.

9. The position of yuwaat̄i is of course not surprising from the point of view of comparative Uto-Aztecán--the negative, like modals and various other elements, is one of a class of first- or second-position morphemes in many if not most Uto-Aztecán languages (for some discussion, see Steele 1973). In other Uto-Aztecán languages with which I am familiar, however, virtually any item of the sentence may be preposed before the negative (possibly with some change in focus or emphasis), which is definitely not the case in Kawaiisu.

10. Many embedded negative clauses (which I will not discuss further here) do not include yuwaat̄i, but are negated either with some "privative" verb suffix (the most common, I think, is -pi?ena) or with the clause-initial embedded negative morpheme kedu, which derives from the general Northern Uto-Aztecán negative *ka-y-t̄i mentioned in the last section of this paper.

11. The remote past Series II ending -pi- (see footnote 4) probably derives from *-pi-, another nominalizer and participial.

12. The explanation for why Series II endings occur on some simple main clauses in Kawaiisu, if it is true that these endings contain nominalizing -na-, may be related to a development in the Southern Numic language Chemehuevi, in which a construction using a na-marked verb is now employed to express a perfective (see Munro 1974a). The use of the perfective would be completely understandable in texts, and it is possible that the extension of such a

construction to some (stative?) adjective and reflexive constructions is not unreasonable.

13. Except for complements of 'say', which act like main clauses in other ways as well (see Munro to appear).

14. Wick Miller's notes on Kawaiisu show some examples of a more complicated comitative construction in which the postposition is attached to a pronominal copy of one of the two conjoined nouns. I have not elicited this construction in speech.

15. The use of an "object form" of certain postpositions in particular syntactic environments was first noted by Sapir (1930) for Southern Paiute, another Southern Numic language.

16. Note that the grammatical number of the "conjoined noun phrase" in the comitative construction seems to be somewhat variable, but probably is generally plural (thus giving some justification to the label "conjoined noun phrase"). The subject clitic corresponding to the conjoined noun phrase is plural in every case I have recorded except (21); semantically plural inanimate noun phrases often seem to be grammatically singular. However, note that the object clitic corresponding to the conjoined (animate) object in (19) is singular. It is probably significant that in this case the order of the two "conjoined" nouns is discontinuous.

17. Conceivably, of course, an N_1 N_2 sentence translated as ' N_1 is N_2 might be analyzed as having a (deleted) copular verb BE.

18. This argument gets complicated. Participles in -t̥i- often develop into verbal aspectual and "tense" markers (like the -d̥i- in the Kawaiisu Series I verb endings), so it's hard to characterize a -t̥i- form as uniquely nominal or verbal. On the other hand, while -d̥i-/r̥i- forms do seem to be fairly verby in Kawaiisu, -t̥i- forms do not.

19. Or perhaps *ka-y-ta. Ronald Langacker has suggested to me that the actual source may be *ka-y̥i-ta.

20. I am grateful to Ronald Langacker for a helpful discussion of the etymology of yuwaat̥i-. There are other negative verb suffixes throughout Uto-Aztecan which may reconstruct to *wa or a leniting *ma.

Interestingly, Southern Paiute -n̥waʔai- and Chemehuevi -waʔai- have exactly the same shape as the subject form of the postposition 'with' (cf. Kawaiisu -weʔe-, discussed above) in those languages.

Maurice Zigmund has pointed out to me a probably related Kawaiisu noun suffix, -aat̥i-, whose use is exemplified in these pairs of words:

hiwa 'parent'
pia 'mother'

hiwaat̥i 'orphan'
piaat̥i 'motherless'

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A Frame for FRAMES

(A Few Remarks on the Methodology of Semantically Guided Text Processing)

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1. The differences in the various linguistic paradigms have in the main been caused by different approaches to semantics. Lewis or Montague do not accept the semantic component of Chomsky's theory as 'semantics', because Chomsky does not operate with truth values. Montague's highly complex grammar does work with truth values, but still it is justifiedly applied to Montague Grammar what Lakoff said about formal descriptions in general: "What is wrong with formal descriptions is that they only allow for those facts that happen to be able to be dealt with by the given formalism" (Lakoff 1974: 153). Generative semanticists apply this statement also to Chomsky's theory and try to develop a flexible 'natural logic', which, they claim, is better suited to describe aspects of meaning than formal theories. In my opinion, however, the disadvantage of generative semantics is that the status of this modified paradigm is not at all clear. But at least the generative semanticists try to develop a theory, which cannot be said of most of the work presently done in artificial intelligence, where the desirability of constructing a theory is explicitly denied, since all they do, they say, is nothing else but 'engineering', simulating and testing of 'understanding natural languages' in simple situations (cf. Schank and Nash-Webber).

In recent studies on semantics such terms as 'logic'/'natural logic', 'inference'/'implicature', 'comprehension', 'understanding', 'context' etc. are used frequently. This seems to support Fillmore's statement that "issues in semantics that have no conceivable application to the process of comprehension cannot be very important for semantic theory" (Fillmore 1974).

One of the basic questions in connection with the investigation of comprehension concerns the rôle which "linguistic information about the meanings of words or sentences and factual information about things and events" (Fillmore 1974) play in comprehension. In trying to set up a theory of comprehension this question can be reformulated as follows: (a) What kind of meaning-postulates are required for the semantic interpretation, and (b) how should the lexicon component of the theory be constructed and how flexible should the interaction be between theory and lexicon? In 'engineering' terms this means, how much commonsense knowledge must be stored in the memory of a computer to allow the simulation of a given situation appropriately?

Logico-semantics-like formal linguistic theories operate

with "possible (and rather restricted) worlds", artificial intelligence research produces interesting ideas in connection with 'scenes and frames', where it is stressed that it is necessary to analyze how the different kinds of frames can/should be constructed (cf. Charniak 1975).

Whatever one may think about the necessity of constructing formal theories, one cannot deny the validity of the following two points:

- (a) It is necessary to have a theoretical framework to integrate the results of research on various fragments. In this context it is appropriate to quote Bar-Hillel who asks "what good does it do to deal with torsos of fragments of natural language if we do not even see how to expand the treatment of those fragments to enlarge pieces? My positive claim is, if you do not see how to extend your treatment, do not give me a treatment of any fragment" (Bar-Hillel in Heidrich 1974: 347). From other similar comments I should also like to mention Woods (1975: 148).
- (b) It is necessary to develop a (formal or at least disambiguating) theoretical language. In connection with artificial intelligence research Woods complains that "one of the depressing methodological problems that currently faces the field of artificial intelligence and computational linguistics is a general tendency to use terms imprecisely and for many people to use the same term for different things and different terms for the same things" (Woods 1975: 149). This does not only apply to computational linguistics but, unfortunately, to other branches of linguistics as well.

It is the aim of this paper to present some aspects of a theoretical framework which (a) should enable the flexible description of all relevant aspects of meaning and text comprehension (in such a form that it guarantees the integration of results of research done in various types of semantics so far, and also, if possible, of the methods used), and (b) operates with a theoretical language easily used to construct representations of natural language texts. This theoretical framework is the so-called "text structure - world structure theory" (with the German abbreviation TeSWeST).

The term 'frame' in the title refers to this theoretical framework, the term 'FRAME' is used as in artificial intelligence: there a FRAME is the representation of commonsense knowledge necessary to understand a standard situation (e.g. shopping at the supermarket).

2. the TeSWeST aims at describing the syntactic, semantic and pragmatic structure of natural language texts. In detail this means

- (a) the assigning of (all possible) syntactic (intensional-semantic) representations to natural language texts,
- (b) the world-semantic (extensional-semantic) interpretation of the individual intensional-semantic representations,
- (c) the generating of syntactic (intensional-semantic) representations, and
- (d) the comparing of a text, of the intensional-semantic representation of a text, and of the extensional-semantic representation of a text with other texts, the intensional-semantic representations of other texts, and the extensional-semantic representation of other texts, respectively.

Since these points represent a generalization of what logical semantics has aimed at, the structure of the TeSWeST must necessarily be analogous to logic. This not only applies to the structure of the theory's components, but also to the relation between the different components. There are two reasons why I speak of analogy rather than identity with logic:

- (a) The aims of the TeSWeST are much more general than the aims of logical semantics, and
- (b) the range of objects to be described by the TeSWeST (i.e. natural language texts) is much larger than the range of natural language objects described by logico-semantic theories so far.

Given this difference between logical semantics and the TeSWeST, then it follows from this that the traditional structure of a logical theory, i.e. logical syntax plus logical semantics, must be replaced by a much more complex structure in the TeSWeST, at least at the present stage of research. This complex structure is shown in Figure 1 (where the direction of the analysis is indicated).

The main components of the TeSWeST are

the Text Grammatical Component (TGrC),
the World-Semantic Component (WSeC), and
the Lexicon Component.

The dominating component is the WSeC. It directly or indirectly determined the structure and functions of the other components. It is the task of the WSeC to carry out the world-semantic (extensional-semantic) interpretations (the result of which is a world-semantic representation (WSeR)) and to draw world-specific logico-semantic inferences (LoSemInf). So far, in logico-semantics only interpretations of relatively restricted natural language fragments have been carried out, one can therefore only hypothesize about the structure of a complex logic (Logico-Semantic Interpretation Component (LoSemIC)) capable of interpreting any kind of natural language texts.

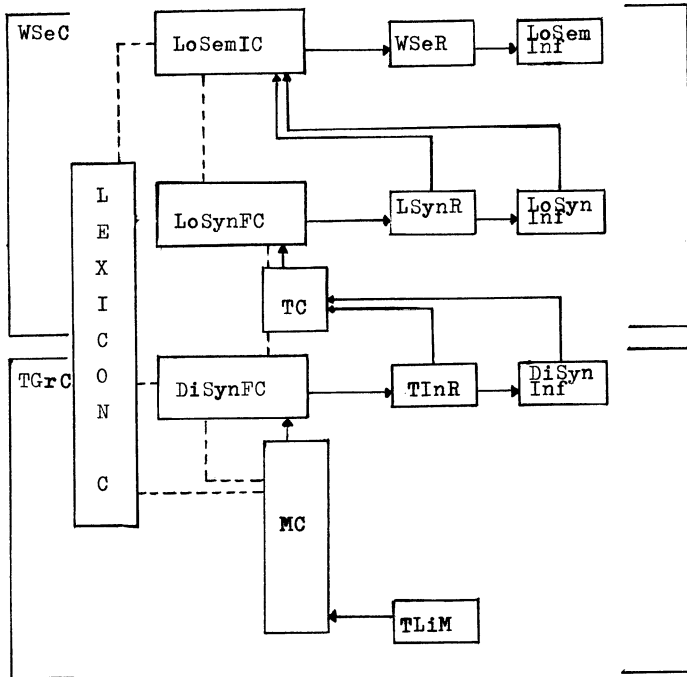


Figure 1

Explanation of abbreviations used:

DiSynFC	Disambiguating Syntactic Formation Component
DiSynInf	Disambiguated syntactic inferences
LoSemIC	Logico-Semantic Interpretation Component
LoSemInf	Logico-semantic inferences
LoSynFC	Logico-Syntactic Formation Component
LoSynInf	Logico-syntactic inferences
LoSynR	Logico-syntactic representations
MC	Mapping Component
TC	Translation Component
TGrC	Text Grammatical Component
TInR	Intensional-semantic text representations
TLiM	Linear text manifestations
WSeC	World-Semantic Component
WSeR	World-semantic representations

Because of this hypothetical nature of the LoSemIC the structure of the Logico-Syntactic Formation Component (LoSynFC) must remain hypothetical also. It is the task of this component to construct syntactically well-formed formulae (logico-syntactic representations (LoSynR)) and to define logico-syntactic inferences (LoSynInf).

The hypothetical nature of the WSeC also affects the structure of the TGrC. On the one hand it must contain a Disambiguating Syntactic Formation Component (DiSynFC) to enable the construction of unambiguous (intensional-semantic) text representations (TInR) based on the analysis or generation of natural language texts, the TInR-s should be translatable into a logico-syntactic language. On the other hand it must contain a Mapping Component (MC) which maps the TInR-s to natural language texts (linear text manifestations (TLiM)) or the TLiM-s to all admissible TInR-s. Apart from the formation rules of the TInR-s the DiSynFC also contains rules for drawing disambiguated syntactic inferences (DiSynInf). (A Translation Component (TC) must guarantee the transition from DiSynFC to the LoSynFC.)

The Lexicon contains syntactic and semantic information and is closely connected with both the TGrC and the WSeC. ('Semantic information' here refers to the lexical and encyclopedic information average native speakers/listeners of a given language have access to when they draw their inferences from natural language sentences/texts in standard contexts, and a register of proper names, which contains all admissible proper names with their minimal classification characteristics.)

3. It is the task of the DiSynFC to guarantee the well-formedness of the TInR-s. Since lack of space does not allow me to present the rule system of the DiSynFC, I want to demonstrate some of the aspects of this system by discussing one representation. A complete well-formed elementary unit of a TInR is an 'atomic text'. The atomic text given in (2) can be assigned as a possible TInR to the meaning of utterance (1):

(1) I think Anne left for London yesterday.

(2) $T_1 = [\text{CASE-BE}] \{st:t_1, sl:l_1, up:p_1^P\}$
 $P_1^P = [\text{TELL}] \{ap:\text{Pers1}/=\underline{A}/, leave:\text{Pers2}/=\underline{B}/, eo:p_1^W\}$
 $P_1^W = [\text{CASE-BE}] \{st:t_2, sl:l_2, up:p_1^W\}$
 $p_1^W = [\text{THINK}] \{se:\text{Pers1}/=\underline{A}/, eo:p_1\}$
 $P_1 = [\text{CASE-BE}] \{st:t_3, sl:l_3, up:p\}$
 $p_1 = [\text{LEAVE}] \{ap:I01, ls:I02, lg:I03\}$
 $\wedge[I01 = \text{Anne} /< \text{Uw1}, \text{Uw2}, \text{Uw3}, \text{Uw4}]$
 $\wedge[I02 = \text{Q1}^{\sim}\text{CU}\{x\} | [\text{PLACE}] \{up:x\} /< \text{Uw1}, \text{Uw2}, \text{Vw3}, \text{Vw4}]$
 $\wedge[I03 = \text{London} /< \text{Uw1}, \text{Uw2}, \text{Uw3}, \text{Uw4}]]$

$\wedge [t_N = t_1 > t_2 > t_3$
 $t_3 \in T_3, [\text{DAY}] \{up:T_3\};$
 $t_1 \in T_1, [\text{DAY}] \{up:T_1\}; T_1 \succ T_3]$
 $w_1 = \text{the real world of } \underline{A}$
 $w_2 = \{P | [\text{THINK}] \{se:\underline{A}, eo:P\}\}$
 $w_3 = \text{the real world of } \underline{B}$
 $w_4 = \{P | [\text{TELL}] \{ap:\underline{A}, go:\underline{B}, eo: [\text{THINK}] \{se:\underline{A}, eo:P\}\}\}$

Commentary:

- (a) In order to mark the actual utterance status of (1), it is necessary to supply information about the communication situation "A communicates to B that (1)". In accordance with this information (2) also has to be completed to make (2) the representation of (1) as an utterance. But I do not want to deal with this problem here; in (2) A and B refer to the 'communicating persons',
- (b) units in capital letters are no real words of the given natural language but constructs in the Lexicon assigned to the respective words,
- (c) "p" indicates a propositional-(function-)frame, while "p" indicates a predicate-(function-)frame; we speak of a 'function' if an argument-place of the frame in question has not yet been filled by a constant. "P" indicates the 'performative modal' character and "W" the 'world-constitutive' character of the respective unit, the figures as subscripts indicate the hierarchical unit (atomic text) the units belong to,
- (d) "st", "sl", "up", "ap", "go", "eo", "ls", "lg" are so-called 'argument labels'. They indicate the function of individual arguments in the given predicate-frame. In the sequence as above they stand for specification temporal, specification local, unspecified participant, agent participant, goal object, effected object, local source, and local goal (cf. Heydrich 1976),
- (e) I_{01} , I_{02} , I_{03} are 'reference indices'; I_{02} is a so-called 'individual description' which has to be read as follows: 1 (=Q1) counting unit (= CU) of those "x"-s which are "places" ($\{x | [\text{PLACE}] \{up:x\}\}$); W_{w1} indicates uniqueness, unambiguous referentializability, V_{w1} indicates variability in the world w_1 ; all reference indices have to be specified for U or V in all the worlds in which they occur,
- (f) the w_i -s are world-indices; " w_2 " refers to the world (= system of propositions representing events or states) constituted by A's thinking; " w_4 " refers to the world constituted by A's thinking and presented by A to B; the symbols "A" and "B" mark the persons, whose world/sub-world is w_2 and w_4 respectively,
- (g) " t_N " is the net of temporal relations; " $\underline{x} > \underline{y}$ " has to be read as follows: \underline{x} is (chronologically) later than \underline{y} ;

"T1 > T3" means that T1 occurs one chronological unit later than T3.

The functors of the predicate frames can be enlarged by operators or operators modified by operators. Thus the following frames can be produced:

- (3) [[[VERY] SLOW] WRITE]{ap:I01}
- (4) [[[VERY] SLOW] GIRL]{up:I01}

By means of connective-function-frames the atomic texts can be connected to form complex texts. In most cases a complex text manifests/constitutes a world-complex. Due to the fact that the p^P and the p^W frames are integral parts of well-formed atomic texts, the rule system of the DiSynFC contains the appropriate means for the representation of this world-complex. The rule system of the DiSynFC also allows to draw 'syntactic inferences', e.g. from (3) the syntactic inferences [[[SLOW] WRITE]{ap:I01} and [WRITE]{ap:I01} can be drawn.

For the sake of terminological clarity I will further specify the term 'frame' in the following way: The TeSWeST as a theoretical framework is called a T-frame. The predicate-function-frames (e.g. [WRITE]{ap:x, eo:y}), the connective-function-frames (e.g. [IMPLIES]{is:P1, im:P1}), ("is" = implicans, "im" = implicatum); and the operator + operand-function-frames (e.g. [[SLOW]...] or [[VERY]---]) are simple frames in the Lexicon, they are called sL-frames. The representation in (2) is a special frame, a grammatical (intensional-semantic) representation, it is called a G-frame.

4. The basic component of the TeSWeST is the Lexicon. The lexicon entries enable on the one hand the combinatorics of the DiSynFC, and on the other hand the construction of synonymous expressions and the explicit reconstruction of those inferences ('implicatures') which can be drawn on the basis of common-sense knowledge.

The argument/operand slots of the sL-frames are marked in such a way that they can only be filled by units fulfilling the required classification characteristics, that way the combination of lexicon entries is controlled. In order to handle the representation of synonymous structures and implicatures economically and consistently on all levels (word level, sentence level, and text level), the Lexicon must be constructed along the following principles:

- (a) a part of the sL-frames is to be regarded as 'primitives'; the primitive sL-frames must fulfil the following requirements
 - (i) with the help of the primitives all non-primitive sL-frames must be definable up to a required depth of common-sense knowledge;

- (ii) the primitives should have at least a restrictedly universal character ('restricted universality' here means 'universality in a certain group/class/set of languages');
- (b) the non-primitive sL-frames can be defined in several steps, i.e. definition-chains lead from the definienda to those definitientia which contain only primitive sL-frames;
- (c) the definitions are constructed like (atomic or complex) texts.

If one follows these principles, then

- (a) the Lexicon is free of circular definitions (or circularity occurs only within the set of primitive sL-frames),
- (b) the TGr and the Lexicon are structurally coordinated: the Lexicon is the Lexicon of the TGr, the TGr is the grammar of the Lexicon.

There is a clear analogy between the definitions in the Lexicon (subsequently 'L-definitions') and a part of the FRAMES (as used by Charniak) as far as their content is concerned. The definitientia in the Lexicon constitute complex L-frames (cL-frame); as to the content they are FRAMES. But definitientia and FRAMES are different with respect to their structure. L-definitions (and the DiSynFC) are constructed in a way to allow the combination not only of definienda but also of definitientia, i.e. G-frames can be generated from sL-frames and/or cL-frames. This means that complex FRAMES can be constructed from elementary FRAMES systematically. For example, the FRAME "Shopping at the supermarket" can be constructed as follows. We assume that

[DO]{ap:io1, eo_f:SHOPPING-of-io1}, [SUPERMARKET]{up:io2},
[BASKET]{up:io3}, [CART]{up:io4}

are sL-frames to be defined ("eo_f" indicates that the argument 'eo' (= SHOPPING-of-io1) is an inseparable complement of the functor (= DO); "io1", "io2", ... are reference indices used in the Lexicon). The structure of the L-definitions are approximately as follows (the definitions here are only given as illustrations, they are not well-formed G-frames):

- (5) [DO]{ap:io1, eo_f:SHOPPING-of-io1} =_D
 - (i) io1 wants to possess the set of objects consisting of the elements m1, ... mk;
 - (ii) io1 goes to place L/places L1, ... Li, where these objects can be bought;
 - (iii) io1 chooses the objects m1, ... mk at the given place(s) in the usual way and becomes the owner of these objects by paying with tokens accepted in the given place(s);
- (6) [SUPERMARKET]{up:io2} =_D

io2 is a large self-service store where persons

do their shopping with a basket_i or a cart_j
 (the indices "i" and "j" refer to the special
 character of the objects in question);

(7) $[BASKET_i]\{up:io3\} =_D$

a container used for shopping at a super-
 market; ...; used in a way that ...;

(8) $[CART_j]\{up:io4\} =_D$

a vehicle used for shopping at a supermarket;
 ...; used in a way that ...;

The G-frame ("somebody (= io1) does his/her shopping at the supermarket") of the complex FRAME "Shopping at the supermarket" can be generated as follows: first the G-frame (9) is constructed with the appropriate definienda sl-frames, then the substitution by the definientia and the so-called canonical transformations, which guarantee well-formedness, must be carried out:

(9) $P_2 = [CASE-BE]\{st:t, sl:io2, up:p2\}$

$p2 = [DO]\{ap:io1, eo_f:SHOPPING-of-io1\}$

$\wedge [SUPERMARKET]\{up:io2\}$

When substituting $[SUPERMARKET]$ by the definiens of (6), either basket_i or cart_j must be selected and, accordingly, either the definiens of (7) or the definiens of (8) must be inserted in the definiens of (6). $[DO]\{ap:io1, eo_f:SHOPPING-of-io1\}$ has to^{be} replaced by the definiens of (5). The canonical transformation consists in the replacement of the part (iii) of the definiens of (5) by the appropriate part of (7) or (8) (cf. "used in a way that ..."). The transformation is directed by the fact that the place L of (5)(ii) is allotted the "io2" of (9).

I hope that even this short presentation succeeded in giving an idea about the Lexicon-conception of the TeSWeSt. The main point is the homogeneity of the Lexicon and the TGr (and not the homogeneity of the FRAMES and a programming language).

5. As to the WSeC I only want to add two remarks here:

- (a) The world-semantic (extensional-semantic) interpretation requires that the TInR-s are translatable into LoSynR-s. This seems to be practicable, the 'case-grammatical' basis of the DiSynFC is no obstacle to the translatability into e.g. a predicate-logic-type of language.
- (b) When constructing semantic interpretations it is a fundamental question how to use the Lexicon flexibly. The definientia represent the uses of lexical units in 'standard contexts' (intensions relating to standard extensional contexts) and thus they are directly inter-

pretable only with respect to such contexts. The DiSynFC should be flexible enough to allow semantic interpretation with respect to all types of contexts.

Finally, I want to emphasize that the TeSWeST is a theoretical framework in the very sense of the word, a framework, the aim of which is to develop an integrated semiotic theory of natural languages. Until now it functioned as a 'progressive problem shift'. (For further information about the TeSWeST and the structure of its Lexicon see the bibliography.)

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BOUNDARIES and GRASSMANN'S LAW in SANSKRIT

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In attempting to find support for his account of the Sanskrit diaspirates, Hoard (1975) advances fallacious theoretical arguments and overlooks counterexamples to his statement of Grassmann's Law, which he adopts from Jensen (1974). It is my intention to show that even if Hoard's rules are revised so as to account for the facts, the analysis in Phelps (1975) is preferable because it derives from sounder theoretical principles.

The Sanskrit roots that begin and end with underlying voiced aspirates exhibit the following kinds of phonetic alternations:

- (1) bhudh- 'know; be awake'
- | | | | | |
|----|-----------|---|--------------|----------------------|
| a. | bhotsyati | < | bhodh-sya-ti | future, 3rd singular |
| b. | bhuddbhis | < | bhudh-bhis | instrumental plural |
| c. | buddha | < | bhudh-ta | participle |
| d. | budham | < | bhudh-am | accusative singular |
| e. | bhut | < | bhudh-s | nominative singular |

There is general (although not universal) agreement that these and similar forms are to be accounted for by the following rules which would be required even if the diaspirates did not exist: Bartholomae's Law, which voices and aspirates t and th if they immediately follow a voiced aspirate (1c); Grassmann's Law, which is a rule of aspirate dissimilation that operates across intervening segments (1c, 1d); a rule (or rules) that deaspirates consonants before obstruents and word boundary (1a, 1b, 1c, 1e); and a rule of regressive voicing assimilation (1a, 1e). Controversy has centered around the ordering of the rules and their explicit content.

Hoard states that his 1975 analysis "differs only in minor ways from the earlier one of 1973", but this is inaccurate, since the later analysis is far less successful than the previous one. Following are the ordered rules that Hoard presents in his revision.

- (2) a. Deaspiration of Consonants (DC)
- $$[+asp] \rightarrow [-asp] / ___ \#$$
- b. Grassmann's Law (GL)
- $$\begin{bmatrix} -syll \\ +cons \\ +obst \end{bmatrix} \rightarrow [-asp] / ___ X \begin{bmatrix} -syll \\ +cons \\ +obst \\ +asp \end{bmatrix}$$
- c. Bartholomae's Law (BL)
- $$\begin{bmatrix} +voice \\ +asp \\ +obst \end{bmatrix} + \begin{bmatrix} -cont \\ +obst \end{bmatrix} \rightarrow \begin{bmatrix} +voice \\ -asp \end{bmatrix} + \begin{bmatrix} +voice \\ +asp \end{bmatrix}$$

Note that in this and the following set of rules there is no general rule that deaspirates consonants before obstruents. As we shall see, this requires the introduction of the # boundary in phonologically conditioned contexts.

For the purpose of comparison, the rules of Hoard's earlier version are given below.

- (3) a. Deaspiration of Consonants = (2a)

- b. Grassmann's Law

$$[+asp] \rightarrow [-asp] / \text{---} V(C) \begin{bmatrix} +asp \\ +Root \end{bmatrix}$$

- c. Bartholomae's Law

$$\begin{bmatrix} +\text{voice} \\ +\text{asp} \end{bmatrix} + \begin{bmatrix} -\text{voice} \\ -\text{cont} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{voice} \\ -\text{asp} \end{bmatrix} + \begin{bmatrix} +\text{voice} \\ +\text{asp} \end{bmatrix}$$

Grassmann's Law applies iteratively, from left to right:
 $\text{bha} + \text{bhandh} + \text{a} > \text{ba} + \text{bhandh} + \text{a} > \text{ba} + \text{bandh} + \text{a}$. Hoard mistakenly states that Grassmann's Law is self-bleeding. He also implies that the direction of application is predictable from general principles, but there are counterexamples to each such principle that has been proposed. Both sets of rules are supposed to yield the following derivations.

- | | | | | |
|-------|-------------|-------------|------------|--------------|
| (4) | dhugh+tha:m | dhugh#dhvam | bhibhr#tha | bhodh#sya+ti |
| DC | -- | dhug#dhvam | -- | bhod#sya+ti |
| GL | dugh+tha:m | -- | bibhr#tha | -- |
| BL | dug+dha:m | -- | -- | -- |
| other | -- | -- | -- | bhot#sya+ti |

Hoard errs in assuming that the elimination of the specification [+Root] from the statement of Grassmann's Law in (2b) is a correct generalization. This form of the rule, taken from Jensen (1974), cannot account for the facts of Sanskrit. Jensen proposes a Relevancy Condition (1974:680) that is intended to determine what the variable X can represent. (Odden (1975) demonstrates that the relevancy condition fails seriously in a variety of ways.)

- (5) Only IRRELEVANT segments may intervene between focus and determinant in phonological rules. The class of segments defined by the features common to the input and determinant of a rule is the class of segments RELEVANT to that rule, provided at least one of the common features is a major class feature. If there is no common major class feature, then ALL segments are relevant.

In order to allow X to represent nonobstruents in Grassmann's Law, redundant major class features must be included in the statement of the rule; since all [+asp] segments in Sanskrit are [-syll, +cons, +obst], these feature specifications are not otherwise needed.

There are two defects in the rule, however. First, s is an obstruent, and Grassmann's Law must be allowed to operate across s, as in tiṣṭha-, the reduplicated present stem of stha:- 'stand', from underlying thi+stha:-. It would therefore be necessary to add [-cont] to both terms of the structural description so as to include s in X.

This is the least of the failings of this version of Grassmann's Law. Without the specification [+Root], aspirates in suffixes will also condition deaspiration. Hoard asserts that this is in fact the case, and offers in evidence two highly irregular second person singular imperative forms containing the suffix -dhi. But Hoard and Jensen have overlooked the consequences for this version of Grassmann's Law that follow from the fact that, by universal convention, X may have a null expansion. That is, the presence of X in a rule, in conjunction with the relevancy condition, indicates the permissible segments that may, but need not, be intervening material; the presence or absence of the segments represented by X is irrelevant to the operation of the rule. Therefore, instead of the derivation shown in (4) for dugdha:m, we actually have the following, where the aspirate in the suffix deaspirates the root-final aspirate.

- (6)
- | | |
|--------------------------|-------------|
| | dhugh+tha:m |
| DC (2a) | — |
| GL (2b), 1st application | dugh+tha:m |
| GL 2nd application | dug+tha:m |
| BL (2c) | — |
| (voicing assimilation) | *duk+tha:m |

Thus, every time that an aspirate is immediately followed by a suffix-initial th, that is, when X is null, Grassmann's Law will incorrectly bleed Bartholomae's Law. In cases such as these, there is no remedy to be found in appealing to a difference in the boundary that occurs before the suffix, as Hoard does in the derivations of (4) and elsewhere. Bartholomae's Law is a rule of internal sandhi; it applies only across the + boundary, and only if the segment that precedes t or th is a voiced aspirate. No one disputes these conditions on the rule.

There are further problems associated with the absence of [+Root] from the statement of Grassmann's Law. Consider the following, which are representative of a large number of similar forms.

- (7) a. bhudh- 'know; be awake'
- | | |
|--------------------|--|
| <u>bubudhathus</u> | < <u>bhu+bhudh+athus</u> , perf. ind., 2nd dual act. |
| <u>bubudha:the</u> | < <u>bhu+bhudh+a:the</u> , perf. ind., 2nd dual mid. |
- b. bhu:- 'be'
- | | |
|---------------------|---|
| <u>babhu:tha</u> | < <u>bha+bhu:+tha</u> , perf. ind., 2nd sing. act. |
| <u>babhu:vathus</u> | < <u>bha+bhu:+athus</u> , perf. ind., 2nd dual act. |

c. bhr- 'bear'

bibhr̥thas < bhi+bhr̥+thas, pres. ind., 2nd dual act.

bibhra:the < bhi+bhr̥+a:the, pres. ind. 2nd dual mid.

bibhr̥tha < bhi+bhr̥+tha, pres. ind., 2nd pl. act.

d. stha:- 'stand'

asthitha:s < a+stha:+(i)+tha:s, aorist, 2nd dual act.

It is apparent from these examples that some device must be used to prevent the aspirates of the suffixes from deaspirating the aspirates of the roots. According to Hoard, it is the presence of the # boundary before the suffix that prevents Grassmann's Law from operating, as in the derivation of bibhr̥tha from underlying bhi+bhr̥#tha (4). However, as the following derivations show, no matter which boundary is assumed to occur before the suffix, the correct result cannot be obtained for the bhudh-forms (7a).

(8)	bhu+ <u>bhudh</u> +athus	bhu+ <u>bhudh</u> #athus
DC (2a)	—	bhu+ <u>bhud</u> #athus
GL (2b)	bu+ <u>bhudh</u> +athus	bu+ <u>bhud</u> #athus
GL	bu+ <u>budh</u> +athus	—
GL	bu+ <u>bud</u> +athus	—
BL	—	—
	*bubudathus	*bubhudathus

These and similar forms demonstrate that [+Root] must be included in Grassmann's Law.

The use of different word-internal boundaries, + versus #, is well motivated in Sanskrit, but this is true only for a relatively small number of suffixes where # is needed to explain other facts that are unrelated to Grassmann's Law or Bartholomae's Law. But, having made this important contribution to the solution of the diaspirate problem in his 1973 paper (earlier, and unknown to Hoard, also proposed by P. Stanley (1972)), Hoard has extended the use of this device in a totally arbitrary way in order to maintain the patently counterfactual assumption that suffix aspirates effect deaspiration by Grassmann's Law.

There is more at issue here than the empirical adequacy of the analysis. The evidence of (6) and (8) shows only that Grassmann's Law must include [+Root]. However, we must also consider whether the theory should permit the introduction of special boundaries in phonologically defined contexts. Under Hoard's analysis, the # boundary must occur before all nine conjugational suffixes that contain th if the suffix is preceded by a root that contains an aspirate followed by nonobstruents (or s). Note that this is almost identical to the context for the version of Grassmann's Law that Hoard is using. In no way could this be construed as a morphologically conditioned exception feature, which Hoard suggests it is, since the presence of # in these cases is completely

determined by the phonological structure of the root and an aspirate in the suffix.

This nonexplanatory use of boundary distinctions is not limited to the cases just mentioned. In Hoard's earlier analysis, as well as in the one under discussion, the # boundary has to be assumed before every suffix that begins with s (not just before the two suffixes he mentions) if the suffix is directly preceded by an aspirate. This is the result of Hoard's contention that there is no separate rule of internal deaspiration in Sanskrit. Root-final deaspiration is attributed by him either to the # boundary or to Bartholomae's Law. Thus, forms such as the following must all have # before the suffix.

(9) dhugh- 'milk'

adhuk-ṣa-	aorist stem
dhok-ṣya-	future stem
dudhuk-ṣa-	desiderative stem
dhuk-ṣva	imperative, 2nd sing. middle
dhok-ṣi	pres. ind., 2nd sing. active
dhuk-ṣe	pres. ind., 2nd sing. middle

Unlike the situation for other suffixes such as -su (locative plural), there is no independent evidence that any of these suffixes requires the # boundary. Here, the occurrence of # is completely predictable from the presence of a final aspirate in the root and an initial s in the suffix, a phonologically determined context. It is this # that is supposed to account for the nonapplication of Grassmann's Law via the bleeding effect of Deaspiration (2a), as in bhodh#syati > bhotsyati (4). But such forms can be explained without the use of internal # boundaries.

As stated earlier, there is a process of regressive voicing assimilation in Sanskrit, as shown in the following rules (Phelps 1975).

(10) a. Bartholomae's Law (BL)

$$\begin{bmatrix} -\text{voice} \\ -\text{cont} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{voice} \\ +\text{asp} \end{bmatrix} / \begin{bmatrix} +\text{voice} \\ +\text{asp} \end{bmatrix} \text{ ---}$$

b. Regressive Voicing Assimilation (RVA)

$$[+\text{obst}] \rightarrow [\alpha \text{ voice}] / \text{ --- } (\#) \begin{bmatrix} +\text{obst} \\ \alpha \text{ voice} \end{bmatrix}$$

c. External Deaspiration (ED) = (2a)

$$[+\text{asp}] \rightarrow [-\text{asp}] / \text{ --- } \#$$

d. Grassmann's Law (GL)

$$\begin{bmatrix} +asp \\ \alpha voice \end{bmatrix} \rightarrow [-asp] / ___ [+seg]_1 \begin{bmatrix} +asp \\ +Root \\ \alpha voice \end{bmatrix}$$

e. Internal Deaspiration (ID)

$$[+asp] \rightarrow [-asp] / ___ [+obst]$$

By restricting Grassmann's Law to aspirates that agree in voicing, and requiring the second aspirate to be [+Root], all of the phonetic variations in aspiration are accounted for as follows.

(11)	bhu+bhudh+athus	bhodh+sya+ti	bhudh#bhis	bhudh+ta
BL	--	--	--	bhudh+dha
RVA	--	bhoth+sya+ti	"	"
ED	--	--	bhud#bhis	--
GL	bu+bhudh+athus	--	--	budh+dha
GL	bu+budh+athus	--	--	--
ID	--	bhot+sya+ti	--	bud+dha
	bubudhathus	bhotsyati	bhuddhis	buddha

Under this analysis, unlike Hoard's, the rules interact with one another in ways largely determined by the segmental structure of the strings to which they apply. With two exceptions, the # boundary that is posited before certain inflectional suffixes is needed to account for phonetic facts unrelated to Grassmann's Law. The two exceptions are the 2nd plural middle endings, -dhve and -dhvam. Diaspirates before these endings retain the initial aspirate: dhugdhve, dhugdhvam. However, diaspirates before the 2nd singular active imperative ending, -dhi, do not retain the initial aspirate: dugdhi. Since there is no phonetic basis for distinguishing between these cases, it is assumed that the # boundary occurs after aspirates before the suffixes -dhve and -dhvam, while the + boundary occurs before -dhi.

These rules, in contrast to Hoard's, provide a phonetic explanation for the fact that diaspirates that condition Bartholomae's Law also undergo Grassmann's Law: Bartholomae's Law prevents Regressive Voicing Assimilation from bleeding Grassmann's Law, as in bhudh+ta > buddha, compared with bhodh+sya+ti > bhotsyati.

Hoard objects to the inclusion of [α voice] in Grassmann's Law, stating (1975:217):

- (12) The formulation of GL with [α voice] is not well motivated. There are no diaspirate forms in Sanskrit which differ in voicing ... Independent evidence for including [α voice] is lacking because there are no roots like *bhath which would simply go through the rules unaltered ... While ED (= DC) is independently well motivated and bleeds the independently well motivated version of GL

that contains no α -variables, one is led to conclude that adding [α voice] to GL is merely a device which allows the independently well motivated rule RVA to bleed a now parasitic version of GL.

What this says is that phonetic contrasts, if derived and not underlying, cannot motivate rules, that the motivation for rules must be based on underlying contrasts, a suggestion that cannot be taken seriously by anyone who is concerned about the acquisition of language, the phonetic basis of phonological rules, or the abstractness of grammars. It would mean that rules of absolute neutralization, which some phonologists would exclude entirely, would be among the best motivated rules because they apply only if there is an underlying contrast that is never directly manifested phonetically. The actual state of affairs is that rules of absolute neutralization, when they are countenanced at all, require more justification than phonetically motivated rules.

Hoard's discussion of "independent motivation" is particularly incongruous in the context of an analysis that proliferates internal # boundaries whose sole motivation is to prevent suffix aspirates from triggering Grassmann's Law in derivations where the "independently well motivated" rule of External Deaspiration plays no role at all, as in $bhi+~~bhr~~\#tha > bibhr\#tha$. Underlying representations, including boundaries, must be as well motivated as the rules that relate them to surface forms.

Part of the problem of accounting for the diaspirates arises from the fact that Grassmann's Law is opaque in two ways. First, the root aspirate that conditions the deaspiration is often phonetically absent, but may be inferred from related forms, as in budham versus buddha. Second, there are forms which one would expect to behave similarly in respect to Grassmann's Law but which do not, as in dhugdhve versus dugdhi. But there is one phonetic situation in which Grassmann's Law never applies in Classical Sanskrit, and that is when the two underlying aspirates disagree phonetically in voicing. Thus, since dhadh-, the reduced reduplicated stem of the root dha:- 'put', is an exception to Bartholomae's Law, Grassmann's Law does not apply in the following forms because Regressive Voicing Assimilation devoices the second aspirate: $dhadh+ta > dhatta$, $dhadh+tha > dhattha$.¹ This is the one phonetically transparent fact associated with Grassmann's Law, but, according to Hoard, incorporating this information into the rule is unmotivated because there are no underlying forms in which the two aspirates disagree in voicing. He goes on to say:

- (13) Complicating GL so that RVA bleeds it may seem an innocuous strategy. But it is not. On the contrary, it must be a basic tenet of (natural) phonology that each phonological rule of a language be independently motivated in its entirety; that is, each rule must be stated in the most general way. Only if each rule is independently motivated in its entirety can questions concerning how rules interact

in a phonology have empirical significance ... Moreover, the whole enterprise of determining what constitutes a natural process or rule is also ultimately pointless in the absence of this tenet.

It seems to me, then, that, because GL has been 'degeneralized' to allow RVA to bleed it, Phelps' solution does not meet this very basic criterion of phonologies.

Although this passage rings with phrases that should stir the heart of any generative phonologist, it is totally lacking in substance. Hoard fails to grasp the distinction between rules and underlying representations that have a direct phonetic basis, and rules and underlying representations that can only be inferred from indirect evidence. It is the latter, not the former, of which it makes sense to say that they account for facts other than the ones for which they are proposed, that is, that there is independent evidence to support them. It is meaningless to talk of independent motivation in any other context, or to equate independent motivation with generality of rules.

I have no disagreement with the goal of stating rules in the most general way, provided the rules are also consistent with the facts. Some generalizations, however, are spurious, as we have seen in the case of Grassmann's Law without the specification [+Root], because they cannot be made to accord with the facts. Furthermore, a given rule must be evaluated in the context of a given grammar, not in isolation. It is not sufficient to compare two statements of a rule and select, on the basis of this comparison alone, the grammar that includes the more general rule. The generalization may have been purchased at the price of complicating other parts of the grammar. In this connection, it might be instructive to review the devices that Hoard uses to deal with deaspiration before obstruents.

In order to get by without a rule of Internal Deaspiration, Hoard requires exception features that introduce word-internal # boundaries in phonologically defined contexts. He thus treats as exceptional what every other analysis accounts for by a phonetically based phonological rule, Internal Deaspiration. This allows him to "generalize" Grassmann's Law by not requiring the aspirates to agree in voicing, but only at the further expense of complicating Bartholomae's Law, which must now include deaspiration.

I suggest that whenever a phonetic alternation can be attributed to the phonetic context by a simple phonological rule, it must be the phonetic context and not an abstract boundary, or exception feature, or morphological condition that governs the alternation. Without such a principle, we lose any hope of discovering anything about the phonetic basis for phonological rules and how phonetically motivated rules interact in a grammar. It is this principle that requires the inclusion of the rule of Internal Deaspiration in the grammar of Sanskrit; it is this principle that requires the inclusion of [α voice] in Grassmann's Law; and it is this principle that disallows both of Hoard's analyses.

NOTE

¹Hoard accounts for this irregularity of dhadh- by "a lexical exception feature associated with dhadh", which he gives as:
 + --> # / ____ [t, th]. This makes it appear to be mere chance that # occurs before exactly those segments that are affected by Bartholomae's Law. Hoard apparently thinks that an exceptional boundary "explains" something that the exception feature [-BL] does not.

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A PROPOSAL FOR TREATING COMPARATIVES IN MONTAGUE GRAMMAR

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Linguists who have investigated the approach to natural language semantics that is appropriately, if not revealingly, known as Montague Grammar, have characteristically been captivated by the fact that someone has at last shown them a way to do rigorous semantic analysis for a significant, albeit quite limited, fragment of a natural language. But the initial bloom of romance fades and they typically grow nostalgic for the far richer variety of constructions about which transformational grammar had something interesting to say. This nostalgia, as often as not, leads to musing about how nice it would be if the ad hoc syntax of the categorial grammar upon which Montague semantics is founded were supplanted by a more elaborate system: say the syntax of a transformational grammar. Cooper and Parsons (in Partee, to appear) have demonstrated that the deep structure of a transformational grammar can be interpreted in such a way that it is precisely equivalent to the categorial base of PTQ, and their work suggests that it will generally be possible to prove the equivalence of suitably constrained transformational grammar bases and the bases of lambda categorial languages. This opens up the possibility of linking transformational grammar and model-theoretic semantics in an almost mechanical way, by the maneuver of using a transformational base in place of a categorial base in an otherwise standard Montague treatment.

The question arises as to whether such a maneuver results in significant gains. In this paper I look at a fragment of English for which the maneuver has been attempted, and try to access the gains and losses with respect to an attempt to account for the same data in a less adventurous Montague extension. Davis and Hellan, in their long paper "The Syntax and Semantics of Comparatives," endeavor to use Bresnan's transformational treatment of comparatives as the basis of a Montague-inspired semantics for English comparative constructions. Their strategy is to invoke special rules for converting the structurally ambiguous base rules of the Bresnan analysis into derived structures that are free of syntactic (in particular, scope) ambiguities. To accomplish this goal, they find it necessary to have rules that 1) introduce nouns, converting predicative adjective phrases into attributive adjective phrases, 2) raise nouns, establishing syntactically just what the relative scopes of noun phrases are, and 3) bind degree variables, introducing a 'flag' element into base trees in order to simplify the statement of constraints on quantifying in to fill or find those variables.

It should be emphasized that Davis and Hellan do not take the steps just mentioned merely to facilitate their semantics for comparatives. The steps are essential if the analysis is to work at all, and must be considered as the price they have to pay for using Bresnan's syntactic rules. It should also be borne in mind

that the syntax Davis and Hellan are appropriating involves a minimum of four transformational rules: three comparative extra-position rules and a comparative deletion rule.

The semantic analysis for which all this is preparatory turns out to be quite complicated. This is so partially, as Davis and Hellan point out, because the Bresnan syntax which they are interested in providing with a direct interpretation is characterized by a high degree of embedding and the repetition of many nodes (a condition which is exacerbated by Davis and Hellan's disambiguating rules). It is therefore possible, and frequently turns out to be the case, that the translations of elements far down in the tree turn out to be the function of many arguments. Thus their translation of much (actually, one of two much's that they posit) is given in (1).

$$1 \text{ } \underline{\text{much}}_{1,j}^1 \rightarrow \lambda \mathfrak{D} \lambda Q^A \lambda A \lambda N \lambda Z (\mathfrak{D} \{ \hat{v} (\eta^+(N)(A)(z) = v) \} \& \\ N \{ z \} \& \lambda \varphi_1 [\lambda \mu_1 [\lambda K_1 ((^v Q^A)(A)(N)(z))(\pi_j)](\mu_j)](\varphi_j) \& \\ ((\delta_j > 0 \& \pi_j \neq 0) \rightarrow \delta_j = \pi_j) \& (\delta_j = 0 \rightarrow \pi_j = \varepsilon_j))$$

In addition to the variables represented by lower case, upper case, and script Roman characters, Davis and Hellan also posit nine variables that take degrees or extents as values, representing the contribution of various lexical and syntactic elements to the comparison that expresses the completed translation. These are supplemented by two constants of intentional logic, interpreted as functions which respectively

...associate with an individual a measure of the extent to which that individual has a characteristic with respect to other individuals in a group

and

denote the number of individuals in the set (to which it is applied)

In other respects Davis and Hellan's semantics involves a direct translation of English into intensional logic, exactly as in other Montague grammars.

I will now attempt to show that a more conventional Montague account of comparatives will automatically produce an explanation for some of the data that led David and Hellan to want to incorporate Bresnan's syntax in their account. In this short paper I cannot hope to explore the range of constructions Bresnan's analysis covers, but I will outline what to expect of a more comprehensive account along the lines I initiate. English comparative constructions are notorious for resisting a uniform treatment of their syntactic and semantic properties. In this paper I undertake to show how several of their more difficult features can be handled, or at least gracefully sidestepped, in a Montague grammar. To avoid lengthy preliminaries, I assume familiarity with the conventions used by Thomason (1972, 1975) to

present syntactic and semantic analyses in a Montague approach. Rather than try to state an explicit set of translation rules, I will rely on type-annotated translation trees to represent my syntactic and semantic analysis.

The following data have been stumbling-blocks to linguists who have wanted to show syntactic and semantic relationships to parallel the morphological relationship exhibited by positive and comparative adjectives in English.

- 2 a. Steve is taller than Jeff.
- b. Steve (Jeff) is tall.
- 3 a. Steve is a taller man than Jeff.
- b. Steve (Jeff) is tall.
- c. Steve (Jeff) is a man.

Intuitively, (2a) does not entail (2b) and (3a) does not entail (2b), but (3a) does entail (3c). These facts seem to mitigate against an analysis in which (2a) is derived by deletion from a source along the lines of (4).

- 4 Steve is taller than Jeff is tall.

Bennett (1974) notices that the attributive use of adjectives exhibits similar properties. He observes that there are adjectives such as mortal which intuitively yield entailments like (5b) and (5c) from (5a).

- 5 a. Max is a mortal man.
- b. Max is a man.
- c. Max is a mortal entity.

Bennett labels adjectives like mortal intersective, referring to the fact that mortal man seems to designate the intersection of the set of men with the set of mortal entities. This is in contrast to adjectives like large (paradigmatic for adjectives which undergo comparative formation). When used in an adjective phrase, large permits entailments like (5b) from (5a), but does not allow the entailment from (5a) to (5c).

- 6 a. Formica is a large ant.
- b. Formica is an ant.
- c. Formica is a large entity.

Bennett calls adjectives like large non-intersective, for the obvious reason. Both types are subsective - that is, the set denoted by the noun with the attributive adjective is a subset of the set denoted by the naked noun. There are also non-subsective adjectives, although they are non-comparable. For instance, alleged and putative, when used in sentences like (7a) do not permit either (7b) or (7c) as entailments.

- 7 a. Percy is an alleged panderer.
- b. Percy is a panderer.
- c. Percy is an alleged entity.

These adjectives will not concern us here, although I will assume the result that Bennet obtains from their consideration, namely that if α is a nonintersective adjectival phrase, β is a common noun phrase, and γ is their appropriate concatenation, then the extension of γ depends on the intension of β .

In order to guarantee the intersective and subjective properties of the appropriate adjectival phrases, Bennett requires that all models satisfy the following meaning postulates.

- 8 $\Box [\forall (P)(x) \rightarrow P\{x\}]$ where \forall translates big or famous in B_{AJ} , or rapidly, slowly, or voluntarily in B_{IAV} .
This is identical to Bennett's MP 5 (Bennett 1974, p. 45) and guarantees the subjective property.

It is a simple matter to assure the correct entailments for comparative adjectives, and in (2) and (3), by amending (8) to allow \forall to translate derived adjective phrases such as taller than Jeff and a taller man than Jeff. This step receives support in view of the reasons advanced by various philosophers in favor of considering the attributive use of adjectives as prior to their predicative use. (see Cresswell (in Partee, to be pub.))

The majority of linguists who have treated the comparative have opted for an analysis which can be represented (in an extremely oversimplified manner) by (9).

- 9 Steve is (er - than Jeff is tall) tall.

Such an approach makes for problems in the semantics in exactly the same way (4) does. If the embedded clause is interpreted by the same set of rules that interpret non-embedded sentences (2b) is incorrectly produced as an entailment of (9). And if embedded clauses are not interpreted in the same way as surface clauses, machinery must be provided to defeat the entailment in some cases while allowing it in others (in relative clauses, for instance). But other arguments favor underlying structures on the order of (9) for syntactic reasons: (9) observes Emonds' structure preserving constraint, it provides syntactic structure to support intonational phrases, it provides the appropriate structures for supplying controllers in comparative deletion transformations, etc. In addition, many linguists have supported (9) on the grounds that it derives comparatives from simple (positive) adjectives, and that the converse is unthinkable. Ginet (1973) expresses the general dismay of linguists at the idea that the comparative is the more basic form. The arguments boil down to the notion that such an analysis would provide no way of accounting for sentences like (10).

- 10 Joyce thinks that Jeff is taller than he is.

Logicians have not been so reluctant to entertain the notion that the comparative, or relational form, is more basic than the positive, or predicative form. Thus Wheeler (1972) reasons (with Boas before him - see Ginet's discussion) that the act of comparing is conceptually and psychologically anterior to the act of establishing a ranking of things compared. Rather than considering tall to be a function that assigns degrees of tallness to its arguments, he looks on it as a relation between an individual and a set of which the individual is a member. Thus Wheeler gets (11a) from (11b).

- 11 a. John is a tall man.
 b. tall(John, x (x is a man)) & John x (x is a man)

Temporarily ignoring the difficulty posed by (10), this formulation seems to have linguistic as well as philosophical merit, in that it is extendible in obvious ways to account for (12) and (13).

- 12 Ben is tall for a four-year-old.
 13 Rich is taller for a jockey than Steve is for a
 basketball player.

The use of tall must be pragmatically conditioned at least in so far as it is our pragmatic knowledge of four-year-olds, jockeys, and basketball players that allows us to pick the relation between individual and set correctly for (12) and (13). I do not have any contribution to make concerning how to relate pragmatic contributions to meaning to semantic contributions, but I do find Wheeler's notion that the degrees of height picked out in (12) and (13) are a matter of physics, rather than semantics, to be seductive.

It also happens to be the case that the problem linguists see in (10) for an account like Wheeler's can be eliminated in a Montague grammar. To give a Montague account of (10) I will need to introduce some theoretical notions: abstracts, as introduced in Thomason (1972) and provided with a semantic interpretation in Thomason (1975), and VP pro-forms as used in Klein's (1975) paper on doing sloppy identity in a Montague grammar. The treatment will depend on the principle of lambda-abstraction, and on treating pro-forms as evidence for variable binding rather than for deletion. In analyzing sentences like (14) we first construct a formula with two free variables, as in (15).

- 14 Tim kisses Aisha and Ben bites her.
 15 Tim kisses him and Ben bites him.

We take the semantic analysis of (15) to be (16), and then produce an abstract of (16) relative to x_1 (17).

$$\begin{array}{l} 16 \quad \frac{\text{kiss}'(x_1)(t) \ \& \ \text{bite}'(x_1)(b)}{x_1 \ [\text{kiss}'(x_1)(t) \ \& \ \text{bite}'(x_1)(b)]} \\ 17 \end{array}$$

(17) is considered to be a function from individuals to truth values and can take the individual constant *a* (the translation of Aisha) as an argument to get (18).

$$18 \quad x_1 \ [\text{kiss}'(x_1)(t) \ \& \ \text{bite}'(x_1)(b)] \ (a)$$

(18) is interpreted as "the property of being kissed by Tim and bitten by Ben is true of Aisha." (17) the abstract of (16) will be represented in the derivation of English sentences by expressions like (19).

$$19 \quad \text{that}_1 \ [\text{Tim kisses him}_1 \ \text{and Ben bites him}_1]$$

so that combining (19) with Aisha will yield (14). Expressed more generally, if *d* is an expression of type τ and v_1 is a variable of type σ , then $\lambda v_1[d]$ denotes a function of type $\langle \sigma, \tau \rangle$ - a function from entities of type σ to entities of type τ .

Klein (1975) uses abstraction operators, that_0 , that_1 , that_2 ..., subscripted variables he_0 , he_1 , he_2 ..., superscripted variables it_0^0 , it_0^1 ..., it_1^0 , it_1^1 ..., and superscripted abstraction operators, that_0^0 , that_0^1 , ..., to account for the ambiguity of (20).

$$\begin{array}{l} 20 \quad \text{John kisses his wife and Bill does it too.} \\ \quad (1 \text{ in Klein (1975)}) \end{array}$$

Using Klein's methodology, it can be shown that scope ambiguities account for the different readings of (10) in a way consistent with the hypothesis that comparative adjectives underline positive ones, so that the hypothesis cannot be dismissed in a Montague treatment. To account for (20), Klein uses VP pro-forms. He looks on do it₀¹ as an IV variable, and cites the sentences in (21), which he credits to Ross and Bouton, in deciding to treat the do in do it₀¹ as an independent lexical item, which combines with expressions that denote properties.

$$\begin{array}{l} 21 \quad \text{What you should do is blow up some buildings.} \\ \quad \text{What I did then was call the grocer.} \\ \quad \text{You do one thing right now: apologize.} \\ \quad \text{Pay my price he has consistently refused to do.} \end{array}$$

Syntactically, do combines with expressions of category index AB, (19) for example. Since do it₀¹ behaves like an IV, do gets the index IV/AB. In order to get ³(20), you construct a higher order abstract, AB1, relative to the IV variable it₀¹, and have it take an ordinary abstract as its argument. Klein breaks down the rule, which I give here as (22) in three parts in order to illustrate the duplication of functions, which I retain for ease of exposition.

22 F_{24}

If β is a variable, then $F_{24}(\text{that}_i^1[\alpha], \beta) = F$, where α' is the result of replacing each occurrence of it_i^1 in α by β .

If β is of the form $\text{that}_j[\gamma]$, then $F_{24}(\text{that}_i^1[\alpha], \beta) = F_{24_2}(F_{24_1}(F_{24_0}(\text{that}_i^1[\alpha], \beta) = \alpha'$ and α' is the result of replacing the first occurrence of it_i^1 in α by β and all other occurrences of it_i^1 by it_i ;
 if α' is of the form $\delta \text{ do that}_k[\gamma] \epsilon$, then $F_{24_1}(\alpha') = \delta F_{30}(\text{do that}_k[\gamma]) = \alpha''$; if α'' is of the form $\exists \text{ that}_j[\gamma] \epsilon$ and δ is a T, then $F_{24_2}(\alpha'') = \exists F_2(\delta, \text{that}_j[\gamma]) \epsilon$.

n.b. Except for F_{24} and F_{25} , which follow Klein (1975) all rule numbers refer to the formulation in Thomason (1972).

To get (20) we construct John does it_3^1 and Bill does it_3^1 , t in the usual way, use that_3 and rule F_{25} to turn it into a higher order abstract. We then quantify in the ordinary abstract that_1 , [he₁ kisses his₁'s wife]. The details of the construction of analysis and translation trees for these phrases are parallel to the steps shown for parallel constructions in (22). This produces the reading in which only John's wife is kissed, we construct that_3 he₄ does it_3^1 and Bill does it_1^1 and quantify into it with an abstract that has non-coreferential variables: that_0 [he₀ loves his₁ wife]. Applying F_{24} to the result yields an analysis tree with a translation tree that gives the desired reading.

Now consider (23), which gives the trees involved in using this approach get (2a). As before, the strategy has been to combine a higher level abstract with a simple abstract. I have fudged the rule adjustment that will be necessary to make the final step, indicated by the squiggly line in the analysis tree. The manner in which I have treated more than is not intended as a serious proposal. While there is linguistic and philological evidence that suggests that more than resembles a conjunction with a negative second conjunct, and some linguists have suggested analyses that incorporate these suggestions explicitly (see Ginnet, 1973, chapters 1 and 2 for a survey), my use here is designed only to simplify the trees and emphasize that I am making no claims about this aspect of the analysis. It would have been easy to adjust my view on more than to get taller than Jeff is tall to be an IV, a linguistically sounder step, but that would have led to a more elaborate tree, and it is my purpose here to demonstrate that whatever the details of a Montague analysis, the data that require deletion transformations for comparatives in transformational grammar can be handled in terms of quantification and variable binding.

23 Steve is taller than Jeff (is)

Steve is tall more than Jeff does it too, t, 24₂

Steve that₄[he₄ is tall] more than Jeff does it too, 24₁

Steve does that₄[he₄ is tall] more than Jeff does it too, 24₀

that₃¹ [Steve does it₃¹ more than Jeff does it₃¹ too], AB1, 25

that₃¹, AB1/t Steve does it₃¹ more than Jeff does it₃¹ too, t

Steve does it₃¹, t, 3 more than Jeff does it₃¹, t, 3

do it₃¹, IV, 30

Steve, T

do it₃¹, IV, 30

Jeff, T

do, IV/AB

it₃¹, AB

do, IV/AB

it₃¹, AB

that₄[he₄ is tall], AB, 1

that₄, AB/t he₄ is tall, t

be tall, IV he₄, T

tall, CN/CN

more than' (do' (tall' (s)), do' (tall' (j)))

$\lambda Q_3^1 [\text{more than}' (\text{do}' Q_3^1 (s), \text{do}' Q_3^1 (j))] (\lambda x_4 [\text{tall}' (x_4)]), t$

$\lambda Q_3^1 [\text{more than}' (\text{do}' Q_3^1 (s), \text{do}' Q_3^1 (j)), \langle \langle e, t \rangle, t \rangle]$

more than' (do' Q₃¹(s), do' Q₃¹(j)), t

do' Q₃¹(s), t

do' Q₃¹, <e, t>

do', <<e, t>, <e, t>>

Q₃¹, <e, t>

$\lambda x_4 [\text{tall}' (x_4)], \langle e, t \rangle$

tall' (x₄), t

tall', <e, t> x₄, e

do' Q₃¹ (j), t

do' Q₃¹, <e, t>

j, e

do', <<e, t>, <e, t>>

Q₃¹, <e, t>

Exactly parallel to (20) we have sentences with comparatives, such as (24).

- 24 Steve is taller than his girlfriend, and so is Jeff.

The ambiguity is the same, and it is to be accounted for in just the same way. The same thing goes for sentences like (25), in which there are compared adverbs.

- 25 Ali pummeled Foreman more viciously than Frazier.

The analysis which provides an account of this sort of ambiguity in terms of quantification and binding can be extended to account for the deleted adverb by the simple expedient of postulating a variable to cover the adverb, whatever the details of the analysis. Klein has justified treating do it to as a TV in order to construct an abstract to treat sentences like

- 26 Jeff kisses Joyce more often than she tries to do it to him.

and the devices he posits, a new 'variable', it to² which combines with terms in the same manner as a TV, and a new abstraction operator, that^{TV}, which takes ordinary abstracts into abstracts of category ABTV¹, are perfectly suited for analyzing the deletions in sentences like those in (27) as instances of variable binding.

- 27 a. Megs plays chess more thoughtfully than checkers.
b. Megs plays chess more thoughtfully than Steve.
c. Megs plays chess more thoughtfully than well.

And given sentential pro-forms, which Klein motivates to handle sentences like (28) even such monstrosities as (29) present no special terrors.

- 28 It disturbs John that Mary hates him and it disturbs Bill too.
29 Jeff is as much better a soccer player than me as I am a better squash player than Steve.

None of the foregoing has touched on the semantics of comparative constructions. The thrust of the discussion has simply been to illustrate that the syntactic facts which justify Bresnan's transformational account are open to explanation within an ordinary Montague grammar account. To my mind, this shows that while there may be constructions in natural languages which will force workers in Montague grammar to substitute a transformational base for a categorial one, English comparatives aren't the one.

The semantics of comparison which Davis and Hellan attach to their account can be transferred, mutatis mutandis, to the sort of

account supported here. I suspect it could even be simplified a bit, considering that the depth of embedding would be greatly reduced. A comparative, each time it occurs in a sentence, is viewed on their account as contributing an ordering relation between a pair of degrees, and possibly a quantitative measure of the difference between the related degrees. This is certainly part of the story, but it is far from evident that such elements should be directly provided by the translation rules. Cresswell (to appear) offers an analysis which makes essentially the same assumptions in a simpler, more elegant formulation. He takes for granted that "when we make comparisons we have in mind points on a scale" and proposes an analysis in which adjectives, for instance, are supplied with scales by their semantic translation, and er than contributes the information that the degree of a property possessed by one of its terms is higher than that of a (possibly different) property possessed by its other term on the scale common to the properties attributed to the respective terms. Since Cresswell does not utilize an intermediate level corresponding to the translation into intensional logic characteristic of Montague grammar, it is by no means a simple task to give an equivalent Montague analysis. Such a statement is far beyond the range of this paper. The only other serious suggestion on how to handle comparative semantics that I know of is Ginet's (1973) proposal, based on a suggestion made by David Lewis in "Universal Grammar." Ginet's suggestion amounts to the notion that comparatives are used to denote the proposition that, in at least one sense, the property asserted of the favored term of the comparison is denied of the unfavored term. All of these accounts have something to recommend them, and all present problems. I will have to leave discussion of their relative advantages and detriments, and my suggestions on integrating their good features into a single account, for another paper.

* * * * *

Notes

1. The careful reader will notice that the rule will not apply here in that one of Thomason's conditions on the rule of quantification is violated, since d contains a j-variable. Klein notices this fact, and solves it by amending the condition preventing from containing any j-variable that was exposed to obligatory reflexivization by an i-variable.
2. In the main point I make in this paper I come down very hard on Davis and Hellan's analysis. This is misleading, because in fact I regard their paper as a very interesting, and possibly correct, approach to the problem, at least in so far as their semantics goes. The version I have seen is obviously quite preliminary, and a bit difficult going, but it rewards the persistent reader with a system that appears to get the proper results, in spite of being rough in spots.

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SOME THEORETICAL CONSIDERATIONS ON THE MERGER OF
THE LOW VOWEL PHONEMES IN AMERICAN ENGLISH

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The purpose of this paper is to examine the phonological systems of speakers who are in the process of adopting a phonemic merger. The merger in question is the merger of the low back vowel phonemes of American English as represented in the minimal pair cot/caught. This contrast is based on the feature "round" as illustrated in Figure I.

[a] front unrounded	[ɔ] back slightly rounded
/a/ [a] central unrounded	/ɔ/ [ɔ] back rounded
[ɑ] back unrounded	[ɔ^2] back rounded, schwa glide

Figure I. Distribution of principal allophones

The most common form of merger in the United States results from the adoption of a phonological rule of unrounding and usually subsequent fronting which applies to the rounded phoneme. The loss of contrast resulting from the adoption of this rule has been reported for much of the United States west of the Mississippi River and for most of Canada. The discussion in this paper is based on data collected in Southern California, Orange County specifically, among school age children and teenagers.

Background

The American English taxonomic phoneme /ɔ/ has never been as "stable" as the case might appear from the standard phonemic descriptions of American English and from textbooks in English as a second language. Wetmore (1959) in a detailed study using the records of the linguistic atlas interviews tried to answer the following questions:

- (1) What is the allophonic range of the low vowel phonemes? What is the norm for each phoneme?
- (2) What are the phonetic subclasses? What are the allophonic norms for these subclasses?
- (3) What are the lexical items which are exceptions to the phonetic subclasses?
- (4) What are the geographical and social differences in (1), (2), and (3)?
- (5) What are the differences for individuals (including style) for (1), (2), and (3)?

On a theoretical level Wetmore found two phonemic systems. In two geographical areas, Western Pennsylvania and Eastern Maine, there was no contrast

between words such as cot and caught since both were pronounced with a low back slightly rounded vowel. Wetmore used /ɒ/ as the phonemic symbol. In all other areas there was a phonemic contrast based on rounding: usually unrounded back /ɑ/ in cot and rounded back /ɔ/ in caught. In no area did he find a merger resulting from the application of a phonological process of unrounding and fronting resulting in a central vowel phoneme as has been reported for Western United States.

In order to underline the extreme variability which Wetmore found, I will briefly review some of his findings for one area. For Vermont, Wetmore reports that the primary phones for the two phonemes are a back rounded one and a back unrounded one. Wetmore claimed that there was no phonemic overlap. On the other hand the distribution of the phonemes themselves was highly irregular. The -g subclass was the most variable: the unrounded phoneme was the norm for fog, hog, and frog but the rounded phoneme was normally found in dog. However, three informants used a rounded phone in fog and an unrounded one in dog. The -f class was also quite variable: office was recorded only with unrounded phones, but in coffin and coffee there was apparently free variation of rounded and unrounded phones. For the -n class, which theoretically is contrastive (don vs dawn) the rounded phones were more frequent for words like dawn but there are occasional unrounded ones recorded. Individual words of this class varied greatly. Ten of eighteen informants used a rounded phone in launch, the other eight used only unrounded phones. In closet and hospital, only one informant used rounded phones. In automobile, eight informants used rounded phones, two used unrounded phones, and one used both. A close examination of the other areas reviewed by Wetmore reveals that this sort of variability is found throughout the Eastern States.

Sources for the Contrast

There are several historical sources for the low vowels which seem to be so asystematically distributed through the lexicon. The primary source was Middle English short o. The unrounding and fronting of this phoneme spread through the phonetic subclasses at different rates in different areas. Examples are given in Figure II in which the contexts in which the change has not been complete in many areas of the United States are enclosed.

top	tot	tock
bob	sod	log
off	moth	cost
	Oz	
mom	don	song
	doll	

Figure II. Short o in monosyllables

It has already been mentioned that in certain areas a rounded phone is still used for all of these subclasses; however this is not the case for most varieties of American and Canadian English for which the unrounding and fronting processes are well advanced. The most conservative context for all speakers is the velar nasal. The only stop which is a negative constraint on unrounding is the velar stop, -g. This class is highly variable in all areas even for the lexical items in this class. The voiceless fricative context is also conservative for most Easterners. However, even in this class there is much variability. The palatal fricative has been a positive constraint for unrounding for many but not all speakers. In the context of -f, -th, and -s, the shift is variable and is constrained by several factors including syllable boundary, number of syllables in the word, and so forth. The degree of fronting also varies according to geographical area.

After the rule of fronting and unrounding had been well established at least in certain contexts, other vowel combinations were monophthongized resulting in a back rounded vowel, normally long and tense: (1) /a+/l/ as in call, ball, salt, talk, caulk, and so forth, (2) /au/ as in law, hawk, strawberry, and so forth, (3) /ou/ as in fought, bought, taught, daughter, and so forth, (4) and for some speakers /a/ after /w/ was rounded in words such as swamp, water, watch, and so forth. The result of this monophthongization was a new set of contrasts in those environments in which short o had been previously unrounded, that is, the previous contrast was reformulated in different phonological terms. These possible contrasts are given in Figure III.

Open Syllable	Closed Syllable
popper (P)	tot (T)
pauper (WP)	taught (WT)
bobbles (B)	tock (K)
baubles (WB)	talk (WK)
totter (D)	Oz (Z)
daughter (WD)	cause (WZ)
la (#)	mod (D)
law (W#)	Maude (WD)
comma (M)	mom (M)
trauma (WM)	Maughm (WM)
	don (N)
	dawn (WN)

Figure III. Possible Contrasts /a/ vs /o/

In word final position the contrast is highly variable: in some areas all word final low vowels are round, in others all are unrounded, others maintain the contrast. The greatest number of contrastive pairs is found with T/WT as cot, caught, tot, taught, sot, sought. In no case does the contrast have a high functional load; minimal pairs are few and usually rare. Also the frequency of the unrounded phones is much higher than that of the rounded phones.

Based on the data from the Eastern dialects alone, I propose that the most adequate view is one of continuous change as illustrated in Figure IV.

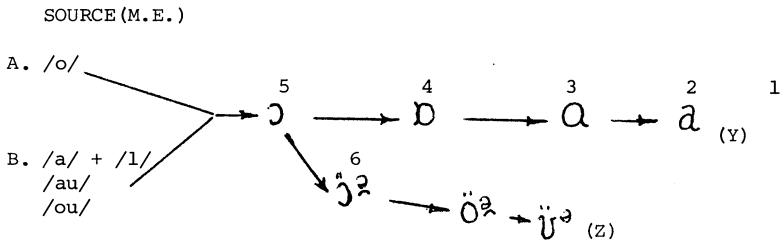


Figure IV. The Path of Change

In Figure IV (Y) indicates the path of change followed by most American dialects; (Z) indicates the path of raising followed by some Northeastern dialects, such as in New York City. The numbers identify the relative fronting of the phones. From these we are able to calculate the mean as an index of unrounding and fronting for various groups and individuals.

For a full description of the function of the low vowel phonemes in American English one would have to indicate at which stages the various phonetic subclasses were located on this path of change. This amounts to describing the constraints operating on the phonological rule of unrounding and fronting.

The Merger in Southern California

In a recent paper (Terrell, 1975) I reported the preliminary results from the data we have collected from interviews with school children and teenagers in Southern California. Our working assumption was that the informants could be divided into two groups: those born and raised in Southern California and those who moved here after the age of two with their families. We realized that many in the latter group would quickly adopt the speech patterns of native Californians; however, we

expected to find differences on a group level at least. The overall results are given in Figure V.

(1) Natives who use no rounded phones (61)	72%
(2) Natives who use some rounded phones (24)	28%
(3) Natives who contrast (0)	0%
(4) Nonnatives who use no rounded phones (23)	64%
(5) Nonnatives who use some rounded phones (11)	36%
(6) Nonnatives who contrast (2)	6%
(7) Black natives/nonnatives who contrast (17)	100%

Figure V. Distribution of Rounded Allophones

These totals reflect all subclasses except -r, which was not tested or tabulated, and velar -l before which all informants tend to favor rounded phones.

To our surprise even on a group level the differences between the natives and nonnatives are minimal. Further investigation with each individual interview revealed that some of the natives had learned to use backed and rounded phones in certain contexts and that most of the nonnatives had learned the California pattern very quickly resulting in merger in all contexts. Thus just by listening to the interview it was in most cases impossible to determine whether the informant was a native or nonnative. For example one informant who had been born and raised in New Jersey and who moved to California when he was ten years old (he was thirteen at the time of the interview), used no rounded phones in any context (except for velar -l) and was completely indistinguishable from native Californians by his speech.

For these reasons we divided the interviews into the subgroups indicated in Figure V in order to calculate the means of the index of fronting. The results are given in Table I.

	Natives (no round)	Nonnatives (no round)	Natives (some round)	Nonnatives (some round)	Blacks (total) (all contrast)
Mean	2.41	2.45	2.81	2.97	3.28
S.D.	.63	.60	.73	.91	1.10
Var.	.39	.36	.53	.84	1.21
N=	2257	715	1502	800	1960 cases

Table I. Means for Total Corpus

From the data in Figure V, in Table I and additional data presented in Terrell (1975), we may conclude the following: (1) No native Californian under the age of 18 systematically contrasts phonemes on the basis of the feature "round". (2) Among the natives who used rounded phones sporadically, all had nonnative parents. (3) Most nonnatives adopt the

merger shortly after moving to California, most in less than two years. (4) Merger has not spread through the Black youth of Southern California. (5) Merger is nonstigmatized; rounded allophones are stigmatized if the rounding is sufficiently strong. (6) The unrounding and fronting of back phones has been completed for all contexts.

We would like to determine how the relationship between merger and phonological context is dealt with by (1) those who use no rounded phones, (2) native Californians who learn to use rounded phones, (3) non-natives who are in the process of adopting the merger, and (4) Black adolescents who may be in the initial stages of adopting the merger. The overall data is displayed in Table II in which the means for the five groups of Table I are broken down by phonological context. In Table II "C" stands for the reflexes of M.E. short *o*, "WC" stands for M.E. /au/, /ou/, or /a+/1/. The means are given in the same order as in Table I.

We will examine the pattern for Black speakers first. The phonological rule which applied first to the Middle English short *o* has produced a central vowel in all contexts except for voiceless anterior fricatives and the voiced velar stop /d/ and the voiced velar nasal /ɣ/. This fronting is even more extreme in most contexts than for any of the white speakers. This is perhaps explicable by the fact that the Black group maintains the round-unround contrast and uses the fronting of the unround phoneme in order to maintain phonetic distance between the two phonemes. Since white Californians do not maintain this contrast they could allow more phonetic variation in the relative fronting or backing of the allophones of their single phoneme.

The rounded phoneme /ɔ/ for Black speakers has as its principal allophones [ɔ] and [ɔ̃]; however in certain contexts, the data suggest that the rules of unrounding and fronting have begun to be applied at least by some individuals. Selected contexts are compared in Table III in which the means for "rounded" classes are given followed by the percentage of rounded phones used in these contexts.

	Black Males (N=8)	Black Females (N=9)	Total Group (N=17 informants)
(1) Contrastive			
WT	4.49 (98%)	4.37 (95%)	4.42 (95%)
WK	4.55 (97%)	4.18 (83%)	4.34 (89%)
WZ	3.88 (88%)	4.33 (100%)	4.11 (94%)
WN	3.20 (35%)	3.81 (72%)	3.54 (56%)
(2) Voiceless Fricatives			
F	4.34 (94%)	3.49 (44%)	3.89 (68%)
θ	4.05 (84%)	3.48 (52%)	3.72 (66%)
S	4.16 (97%)	3.92 (75%)	4.03 (81%)
(3) Voiced Velars			
G	4.10 (94%)	3.50 (56%)	3.78 (74%)
NG	3.95 (95%)	4.00 (100%)	3.97 (98%)
EL	4.22 (96%)	3.87 (76%)	4.03 (87%)

Table III. Means for Selected Subclasses for Black Population

		Labials	Dentals	Alveolars	Palatals/Velars
Stops	VL	C 198/206/238/220/244		200/206/230/224/204	211/216/233/235/216
	WC	200/250/250/350/381		200/211/250/346/442	214/234/250/296/435
	VD	C 209/225/254/214/206		209/200/231/214/200	231/242/283/280/344
	WC	211/220/256/267/200		226/233/262/250/329	
Fricat.	VL	222/226/238/312/389	222/222/300/338/373	199/200/243/274/353	238/238/240/239/215
	C	225/217/238/236/208	254/245/281/283/218	257/250/292/271/212	
	VD	WC		215/200/250/350/412	
Affric.	VL				252/267/277/243/218
	VD				232/217/256/236/206
Nasals	C	251/261/275/245/256		265/260/282/250/204	271/233/328/290/397
	WC			267/275/300/321/356	
Laterals				224/250/295/281/224	339/339/387/415/403
Word Final		239/262/268/292/376			

Back rounded allophones are maintained most strongly in the contrastive contexts except for WN and before velar nasals and laterals. The fronting is most apparent in the WN class especially for males who used rounded phones only 35% of the time. On the other hand females seem to be somewhat more advanced than males in fronting in noncontrastive contexts. It is possible that the rounded phoneme is considered to be an integral part of Black vernacular speech. If so a possible explanation for the differences would be that males tend to be more conservative in conserving the vernacular, whereas females are more influenced by white standards.

Let us now turn to a detailed examination of the four groups of white speakers. The means from Table I for the natives who use no rounded phones and for the nonnatives who have adopted this pattern are not significantly different. An even closer examination of the means for each phonetic subclass fails to yield any appreciable differences. The Standard Deviation and Variance figures are also lower than for any other group. The norm for both groups is a central phone and there is very little variation from this norm in any context. The general constraints for unrounding and fronting for these groups is for the process to apply if the following sound is (1) an obstruent rather than a sonorant, (2) a stop rather than an affricate or a fricative, (3) a voiceless rather than a voiced consonant, (4) a nasal rather than a lateral, and (5) an anterior consonant rather than a posterior one.

The data from Table I suggest that the pattern used by natives who use some rounded phones is actually closer to the pattern used by nonnatives in process of adopting the merger. Selected subclasses are displayed in Table IV in order to compare there two groups more closely. Means and the percentage of rounded phones used are compared with averages for the groups who use no rounded phones (natives and nonnatives).

	Natives (with round phones)	Nonnatives (with round phones)	Merger Groups (No round phones)
Contrastive Contexts			
T/WT	2.31/2.50 (15%)	2.24/3.46 (61%)	2.09/2.02 (0%)
K/WK	2.32/2.50 (6%)	2.35/2.96 (26%)	2.12/2.19 (0%)
Z/WZ	2.92/2.50 (0%)	2.71/3.50 (50%)	2.55/2.69 (0%)
N/WN	2.82/3.00 (0%)	2.50/3.21 (33%)	2.70/2.69 (0%)
Voiceless Fricatives			
F	2.83 (23%)	3.12 (36%)	2.33 (0%)
θ	3.00 (18%)	3.38 (52%)	2.22 (0%)
S	2.58 (13%)	3.00 (25%)	1.99 (0%)
Voiced Velars			
G	2.83 (24%)	2.98 (37%)	2.37 (0%)
NG	3.28 (41%)	3.90 (91%)	2.63 (0%)
EL	3.87 (72%)	4.15 (85%)	3.39 (39%)
Contrastive Total			
	2.51/2.64 (7%)	2.39/3.22 (40%)	2.27/2.27 (0%)
Noncontrastive Total			
	3.24 (34%)	3.43 (50%)	2.61 (12%)

Table IV Means for selected subclasses

These data show that there are striking differences between the native and nonnative groups. Except in isolated instances the native group is not able to use the rounded phones contrastively. In contrastive contexts rounded phones are used by natives in only 7% of the possible instances compared to almost one-half of the time (40%) for nonnatives. The means for each subclass are so close that the differences are not great enough to provide a margin for contrast. In fact, natives seem to use more backed phones in all contexts. It is possible that these native speakers have heard the use of rounded phones by their parents and others (since all in this group have nonnative parents) and have coded this use of rounded phones into a general tendency to use more backed phones. This backing and sporadic rounding is purely phonetic however as is evident from the fact that the rounding is most pronounced in noncontrastive contexts.

In order to examine these patterns for individuals the data from Table IV for the contrastive and noncontrastive contexts are displayed broken down by individual informants with the highest rates of use of rounded phones in Table V. (The first number represents the number of years in the home state; the second, the second the number of years in California).

	Natives						
Contrastive	20%	18%	14%	14%	10%	5%	0%
Noncontrastive	42%	54%	43%	25%	38%	33%	12%
	Nonnatives						
Contrastive	91%	86%	52%	24%	20%	5%	0%
Noncontrastive	81%	75%	51%	46%	15%	33%	44%
	Ohio	Iowa	Penn	Ken	Tex	Tex	N.C.
	(10+2)	(3+10)	(7+5)	(5+7)	(10+3)	(7+6)	(11+1)

Table V Percent of rounded phones of individual informants

These data support the conclusion that natives are unable to use the feature "round" contrastively. The nonnatives, on the other hand evidently start with a round-nonround contrast which is quickly lost as the rule of unrounding and fronting is adopted. The quick loss of contrast may be explained by the fact that in those contexts in which the contrast is strongest, the voiceless stops, the rule of fronting is most applicable.

In summary the differences between these groups may be interpreted formally as follows. All natives have a low central vowel /a/ as underlying in all contexts. The feature "round" functions only redundantly. For the informants who use some rounded phones, we may posit that they have adopted a sort of redundancy rule which backs and rounds allophones

of /a/ in certain contexts. This rule is highly variable from individual to individual since it represents each informant's approximation to the system he hears from family and others. The nonnatives, on the other hand, have an underlying round phoneme posited on the basis of the speech of their original communities. As they arrive in California they adopt the unrounding and fronting rule as a variable phonological rule. When the application of this rule approaches 100% the lexical items are restructured with a central unrounded phoneme.

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"Expectation" in Chinese
 A Functional Analysis of Two Adverbs*
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I. Introduction

It is now commonly recognized in linguistic studies that, as interlocutors in our daily verbal interaction, we are constantly anticipating or expecting something, phonologically, syntactically, and semantically. Judging from the role that "expectation" plays in our verbal behavior, it would indeed be very strange if any natural language did not build into its system some way of showing expectation. In this paper, I would like to examine two morphemes, traditionally termed "adverbs," which have a great deal to do with communicating expectation in Chinese.

The two morphemes can occur in a sentence like (1).

- (1) Wo $\begin{matrix} \text{a. cai} \\ \text{b. dao} \end{matrix}$ mei dong-guo ni-de dongxi.
 I not move-ASP your things.
 "I _____ didn't move your things."

Like many other adverbs, cai and dao have different senses. Because of the lack of systematic studies on adverbs in either the earlier structuralist framework or the new transformational-generativist model, these adverbs are often either overdifferentiated or underdifferentiated. Of course, how to determine different senses of a word is a question that, to the best of my knowledge, has never been satisfactorily answered. At this stage of the art, one can only hope that, as more and more systematic attempts are made, linguists can understand the exact nature of the problem and thereby develop some ways of tackling it. In the sense they are used in (1) cai and dao do not seem to affect the propositional content of the sentence, which is roughly, "I didn't move your things".¹ Each of them, however, carries with it certain presuppositions, which makes it impossible to find an exact equivalent in English without a larger context. The fact that these adverbs are so context-bound also explains why in the past Chinese grammarians, who do not go beyond the sentence boundary, have had so little success in explaining them.

Chao (1968), for instance, explains cai as "then and only then will it be, 'extremely'" and gives the example, "cai ma-fang ne, extremely troublesome" (p. 787). This characterization of the use of cai is inadequate in two ways. First, given that these meanings are correct (see below), it still does not explain why the same word cai should behave in ways so different. As suggested by the two definitions cited by Chao, a reader will be hard put to imagine what relationship, if any, there is between these two senses. Of course, by making such a remark, I do not mean that every homophonous morpheme should have the same

meaning as its homophones, which is obviously false. However, I do want to suggest that, to the extent possible, linguists should give a unified explanation to different senses of a polysemous set. Second, while it is not incorrect to explain cai ---- ne as 'extremely' in the example just given, it is inadequate. This inadequacy can be clearly seen if we use the term in a real context. Suppose you meet a friend on the street and you want to convey the meaning that 'it is extremely hot today', you can not say (2) in Chinese.

- (2) # Jin-tian cai re ne.²
 today extremely hot PART
 "Today is extremely hot."

If you did, your friend would probably answer, "what's wrong with you?" in Chinese. The proper thing to say in this case is either (3) or (4), replacing cai with hao 'very' or -ji-le 'extremely'.

- (3) Jin-tian hao re ah.
 "Today is very hot."
 (4) Jin-tian re-ji-le.
 "Today is extremely hot."

The reason why (2) is inappropriate in this context will be explained later in the paper.

In section II and III of this paper, I will attempt to give a unified explanation of the different senses of each of the adverbs. Section IV will be concerned with the scope problem and the interaction with negation. The final section will examine the implications this analysis may have for grammatical theory in general and Chinese grammar in particular.

II. Cai

There are three related uses of cai in Modern Mandarin. In one of its senses, it means roughly "just" or "no more than." It occurs either in a time clause or a measurement clause.³ Let's call cai so used cai₁. Some examples follow.

- (5) Xian-zai cai si-dian-zhong.
 now (no more than) 4 o'clock
 "It is now just 4 o'clock."
 (6) Ta cai lai san-tian.
 he (no more than) come 3 days
 "He has just been here three days."
 (7) Cai wu-kuai-qian ma? Zhen pian-yi.
 (just) five dollars PART really cheap
 "Is it just five dollars? It's really cheap."
 (8) Ta cai liang-sui, hai xiao ne.
 he (just) 2 years' old still small PART
 "He is just two years's old; he is still small."

Cai₂ differs from cai₁ in two respects. First it interacts with a wider range of clause types--time, reason, measurement, or condition clauses. Second, it is always preceded by a clause of one of the types just mentioned. Its meaning is roughly equivalent to "only then" in English, indicating that an action occurs, a state is achieved only after certain time, or when the manner, reason or condition set by the preceding clause is obtained. Some examples follow.

- (9) Duo yi-jing guo-le wu-yei, yueliang cai chulai.
already passed midnight moon (only then) came out.
"It was only after midnight that the moon came out."
- (10) San-ge yue, cai neng zuo-de-hao.
three month (only then) can do-finish
"(I) can finish doing it only in three months."
- (11) Zhe-yang shuo cai dui.
this way say (only then) right
"It is right only by saying it this way; now you are talking."
- (12) Neng chi-ku cai neng chu-ren-tou-di.
can eat-hardship (only then) can exceed others
"Only by enduring hardship can one exceed others."
- (13) Ni zhi-you kuai pao cai neng zhui-shang ta.
you only fast run (only then) can catch up with him
"Only by running fast can you catch up with him."
- (14) Zai min-zhu guojia-li cai neng chan-sheng zi-you.
at democratic countries (only then) can beget freedom
"Only democratic countries can beget freedom."
- (15) Xiao mei-mei yin-wei kan-bu-jian mama suoyi cai ku.
little girl because can see mother so (only then) cried
"It was only because the little girl couldn't find her mother that she cried."

In addition to the meanings just posited for cai₁ and cai₂, both forms carry with them certain implications. These implications are clear when the two interact with time and measurement clauses and less so when they interact with other types of clauses. Cai₁ has the implication that the time is earlier or that the amount is less than expected, while cai₂ has the opposite implication. So in (5) the speaker implies that the actual time is earlier than expected and in (7), the amount of money is less than expected. In (9), the speaker anticipates the moon to have come out earlier and in (10) the implication is that "three months" is longer than expected. This contrast in expectation can be clearly seen in the following minimal pair.

- (16) a. Tamen cai renshi yi-nian, jiu yao jie-hun-le.
they (just) know one-year want marry PART
"They have known each other just one year, and they want to get married."

- b. Tamen renshi cai yi-nian, jiu yao jie-hun-le.⁴
 they know (just) one-year want marry PART
 "Same as above."
- (17) Tamen renshi yi-nian-le, cai yao jie-hun.
 they know one year PART (only then) want marry
 "They have known each other for a year, and now finally
 they want to get married."

Clearly, in (16) the implication is that the period of acquaintance before marriage is shorter than expected, while (17) implies just the opposite. Since cai₂ also interacts with clause types other than time and measurement, one would expect that it may have a similar implication. This is so, only less explicitly. (14), for instance, has the implication that the places where freedom is found are more limited than the speaker and/or the hearer have expected.

Finally, there is cai₃. This is the direct extension of the "expectational" aspect of the meanings of cai₁ and cai₂. In a direct discourse situation, it is used to contradict the called-for, and therefore expected, response to the preceding speech act.⁵ If the preceding act is a request, the called-for response will be compliance; while if the preceding act is an assertion, then the expected response will be belief or agreement. In general, we may say that cai₃ indicates an emphatic refutation of the expected response to the preceding act. This explains why (2) is inappropriate: it is used to begin a conversation and, therefore, is not in any sense the refutation of a called-for response. Some more examples involving cai₃ follow.

- (18) Speaker 1: Ba le-se na chu-qu dao-diao.
 OBJ. MARK. garbage take out dump
 "Take out and dump the garbage."
 a. Speaker 2: Cai bu yao.
 (just) don't want
 "(I) just don't want to."
 b. Speaker 2: * Cai hao.
 (just) O.K.
- (19) Speaker 1: Ta shi-ge gong-ren, yi-ding mei shenme xue-wen.
 he is a worker must have-not any
 knowledge
 "Since he is a worker, he must have little
 knowledge."
 Speaker 2: Ta xue-wen cai da ne.
 his knowledge (just) great PART
 "(On the contrary,) his knowledge is just great."
- (20) Speaker 1: Zhongguo ren chang shuo, "Fa-cai, fa-cai",
 Chinese people often say "develop wealth"
 yi-ding zui xihuan qian.
 must most love money
 "Since Chinese people often say, "Get rich"

- they must be money-hungry."
- a. Speaker 2: Cai bu-shi ne.
(just) not-BE PART
"(On the contrary), it is simply not the case."
- b. Speaker 2: *Cai shi ne.
(just) BE PART
*"Just right."

Sometimes, the speaker can play a double role, so to speak, by assuming the addressee's expectation and then negating it emphatically with cai₃ as in (21).

- (21) Ni yi-wei ta qiong ma? Ta cai you-qian ne.
you think he poor PART he (just) rich PART
"Do you think he is poor? Just the opposite, he is rich."

As can be readily observed, the first part is actually a rhetorical question, which serves no other purpose than to provide a chance for the speaker to refute it emphatically with cai₃.

III. Dao

In modern Chinese, dao is still used as a manner adverb, meaning 'contrary' or 'opposite' as in (22) and (23).

- (22) Ni yi-fu chuan dao le.
you clothes wear opposite PART
"You have worn your clothes inside out."
- (23) Ta ba hua gua dao le.
he OBJ. MAR. picture hang opposite PART
"He hung the picture upside down."

The dao so used can be called dao₁. Its normal position is after the verb it modifies. In another sense of the adverb, it precedes a verb or a degree adverb if there is one. It has the whole sentence as its scope and the meaning is roughly 'contrary to expectation'. Let's call dao so used dao₂. Given the postulated meanings, are dao₁ and dao₂ related? They are because, in the case of dao₁ what is 'opposite' can only be interpreted relative to a norm, which, of course, is the expected state of the things involved. Only when dao is used in the sense of dao₁ the expectation is physically or socially determined. It is usually not subject to personal interpretation, as is very much the case of dao₂. Below are some examples involving the use of dao₂.

- (24) Jia-li you-mei cai you-mei mi, ni hai zai xia
at home neither food nor rice you still at play-
xiangqi ni dao zhen kan-de-kai.
ing chess you really optimistic
"There is neither rice nor food at home, and you are still

playing chess; you are really optimistic (beyond my expectation)."

- (25) Wo yi-wei-shi gege lai, jieguo meimei dao
I thought elder brother come result younger sister
lai-le.
come

"I thought the elder brother would come, but, as it turned out, it was the younger sister who did."

Because of this meaning of dao₂ it is also extensively used in making comparison. Observe the following sentences:

- (26) Ta suiran bu zhenme congming, dao hai qing-kuai.
he although not quite smart still diligent
"Although he is not very smart, he is diligent."
(27) Didi hen lan, gege dao hen qingkuai
younger brother very lazy elder brother very diligent
"The younger brother is very lazy, but the elder brother
is very diligent."
(28) Wanshang, Taipei hen renao, Tainan dao hen
evening Taipei very noisy Tainan very
anjing.
quiet

"In the evening, Taipei is very noisy, but Tainan is quiet."

From the above examples, it seems clear that dao₂ is involved in contrastive constructions. But what does it have to do with the expectation of the speaker and/or the hearer? I think the connection is also clear if we can fill in the missing links in the chain of practical reasoning. Thus, if a person or object has a good quality, people tend to expect he or it also has another, or if two persons or things are related, they tend to have similar qualities (for a psycholinguistic experiment bearing on this, see Osgood and Richards, 1973). Thus, in the case of (26), since the subject lacks one good quality, he is expected to lack another. However, when this expectation is not borne out, dao₂ is used to mark this 'contrariness of expectation.' In (27) and (28), it seems the chain of reasoning is more involved. In order to make sense out of (27) and (28), one would have to supply the links that brothers are related and that they are usually alike, and in the latter sentence, that Taipei and Tainan are cities and cities are noisy. If this analysis is correct, then it seems that the speaker and the hearer automatically bring their knowledge of the world to bear on the use and interpretation of grammatical structures.

Somehow because of this involvement in overt contrast, dao₂, even when used alone, can give rise to the implication that someone or something else is involved in the action or state opposite to that predicated by the main verb, whenever the context allows for such an implication. Below are some examples.

- (29) Wo ziji dao mei zhuyi-dao bian pang-le.
 I myself didn't notice turn fat PART
 "I myself didn't notice that I had put on weight."
 (30) Wo dao wu-sou-wei.
 I don't care
 "I don't care."
 (31) Baba dao mei shuo shenme.
 Father didn't say anything
 "Father didn't say anything."

(29) indicates something contrary to expectation because one would generally expect oneself to notice something about oneself first, but in the case of (29), evidently the speaker didn't, so dao₂ is used. It also implies that someone else noticed the fact first. That is why if the speaker chooses to be more explicit, he could continue it with (32).

- (32) Shi bie-ren gaosu wo de.
 BE others told me PART
 "It was others who told me."

Likewise, (30) means that, contrary to the addressee's expectation, the speaker asserts that he doesn't care but implies that someone else does. Finally, (31) means that, contrary to what the addressee had expected, Father was not the one who said something, but someone else did. That this predicted meaning is, in fact, true can be demonstrated by embedding (31) in a larger context as in (33).

- (33) Speaker 1: Ni haoxiang hen bu-gaoxing, shi-bu-shi Baba
 you seem very unhappy did Dad
 ma-le ni?
 scold you
 "You look very unhappy. Did Dad scold you?"
 Speaker 2: Baba dao mei shuo shenme. Shi Mama ba wo
 Dad didn't say anything BE Mom OBJ. MAR.
 ma-le yi-dun.
 me scold one CLASSIFIER
 "Dad didn't say anything. It was Mom who scolded me."

However, compared to cai₃, which is a strong refutation adverb, dao₂ is much milder. Thus, cai₃ can also be used in place of dao₂ in (33), although its negative (denial) force is much stronger and it lacks the implication that it was someone else who did it. At present I do not know of any test that can reveal the relative strength of negative force. One observation that may be relevant here is that cai₃ is always stressed while dao₂ may or may not be.

There is another difference in use between cai₂ and dao₂.

Dao₂ may be used to show a very weak casual relationship as in (34).

- (34) Wo yinwei xiansheng chi-su dao xiang-qi yi-ge xiaohua
I because husband vegetarian think of a joke
lai-le.

PART

"Because my husband is a vegetarian, I am reminded of a joke."

Since under normal interpretation the causal connection between her husband's being a vegetarian and the joke is very indirect, it is also something the speaker and/or the addressee may not have expected. So dao₂ is used to show this contrariness of expectation. That this analysis is not too far off the mark receives some confirmation from (35), where the use of dao₂ in a sentence in which the causal relationship is more direct makes it ungrammatical.

- (35) # Wo yinwei mei chifan duzi dao hen e.⁶
I because didn't eat stomach very hungry

However, if cai₂ is used in place of dao in (35), then it is appropriate. But the speaker would be asserting that it is only because he didn't eat that he is hungry, indicating a direct causal relationship between the two events.

Having explicated the meaning of cai and dao, we can now return to (1). Cai in (1a) is cai₃ and dao in (1b) is dao₂. So (1a) is actually an emphatic denial of the previous speaker's assertion that the present speaker moved his things. (1b) is a milder denial together with the implication that someone else did it. The meaning will be clear if we embed them in a larger context as in (36).

- (36) a. Speaker 1: Ni dong-guo wo-de dongxi.
you move-ASP my things

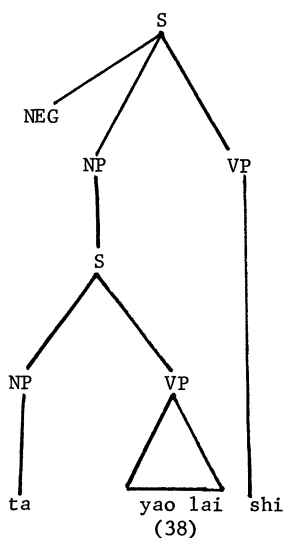
"You moved my things."

- Speaker 2: Wo cai mei dong-guo ni-de dongxi.
I (just) didn't move your things
Wo bu zhidao shi she dong-de. Fanzheng
I not know BE who moved anyway
bushi wo.
not I

"I did not move your things. I don't know who did. Anyway, it was not me."

- b. Speaker 2: Wo dao mei dongguo ni-de dongxi.
I didn't move your things
Shi didi dong de.
BE younger brother move PART

"(Contrary to what you have expected,) I didn't move your things. It was our younger



The difference in meaning, according to Teng, lies in the fact that in S-negation the negative specifies that the whole S has a negative value while in S-refutation the S can be used to deny or refute an utterance made by someone. This distinction is valid in general although the test proposed by Teng is not fool-proof, as shi, under some as yet unknown condition, can be deleted.

With this distinction in mind, we can then subject different senses of cai to negation test. Let's start with cai₁. For convenience, (6) is here repeated as (39).

- (39) Ta cai lai san-tian.
 he (no more than) come 3 days
 "He has been here no more than three days."
 (40) Ta cai bu lai san-tian.
 he (no more than) not come 3 days
 "He has been absent no more than three days."
 (41) Ta bu-shi cai bu lai san-tian ma?
 he not-BE (no more than) not come 3 days PART
 "Isn't it the case that he has been absent no more than three days?"
 (42)* Ta cai₁ bu-shi bu lai san-tian.
 he (no more than) not-BE not come 3 days

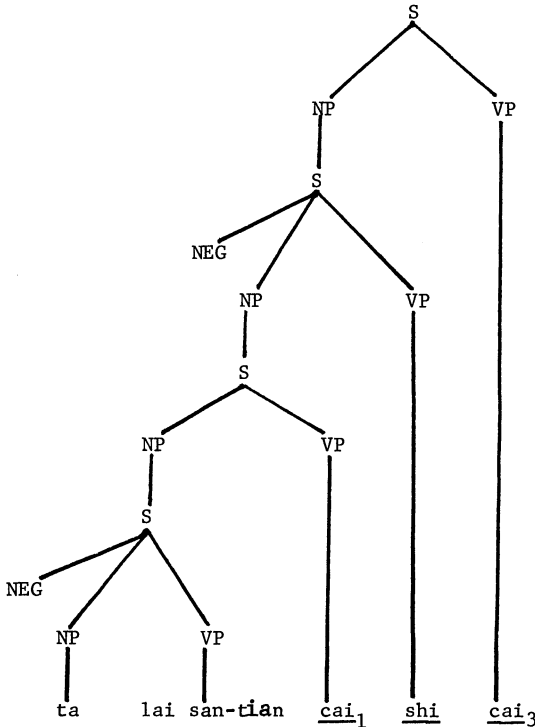
Clearly, S-negation can occur within the scope of cai₁ as in (40), and cai₁ can in turn occur within the scope of S-refutation as in (41). However, cai₁ can not occur outside the scope of S-refutation, as (42) is ungrammatical in cai₁ interpretation. The sentence, however, is grammatical if cai is interpreted as cai₃, as in (43).

- (43) Ta cai₃ bu-shi bu lai san-tian.
 he (just) not-BE not come 3 days
 "It is just not the case that he has been absent for three days."

This phenomenon is perfectly in line with the meaning postulated for cai₃, i.e. an emphatic modifier modifying sentence refutation. That this analysis is correct receives another confirmation from the fact that both cai₁ and cai₃ can occur in a sentence in which both S-refutation and S-negation occur as in (44).

- (44) Ta cai₃ bu-shi cai₁ bu lai san-tian ne.
 he (just) not BE (no more than) not come 3 days PART
 "It is just not the case that he has been absent for no more than three days."

So the scope of cai₃ and cai₁ and the two types of negation can be schematically represented in the following diagram.



With cai₂, however, the problem is different. Observe the following sentences. (10) is here repeated as (45).

- (45) San-ge yue cai neng zuo-de-hao.
 three months (only then) can do-finish
 "(I) can finish doing it only in three months."
 (46)* San-ge yue cai₂ bu neng zuo-de-hao.
 3 months (only₂ then) not can do-finish
 ?"(I) can not finish doing it only in three months."

There seems to be some pragmatic constraints concerning the occurrence of negation within the scope of cai₂. This can be explained by the meaning of cai₂ and the condition of the world. Recall that cai₂ indicates that something can be achieved only when the condition set by the preceding clause is met. So it seems to me that unless something can be achieved negatively, it is impossible for negation to occur within the scope of cai₂. That this seems to be correct can be seen from the following pair of sentences.

- (47) * Ni zhi-you kuai pao cai bu hui zhui-shang ta.
 you only fast run (only then) not will overtake him
 *"You will not overtake him only by running fast."
 (48) Ni zhi-you kuai pao cai bu hui bei ta zhui-shang.
 you only fast run (only then) not will PASS. MAR. him
 overtake
 "Only by running fast will you not be overtaken by him."

(46), however, can receive an interpretation when cai there is taken to be cai₃ in a context like (49).

- (49) Speaker 1: Wo xiang san-ge yue ding neng zuo-de-hao.
 I think 3 months must be able do-finish
 "I think (they) must be able to finish doing it
 in three months."
 Speaker 2: San-ge yue cai bu neng zuo-de-hao.
 3 months (just) not can do-finish
 "(They) can not finish doing it in three months."

The second speaker's part in (49) is roughly equivalent to (50).

- (50) Cai bu-shi san-ge yue neng zuo-de-hao.
 (just) not-BE 3 months can do-finish
 "It is just not the case that they can finishing doing it in
 three months."

This shows that cai in (49) is cai₃ not cai₂. Cai₂, however, can freely occur within the scope of S-refutation as in (51).

- (51) Bu-shi san-ge yue cai neng zuo-de-hao.
 not-BE 3 months (only then) can do-finish
 "It is not the case that they can only finish doing it in
 three months."

The fact that cai₁, cai₂, and cai₃ interact differently with negation, and that these differences can be explained by their different scopes and meanings seems to show independently that our analysis is not too far off the mark. The interaction between dao and negation is, I believe, equally interesting, although space prevents us from going into it here.

V. Theoretical implication

This analysis of two Chinese adverbs has revealed three points of theoretical import.

1. To the extent that this analysis has been successful in explicating the meaning and use of the two adverbs, it demonstrates clearly that some adverbs are very much context-bound. It would be very difficult, if not impossible, to study their meaning and use if we continue to follow in the footsteps of many grammarians, who have claimed, in one form or another, that

the sentence is the largest unit that is important for grammatical analysis. If we restrict our grammatical description to the sentence boundary, then our grammar will probably have no place for cai₃ and dao₂.

2. Recently it has been quite fashionable in linguistic studies to analyze anything that contributes to the propositional content of a sentence as part of the meaning of the sentence and anything that does not as conventional implicature or conversational implicature in the Gricean sense. To the extent that this analysis of the two adverbs is correct it seems to show that such a distinction is arbitrary if not completely untenable.

3. This analysis has also shown that the pragmatic notion of "expectation" may have far-reaching interaction with syntax and semantics. And a survey of recent linguistic publication will show that this is by no means an isolated case. There are many studies in many different languages which show that form and use can interact in many more ways than have hitherto been imagined possible. So the problem facing linguists now is not whether we should study pragmatics or not, but rather how we can best study it so that we can bring to light the true nature of its interaction with syntax and semantics. It is in this regard that I think studies of adverbs can best contribute to our understanding of language.

FOOTNOTES

- * I am greatly indebted to Professors Sandra A. Thompson, James T. Heringer, and Robert B. Kaplan for their valuable comments on an earlier version of this paper. Needless to say, I, and I alone, am responsible for all the possible errors in it.
- 1. Whenever a rough English equivalent is possible in a particular context, it is given in the gloss in parentheses.
- 2. '#' before a sentence indicates that the sentence is not appropriate in the context under consideration, though it may be so in other contexts.
- 3. How to characterize a time clause, a measurement clause, or, for that matter a manner clause is an unsolved problem that I will not go into here. Quite often there will be some time expressions (such as qian-tian 'the day before yesterday', san-nian-qian 'three years ago' or measurement expressions such as, wu-qian-kuai 'five thousand dollars', shi-jing 'ten katty', shi-wu-li 'fifteen miles') occurring in the clause, although this is not a necessary condition. Also these time or measurement phrases can often occur without a verb in the surface. Following Chao (1968), I am regarding them as nominal predicates. For a detailed discussion of time and measurement phrases see Chao (1968: Chapter 7).
- 4. It would seem from (16 a & b) that cai can occur either before the verb or after it. This fact can be captured by

positing a rule which moves cai from the preverbal position to the position between the verb and the following time or measurement phrase. There are, however, some unknown constraints on this otherwise optional rule. Observe that (I) is grammatical while (II) is questionable.

- (I) Ta mei-ge-yue cai zhuang san-bai-kuai.
 he every month (no more than) earn 300 dollars
 "He earns no more than 300 dollars a month."
 ?(II) Ta mei-ge-yue zhuang cai san-bai-kuai.

5. The notion of "called-for response" was first proposed by George Lakoff (1974). Although it seems intuitively sound, it is not part of the essential condition in the theory of speech acts proposed by Searle (1969), as Lakoff claims. In Searle's framework, the essential condition is roughly equivalent to the elocutionary point of a speech act. In the case of request, for instance, the point is that the speaker intends the hearer to perform some future act. This intention on the part of the speaker can be said to call for certain response only when taken in the context of Grice's conversational maxims (Grice, 1975) together with a politeness convention. In other words, the speaker in uttering a request expresses a certain intention and the hearer, following the Cooperative Principle and the politeness convention will normally respect the intention unless he has reason not to do so.
6. Actually, I should say the sentence is inappropriate because it may be grammatical in a context like the following:

Speaker 1: Xianzai cai liang-dian. Ni yi-ding bu e ba.
 "It is just 2. I am sure you are not hungry yet."
 Speaker 2: Wo yin-wei mei chi wu-fan, duzi dao hen e.
 "(Contrary to what you have expected,) because I
 didn't have lunch, I am really hungry."

Clearly, in the context dao₂ does not refer to the causal relationship.

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ANALYTIC/SYNTHETIC AND SEMANTICS.

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I. Introduction.

In this paper we enumerate the main functions in terms of which semantics is justified. We remark that primarily the function of representing explicit verbal definitions is taken into account by most authors when constructing a semantic system. This is based on the hypothesis that explicit definitions mirror semantic relations. We ask if this is justified. Are the explicit verbal definitions not derived from a synthetic system of interrelations between terms ?

To answer this question we look at a set of explicit verbal definitions. These fall into three classes. From the analysis of each we make the point that each type is synthetic. By referring to the cognitive tendency to simplify information, we hypothesize an explanation for the impression of analyticity of type II_B definitions.

Subsequently we sketch our approach to a methodological synthetic semantics, and illustrate with an example. Our results are corroborated by confronting our system with a set of explicit definitions from our informants.

II. Explanation and semantics.

In the literature on semantics, a lot of adequacy requirements appear : efficient realizations of deductions (e.g. Shank 1975, p.37); question answering

and paraphrasing (e.g. Winograd 1973); translation (Steiner 1975); resolving ambiguity (e.g. Katz); explaining analogies and differences between sentences (e.g. Norman and Rumelhart),... . The most important function, however, for semantic systems, or that which seems to be taken most strongly into account by semanticists, is without doubt : the explicit verbal explanatory behavior. In the work of e.g. Katz, Shank, Hays, Winograd, Norman and Rumelhart, Weinberg, Jackendoff and Lakoff, the explaining of verbal terms (sometimes called concepts) is basic. All the other roles mentioned above are only secondary.

Some rare authors have criticized this. Thus Minsky (1975, p. 114) remarks that it is not necessary that the semantic system explicitly reflect definitions. Wilks (1975, p. 40), moreover, warns against the naive view that by writing terms in upper case letters, we are departing from natural language to some more basic cognitive or denotative layer.

In any case, for semantics the interrelations between the terms used in actual speech are of central importance. Which combinations are normally expected in which contexts ? Which are not ? Here, the crucial question is, what is the epistemological status of the interrelations and combinations ? Are the explicit verbal definitions the basis for the interrelations between the terms and their signification ? Or should we take the actual combinations of terms in normal conversation as our point of departure ? In this case the explicit verbal definitions are derived from the primary system of interrelations of terms for the purpose of inducing in the listener a correct

hypothesis on the signification of a term (note 1).

In order to answer these questions we want to examine some verbal explanations.

- (1) "The atmospheric conditions have been very unfavourable lately" said Owl.

"The what?"

"It has been raining" explained Owl.

"Yes" said Christopher Robin "It has".

(A.A. Milne, Winnie the Pooh, 1961, p. 140) (note 2)

- (2) "That is Jacques" said Mike.

"Who?" asked daddy.

"He is that child who always finishes first with his reading." answered Mike.

(note on a conversation)

- (3) Bachelor: human, male, who has never married.
(Katz)

- (4) Brother: male sibling. (A. Wierzbicka 1975, &: classical method)

- (5) Man: animate, +humanness, +sex, v marriage
(Steinberg 1975, p. 37)

- (6) Cube: object, manipulable, rectangular (Winograd 1973, p. 174)

- (7) To eat: ingest an object after bringing it into the mouth with an instrument (this is an informal translation of Schank's formal definition of "eat"; Schank 1973, p. 201)

- (8) Grandfather: someone who is thought of as father of X's mother and father (Wierzbicka 1975, 3)

- (9) Politics is dirty intriguing between big bosses behind the scenes (De Volkskrant, 19 July '75)

From all these verbal explanations of the terms, it is clear that the explanation is given by relating

(or substituting) the term with other terms which are contextually (physically or psycho-socially) related.

(3), (4), (5) and (6) (set I) differ from the others in this way: in the explanation only a set of juxtaposed terms is introduced, and no interrelations between the several juxtaposed terms are specified. As far as the relation between the explicandum and each term in the explicans is concerned, we have inclusion.

The other explications (Set II) are much richer. Relations between the terms in the explicans are also expressed. As a consequence, other relations than inclusion relations do appear between the explicandum and the explicans.

In set II we also note an important difference between (1) and (2) on the one hand and (7), (8) and (9) on the other. It is true that in both sets the explication proceeds by relation the explicandum (E) to a certain structure of terms. This construction can be arrived at in two ways: either (II_A) this explanative construction can be the result of an operation with the explicandum (E) as a "hypothesized" argument, in other words by its actual functioning, or by indicating a result of its functioning it is explained, or (II_B) the explicandum E can be the hypothesized result of the construction which is the explicans.

In any case the explicans is always a construction by means of which is hoped that the listener will be able to make a successful hypothesis about the signification of the term. By introducing additional constructions it is possible to help the listener to control the fruitfulness of his hypothe-

sis about the signification. Another important consequence is that there is a possibility, which without doubt is generally true, that there are several ways the listener can be brought to a successful hypothesis on the signification of a term. This means that a pluralism in the successful explicit verbal behavior is possible.

This ties in with Myhill's view that every analysis of a certain term is a creative hypothesis about its possible connections with other terms. An analysis is a construction of type II_B . Examples (7), (8) and (9) are analyses. (1) and (2) are constructions of type II_A .

An interesting question is how to explain the human tendency to look at constructions of the second type (II_B : explicit definitions) as necessary, in other words as analytical and even complete and unique. On the other hand, the plurality and the synthetic character of the type II_A explications is broadly accepted.

The explanation of the dissymmetry in the evaluation of types II_A and II_B could perhaps be explained by referring to (a) the praxeological principle of multiple efficient use of an element x (type II_A) and (b) the cognitive simplification tendency of hypothesizing only one efficient way to construct the element x (type II_B). This simplification hypothesis seems to be deeply embedded in human cognition, and perhaps it explains why the fundamental arguments of Quine and others on the synthetic character of all definitions have been overlooked by most contemporary semanticists. Perhaps a further reason is that it did not seem possible to do semantics when rejecting the

analytic/synthetic distinction. We believe that a solution for this problem can be found, if we keep in mind the point already made : the primary task of semantics is to determine interrelations between terms as they occur in certain contexts, for certain groups of speakers. These relations are evidently synthetic and the system of interrelations is dynamic. Given such a system, verbal explanations can be derived as well as all the other types of semantic functions we listed initially. In what follows we want to make a sketch of some work done in this spirit.

III.A synthetic semantics.

We have tried to construct the semantics of the language of a group of drug users along the principles just described (note 3). The problem we met was that one very quickly gets a very complex system of interrelations of terms. Here the point of certain authors - (e.g. L. Apostel 1967) that a theory of semantics must be rooted in pragmatics - became convincing. To get a non-arbitrary structure in this clumsy set of interrelations it seemed fruitful to split it up according to the pragmatic situation the terms were used in.

This presupposes the introduction of certain praxeological principles. We cannot discuss them here in detail (note 4). However, applying these principles on the set of contexts in which the terms were used, we obtained four types of situations. These types are :

(1) acquisition of "stuff"

(a) by buying

- (b) by getting it free
- (2) physical operations on stuff (cutting, etc.)
- (3) smoking
- (4) the evaluation

In each context type we must differentiate from a praxeological point of view the several roles the actors can have. These roles are :

- (1) dealer
- (2) drug user
 - (a) a customer of the place
 - (b) a strange drug user
- (3) a stranger (not a drug user)

Taking these praxeologically defined categories into account, we get (not including the subcategories) twelve combinations. Each combination (if all information - perceptual, verbal, social and emotional - is introduced) is rather akin to Halliday's registers or Minsky's frames. In practice some of these combinations, viz. registers, can be empty in the sense that we do not have information on them from the soft drug users: our informants.

If we apply these frames to the information set we have of the drug user, we get a more manipulable quantity and therefore more manipulable constructions. Very striking is the discovery that certain terms which seem rather synonymous (e.g. terms as 'stuff' and 'shit') are used in different 'frames'. 'Stuff', for instance is mostly used in the interaction between the customer and the dealer (all this is verified for our informant group.) The term 'shit' is mainly used in the evaluation among customers and never by the customer when buying it from the dealer.

In the evaluation frame, we see that the term 'shit' is mainly used in contexts of evaluation of (a) the dealer, (b) the place where is smoked and (c) the shit itself. In the evaluation of the dealer it is stressed that a dealer knows everything about shit, that he has good shit and that he does not cheat as far as shit is concerned. In the evaluation of the stuff itself it is referred to as being "good" and "soft"; the price is considered interesting as is its origin; the physical consequences being stoned, being ill, etc. - are referred to also.

In a simplified way we can introduce the following model (fig. 1) for the above evaluation of 'shit' (note 5).

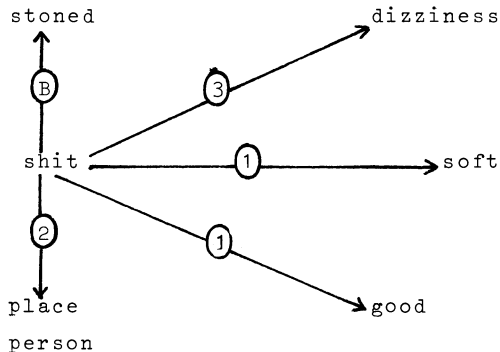


fig. 1

The following conventions are here introduced:

- ← (1) → exemplification relation ³
- ← (2) → relation indicating origin
- ← (3) → indication of causality

At a certain point, after collecting our corpus, we arranged for certain people to enter the group of

informants and ask them for some explicit definitions of terms.

We did this in order to control our construction system. In this way we could see if our system of interrelations describing the information we got from informants also made it possible to explain the explicit definitions produced by the informants. In this way it would be possible to falsify or to corroborate our basic hypothesis that the definitions are derived from the system of interrelations.

The sample of the definitions we obtained for 'shit' are in this respect very instructive. We got chiefly the following results.

Question I: What is shit?

Answers : I. Relaxing agent by which you get stoned.

II. hash.

III. stuff.

IV. Something to smoke. If used in small quantity you have a lot of fun. If used in large quantity you sometimes become passive.

Already from the simplified evaluation subframe of shit (fig. 1) we can derive most of answers I and IV.

IV. Conclusion.

We hope with this short paper to have indicated some lines of development for synthetic semantic systems. To prove their adequacy, it is of course not enough to indicate how natural definitions and explanations can be derived from the system of interrelations; the possibility of executing the other

functions of semantics must also be proved.

Notes.

- (1) On an extensive treatment of 'meaning', 'signification', etc. : see Vandamme 1972, 1975a, 1975b.
- (2) We take this from A. Wierzbicka 1975, 1.
- (3) For a more extensive treatment of our method and results : see F. Vandamme and P. Frericks (1975), F. Vandamme and P. Frericks (to appear).
- (4) We discuss this more thoroughly in "Logic of Action and Semantics" (to appear in *Communication & Cognition* 1976).
- (5) In a more detailed description of a frame, we see that it can be fruitful to have references to other frames too.

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AN ALTERNATIVE TO PROTOTYPE RULES*

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1. Recently, a number of linguists (e.g. Lawler, 1975: 371, and Lakoff, 1975a-b) started to doubt the value of the transformational or derivational paradigm which has governed linguistics for the past twenty years. It is not self-evident what kind of theory will fill the post-transformational vacuum, in which this paper is to be situated. But recent developments (e.g. the 1975 CLS Parasession on Functionalism) suggest that a central part will come to be assigned to the notion function. The application of prototype theory is a form of this functionally oriented characterization (or explanation in so far as the characterization is claimed to be universal) of linguistic forms. The prototype notion originated in psychology (e.g. Rosch, 1975) and was first introduced into lexical semantics² by Fillmore (1975a-b) who offered it as an alternative to checklist or feature theories of meaning: "Instead of the meaning of a linguistic form being represented in terms of a checklist of conditions that have to be satisfied in order for the form to be appropriately or truthfully used, it is held that the understanding of meaning requires, at least for a great many cases, an appeal to an exemplar or prototype (...)." (1975a:123). Later, Lakoff (1975b) started to think of syntactic phenomena in prototype terms. He claims that, perhaps, sets of widely divergent linguistic forms, like the ones normally referred to as 'passive', can be related to prototypes. In this paper, the linguistic application of prototype theory will figure as an exemplification of the functional approach to language (even though it is not only a matter of functions).

In spite of its title, it is not the purpose of this paper to completely supplant the prototype idea, but rather to make it more workable by revealing its limitations. First we shall point out a number of difficulties inherent to a prototype approach to syntax. Afterwards we shall show them to be due to a widespread misconception of the way in which functions can figure in linguistic explanations. And finally we present a functional approach to language which avoids the difficulties mentioned.

2. General issues as the doubtful difference between the properties in terms of which prototypes have to be described and the features presented in checklist theories, will be left aside. Nor shall we answer the question how to decide which properties belong to a prototype and which ones do not. Since our cognitive apparatus itself seems to operate with prototypes - to a certain extent at least - we shall simply take our intuition as a guide.

Let us stick for a while to the specific problems arising when we try to find prototypes for syntactic phenomena. Our example will be the passive. To illustrate the problems we do not resort to wildly exciting exotic languages - though that is very fashionable these days - but we simply compare the passives of two languages as trivial and as closely related as English and Dutch. Sentences (1) to (4) are examples of Dutch passives.

- (1) Het boek werd aan Jan gegeven
(The book became to John given)
- (2) De huizen werden verwoest
(The houses became destroyed)
- (3) Er wordt te veel gemopperd door de soldaten
(There becomes too much grumbled by the soldiers)
- (4) Er wordt geklopt
(There becomes knocked)

In contrast to (1) and (2), sentences (3) and (4) are impersonal passives. I want to argue (i) that a focus on the event expressed by the verb is the main functional characteristic of the Dutch passive, and (ii) that this function is most prototypically realized in the impersonal passive.

In order to prove these points, we have to eliminate a misconception first. Many people think that the Dutch impersonal passive is a relatively marginal phenomenon. In an otherwise very insightful paper, Kirsner (1975), for instance, (i) calls is a "pseudo-passive", (ii) claims that it can occur only with intransitive verbs and with pseudo-intransitives (i.e. verbs with omissible objects, like 'to eat'), and (iii) says that its implied logical subject must be human (whereas that of the so-called "true passive" can be human, non-human animate or inanimate). Those claims are wrong. Sentence (5) can be non-defectively uttered though its verb is transitive and irrespective of whether its agent is human, a herd of wild elephants, or a storm.

- (5) Er werden vele huizen verwoest
(There became many houses destroyed)

Consequently, the impersonal passive applies to a wider range of verbs (viz. transitive, pseudo-intransitive and intransitive) than the personal passive, which can only be used with transitives and pseudo-intransitives.

A second observation: not all occurrences of the passive sound equally natural. Have a look at sentences (6)a to (7)c.

- (6) a. Het boek werd aan Jan gegeven
(The book became to John given)
- b. Een boek werd aan Jan gegeven
(A book became to John given)
- c. De huizen werden verwoest
(The houses became destroyed)
- d. Vele huizen werden verwoest
(Many houses became destroyed)
- e. Huizen werden verwoest
(Houses became destroyed)
- (7) a. Er werd een boek aan Jan gegeven
(There became a book to John given)
- b. Er werden vele huizen verwoest
(There became many houses destroyed)
- c. Er werden huizen verwoest
(There became houses destroyed)

In general, in spoken Dutch the personal passives always carry a flavour of being artificial. The only cases in which they cannot be replaced by an impersonal passive are sentences (6)a and (6)c, in which there is a definite logical direct object. In all other cases the impersonal form is the preferred one: thus (7)a is more natural than (6)b, (7)b is more natural than (6)d and (7)c is more natural than (6)e. (This is not to say that any of these sentences should be ungrammatical.) We conclude that the impersonal passive expresses more states of affairs naturally than its counterpart.

Now we come to the crucial points of the discussion. First, what is the main functional characteristic of the Dutch passive? It is clear that the impersonal passive can do little else than focusing on the event (unless a special intonation pattern is used). And since in all cases in which both forms are grammatically possible, the impersonal passive is preferred over the personal one, it seems reasonable to assume that also in those cases the focus on the event is the most salient feature (no matter which one of the two forms is actually used). Only when there is a definite logical direct object not only the event seems to matter, but also the object in question. But now my claim is that this happens not by virtue of the passive construction as such, but by virtue of the definiteness of the di-

rect object itself. Consequently, the focus on the event characterizes the Dutch passive as a whole.

Second crucial question: what type of passive realizes this function in the most prototypical way? The answer is implicit in the answer to the first question already. Additional arguments for the prototype status of the Dutch impersonal passive are to be found in the above observations that it applies to a wider range of verbs and expresses more states of affairs naturally than the so-called "true passive". None of these are real proofs. They only serve to make our intuitions more comprehensible.

Our comparison with the English passive can be extremely brief. Though focusing on the event expressed by the verb may be one of the features of some English passives, it is not likely to be the central characteristic of them all. English simply uses different devices for that function, as emerges from (8) and (9), which are the equivalents of the Dutch (3) and (4).

- (8) There is too much grumbling among the soldiers
(9) There is a knock

Anyway, if our analysis is correct, the prototypical English passive will differ significantly from the Dutch one since English has no impersonal passives at all.

It should be quite clear by now that positing universal prototypes for syntactic phenomena is virtually impossible. But what is the core of the problem? And, more importantly, how can we solve it?

3. Let us first try to find an 'explanation' for the difficulties. They seem to follow from a mistaken conception of the way in which functions explain forms, which seems to lurk behind the prototype treatment of syntax - and, for that matter, behind most of the functional approaches to syntax that I am aware of. Functions do not explain why a language uses a specific form as such, since there is a lot of arbitrariness, as the case forms of the objects in sentences (10) to (13) show.

- | | | |
|------|---------------------------------|--------|
| (10) | The father helps his son | (Acc.) |
| (11) | Der Vater hilft seinem Sohn | (Dat.) |
| (12) | a. Pater adiuvat filium | (Acc.) |
| | b. Pater adest filio | (Dat.) |
| (13) | a. De vader helpt zijn zoon | (Acc.) |
| | b. De vader staat zijn zoon bij | (Acc.) |

But functions do explain why languages use specific forms for specific functions in relation to each other

or, in other words, why it is possible to use a form, which is used for a certain function, for a different function as well within the same framework of linguistic devices (i.e. within the same natural language). This type of explanation is illustrated, for instance, in Comrie's (1973 and 1975) functional approach to ergativity. Linguistic forms are usually relatively arbitrary devices to express certain meanings and functions. In other words, they are not naturally and necessarily connected with a particular function. This explains the impossibility to find one prototype for both the English and the Dutch passive.

In spite of this relatively straightforward observation, all the functional approaches to syntax that I am aware of - including the prototype approach - take a linguistic form as their starting-point and then ask what its functions are and/or try to explain it in terms of its functions. We shall call this the from-form-to-function approach. To a certain extent this works if one remains within the boundaries of one language, but it is bound to meet a tremendous amount of difficulties - if not complete failure - if one wants to make universal claims, as we have tried to show in the preceding section. The foregoing considerations suggest that, since functions are more likely to be universal than either forms or the combination of forms and functions, the from-form-to-function approach can be replaced by or at least supplemented with a from-function-to-form approach.⁵ We shall first draw a comparison with the prototype analysis of lexical items. In the next section we shall discuss how the principle works out for syntax.

In the case of lexical semantics, a universal from-form-to-function prototype approach seems to work well for colour terms, probably because colour is such a universal thing. But difficulties crop up as soon as one starts thinking about such trivial things as chairs. Does a throne or an electric chair belong to the class of chairs? A primitive throne, as well as a somewhat stream-lined electric chair, may look exactly like a simple kitchenchair. Also in terms of motor programs there needn't be any difference: one makes exactly the same movements to sit down on any one of them. But probably we would not be inclined to put them into one class of objects, because of their respective functions. We claim that the problem would not even arise if one did not start from the word 'chair', but from universal functions: (i) everybody has to sit down once in a while, people use objects to sit down on, and those objects form a separate class of things; (ii) the

electric chair would come to be classified with guillotines and other instruments to execute caught criminals and other unlucky people with; (iii) in the same way a throne would come to belong to the class of objects to which also the White House belongs, viz. the symbols of power (which every culture has; people who do not believe that the exertion of power is really universal, have to be reminded of the story about the ship on which nobody wanted to command the others and which got into a storm; the story is extremely short; the ship sank).

4. To return to syntax, what would a from-function-to-form approach look like there? We want to illustrate it by giving a brief account of some recent investigations (Verschuere, 1976). The account will, of necessity, be too short. Therefore the main point of attention will be the conclusions we were able to draw from the study. It is their relevance which will have to serve as a measure for evaluating the procedure we propose.

In "A Fragment of the Functional Grammar of Giving" we set out to capture the ways in which the proposition

(14) GIVE(John_{Ag}, Peter_G, a book_{Pat}) - Past

(i.e. a past act of 'giving' in which there are two human participants, the Agent 'John' and the Goal 'Peter' and one non-human participant, the Patient 'a book') can be stated literally in English in a context in which one of the four main points of information (viz. 'GIVE', 'John', 'Peter' and 'book') or a combination of them is asked for. Fifteen questions of that type are possible. We list them here because they represent the functional variation we allow.

- Q1. What happened with John, Peter and a book?
What did you say about John, Peter and a book?
- Q2. Who gave Peter a book?
- Q3. To whom did John give a book?
- Q4. What did John give to Peter?
- Q5. What happened with Peter and a book?
What did you say about Peter and a book?
- Q6. What happened with John and a book?
What did you say about John and a book?
- Q7. What happened with John and Peter?
What did you say about John and Peter?
- Q8. Who gave a book to whom?
- Q9. Who gave what to Peter?
- Q10. To whom did John give what?
- Q11. What happened with a book?
What did you say about a book?

- Q12. What happened with Peter?
 What did you say about Peter?
 Q13. What happened with John?
 What did you say about John?
 Q14. Who gave what to whom?
 Q15. What happened?
 What did you say?

There are too many possibilities to express the proposition (14). Therefore we limited the scope of our investigation by allowing only four phenomena to vary: (i) the sentences can be active or passive; (ii) the Goal can have a preposition or not (in other words, it can be dative or not); (iii) every participant in the action can be pronominalized, which provides us with 8 different pronominalization patterns; (iv) we allow 4 different stress patterns (either 'GIVE', 'John', 'Peter' or 'book' can be stressed). This provides us with 128 possible sentences.

In order to find out how the functions represented by the questions Q1 to Q15 are realized in English, we simply have to check which ones of the 128 sentences are possible answers to each one of the 15 questions. Of course only those sentences are regarded as answers to a specific question, which are possible purely on the basis of the presuppositions of the question itself, without relying on any other information. The data thus obtained are only limited by the fact that we do not consider all the possible expressions of the proposition (14). But notice that the incompleteness is completely under control. Here are some of the conclusions we have been able to draw. Remember that they bear exclusively on the data at hand and that they can only suggest more general processes.

First, our data show that the capacity of a noun to be pronominalized does not only depend on its being 'given' in the preceding discourse and/or context. If there are two human participants in an action, they can only be pronominalized if, in addition to being given information themselves, the action in which they participate and their respective roles in it, are given. This emerges from the fact that 'John' and 'Peter' can be pronominalized in answer to Q4, but not in answer to Q1.

Second, one would expect that a question which asks for two pieces of information could never be answered with one of our 128 sentences, which all have one stress only. Q5 cannot, but for Q6 we find at least 12 answers, in all of which the Goal is stressed, but never the verb. Both questions presuppose the Patient

'a book', but they differ in that Q5 presupposes the existence of the Goal and Q6 of the Agent. It seems that, curiously enough, when the Agent is given in the question (but not the action), also the action takes the shape of given information in the mind of the hearer (i.e. the person who is about to answer the question). This suggests (i) that an action and its agent form a much stronger unity in the human mind than is sometimes assumed, and (ii) that a presuppositional gap (here between questioner and answerer) is not always a case of communication failure, but a productive communicative device.

Third, the Patient 'book' seems to be the normal carrier of stress since Q12, Q13 and Q14, which all ask for three pieces of information, can only have one-stress answers if the stress is on 'book'. This might lead us to the conclusion that the relational grammar habit of relegating the logical direct objects in sentences with a dative (e.g. John gave Peter a book) to the limbo of forgotten things (called 'chômeurs') is not psychologically justified, since it is the prominent element throughout.

Fourth, the same conclusion can be drawn from the observation that there is no distributional difference at all between sentences of 'giving' in which the Goal takes a dative case form and those in which it is a prepositional phrase. This observation might also put an end to the series of transformational attempts (a recent one of which is to be found in Seuren, 1975: 39-50) to find out which structure is the more basic one.

It is up to you to judge whether conclusions of this kind, drawn from a very brief application of the from-function-to-form approach to syntax, are interesting enough to justify its further pursuit. No doubt the foregoing proposal is very far removed from any type of formalized syntax, but part of the intention was to make linguistics simple again.

FOOTNOTES

- * Thanks are due to George Lakoff, during whose lectures (Fall 1975 and Winter 1976, at Berkeley) the ideas constituting this paper have come to my mind (even though he may not like some of them); to Johan Van der Auwera, for his comments on an earlier draft; and to the Commonwealth Fund of New York, on whose Harkness Fellowship I am living at this very moment.

- 1 The renunciation of transformations does not imply that one no longer recognizes the existence of a deep and a surface structure, though one would deny that the one is really 'deeper' than the other and though one would prefer to call the former 'logical structure' and the latter 'grammatical structure'. Ironically enough, this leads us back to traditional grammar.
- 2 Here we abstract from areas in linguistics which have applied the prototype idea unconsciously. The earliest application is probably to be found in phonology: a phoneme could be defined as the prototype of a group of phonetically divergent sounds. Here it is evident that - as we shall argue later in connection with syntactic phenomena - different languages have different prototypes even if they have the same sounds. Both in English and in Dutch the sounds [k] and [g] occur, but in English they have to be regarded as two separate phonemes /k/ and /g/ whereas in Dutch [g] is simply an environmentally determined variant of the single phoneme /k/.
- 3 While advocating a from-function-to-form approach, we do not want to brand the from-form-to-function approach as heretic. Rather, we presuppose the insights it can yield.

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On the Pragmatics of Control *

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Several languages exhibit an interesting pattern in the formation of their morphological causatives.¹ Namely the verbs, which according to the philosophers of action and linguists denote volitional events such as drink, walk, save money, leave cannot occur with non-human subjects. They take only human subjects in the morphological causatives of these verbs. However, verbs denoting necessarily non-volitional events such as get thirsty, forget, faint can take non-human subjects (Wachowicz 1976).

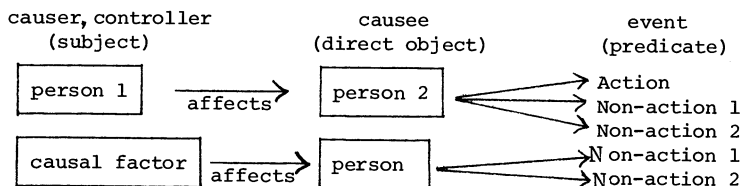
There is a third group of verbs denoting events that are normally non-volitional but can be volitional as well, for example: cough or break. Cough denotes anything from a coughing fit to a volitional clearing of one's throat, or to a pretended cough. Breaking a plate means either doing so intentionally or dropping it accidentally. This third group can occur either with human subjects if the event is understood to have been carried out volitionally, or with non-human subjects if the event is understood to have happened non-volitionally to a person.

Thus, a verb classification along these lines, classifying verbs according to their ability to be used to denote volitional events, necessarily non-volitional events or events that can be either volitional or non-volitional, allows for a formulation of the principles for the usage of human or non-human subjects in the morphological causatives formed from these verbs.

Tests for the verb classification or rather for verb uses have been developed by Brennenstuhl (1975), or less elaborately by Vendler (1967). These tests were a prerequisite for the verb use classification used in our analysis of morphological causatives.

As a result, the following picture emerges for the subject selection in morphological causatives:

Subject denoting the causer of the event			
	Volitional events (Actions)	Necessarily non-volitional events (Non- actions ₁)	Non-volitional events that are not necessarily non-volitional (Non-actions ₂)
human	+	(+)	(+)
non-human (e.g., forces of nature, environmental conditions)	-	+	+



A morphological causative involves the following roles:

causer or controller	a person (group of persons) or a causal factor denoted by the subject of a morphological causative
causee	in the data presented here a person denoted by the direct object of a morphological causative

and the following relations:

the causer affects the causee: by an action in case of human causer or by causation in the case of a causal factor; denoted by the causative morpheme

the causee brings about an

event: either an action or non-action; denoted by the predicate.

Although the principle we are considering here seems to hold for a number of languages we will limit ourselves to three languages in this paper: Hungarian, Finnish and Turkish since these languages turned out to be the most regular in this respect and since we had a number of native informants and linguists-native speakers of these languages. We had, therefore, an opportunity to check the data several times. Since grammars are usually silent on the subject we prepared a questionnaire of 30 sentences which were filled out by native speakers.

The following morphological causatives from Hungarian illustrate our principle:

- (1) Hungarian: Az apa spóroltatott vele péntzt
the father save-caus with him money acc.
'Father made him save money'
- (2) *az inflacio spóroltatott vele penzt
the inflation save-cause with him money
'Inflation made him save money'

If we want to use a non-human noun in a morphological

causative from a verb denoting a volitional event, a construction with a causal connective similar to the English: because must be used in Hungarian as shown in (3):

- (3) az inflacio következményeképen pénzt spórolt
 the inflation as-a result-of money-acc. saved
 'Because of inflation he saved money'
 'Inflation made him save money'

Similarly to Hungarian other languages must use either periphrastic² causatives in these sentence types or other causal constructions as shown by the examples from Finnish and Turkish: Sentences (4) and (5) are the Finnish and Turkish translations of the English sentence: The smoke made the girl leave the room.

- (4) Finnish: Savu {^{sai}
 pani} tytön läntemään huoneesta
 Smoke made girl leave room
 'The smoke made the girl leave the room'
 (5) Turkish: Duman kızın odadan çıkmasına seber oldu
 smoke girl-gen. room-abl. leave 3 sg. cause was
 'Smoke made the girl leave the room'

The following pairs of sentences can illustrate this principle further with respect to the feature of volition:

- (6) The smoke made the girl cough
 (7) The smoke made the girl leave the room
 (8) Hot weather makes me thirsty
 (9) Hot weather made me drink a lot

coughing or getting thirsty usually doesn't depend on one's volition. It is a physiological reaction whereas leaving or drinking can be a volitional activity. Only the sentence (6) and (8) with a non-volitional verb can be made into morphological causatives as shown in (10)-(15):

- (10) Hungarian: A füst megköhögtette a lányt
 the smoke cough-cause-it-her the girl
 'The smoke made the girl cough'
 (11) Finnish: Savu yskitti tyttöä
 Smoke cough-cause girl
 literally Smoke coughened the girl
 'The smoke made the girl cough'
 (12) Turkish: Duman kızın öksürttü
 smoke girl-obj. cough-cause -past 3 sg.
 'The smoke made the girl cough'
 (13) Hungarian: Ez a nagy hőseg megszomjaztat
 this the big heat thirsty makes-it-me
 'This big heat makes me thirsty'

- (14) Helteellä janottaa
Hot weather drink cause (one)
'Hot weather makes one thirsty'
- (15) Turkish: Sıcak hava beni devamli susatti
Hot weather me all the time be thirsty
caus-past
'Hot weather made me thirsty all the time'

Human subjects, on the other hand, can be used also with volitional verbs in morphological causatives.³ Sentences (16) and (17)

- (16) The editor made Maya rewrite her article
(17) His father made him save money

with volitional verbs can be translated into sentences with morphological causatives in all the three languages:

- (18) Hungarian: A kiadó ujraitta Mayával a cikkit
the editor rewrite-caus -he-it Maya-with
the article -her
'The editor made Maya rewrite her article'
- (19) Az apa pénzt spóroltatott vele.
the father money-acc. savecause-he- it with
him
'The father made him save money'
- (20) Finnish: Toimittaja kirjoitutti Maijalla artikkelin
Editor write-cause Maya all article
uudelleen
again
'Editor made Maya rewrite her article'
- (21) Hänen säästätti hänellä rahaa
father save-cause him all money
'Father made him save money'
- (22) Turkish: Redaktör Maya'ya makalesini fekrar
editor Maya-dat article 3 sg. obj.
yazdirtti
rewrite-caus
'The editor made Maya rewrite her article'
- (23) Babası ona para biriktitti
father him money save-cause
'Father made him save money'

The question arises how to explain this data. Why is it that non-human subjects take only non-volitional verbs in morphological causatives while human subjects take both volitional and non-volitional verbs? We would like to suggest that the notion of Controller is a useful concept in providing an explanation to the discussed facts about morphological causatives.

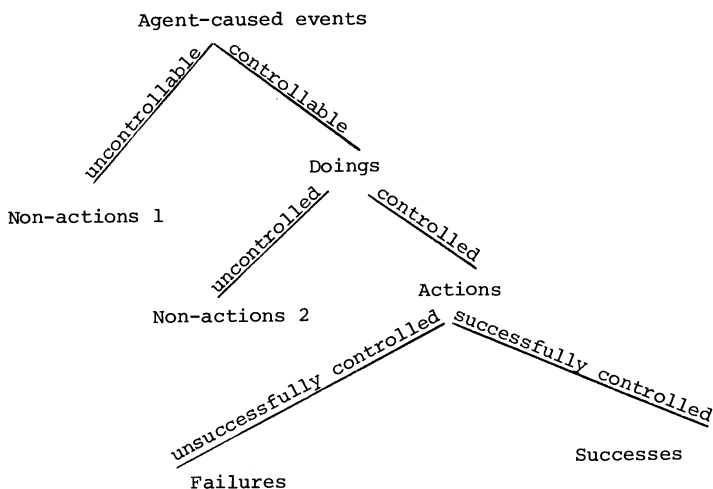
The notion of control has been used by several linguists on various occasions: Berman (1970), Kuno (1971), and more recently by Givón (1975) and Brenne^hstühl (1975). Kuno attempted to explain

some of the facts about statives, which were observed by Lakoff (1965), in terms of control. For example stative adjectives cannot have imperatives. Therefore an imperative *be tall is ill-formed. According to Kuno and Berman this is due to the fact that one cannot have control over one's height. Controllability, though more or less inherent in certain verbs depends on the real world facts.

However, the notion of control is not well defined in the philosophical literature. Thalberg (1972) makes an attempt to classify verbs in terms of control. However, although he gives a number of interesting facts concerning control he has not attempted a formal definition of control.

In the linguistic literature an explication and definition of control has been given by Waltraud Brennenstuhl (1975), who uses the notion of control to distinguish Actions from Non-actions. Her notion of control applies to human controllers, i.e., agents, explicating to what extent they have control over their own actions.

Her explication leads to the following categorization of the agent-caused events:



An action is defined as a controllable and controlled bringing-about by a potential agent of an event which otherwise, all things being equal, would not have occurred, e.g., drink, walk, save money.

A Non-action 1 is defined as an uncontrollable, and hence uncontrolled, bringing-about of an event by a potential agent (get thirsty, forget, bleed).

A Non-action 2 is defined as a controllable, but, on the actual occasion in question, uncontrolled, bringing-about of an event by a potential agent, e.g., cough, break a plate, breathe.

Brennenstuhl (1975) explicates the key notion controllable in the following way: Suppose that in a particular situation a

person has, in principle, the opportunity of either bringing about a particular event or forbearing to bring it about. Suppose further that this person, in this situation, has also the intention a) of bringing about this event or b) of forbearing to bring it about. If he has the ability to carry out whichever of these intentions he chooses, it can be said that the bringing about of the event is fully controllable for him.

The agent can be said to have the ability to carry out an intention, if in an appropriate number of cases in which he has such an intention, he succeeds in his attempt to carry it out.

The number of successes required is in proportion to the difficulty ascribed to the performance of the action. The lower the rate of success, the smaller the degree of controllability.

The causation of an event by an agent is controlled if he caused the event:

- a) as a result of an intention and an attempt to bring it about,

or

- b) as an (unsuccessful) result of a contrary attempt not to bring it about.

The causation of an event by an agent is uncontrolled if he had no intention whatsoever with respect to the bringing-about of that event.

Now our data require an extension of this notion of control. It can easily be extended to the control of one agent over another agent's Actions and Non-actions, i.e., to coercion. An agent has control over another agent's Actions and Non-actions if in an appropriate number of cases where he tries to make the other person behave in a certain way he really succeeds in doing so. Of course, the success of coercion depends in many cases also on what the coerced person chooses to do. The strategy of coercion is to make other alternative reactions seem so unfavorable to the urged person that he prefers to avoid them by choosing the alternative the controller wants him to choose. The fewer alternatives the controlled person has as a result of coercion, the greater is the controller's degree of control over him.

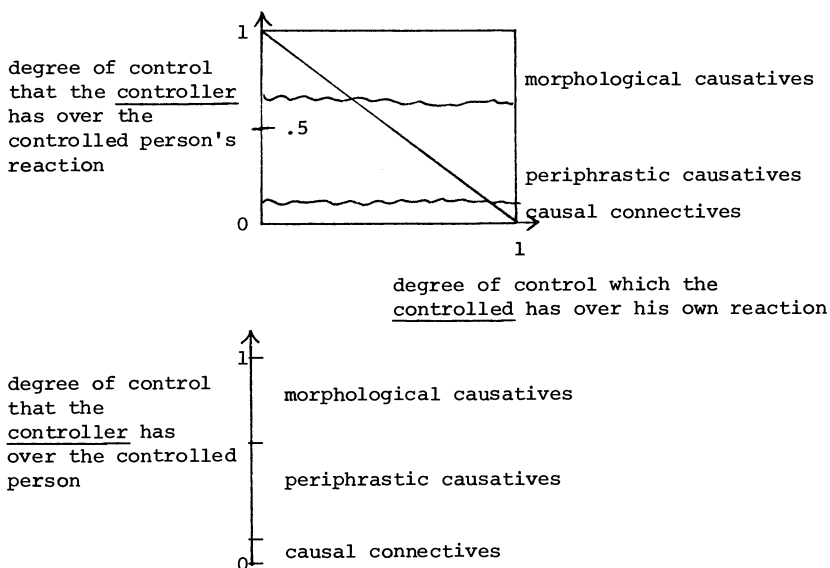
To extend the notion of control to causal factors we have to say that a causal factor has control over a Non-action of a person if in an appropriate number of cases where this factor is present in the environment the person will go through a specific Non-action. The more control the causal factor has over the person the less control the person has over his own reaction to it.

In general, the degree of control the controller has over the controlled person is in inverse proportion to the degree of control the controlled person has over his own reaction. As we said, an agent has control over his own behavior if he has the ability to choose either to behave or not to behave in a certain way. If he is not able to carry out whichever of the alternatives he chooses when he intends to do so, what he does is out of his control. A controller (animate or inanimate) which has full control over the controlled person makes the controlled person unable not to react in the way the controller demands. In other words, in this case it

is totally out of the controlled person's control to choose between whether to react in the way demanded or not.

At the other end of the scale a controller has nearly no control over the controlled. This happens when the controlled person has nearly the full ability to choose whether or not to allow himself to be influenced by the controller. In such a case the controller will merely enter the controlled person's decision-making process and may serve as a reason for his reaction.

We have seen from the data that morphological causatives are used to express a high degree of control with respect to the controller and that periphrastic causatives and causal connectives are used to express a low degree of control with respect to the controller.



Our notion of controller can be said to have some similarity to Fillmore's Agent: instigator of the event. What we have shown so far is: the notion of control must include all kinds of pragmatic considerations as the means of control and the interaction between the causer (controller of the event) and the causee (the surface object of a morphological causative, the entity acted upon by the controller). In order to account for the effect the controller has over the controlled person we must take into consideration the degree and the source of control. Non-human controllers, such as environmental conditions, chemicals, drugs, etc., typically can instigate physiological or emotional states and state changes in humans. Thus heat makes one thirsty. It is not up to us whether to get thirsty or not. In this sense we have not control over this

reaction. However, heat cannot induce drinking. It can be the reason for drinking but the final decision whether to drink or not still belongs to the causee, i.e., drinking is mainly in the control of the causee. In this sense heat does not have total control over the action of drinking. In such a manner we explain why (8) Hot weather makes me thirsty can be translated into a well formed morphological causative but (9) Hot weather makes me drink a lot cannot.

A human causer, on the other hand may have more possibilities to influence other humans and control even their decisions and volitional actions. Possible means of control available to him are: physical force, authority, threatening, urging, forbidding. As a result, typically, he may have control over the causee's Actions although he may have control over some Non-actions too, e.g. over changes of emotional states like for example, getting angry.

Let us look again at the example (16) The editor made Maya rewrite her article. Rewrite is in principle a volitional verb dependent on the causee's volition. However, in some contexts, the actual total control may belong to the causer. The authority of the editor is the source of control. He may force someone to rewrite an article because it is up to the editor to accept the article or not. But this is not the whole story. Whether Maya (in the example 16) rewrites her article or not may depend on a number of circumstances. She may have no choice because he would fire her otherwise. There may be other reasons. For example, she must have an article accepted for publication. Unless she follows the editor's requirements and changes the article according to his wishes it would not be published at all.

What seems to be crucial here is that there is a necessity for the causee to act or react in a certain fashion. This necessity may arise as a result of coercion and the wish to avoid punishment or other non-preferred consequences as is the case with human causers or as a result of all kinds of physiological reactions as is the case with non-human causers.

This hypothesis is further supported by the fact that the morphological causatives in the languages discussed carry an inference of strong coercion. Some stylistic effects follow from this. For example, in Turkish under very special circumstances one may use a morphological causative to translate the sentence: The smoke made the girl leave the room. This would indicate that due to some special circumstances she lost her control over her actions (I owe this information to Doğan Çuceoğlu). However, he could not devise a context where the sentence Hot weather makes/made me drink a lot could be used with a morphological causative. Here a special causative construction 'seber oldu' is obligatory.

In colloquial Finnish a normally volitional verb 'eat' can be used with a non-human controller in the following context:

- (25) Tämä kakku on sellaista (niin) hyvää että se syöttää
 this cake is such (so) good that it eat-cause
 'This cake is so good that it makes eat'

The usual rule for morphological causatives has been seemingly violated in order to denote the degree of temptation which makes the causee loose control over his decision whether to eat or not. This shows that eating in this situation is a highly involuntary event.

As we have already said there exist a scale of control among the causative expressions in language: morphological causatives--periphrastic causatives--causal connectives corresponding to a scale of controllability. Morphological causatives denote the greatest degree of control on the part of the causer and causal connectives such as the English because, the least amount of control. Periphrastic causatives are in the middle of the scale.

It is well known that periphrastic causatives follow different syntactic principles with respect to adverb modification, negation and clitic movement (Shibatani 1973; Aissen 1974; Horn 1975). How this difference in the syntactic behavior is connected to the degree of controllability of the causee's behavior expressed in the periphrastic and morphological causatives has yet to be examined. Most likely the solution has to be sought along the lines of degree of clausiness (Aissen's 1974 term).

The notion of controller is also applicable to other linguistic phenomena. For example, it is useful in explaining facts about pseudo-reflexives. Pseudo-reflexives can never occur with any volitional adverbs such as: deliberately, on purpose, etc., in Finnish, German, Hungarian and Polish. They denote an event beyond one's control, either an emotional state as in Polish (26) or German (27):

- (26) Martwić się
worry oneself
'to worry'
- (27) sich sorgen
oneself worry
'to worry'

or an action performed by mistake or carelessness as in the Polish sentence (28):

- (28) Paznokcieć mu się złamał
Nail to him itself broke
'He got his nail broken'

We hope that the notion of control may prove useful in explaining facts about voices in general like: passivity, activity, middle voice and ergativity.

FOOTNOTES

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¹Morphological causatives are the causatives formed by adding a causative morpheme to the verbal stem, e.g., Turkish suffix -t: Öksür 'cough': Öksür-t-tu 'cause to cough', 'make cough'.

²Periphrastic causatives are analytic verbal causatives such as the English: cause, have, make.

³There is a number of various types of irregularities in the morphological causativization.

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The Opacity of Real Conspiracies
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The conspiracies referred to in the title are criminal, not linguistic. The statute and case law governing criminal conspiracy is of perhaps unexpected interest to linguists as linguists, because it regularly poses to attorneys and judges the question of how to treat opaque contexts. The record of their responses provides suggestive material on natural-language reasoning. In turn, the study of these responses as responses to the opacity problem, rather than from some other perspective, gives to conspiracy law a degree of conceptual unity it now lacks.

In the common law, conspiracy is typically defined as a "combination between two or more persons formed for the purpose of doing either an unlawful act or a lawful act by unlawful means" (LaFave and Scott, 1972: 454). Some jurisdictions, such as New York State, have by statute added an additional element to this definition. Thus Section 105.20 of the New York Penal Law requires that "a person shall not be convicted of conspiracy unless an overt act is alleged and proved to have been committed by one of the conspirators in furtherance of the conspiracy." The overt act need not, in itself, be criminal. If two conspirators have agreed to rob a bank and one of them photographs the bank's rear entrance, his act counts, even though a famous mural in imminent danger of demolition might fill a significant portion of the picture he took.

Conspiracy is familiar to nearly everyone today as an area of the law which is extremely susceptible to abuse, but my concern is not with the linguistics of paranoia and vagueness. For my purposes, the most legitimate and honest prosecution with no Bill of Rights overtones would suffice, because the fundamental issue would remain the same. Western jurisprudence tends to demand more than an evil thought before punishment may be inflicted. A conspiracy conviction comes closer than most to punishing mere thought. For this reason, the common law requires an act as well as the requisite mental state, although common law jurisdictions treat the conspiratorial agreement itself as such an act. As noted, some jurisdictions require more. The requisite mental state consists in the intention to carry out the acts supposedly agreed upon. In some cases the evidence of at least verbal agreement may be clear; in others it may not. If no direct proof of agreement is available, the agreement may be inferred circumstantially. But whatever the status of the agreement, a link must be established between it and the intention. Even in a common-law jurisdiction the jury may be hesitant to convict for the mere utterance of words, and the accused will surely try to argue that he was just joking or was misunderstood. For example, in *United States v. Geaney*, 417 F.2d 1116 (2d Cir. 1969), "Geaney claimed that while he had been associating with Lynch, Donnellan and McKeever, he had no knowledge that they planned a robbery and had ridden on the motor boat solely for recreation. He also denied that the photograph of himself drinking beer with Lynch and

Donnellan had been taken at the same time as the photographs with the shotgun, despite the identity of Lynch's and Donnellan's costumes." In a jurisdiction like New York a jury might be unwilling to find that an apparently innocent deed was "an overt act... committed...in furtherance of the conspiracy."

At this point in the argument, a legal text or judicial opinion will typically pose itself the question: What was the intention of the accused? Using a common-sense understanding of what "intention" means, the text or opinion will try to determine the content of the object clause underneath the verb "conspire" (or "intend"). Naturally, the question is not posed in these words, but all consideration of whether the evidence of conspiracy is sufficient either to go to the jury or to convict appears to involve exactly this. X conspired to do A. How do we know? By considering what it means to do A and what kind of evidence exists for describing the object of conspiracy as A in the first place. A particularly clear example of the kind of reasoning involved can be found in *United States v. Alsondo*, 486 F.2d 1339 (2d Cir. 1973), about which more later.

It is precisely here that the texts and the courts err. By treating their task as identifying the content of the object clause - and considering any problems as aberrations, they (through no fault of their own) overlook the fact that the verbs and their complements are only parts of a larger, implicit logical expression or underlying semantic representation. Crucial to this larger representation is the placement of any existential quantifier or quantifiers. Roughly speaking, the court or jury must decide which of the following ways of characterizing a conspiracy to assault a federal officer is the correct one.

1. Bob exists and is a federal officer; Bill and Sam conspired (intended) to assault him.
2. Bill and Sam intended that the object of their conspiracy be a certain existing federal officer named Bob.

That is, in (1) the existential quantifier is outside an opaque context; in (2), it is inside one. The two characterizations are not equivalent, nor is there any known way of deriving the one from the other. If Bill and Sam believe Bob to be a federal agent, it does not follow that he is one; and if he is one, it does not necessarily follow that they believe he is. The courts intuitively know this, but they cannot seem to escape their narrow verbal concentration on object clauses. Their intuitions, however, slip into the foreground when they try to resolve the problems created by this limited approach. When that happens, the courts slide back and forth between characterizations (1) and (2).

Characterizations like (1) are of advantage to a court in finding guilt because important elements of the intended criminal act are taken as given, or at least as relatively unproblematical; being unproblematical, they are removed from the realm of mere thought, for which one is not to be punished. See, for example,

the reasoning of the district judge in *United States v. Alsondo*: "It is not necessary for the government to prove that the defendants... knew that the persons they were going to assault or impede or resist were federal agents. It's enough, as far as this particular element of the case is concerned, for the government to prove that the defendants agreed and conspired to commit an assault" (Trial Transcript, cited 95 S.Ct. 1255, at 1259).

Characterizations like (2) become important when the defense claims the defendant had no such thing in mind. He may have done something wrong, but he did not conspire to do it - it just happened. Since consecutive sentences can be handed down for the substantive crime and the conspiracy to commit it, such verbal maneuvering is not necessarily idle play. Judge Learned Hand provides a relevant and often-cited passage: "While one may, for instance, be guilty of running past a traffic light of whose existence one is ignorant, one cannot be guilty of conspiring to run past such a light, for one cannot agree to run past a light unless one supposes that there is a light to run past" (*United States v. Crimmins*, 123 F.2d 271 (2d Cir. 1941)). In addition, a characterization like (2) would represent the only possibility available to the prosecution if the putative object of the conspiracy was in the given case impossible to attain. LaFare and Scott provide a convenient summary: "It has been held, for example: that there may be a conspiracy to commit abortion even when, unknown to the conspirators, the woman was not pregnant; that there may be a conspiracy to commit rape on a woman believed to be unconscious although she was in fact dead;...that there may be a conspiracy to smuggle liquor in violation of the customs law even though, unknown to the conspirators, the liquor was of domestic origin" (1972: 475-76).

From these last remarks it might appear that the courts will "opportunistically" seize whichever characterization best suits their purposes. That "opportunism" is not quite so rampant, however, may be seen in the earnestness with which the courts attack essentially the same problems when they are presented without their traditional labels. Such situations arise when there is no direct evidence of an actual agreement between supposed conspirators. It becomes necessary to infer one. How can this be done? In *People v. Luria*, 251 Cal. App. 2d 471, 59 Cal. Rptr. 628 (1967), the Court had to decide whether the owner of a telephone answering service was guilty of conspiracy to commit prostitution. The prosecution attempted to show that Luria must have conspired, because, although he had knowledge of the criminal activity, he still allowed his answering service to be used. In other words, certain criminal activities existed (existential quantifier outside the opaque context); from the existence of these activities the prosecution wants to conclude that Luria intended them to exist or conspired to bring about their existence (existential quantifier inside the opaque context). Since there is no logical derivation leading from the one to the other, various other more or less plausible methods must be tried in order to obtain the desired result. In its opinion the Court analyzes a number of methods available to it in the form of

precedent. It apparently concludes that in some circumstances intent can be inferred from the defendant's knowledge and that knowledge of the illegal use of goods or services can itself be inferred from certain facts. I say apparently, because the Court fails to separate clearly the proof of knowledge from the inference of intent. A clear progression is visible here: The Court slips from facts known to the state, to knowledge possessed by the defendant, to the defendant's intent.

The specific situations which, according to the Court, permit the inference of constructive (i.e., hypothetical) intent are: (1) "when the purveyor of legal goods for illegal use has acquired a stake in the venture" - as when grossly inflated rates are charged for the ultra-short-term use of rooms; (2) "when no legitimate use for the goods or services exists" - as when a girl is apprenticed to a "music teacher" who has no means of teaching music; (3) "when the volume of business with the buyer is grossly disproportionate to any legitimate demand" - as when 300 times the normal supply of narcotics is sold to a country doctor; (4) when a "supplier... furnishes equipment which he knows will be used to commit a serious crime" - as when a service-station attendant knows that the gasoline he is selling will be used to make Molotov cocktails. For all four classifications the Court adds the proviso that it will draw the desired inference only if the use in question constitutes a felony, not a misdemeanor.

For situations (1) through (4) above the Court feels reasonably sure that anyone thus occupied must be aware of the normal concomitants to his acts. In fact, it might conclude that someone was mentally defective who lacked such awareness, as writers often do when dealing with related issues in the law of attempt. If the Court treats situations in the manner just sketched, it must supplement its reasoning with additional criteria to fill in the gap between plausibility and deduction. One such gap-filling criterion is the requirement that the substantive crime be a felony. This requirement of feloniousness serves two related purposes: (1) It accords with a common modern rationale for conspiracy law; (2) it suggests a fairly stringent evidentiary standard.

Conspiracy law is supposed to provide society with the means of interrupting criminal activity before it causes irreparable harm. The need for interruption is thought to be especially great when a group forms for criminal ends, since even in crime the division of labor brings rewards. If the aim of the conspiracy is the commission of a felony, the degree of danger involved putatively justifies faith in less conclusive forms of reasoning. On the other hand, distinguishing felonies from misdemeanors indirectly increases the amount of proof required, since a judge or jury will, at least ideally, demand clearer indications of intent before subjecting an individual to the more severe penalties felonious intent may involve.

Note that none of the criteria discussed above is equivalent to the one most commonly mentioned in linguistics: synonymy of expressions, based on the ideal speaker-hearer's knowledge of the language. Nor is any exactly of the Morning Star/Evening Star

variety, which is used to show that referentially identical expressions can behave differently in opaque contexts. Instead, these legal examples occupy a middle ground. They neither require ideal speakers nor do they presuppose the discovery of non-obvious empirical relations.

One additional, and opposite, technique of judicial reasoning may be added. In *United States v. Feola*, 95 S.Ct. 1255 (1975), the Supreme Court reversed the Court of Appeals decision in Alsondo (see above), on the grounds that Feola need not have known that a federal agent was to be the victim of his assault in order to be convicted of conspiring to assault a federal agent. It reached this result by holding that the "federalness" of the agent simply established federal, rather than state, jurisdiction. Such a maneuver is equivalent to lifting part of the characterization of the crime out of the opaque context, thereby eliminating a difficult question of proof, since all were agreed that the victim really was an agent. The Court felt justified in removing an element of Feola's intent because the dangerousness of his criminal purpose had already been made evident by the completion of the assault. It therefore saw no need to employ the means discussed above for shifting material into the opaque context. Rather, it had to articulate reasons for its definitive rejection of Learned Hand's line of argument in Crimmins, and it found some in the intent of Congress to protect federal officers and federal functions against criminal interference and state neglect. After arguing that congressional purpose allows it to read the federal assault statute (18 U.S.C.A. §111) as not requiring the assailant to know that his victim is a federal officer, the Court proceeds to claim that for the same reason knowledge is also not requisite for conspiracy to assault. In supporting this additional proposition the Court relies on a careless reading of the general federal conspiracy statute and a misrepresentation of the Crimmins rationale. Both these weaknesses are revealing when considered with regard to this paper's reformulation of conspiracy characterizations.

"The general conspiracy statute, 18 U.S.C. §371, offers no textual support for the proposition that to be guilty of conspiracy a defendant in effect must have known that his conduct violated federal law. The statute makes it unlawful simply to 'conspire... to commit any offense against the United States.' A natural reading of these words would be that since one can violate a criminal statute simply by engaging in forbidden conduct, a conspiracy to commit that offense is nothing more than an agreement to engage in the prohibited conduct" (95 S.Ct. 1255 (1975), at 1265). Not only is knowledge that someone is a federal officer not equivalent to knowledge that one is breaking a federal law, but the Court's reasoning is lacking in other ways as well. If knowledge is not essential to the prohibited substantive crime, so argues the Court, then it follows that it is not essential to the conspiracy. But here the Court merely assumes what it wants to prove. In fact, the most "natural" reading seems to involve placing the words "any offense against the United States" within the object complement of "conspire," that is, within the opaque context.

To conspire to commit an offense against the United States is not quite the same thing as to conspire to commit an offense and to find out later that it was one against the national government.

The Court's interpretation of Crimmins is no more convincing: "One may run a traffic light 'of whose existence one is ignorant,' but assaulting another 'of whose existence one is ignorant,' probably would require unearthly intervention" (Id., at 1267). True enough, but here the Court is parodying the characterization which Crimmins would suggest in this case, namely something like characterization (2) above. Physical existence is not at issue here. What matters is knowledge of the existence of the victim under a description as a federal agent. Because the Court fails to see this, its opinion remains weak. Interestingly, however, it retains the normal style of argumentation when discussing conspiracies which have not succeeded. "Where...there is an unfulfilled agreement to assault, it must be established whether the agreement, standing alone, constituted a sufficient threat to the safety of a federal officer so as to give rise to federal jurisdiction" (Id., at 1269). Making such a determination involves shifting quantifiers into opaque contexts, which in turn requires the kind of careful distinctions the Court seems unwilling to make.

Because the federal jurisdiction rationale is defended so poorly in Feola, its value might be questioned, but it is nevertheless obvious that the rationale appeals or appears persuasive to a fair number of judges. For this reason I prefer to leave it in the list of devices which the law uses to motivate the placement of existential quantifiers. To this list could be added a number of techniques employed in the law of attempt; I reserve that task, however, for an expanded version of this article. What is important now is to stop looting cases in search of linguistic examples and to point out the value of this exercise for conspiracy law.

The conceptual unity of conspiracy law arises at present out of its orientation toward the aims of preventing the fruition of inchoate crimes and breaking up coordinated criminal activity. As has been seen, these aims inform some of the devices for placing existential quantifiers. Perhaps such aims are even an essential part of any system of criminal justice. By themselves, however, they provide little help in arguing particular cases; they help shift the balance in favor of one quantifier placement or another, and logically they seem to remain subordinate to this task of placement. In fact, I believe that without the tacit importation of ideas concerning quantifier placement they would even lose much of their force as policy. The very notion of closeness to fruition depends on the relation between characterizations like (1) and (2), on the kinds of plausible connections that can be created between existential quantifiers under intent verbs and those above them. Since it is fairly difficult to see this relation while considering solely the content of the object clauses themselves, the slight shift of attention which linguistics suggests and this article advocates leads to a concentration on the central issues, thereby providing greater conceptual unity to conspiracy law and permitting

a more coherent analysis of apparently random variations in the decided cases.

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The Shift from Postposition to Preposition:
 Evidence from Early Greek
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Abel Bergaigne was the first scholar to investigate word order in a number of early Indo-European languages from a systematic historical point of view. He summarized his conclusions in a 'double formule: le terme qualifiant précède le terme qualifié et le terme régi précède le terme régissant' (1875/8:27). Bergaigne was of the opinion that both preverbs and case-governing particles (adpositions) developed out of earlier adverbs, and that when these particles were associated with nouns they followed them (1875/8:180). Berthold Delbrück arrived at the same view independently in his study of the word order of the Satapatha-brāhmaṇa (1878:46), and repeated it in the Grundlagen der griechischen Syntax (1879:153), but in the Ver-gleichende Syntax III (1900:104-109; cf. I, 1893:643-774) he no longer felt that the usage of the oldest Sanskrit prose could be reconstructed to Proto-Indo-European. His new opinion was based on the fact that in Vedic Sanskrit and in most of the other IE languages either a mixed system, with some adpositions preposed and others postposed or variable, or a fully developed prepositional system prevailed. Delbrück concluded: 'Diese Zustände sind nur begreiflich, wenn man annimmt, dass in der Urzeit die Präpositionen sowohl vor als hinter dem Kasus stehen konnte' (1900:105). Furthermore, Delbrück maintained that this variation in position was a consequence of the use of these particles as preverbs, in which function they could occupy two positions, either sentence initial or immediately before the verb (1893:648ff.). Thus, for Delbrück, adpositions were originally preverbs which came to be associated with nouns only because of the ambiguity of reference in sentences such as

dāśvāmsam ūpa gachataṃ RV 1,47,3
 'come to the worshipper'
 blephārōn apo dākrua pīptei Od. 14.129
 'tears fall from (her) eyelids'

for the origin of the postpositional uses, and

pāri dyām anyād īyate RV 1,30,19
 'the other surrounds heaven'
 metā dē mnēstērsin ēeipe Od. 17.467
 'and he spoke among the suitors'

for the origin of the prepositional uses (1893:654-659, 1900:105), while the development of a consistent order, whether postpositional or prepositional, took place only in the individual IE languages. This view is similar to that defended by Antoine Meillet, who believed however that both the preverbal and the adpositional uses evolved from earlier adverbial functions (1964:193-194). W.P. Lehmann (1974:212-214, 234) expresses similar views on the function and development of these particles, but with the added realization that when they came to be associated with nouns they must have followed them, since Proto-Indo-European was an Object-Verb language, and on typological grounds one would expect postpositions and not prepositions (cf. Greenberg 1963). Moreover, when late PIE and the individual IE languages were in the process of changing from OV to VO order, they would have shifted postpositions to prepositions (1974:234). Very little has been said about the operation of such a shift; in this paper I propose to describe one part of it and to call attention to a parallel development with verbs and their objects.

It is now generally accepted that PIE was a SOV language with *inter alia* the verb-final order and the postpositions characteristic of this order type (cf. Watkins 1963, 1964 and Dressler 1971 in addition to Lehmann 1974). In fact, precisely this state of affairs is found in Hittite alone (1); the other IE languages show either SVO or VSO order, or some mixture of SVO, VSO and SOV types. This mixture of types is characteristic of the classical languages, and Greek has notoriously 'gone farther than any other IE language in the elaboration of a "free" word order' (Watkins 1964:1039, and cf. Dover 1960). Word order was consciously exploited as a literary device in Classical Greek, and a rather great freedom was made possible by the inflectional system of the language. For example, Hjalmar Frisk gives percentages of OV and VO for selected passages in Herodotus (49.5% OV), Thucydides (61.7% OV), Plato (70.3% OV) and Lysias (76.1% OV) among others (1932:16, in each case the number of examples is 900). The wide variation between authors shows that at least verbs and objects were freely transposed for literary purposes. Yet it seems safe to claim that some correlates of word order types are much less subject to literary rearrangement than are others. Thus, in spite of its otherwise "free" word order, Classical Greek is prepositional (2).

Homeric word order is relatively "free", but

according to the figures given in P. Fischer (1923: 200), OV sequences outnumber VO sequences by about two to one (3). As against this preponderance of OV over VO, the poems show an overwhelming predominance of prepositions over postpositions. The following types of constructions are found:

- Np theōn ápo Od. 6.12 'from the gods'
 thrónōi éni Il. 15.142 'in the chair'
 pónton épi Il. 7.63 'on the sea'
- NpA gaíes apo patrídos Il. 13.696 'from his paternal land'
 Ilion eis eúpōlon Il. 16.575 'to Troy (which has) good horses'
- ApN thoās epí neas Il. 24.1 'on swift ships'
 hierous katà bōmōus Il. 2.305 'onto sacred altars'
- ApNA emà pròs dómata kalá Od. 8.41 'to my beautiful house'
 thoēi sùn nēi melainēi Od. 3.61 'with a swift black ship'
- pN apō khthgnós Il. 5.13 'from the ground'
 epi karpōi Il. 24.671 'by the wrist'
- pAN pròs makròn Ólupon Il. 24.694 'towards blessed Olympus'
- pNA sùn nēi poluzúgōi Il. 2.293 'with a many-benched ship'.

A.S. Haggett (1902) counted the adpositions in Homer and found that of 8198 examples some 255 were postpositions governing single nouns (4). This is, as he points out, about 3.1% of the total. With phrases consisting of an adjective and a noun, some 390 (4.7%) have the adposition between the noun and its modifier in that order, while 600 have the adposition between the adjective and the noun (7.3%). The remainder are prepositional and have the order pN, pAN or pNA etc. (adjectives and nouns are freely rearranged). If the figures for all the non-preposed examples are combined, the total is 1245 (somewhat less than 15.2%). Haggett explains the postposed examples in the following words: 'In Homer where the transition from local adverbs to prepositions proper was not yet complete and the position of the preposition had not yet become rigidly fixed, postposition is to be regarded as a freedom of the language' (1902:182). Virtually the same explanation is given by Chantraine (1953:83), who maintains that the position of the prepositions 'était originellement fort libre'.

Even without the considerations made possible by syntactic typology there are two strong arguments against the explanation of the placement of these particles as free. First, the usual accentuation of the prepositions in Greek is proclisis: apò epì perì hupò amphì prò eis etc. (5). These elements are orthotonic only if they are placed after their nouns:

theōn ápo Od. 6.12 'from the gods'
 pónton épi Il. 5.63 'on the sea'
 hēn perí Il. 15.142 'about her'
 khersìn hupo Trōon Il. 11.827 'at the hands of the
 Trojans'.

That this accentuation, and not proclisis, is inherited from PIE is shown by Vedic Skt. ápa ápi pári upa abhi prá (Vendryes 1938:69-71, 243-244; Schwyzler I, 1953:386-387, II 1953:420) (6). In view of the statistics presented above, this position (anastrophe) and accentuation of the adpositions is clearly an archaism in Homer. Second, adpositions do not occur after sequences of adjective plus noun or noun plus adjective in these poems (7). If the governed noun has a modifier, the adposition must either precede both, or be placed between the noun and its modifier. If the arrangement of these particles and their nouns were free, it would be difficult to account for this restriction. A further peculiarity in the accentuation of these particles is found in the phrases where they are interposed between their noun and its modifier. According to the ancient grammarians anastrophe occurs only in the sequence NpA, and not in ApN (Vendryes 1938:247). Thus, the accentuation of eni in

néess' éni pontopóroisi Il. 3.240 'in seafaring ships'

contrasts with that in

plōtēi enì nēsōi Od. 10.3 'on a floating island'.

Delbrück thought that the type NpA was the older of the two, and that the type ApN had its origin in a 'modifizierende Nachahmung' of the earlier sequence (1900:106).

Mycenaean Greek, in contrast to Homer, seems to show no trace of the postpositional use of these particles (cf. Villborg 1960:119-122, 139; Ventris and Chadwick 1973:90). This fact is surprising because of the early date of the tablets, yet Mycenaean syntax in general seems to represent a later stage in

the history of Greek than does the syntax of Homer. The absence of postpositions in Mycenaean can be correlated with the fact that although all three of the principal word order sequences SOV, VSO and SVO are attested, SVO is by far the most common, and SOV (with no postverbal material) by far the least frequent (8). In fact, objects may precede their verbs only if they are one word long (not counting preceding adnominal genitives). If the object is more than one word long, or has following dependent material, either the whole phrase is placed after the verb, or it is broken up after the first accusative nominal form so that the latter precedes the verb and the remainder of the phrase follows. Examples of the various orders are (in all instances I cite the text and translation given in Ventris and Chadwick 1973):

SVO PY Ea 800 ke-re-te-u e-ke o-na-to pa-ro mo-ro-go-ro po-me-ne WHEAT 2 'Kretheus holds a lease from Molog^uros the shepherd: 240 l. wheat.' (No. 110, p. 240)

VSO PY Vn 06.1 o-di-do-si du-ru-to-mo
.2 a-mo-te-jo-na-de e-pi-pu-ta 50
.3 a-ko-so-ne 50
'Thus the woodcutters contribute to the chariot workshop: 50 saplings, 50 axles.' (No. 252, pp. 349-350)

SOV PY Ae 264 pi-ra-jo / ai-ki-pa-ta su-ra-te du-ni-jo-<jo> me-tu-ra su-ra-se MAN 1 'Philaios the goat-herd (who is acting as?) seizer has seized the cattle of Dunios.' (No. 30, p. 169)

SOV plus additional postverbal material PY Ep 01
.2 ai-ti-jo-go o-na-to e-ke pa-ro da-mo ke-ke-me-na ko-to-na 'ko-to-no o-ko' to-so pe-mo WHEAT 1 T 4 3 'Aithioq^us holds the lease of a communal plot from the village (being himself) a plot owner: so much seed: 174 l. wheat,' (No. 131, p. 251)

SOV where 0 is an infinitive phrase PY Ep 704
.5 / da-mo-de-mi pa-si ko-to-na-o
.6 ke-ke-me-na-o o-na-to e-ke-e to-so pe-mo WHEAT 3 T 9 'but the village says that he/she (merely?) holds the lease of communal plots: so much seed: 468 l. wheat,' (No. 135, pp. 252-256).

The last example shows clearly the mechanical operation of the rule which breaks up long object phrases: the accusative enclitic pronoun -mi 'he, she' (min) is the subject of the infinitive e-ke-e 'to have'

(ékhein), but it occurs in the enclitic sequence after the first word of the matrix clause, and it is separated from the remainder of its own clause by the verb pa-si 'says' (phēsi) (9). The breaking up of long object clauses is a feature of Homeric Greek as well:

ándra moi énnēpe, Mōsa, polútropōn Od. 1.1 'Tell me, Muse, about the man of many turns'
 pólemón te pepheugótes édē thálassan Od. 1.12 'having escaped war and the sea'
 nóstou kekhrēménōn édē gunaikós Od. 1.13 'longing for his return home and his wife'
 tōi hoi epeklōsanto theoi oíkōnde néesthai/eis Itháken Od. 1.16-17 'in which (scil. year) the gods allotted him to sail home to Ithaka'.

In the last example, the dative enclitic hoi serves both as object of epeklōsanto and as subject of the infinitive néesthai, so that the structure of this sentence is analogous to that of the Mycenaean example discussed above (10).

In a classic essay, Jan Gonda has discussed sentences in Vedic Skt. which have a SOV nucleus with additional material after the verb, and has characterized them as 'amplified, that is to say: they are from their beginning until the verb complete in themselves and all the words following the verb may be left out without mutilating the sentence' (1959:7). Gonda however includes embedded infinitives, e.g.

ko hi tvaivaṃ bruvantam arhati pratyākhyātum BARU. 6, 2,8 'for who can refuse you when you speak like this?'

(1959:15), where the infinitive pratyākhyātum 'refuse' follows arhati 'is able', and its object tva 'you' is in enclitic position after the first element of the matrix clause, so that one can scarcely characterize this sentence as 'complete' up to the inflected verb. It seems best merely to note that embeddings are broken up in the same manner as other lengthy objects are:

phenam asyanti bahulāṃś ca bindūn AV. 12,3,29 'they hurl foam and abundant drops' (1959:65)
 yo vai taṃ puruṣaṃ vidyāt sarvasyātmanāḥ parāyaṇam BARU. 3,9,10 'who knows that Person as the ultimate support of every soul' (1959:16).

Larry Hyman has investigated analogous sentences in Niger-Congo languages and has suggested 'afterthought' as a cover term for the postverbal material in such

sentences (1975:141). Furthermore, he proposes that afterthought can serve to 'activate' a change from SOV to SVO because

'...speakers may find it necessary to append additional information after completing the basic sentence with the inherited SOV syntax. In so doing, a certain point is reached at which a restructuring of the syntactic order takes place, yielding a preferred syntax with the verb no longer final--and ultimately, a standardized syntax with the verb second.' (1975:141-142)

Hyman's proposal goes much farther in explaining the shift from SOV to SVO than do any of the alternative theories he discusses. However, there seems to be no manner in which afterthought can be used to explain postverbal embedded infinitives with subject and/or object pronouns still to the left of the matrix verb as in the Sanskrit and Greek examples cited above. Infinitive complements are readily shifted past the verb in all older IE languages with the exception of Hittite (11). Moreover, the IE languages that are characterized by the presence of SOV nuclei with post-verbal material seem also to be characterized by the presence of adpositional phrases with the adposition interposed between the noun and its modifier, and just as the SOVX structures seem to be transitional between SOVX and SVOX, so the NpA and ApN sequences seem to be transitional between ANp and pNA.

As further support for the claim that NpA/ApN sequences are transitional between the more consistent ANp and pNA I cite the following Umbrian examples:

Np asa-ku IIa 39 'at the altar'
 pNA pre-veres treplanes Ia 2 'before the Trebulanian gate'
 NpA tuta-per ikuvina Ia 5 'for the Iguvine community'
 ApN testru-ku peři Ia 29 'at the right foot'
 todcom-e tuder VIa 10 'in the city limits'.

Umbrian and Oscan seem also to share with Homeric Greek the limitation of placement in these phrases, since no examples of ANp are found in the texts, with the exception of the 'improper prepositions' Osc. amnud 'for the sake of' (formally an ablative sing. noun, cf. Lat. causā) and Umbr. paca 'for the sake of' (another ablative sing.):

Osc. Tabula Bantina (Vetter 2) egm[as . touti-]/cas.
 amnud 'rei publicae causa'

Umb. VIa 19-20 ocrer / pehaner . paca 'arcis piandae causa'.

Neither of these words is an inherited adposition, and both take genitive objects (cf. von Planta 1897:440-441 on the placement of adpositions in Oscan and Umbrian, and Buck 1928:205-211) (12). In general, word order in Oscan and Umbrian is very similar to that found in Homer and in archaic Latin inscriptions (von Planta 1897:490).

Latin has postpositions only with pronouns: mecum 'with me' tecum 'with you' quo ab 'from which'; there is no NpA in prose (Delbrück 1900:107), although this pattern is well represented in early poetry:

NpA Ennius arbusta per alta 'through the high trees'
NpAA Plautus damnō cum magnō meō 'with my great in-jury'
ApN magnā cum curā 'with great care'.

There seems to be no ANp, with the possible exception of the 'improper prepositions' gratiā and causā; Latin shares this restriction on the placement of inherited adpositions with Greek and Oscan and Umbrian.

This restriction on the placement of adpositions is in sharp contrast with the situation in Vedic Sanskrit and in Hittite. In Vedic Sanskrit virtually all of the possible combinations of N, A and p are found (I cite examples from Delbrück 1900:105-106 and Delbrück 1888:440-470):

ANp imāñī lokāñ āti ŚB 1,2,1,12 'beyond these worlds'
NAP jātāñ ubhāyāñ antār RV 4,2,2 'between the two races'
prāvato mahīr ānu RV 10,14,1 'along the great slopes'
NpA rōdasī antār urvī RV 7,12,1 'between the two broad worlds'
tanvām pāri svām RV 3,53,8 'over one's own body'
ApN ubhé antā rōdasī RV 4,7,8 'between the two worlds'
hiranyāyāt pāri yōneḥ RV 2,35,10 'from the golden womb'
pAN ā tṛtīyāt pūruṣāt TS 5,4,10,4 'to the third generation'
pAANA antār mahī bṛhatī rōdasīmē RV 7,87,2 'between these two great high worlds'.

The word order of Vedic prose is basically SOV, although postverbal material is tolerated; adpositions usually follow their nouns (with the exception of ā

and pura 'before', Delbrück 1878:46). In poetry, on the other hand, the word order is free, although still predominantly SOV, and the placement of adpositions shows a corresponding freedom, as the examples cited above demonstrate. Delbrück notes further (1888:21) that in distinction to the inherited adpositions the 'improper' prepositions usually precede their noun (13).

Hittite is a rigid SOV language, and it is exclusively postpositional with the exception of a few examples in early texts where the object of the adposition is an enclitic pronoun (Friedrich 1960:129-130, 134; Otten and Souček 1969:70-73). Thus only the following types are found:

Np HUR.SAG-1.šēr 'on the mountain'
ANp ANA LÜ.MES KUR Amurra šēr 'because of the people
from Amurru'

and with an enclitic possessive pronoun

šēr-šit 'for him'
piran-tet 'in front of you'
katti-mi 'with me'

(Friedrich 1960:130, 134). The adpositions with a suffixed enclitic possessive pronoun appear to be also capable of governing a preceding genitive noun:

LUGAL-aš SAL.LUGAL-ašš-a šēr-šemet 'over the king and the queen'

(Otten and Souček 1969:71). In these examples, the postposition is treated as if it were a noun (Friedrich 1960:134), while the disruptive factor is the enclisis of the pronominal forms.

From the preceding survey it is clear that the shift from postposition to preposition is one of the earliest facets of the change from OV to VO order. The language which is rigidly SOV is also rigidly postpositional, while the languages which seem to be basically SOV but which tolerate postverbal material and break up long object phrases are characterized by adpositions interposed between nouns and their modifiers. These languages are in the process of altering their basic order, and the earlier and later stages of this process can be correlated with the acceptability of the inherited ANp sequence: early if it is still accepted and cooccurs with the more recent interposed and preposed orders, and late if ANp no longer is productive.

NOTES

- (1) The only sentences in Hittite which do not have the verb in absolute final position are those in which the verb has been moved towards the beginning of the sentence for some contextually determinable reason and those in which the verb is the only non-enclitic element and has to serve as a prop for the enclitics.
- (2) With the exception of the 'improper' prepositions héneka and khárin (and perí in its non-locational meanings). 'Improper' prepositions are traditionally defined as those which do not enter into compounds with verbs, or as those whose origin as nominal forms (or phrases) is synchronically transparent (Delbrück 1888: 21). The boundary between the categories 'proper' and 'improper' cannot be sharply drawn; the latter is the productive category, while the former contains the inherited adpositions, and both contain different chronological layers.
- (3) Fischer's figures are given in terms of 'Anfangs-' 'Mittel-' and 'Endstellung' of the verb; I arrive at the proportion given by reinterpreting these categories and by combining the totals for SOV and for SOV with additional postverbal material. Fischer does give figures for S, O and V in the passage he investigates.
- (4) Haggett counts only the 'proper' prepositions.
- (5) The writing of a grave (or acute) accent on the final syllable of the prepositions is only a graphic convention (Vendryes 1938:66-69).
- (6) The Sanskrit adpositions retain their accent no matter where they are placed. The development of proclisis in Greek prepositions probably took place at about the same time as the obligatory univerbation of verbal prefix and verb.
- (7) Delbrück states that this position is 'unhomerisch' (1900:106); I looked through books 1-5 of the Iliad and 1-3 of the Odyssey and could not find any ANp or NAp.
- (8) Ventris and Chadwick 1973:90, Villborg 1960:137. SOV with additional postverbal material (SOVX) is however relatively frequent, especially in the formula onato eke kekemena kotona.
- (9) This process seems to be responsible for almost all of the examples of Wackernagel's law that apply to the enclitic pronouns of an embedded clause. It is not the pronouns that have been moved but rather the remainder of the clause they go with.
- (10) Or at least hoi is responsible for the deletion of the pronominal subject of the infinitive néesthai: there do not seem to be any examples of two enclitic pronouns in different cases referring to the same NP.
- (11) A Hittite example with a structure analogous to

that of the Greek and Sanskrit examples given above is: apās-ma-mu harkanna san(a)hta 'he sought to destroy me' where the pronoun -mu is object of the infinitive harkanna (Hatt. III 63, cited in Friedrich 1960:144). In Homer, the great majority of infinitives are placed after the inflected verb they depend on. In the passage investigated by Fischer 29 of 34 infinitives follow the matrix verb (1923:201).

(12) Oscan repeats the adposition in Ve. 147 húrtín . / kerríín . This is the only example of this phenomenon in the Italic dialects. Umbrian regularly postposes its monosyllabic adpositions which do not end in consonant clusters; all the other adpositions are preposed.

(13) W.P. Lehmann has recently proposed that the development of postpositions in New High German is related to the fixing of SOV order in dependent clauses in that language (1971). It is interesting to note that almost all of the adpositions in question: entlang zufolge gemäss entgegen etc. are phrasal or nominal in origin. In view of the Hittite, Vedic, Greek and Italic evidence for the placement of newly created adpositions, it would seem that Lehmann's proposal has to be modified.

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