CORNELL WORKING PAPERS IN LINGUISTICS

Volume 7 • Fall 1985
The Cornell Working Papers in Linguistics is an informal publication of the Department of Modern Languages and Linguistics at Cornell University. It is intended as a forum for presentation and rapid dissemination of current research by the faculty and students of the DMLL. Since the papers represent work in progress, comments and criticism are invited. All correspondence may be addressed to Working Papers in Linguistics, DMLL, 203 Morrill Hall, Cornell University, Ithaca, New York 14853.

Due to the irregular schedule of publication, we cannot offer subscriptions. Brochures describing current issues as well as back issues will be sent to those on our mailing list.
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iris B. Alemán</td>
<td>The Positions of Clitics in Old Spanish</td>
<td>1</td>
</tr>
<tr>
<td>Leonard H. Babby</td>
<td>Departicpial Adverbs in Russian</td>
<td>18</td>
</tr>
<tr>
<td>G.N. Clements</td>
<td>The Problem of Transfer in Nonlinear Morphology</td>
<td>38</td>
</tr>
<tr>
<td>William D. Davies</td>
<td>Nominative Nonsubjects in Choctaw</td>
<td>74</td>
</tr>
<tr>
<td>Stanley Dubinsky</td>
<td>A Union Analysis for Japanese 'Adversative Passives'</td>
<td>92</td>
</tr>
<tr>
<td>Sarah M.B. Fagan</td>
<td>Geminates in Intensive and Iterative Germanic Class II Weak Verbs</td>
<td>107</td>
</tr>
<tr>
<td>Chu-Ren Huang</td>
<td>On Pseudo-Possessive NPs in Mandarin Chinese</td>
<td>129</td>
</tr>
<tr>
<td>Joan Maling and Annie Zaenen</td>
<td>Preposition Stranding and Oblique Case</td>
<td>149</td>
</tr>
<tr>
<td>Joan Mascaró</td>
<td>Catalan Nominal Markers and Vowel Insertion</td>
<td>162</td>
</tr>
<tr>
<td>James S. Noblitt</td>
<td>Compensatory Articulation and Language Learning</td>
<td>176</td>
</tr>
<tr>
<td>Margarita Suñer and José Padilla-Rivera</td>
<td>On Obviation and Subjunctive Clauses</td>
<td>196</td>
</tr>
</tbody>
</table>
THE POSITION OF CLITICS IN OLD SPANISH

IRIS B. ALEMAN

CORNELL UNIVERSITY

In this paper I intend to study one of the major differences in behavior between unstressed pronouns in Old Spanish (OS) and in Modern Spanish (MS). This difference involves the fact that in OS these pronouns were able to appear in a wider range of positions than their modern counterparts. The explanation I propose for at least part of this phenomenon is the existence of a rule of clitic preposing in OS which does not exist in MS.

I start by comparing the positions in which clitics appear in MS and in OS. Then I proceed to examine briefly two explanations for these facts presented by Ramsden (1963) and by Rivero (1984). Finally I explain the same phenomenon by means of the rule mentioned above. My explanation could incorporate both Ramsden's and Rivero's hypotheses without problems.

1. The Position of Clitics in OS and MS

1.1 Clitics in MS. MS has one set of clitics for 1st and 2nd person, singular and plural, which is used as direct object clitics (DO), indirect object clitics (IO) and reflexive clitics (refl.): me, te, nos, os.¹ Third person clitics distinguish between DO: lo, la, los, las; and IO: le, les / se. Se is also used as the reflexive clitic for 3rd person, both singular and plural. These clitics appear in preverbal position in MS if the verb is finite:
1. Te lo regalo
   2's 3's give 1 s pres
   'I give it to you'

If the verb is non-finite and there is a tensed modal, causative or auxiliary verb with it, in most cases the clitic pronouns can appear in front of the tensed verb or after the non-finite verb:

2. Te lo voy a regalar
   2's 3's go 1 s to give
   IO DO pres infinitive
   'I am going to give it to you'

2'. Voy a regalártelo

3. Me la está diciendo
   1 s 3 s be 3 s say
   IO DO pres. progr.
   'S/he is saying it to me'

There is no difference in meaning and apparently both orders are in real free variation.

In command forms, clitics obligatorily appear after the verb in affirmative commands (4), but they have to be placed in front of the verb in negative commands (5):

4. Pón - te - lo
   put 2 s 3 s sing. comm. IO DO
   'Put it on you'

5. No te lo pongas
   Not 2 s 3 s put sing. comm. neg.
   'Do not put it on you'

1.2 Clitics in OS. Contrary to MS, in OS the equivalent pronouns could appear after a finite verb ((6) and (7)), although they could also appear in front of a finite verb (cf. (8)-(9)), just as in MS:

6. Et dio - ge - la por mujer (Lib. Est. 49.32)
   And give 3 s 3 s 3 s for wife
   'And he gave her to him as a wife'
THE POSITION OF CLITICS IN OLD SPANISH

7. El diablo lo lleva — por sendas no conocidas
   The devil carry 3 s by paths not known (Cor 67)
   'The devil takes him by unknown paths'

8. Nunca te verás pobre (Alex 345c)
   Never see 2 s poor refl. fut.
   'You will never see yourself poor'

9. Si él mal lo mandaba. (Milagros 723d)
   If he wrong 3 s order 3 s DO imperf.
   'If he wrongly ordered it'

   In addition, they could also appear before (10) or after (11) a non-finite verb:

10. Maldiziendo su conciencia por la no creer (Cor 118)
    Cursing his conscience for 3 s not believe DO infin.
    'Cursing his conscience because he did not believe it'

11. e decir les a: Ove fame ... (Mand 83-4)
    And say 3 pl. have have hunger IO pres past
    'And he will tell them: I was hungry ...'

   The position for command forms was usually pretty much the same
   as in MS although with some exceptions. I will not deal with command
   forms since I consider that they need some other explanation (possibly
   dealing with tense) both in OS and in MS.

   Another difference in the location of OS clitics is that in MS
   only another clitic can intervene between a clitic and the verb. But
   in OS a restricted set of elements, mainly adverbs and subjects, can
   appear between the clitic and its verb. This phenomenon, usually
   called interpolation, has been mentioned since the first studies about
   OS. Apparently it is very rare in the Romance languages except in Old
   Portuguese and OS. Two examples are found in (12) and (13).

12. Si lo por bien toviesses (Alex 291a)
    If 3 s for good have 2 s DO subjunct. imperf.
    'If you think it is good'

13. Quanto vos oíne non podrie dezir (Alex 1967d)
    All 2 s man not can 3 s tell IO condit. infinit.
    'All that a man can't tell you'
2. Two explanations for the Difference in Clitic Position

2.1 Rivero's Explanation. I examine Rivero's position first since my
own conclusions draw heavily on Ramsden's work and I will discuss
the latter in more detail.

Rivero explains the data above positing that weak pronouns in OS
were pronouns at the syntactic level and as such they occupied argument
positions and could appear wherever full noun phrases appeared. She
argues that the verb phrase in OS had a flat structure, which implies
that it did not have a fixed order, and so all NPs, including weak
pronouns, could appear before or after the verb. Moreover, some other
element of the VP could intervene between them and the verb.\(^2\) They
were clitics, though, at the phonological level while MS clitics are
so at all levels of the grammar:\(^3\) they can only appear in a restricted
set of positions, in a fixed order, and only other clitics can intervene
between the clitic and its host, the verb (as explained in 1.1).\(^4\)

As a corroboration of the clitic status of these pronouns in OS
Rivero points out that they absolutely obey Wackernagel's law: they
never appear in absolute initial position since they have to be preceded
by a stressed element.\(^5\) Furthermore, the spelling in OS revealed the
enclitization to a preceding stressed element (clitics were also
affected by a final vowel deletion rule), as in (14) and (15).

14. No - I querades (Por 52)
   Not 3s want comm.
   DO
   'Do not want it/him'

15. Io que - I conviene (Por 33)
    what that 3s is convenient
    IO
    'What is convenient to him'

This stage of the language is evident in the earliest Romance
texts up to the second half of the XIV century, when an order quite
similar to that of MS is established (both Rivero and Ramsden agree as
to the approximate date of the change).

2.2 Ramsden's Explanation. Ramsden presents a different explanation
for OS clitics. He says that even in Late Latin enclisis, which has
been accepted by several scholars for Latin,\(^6\) is not supported by the
data. He proposes an explanation whereby, first because of a change
in order from SOV to SVO and then because of a change in the stress
pattern of the language from a descending to an ascending pattern, the
clitic pronouns changed from a basically enclitic form (Classical
Latin) to a mixed form where both enclisis and proclisis, or rather
preposing and postposing with respect to the verb, were possible. The
order was determined by the semantic relation of preceding elements: a close semantic relation would trigger preposing while a not so close relation would trigger postposing.

Ramsden lists the possible elements that precede the verb-clitic cluster and then explains which of them trigger preposing, which postposing and which both. The elements are as follows:
I. Relative pronouns, adverbs or adjectives
II. Subordinating conjunctions (mainly si: if)
III. Interrogative or exclamative pronouns or adverbs
IV. The non-finite element of a periphrastic verbal construction
V. A predicative complement (complex subjects, objects, adjectives or nouns; apparently he includes here sentential arguments)
VI. A negative adverb
VII. An adverb other than those in I, III or VI
VIII. An adverbial or prepositional phrase (complex phrases consisting of more than just the adverb or preposition)
IX. The subject of the sentence
X. A DO or IO
XI. A subordinate clause or absolute expression (his examples are mainly adverbial or prepositional phrases, so they coincide with group VIII)
XII. A coordinating conjunction
XIII. The verbal group itself.

Of these possible elements, groups I-VI, and X trigger preposing, group XIII shows only postposing, and groups VII-IX, XI, and XII show both.

3. Clitic Preposing

Let us examine these groups more carefully. Groups I-III are constructions considered in Government and Binding theory to involve a +Wh Phrase and/or movement to Comp. These constructions exhibit clitics in preverbal position.

16. Mas tu non ñes ombre que me puedas vencer (Alex 37ab)
   But you not are man that I s can 2 s vanquish
   DO pres. infinit.
   'But you are not a man that can vanquish me'

This sentence containing a relative clause would be analyzed in Government and Binding terms as containing a non-overt phrase that has moved from the subject position of the embedded clause to the Comp position immediately after the head of the relative, leaving a trace (t) behind.
16'. \[S [\text{Comp} \quad \text{tu non \ ombre}_i \quad S [\text{que} \quad \text{NP}_i \quad t_i \quad \text{me puedas vencer}]]\]

17. si le sacasses della (FGlz 293ab)
   if 3's get out of it
   IO 2's subjunc.
   'If you get him out of it'

Si in (17) is considered a +Wh Comp since it introduces indirect questions; it alternates with WhPhs.8

18. cómo la conquirieron (Lib Reg 202 16-19)
   how 3's conquer 3 pl
   DO past
   'How they conquered it'

Cómo in (18) is a WhPh which has been moved from its original position, presumably from after the verb. However, since OS did have much more flexibility in word order than MS (as pointed out by Rivero), it is hard to tell which would be the original position of an adverb.

We have seen so far that a moved element or WhPh in a preceding Comp coappears with a preposed clitic.

Group IV is somewhat puzzling. In cases where a non-finite verb appears before its auxiliary or modal, the clitic is placed between the non-finite verb and the auxiliary or modal. It is difficult to tell whether the clitic is proclitic on the auxiliary verb or enclitic on the non-finite verb.

19. e decir les a (Mand 83-4)
   and tell 3 pl have
   infinit. IO 3 s pres.
   'And he will tell them'

Two possible explanations are that either this is a case of topicalization of the non-finite form of the verb, or the order is really a residue of a construction which was to result in the future tense in MS, formed by the integration of an infinitive verb and the auxiliary haber following it (the already integrated form appears even in some of the earliest texts). One way to determine the position of the non-finite verb is to see its interaction with the negative particle no(n). In OS, as in MS, this particle seems to appear in front of the VP.
THE POSITION OF CLITICS IN OLD SPANISH

20. que non saben que se far (Cid 1155)
    that not know what 3 refl. do inf.
    pres.
    'That they do not know what to do with themselves

21. Esta stela non se dond vinet (Auto 19)
    This star not know where come 3 s
    1 s
    pres.
    'This star, (I) do not know where (it) comes from'

If the construction in question consists of a topicalized verb, this
verb would be in TOP position, outside of S, while the negation would
be in between the subject position and the VP (see 20, 21). But if
the infinitive is part of the VP, as it would be if it is in a
construction equivalent to an auxiliary and a main verb, then the
negation should precede the non-finite verb. The data point to the
first hypothesis as the correct one.

22. vender non los podemos (Cid 619)
    sell not 3 pl can 1 pl
    infinit. DO pres.
    '(We) cannot sell them'

23. trobar non lo podieron (Milagros 83)
    find not 3 s can 3 pl
    infinit. DO past
    '(They) could not find him.'

Notice that, if the non-finite verb is in TOP position, the sentence
involves movement of a non-overt phrase from its base generated
position (the position linked with the phrase in TOP) to the Comp
nearest to the topicalized element. Such element in Comp triggers
clitic fronting as with other examples we have seen up to now: the
clitic is preposed to the tensed verbal element (the auxiliary or modal
verb).

Group V consists, according to the examples presented by Ramsden,
of Prepositional Phrases (PP) or Adverbial Phrases (AdvPh) preposed,
presumably to TOP position. As explained above, this implies the
presence of a moved element in Comp. Apparently Ramsden also includes
sentential subjects and objects here, but the only examples he presents
are from Late Latin. The Early Romance data do not contain any
sentential argument. But if there are any in the texts, they could be
explained in the same way as the cases above: according to Stowell
(1981), sentential arguments are not really in argument position; they
are moved to TOP or adjoined to a non-argument position. One of the
examples of group V presented by Ramsden is found in 24. In this
example a PP has been preposed. The PP is a complement of the verb terne.

24. Por Dios de todos lo terne (Auto 18)
   As god of everybody 3's have 1's
   DO fut.
   'I will hold him as god of everybody'

   I will postpone the discussion of group VI until later. Group X, again, contains an element in leftmost position of a clause which could be in TOP position and, as a result of topicalization, the sentence would involve movement.

25. La cara se santigua (Cid 216-17)
   The face 3 refl. make the sign of the cross 3's pres
   'He makes the sign of the cross on his face'

25'. [La cara S - [NPi S [se santigua ti]]]

   The same could be said of (26).

26. A ti logradesco, Dios (Cid 216-17)
   To you 3's thank 1's god
   DO pres
   '(I) thank you for it, god'

   Ramsden notices that in all the cases of group X where there is a clitic preposed to the verb, the preceding DO or IO is not coreferent with the clitic. In the cases where it is coreferent with the clitic, the clitic follows the verb (cf. (27)).

27. a mujieres et fijos ano - los avilitados (Alex 1465ab)
   To women and children have 3 pl 3 pl provide
   DO past part.
   '(They) have provided (for) women and children'

   This last example, where an element is in leftmost position, presumably in TOP, but a correfering clitic pronoun (a resumptive pronoun) occurs in argument position, seems to be what has been called left dislocation (see Rivero 1980 for discussion). Because it does not exhibit subjacency effects, left dislocation is not considered to involve movement; rather, the phrase in TOP and the resumptive pronoun are considered to be base-generated. Since there is no movement, no moved element or WhPh is in Comp. The behavior of clitics in OS seems to confirm this explanation of left dislocation: unlike cases which are considered to involve movement to Comp (Wh Movement, relative clauses, topicalization) and cases where a +WhPh appears in Comp (the complementizer si), in cases of left dislocation the clitics are not preposed,
THE POSITION OF CLITICS IN OLD SPANISH

exactly as would be expected if no moved phrase or WhPh is present to trigger fronting.

In group XIII, where the verb starts the sentence, clitics always follow the verb. Since Spanish is a pro-drop language and phonologically null elements cannot be in TOP, such sentences consist of pro in subject position and the verb phrase in its base generated position. There is no reason to suppose the presence of any moved or +Wh phrase in Comp to trigger fronting.

Groups VII to IX and group XII evidence both preposed and postposed clitics. Let us look at them more carefully.

Group VII (adverbs other than I, III, and VI) and group VIII trigger preposing in cases where, according to Ramsden, there is an "intimacy of the semantic relationship between the verb and its preceding element". A possible explanation for this "intimate" semantic relationship may be that some of the AdvPhs or PPs are modifying the verb and originate inside the VP:

```
S
   NP        VP
        V     AdvPh
```

The only way for an adverb of this type to appear clause-initially would be through topicalization. Thus, in such cases a moved element in Comp will account for the clitic fronting, while in other cases, where the semantic relationship is not so "intimate", the AdvPh or PP modifies the whole S and as such originates outside the VP, immediately dominated by S; it can appear in several positions in the sentence under the assumption of free order, including initial position, but not necessarily on TOP or Comp:

```
S
   (AdvPh) NP (AdvPh) VP (AdvPh)
```

A preposed VP-type AdvPh or PP would always trigger clitic preposing since, when it precedes the VP, one should assume it is in TOP position, thus movement is involved.
28. a la puerta se llega (Cid 37)
to the door 3 refl. come close
3 s imperf.
'He was coming close to the door'

A preceding S-type AdvPh or PP does not necessarily trigger clitic preposing since it could be in its base-generated position.

29. e pues solto - lo (Lib Reg 210.12)
and after set free 3 s 3 s
past DO
'And then he set him free'

However, it could trigger it if it is topicalized. The difference between the two possibilities for S-type AdvPhs or PPs would not be reflected in the linear order of the AdvPh or PP with respect to the rest of the sentence. But one would assume, since any phrase can be topicalized, that such a possibility would exist and, again, the behavior of the clitics in OS supports such assumption: with preceding S-type AdvPhs and PPs clitics sometimes follow the verb (see 29) while at other times they are preposed:

30. Pero antes que esto fuese les vino muitos males (Lib Reg
But before that this be 3 s 3 pl come many evils 202.31
subjunc.IO 3 s past
'But before this happened, many evils befell them'

In sentence 30, since the clitic is preposed and we have seen that clitics prepose when preceded by a moved phrase or WhPh in Comp, we can assume the adverbial clause is in TOP and a moved non-overt element is in Comp, triggering preposing. The same can be said of sentence 28, where a VP-type PP precedes the rest of the clause, while sentence 29 shows an S-type adverb in base-generated position inside of S.

A similar explanation can be posited for group IX, subjects. Since subject position is at the leftmost position of an S, unless there is any other element in Comp or TOP, the surface order of a sentence with the subject in its base position is the same as that of a sentence with the subject in TOP position. The clues to distinguish both types of sentences (intonation and pauses) are not available when dealing with historical data. But it seems reasonable to assume that cases of topicalized subjects, like cases of topicalization of other constituents, will trigger clitic preposing while there is no reason to assume a subject in situ will have that effect. If so, sentence 31 is an example of a topicalized subject while sentence 32 is an example of a subject in situ.
31. Hyo lo were con el Cid (Cid 1435)
   I 3's see with the Cid
   DO 1's fut.
   'I will see (about) it with the Cid'

32. moros e moras tomaron se a quejar (Cid 852)
   moorish men and women take 3 pl 3 to complain
   past refl.
   'Moorish men and women got (themselves) to complain'

Group XI seems to include elements that should belong to group
VIII and other groups we have seen already.

33. con los sos se acordando (Cid 828)
   with the his 3 agreeing
   refl.
   'Getting to an agreement with his (people)'

34. seyendo aun buio iudgades me por muerto (Alex 850a-c)
   being still alive judge 2's 1's for dead
   'Being still alive you think of me as dead'

In sentence (33) we have a PP which is a complement of the verb
acordando and as such, it should have been generated inside the VP,
its position in the sentence being explainable as topicalization. This
agrees with the clitic being in front of the verb, since we have seen
that topicalization triggers preposing. In sentence (34) we have a
gerund phrase which modifies the whole sentence and, as AdvPhs and PPs
of the S-type, can appear in initial position but not necessarily in
TOP. Thus the explanation presented for group VIII can be extended
for this group: when the AdvPh or PP is generated in the VP and is
topicalized, the clitic is preposed. When it is an S-type AdvPh or PP,
there may or may not be clitic fronting depending upon the real position
occupied by the phrase in question: if in TOP, clitics are preposed;
if it is inside S, no preposing occurs.

Group XII usually shows postposition. The examples with
preposing that Ramsden presents contain, besides a conjunction (which
by itself should not trigger preposing) a constituent that seems to
be in TOP or a WhPh in Comp, which is the real trigger for clitic
fronting.
35. Si bien a de ser e me quieres prestar (Milagros 797)  
   If well have of be and I's want 2's lend infinit.  
   3 s infinit. IO pres.  
   pres.  
   'If it is fine and you want to lend me...'  
36. e bien ge - las guardarien (Cid 163)  
And well 3 s 3 pl keep 3 pl.  
IO DO condit.  
'And (they) would keep them well for him'  

In general, we have seen up to now that a moved constituent or  
the presence of a WhPh in Comp attracts the clitic which is moved in  
front of the verb:  

\[ S \left[ \begin{array}{c} \text{XP} \\ \text{S} \end{array} \right] \rightarrow S \left[ \begin{array}{c} \text{XP} \\ \text{S} \end{array} \right] \left[ \begin{array}{c} \text{C} \\ \text{V} \end{array} \right] \]  

This rule resembles the phenomenon of verb preposing in MS, which  
is posited to be triggered by a WhPh in Comp (a subset of the triggers  
of clitic preposing in OS) and which attracts the verb to either Comp  
or to a position outside of S. The resemblance is greater if one has  
in mind that, if a clitic is present in MS, it must be preposed with  
the verb.  

The remaining group, VI (negative adverbs) does not seem to  
fall under this generalization since negation has not been thought of  
as involving movement to Comp. Yet clitics are always preposed when  
preceded by a negative adverb.  

37. Nunca te ueras pobre nin te ueras mal trecho (Alex 345c)  
Never 2 s see 2s poor nor 2 s see 2s maltreated  
refl. fut.  
You will never see yourself poor or wretched'  

Consider, however, the similarity between negation and quantifiers.  
Negation involves scope as quantifiers do and even though a negative  
adverb may appear inside the sentence, its scope may be the whole  
sentence. Thus it is not so far fetched to think of negation as  
involving some sort of raising at LF. If such a negative raising  
rule exists at LF, however, clitic preposing when negation is the  
trigger presents a puzzle in terms of the organization of the grammar.  
I have suggested that clitic preposing is triggered by syntactic  
movement and therefore can take place no later than SS. However,  
its effects are phonologically realized, and therefore cannot take  
place in LF, given the organization of the grammar in note (3).
THE POSITION OF CLITICS IN OLD SPANISH

According to that model, PF has no access to LF. Thus, it appears that preposing cannot refer to LF movement.10

One way of solving this problem is to consider van Riemsdijk's 1982 proposal that sentences with quantifiers have an abstract base-generated scope-marker in the Comp of the clause over which the quantifier has scope. This marker characterizes that Comp as the landing site for movement in LF. Even at SS it is present so a rule like clitic preposing would have some way of "predicting" LF movement. Clitic preposing would be sensitive to the scope operator in Comp, as it is to other operators (e.g. WhPhs) in Comp.

Another possibility is that clitic preposing is triggered not by movement or by an operator in Comp, but by the presence of any preceding scope-bearing element, whether or not in Comp. In all the examples studied such an element, either a WhPh or a moved phrase in Comp or a negative adverb in front of the VP, always precedes the VP containing the clitic.11

A way to test which of the two explanations is the correct one would be to observe the behavior of quantifiers. If a quantifier appears in situ after the verb but is understood as having wide scope, under the first hypothesis it should trigger clitic preposing since the operator marking the scope of the quantifier would be in a preceding Comp. If the second hypothesis is right, a quantifier in place after the verb-clitic group should not trigger clitic preposing since the scope element does not precede the clitic. I have been unable to find examples of the right kind to test the hypotheses, but it is expected that future research will provide such evidence to help us choose the correct solution.
FOOTNOTES

1This system is used in Peninsular Spanish. In Latin America, os, second person informal plural, has disappeared and its function has been absorbed by los, las (if DO) or les/se (if IO, se if refl.), originally 3rd person plural or 2nd person formal plural.

2Rivero distinguishes some cases of interpolation, where she thinks there is a rule that adjoins the clitic to S or to VP, from cases which she considers involve different ordering possibilities within the VP. Although according to Ramsden interpolation usually patterns with examples where the clitic is immediately preceding the verb, I do not pretend to explain interpolation since I consider it needs further study. I am restricting my explanation to simple cases of verb-clitic order with no intervening elements between them.

3Rivero follows the current structure for the grammar accepted by Government and Binding theory:

D Structure
    | Transformations (Move $\alpha$)
    S S(structure)
       | PF
       | LF
(Phonological Form) (Logical Form)

PF and LF apply after the syntactic levels.

4Not all languages restrict so narrowly the possible elements intervening between the clitic and its host as MS does. German allows a much wider set of elements in between clitic and host, as OS did.

5In MS clitics can appear in initial position with no stressed element preceding them since they are proclitic:

1. Lo vi
   3s saw 1s
   'I saw him'
6 See Wackernagel 1892; Marouzeau 1922.

7 In establishing the order of the elements in Comp, I am following Rivero 1980.

8 Thus:
   i. Me pregunta qué haces
      1 s ask 3 s pres. what do 2 s
      'S/he asks me what you are doing'

   ii. Me pregunta si vienes
      1 s ask 3 s if come 2 s
      'S/he asks me if you are coming'

9 See Torrego 1984.

10 I am indebted to Margarita Suñer for bringing to my attention this ordering paradox.

11 A left dislocated element in TOP would not be considered a scope bearing element since the resumptive pronoun it binds is not considered a variable at syntactic levels (see Chomsky 1982).
TEXTS' ABBREVIATIONS

Alex El libro de Alexandre Ed. R. S. Willis
Apol Apollonio Ed. Marden
Auto Auto de los Reyes Magos Ed. R. Menéndez Pidal
Cid Cantar de Mio Cid Ed. R. Menéndez Pidal
Cor Corbacho Ed. González Muela
F Glz Poema de Fernán González Ed. R. Menéndez Pidal
Lib Est Libro Estados Ed. Tate & Macpherson
Lib Reg Liber Regum Ed. Serrano & Sainz
Mand De los diez mandamientos Ed. A. Morel Falio
Milagros Milagros de Nuestra Señora Ed. Dutton
Por Poridat Ed. Kasten
REFERENCES

Alonso,M. (1964) Evolución Sintactica del Español, Madrid, Aguilar S.A.

of Government and Binding, Linguistic Inquiry Monograph 6, MIT Press,
Cambridge, Mass.

Gredos.

Lathrop,T. A. (1960) The Evolution of Spanish, Delaware, Juan de la
Cuesta.


Menéndez Pidal,R. (1965) Crestomática del Español Medieval, Madrid,
Universidad de Madrid.

Otero, C. (1972) "The Development of Clitics in Hispano-Romance",
Proceedings of the Conference on Diachronic Romance Linguistics

Rivero,M. L. (1980) "On Left Dislocation and Topicalization in
Spanish", Linguistic Inquiry 11.

and Old Spanish, Unpublished Manuscript.

Ramsden,H. (1963) Weak-Pronoun Position in Early Romance Languages,
Manchester, University Press.

Cambridge, Mass.

Linguistic Inquiry 15.

van Riemsdijk,H. (1983) "Correspondence Effects and the Empty Category
Principle", Y. Otsu and H. van Riemsdijk (eds.) Studies in Generative
Grammar and Language Acquisition, Tokyo, International Christian
University.
DEPARTICIPIAL ADVERBS IN RUSSIAN

Leonard H. Babby
Cornell University

1.0 Introduction

This paper will deal with the morphosyntactic properties of a relatively new verbal category in Russian, namely, departicipial manner adverbs formed with the suffix -сe (/s,e/) such as, удроуссе 'depressingly', обессаусце 'promisingly', угрозуссе 'threateningly', дразнуссе 'teasingly', etc. Its main purpose is to shed some new light on the classic problem of "hybrid" verbal categories, i.e., categories that combine the properties of verbs and non-verbal categories like noun, adjective, or adverb.

In the first part of the paper I will describe the relations between these сe-adverbs and both the corresponding active participle in -сae (удроусаусе 'depressing', обессаусе 'promising') and the corresponding gerund in -a (удроуса 'depressing', обес 'promising'), since the former bears an obvious formal relation to сe-adverbs, while the latter bears a functional relation (they are sometimes referred to as verbal adverbs). In the second part I will propose an explicit account of the relations between these three verbal categories in terms of recent morphological theory, and will argue that they make a unique contribution to our understanding of the relation between word structure (the internal organization of morphologically complex words) and phrase structure (the internal organization of
the phrases that these words head). But first a few preliminary remarks are necessary.

1.1 Active participles (verbal adjectives) in modern Russian have an exclusively attributive function which is close to that of relative clauses; their endings are the same as primary adjectives in the long form, i.e., they are inflected for gender, number, and case. Gerunds (verbal adverbs) have a function close to that of adverbial clauses, and, like all adverbs in Russian (including sce-adverbs), they are uninflected. One of our goals will be to characterize the differences between gerunds and sce-adverbs, which appear at first glance to have the same (adverbial) function; e.g., see the discussion of sentences like the following in Gvozdev 1955:256.

(1) Rebenok govoril, umolja\acute{\j}a pusti\U{\v{c}} ego na spektakl'.

(2) Rebenok smotre\l\l umoljajusce na mat'.

2.0 sce-Adverbs and Deadjectival Adverbs

The following sets of examples demonstrate that sce-adverbs have the same function and syntactic distribution as manner adverbs formed from primary adjectives.

(3) a. Daze kogda ona ulybalas', oni (=glaza) smotre\l\l voprosajusce.

b. Kolesa postuko\v{\v{c}}ali usypljajusce

c. On ponimajusce kivnu\l.

d. Ona ulylabalas' znajusce/manjasce/zaiskivajusce.

e. Ona protestujusce zadvigal brov'jami.

f. Eta legkaja smert', --utesajusce/uspokaivajusce skazal vrac.

g. Ona vyzidajusce/izucajusce/ozidajusce smotre\l\l na menja.

h. Ivan placusce zaoral na ves' gorod.

i. Stol' naprijazennyj trud dolzen sootvetstvujusce oplacivat'sja. (Izvestija, 1979)
j. On osuzdajuscokacal golovoj.
k. Glaza Ivana skol'znuli ocenivajuscopo elegantnomukostjumu Viktora.

Like manner adverbs formed from primary adjectives, sce-adverbs also modify adjectives and participles, e.g.:

(4) a. slepjasce belyj 'blindingly white'

b. On xodit v uzasajuscervanyxbasmakax.

c. Pocemu on govorit s nami takim issusajuscenaucnymjazykom?

d. podkupajuscasirokaja ulybka.

e. Samie neznacitel'nyepoliticeskiesluxikazalis'zaxvatyvajuscointeresnymi.

sce-adverbs freely conjoin with deadjectival manner adverbs in -o, as in (5), or can be used in parallel constructions with them, as in (6).

(5) a. Pljasali dve obnazennyenzesciny, ulybalis' zazyvno iobescajusc.

b. Fedor nasmslivoo i sozalejuscaposmotrel nadevusku.

c. Tanja sprasivalatetrebatel'noimoljasce.

d. Golos ego zvucaltverdo iobodrjajusc.

e. Onivygljadeli ivyzvyvajuscie trogatel'no.

(6) a. Onavnimatel'no, izucajesceposmotrelana muza.

b. Glaza smotrelipristal'no, ispytujusc.


d. Zdes' razgovarivaliposoobennomu --- korotko, predosteregajusc.

Finally, like true manner adverbs, sce-adverbs can both modify and be modified by other manner adverbs, e.g.:

(7) a. Pticy tepert'peli

b. Onipisaliporazitel'no udrucajusc.
c. Pridonnaja voda ostuzajusce-sladostno zaskol'zila vokrug ee tela.

3.0 The Morphosyntactic Properties of sce-adverbs and scij-participles.

The examples in (3) - (7) suggest that the relation between scij-participles and the corresponding adverb in -sce is entirely parallel to the relation between primary adjectives and their corresponding manner adverb in -o (i.e., gromkij : gromko :: umoljajusciij : umoljajusce, etc.). But it turns out on closer inspection that this parallelism is not complete: while primary adjectives that have corresponding manner adverbs in - normally have predicate short forms as well as attributive long forms, scij-participles in Modern Russian do not have short forms and are not used in the predicate (e.g. *Ona byla sidjasca za stolom 'She was sitting at the table'). Since it is normally assumed that primary manner adverbs in - (grom'-o 'loudly') are related to neuter singular short forms of the same adjective (grom'-o 'loud'), we cannot therefore simply claim that the relation between scij-participles, which have long forms only, and sce-adverbs is identical to the relation between primary adjectives and the corresponding manner adverb, and leave the matter at that; scij-participles and their relation to sce-adverbs must be considered separately.

3.1 Primary Adjectives in -scij. The analysis of the relation between scij-participles and sce-adverbs is complicated by the existence of what appear to be predicate short forms of scij-participles, e.g.:

(8) a. Spiski nepravil'nyx form iscerpyvajusci. 'The lists of irregular forms are exhaustive'

b. On byl privlekatelen i otalkivajusci odnovremenny. (Tokareva) 'He was attractive and repulsive at the same time'

c. Ljubaja dejatel'nost', kotoroj zanimajutsja deti pod rukovodstvom nastojascegogo pedagoga, vsegda vsopytvyavusca. (Izvestija, 1979) 'Any activity in which children participate under the direction of a real pedagogue is always educational'

It turns out on closer inspection, however, that the predicate short forms in (8) are synchronically primary adjectives, not participles. What happened historically in this: Short forms like the ones in (8) were scij-participles that underwent a diachronic process which reanalyzed them as primary adjectives, and these adjectives are listed in the lexicon of Modern Russian along with
all the other primary adjectives. The most convincing evidence for this reanalysis (Selkirk 1982:104 suggests the term recategorization comes from the meaning of these forms. Participles always have the same meaning as the corresponding verb stem, but, as the English glosses demonstrate, the meaning of the predicate forms in (8) differ from that of the corresponding verb (and participle). For example, the verb iscerpyvat' means 'to exhaust, use up', and the sciij-participle formed from it has the same lexical meaning. But the "departicipial" adjective iscerpyvajuscij(-ij) in (8a) means 'complete, exhaustive' (not 'exhausting'), and, since it is synchronically a primary adjective, it can have predicate short forms as well as attributive long ones. This difference in meaning between sciij-participles and the corresponding sciij-primary adjectives is particularly clear in the case of (8c). Thus modern Russian has a large number of homophonous pairs in -sciij, one a primary adjective listed in the lexicon, the other a participle, which is part of the corresponding verb's paradigm and, since its form and meaning are entirely predictable, is not entered in the lexicon (see Halle, 1973 for a different viewpoint). Given this analysis of the predicate short forms in (8), we are indeed justified in asserting that sciij-participles do not have short forms in Modern Russian.

It should also be noted here that while some sce-adverbs correspond to sciij-participles that have been recategorized as adjectives, most sce-adverbs do not (e.g., there is no sciij-adjective corresponding to the verb protestujusce 'protesting'). We cannot therefore claim that the sce-adverb is nothing more than a manner adverb in -/o/ that is formed from a primary adjective whose stem happens to end in -sc-.3

4.0 Gerunds and sce-Adverbs.

The preceding section was devoted to an informal discussion of participles (umoljajuscij) and the sce-adverbs associated with them. Now we will consider the relationship between sce-adverbs (umoljajusce) and gerunds (umoljaja).

It is a relatively easy matter to characterize the functional similarity of gerunds and sce-adverbs: both are adverbial forms of the verb. The crucial difference between them is this: sce-adverbs function exclusively as manner adverbs, while gerunds in Russian have a wide range of adverbial and quasi-adverbial functions, including that of manner adverbs. Speaking in the broadest possible terms, gerunds in Russian denote actions that are both related and subordinate to the action denoted by the main verb of the clause in which they are contained. The precise semantic interpretation of the gerund depends on a number of parameters (e.g., overall context, aspect, word order, lexical meaning). Thus sce-adverbs are manner adverbs whereas gerunds may function as manner adverbs (especially when they have no complements).
The use of gerunds as manner adverbs is illustrated in the following examples. In (9) gerunds are conjoined with manner adverbs formed from primary adjectives; in (10) they are conjoined with sce-adverbs.

(9) a. On govoril bistro i ne umolkaja.  
    'He spoke quickly and without stopping'

    b. On sagal po ulice bodro i ne ustupaja dorogu.  
    'He walked down the street boldly and not getting out of anyone's way'

    c. Spokojno i ne toropjas', on prileg.  
    'He lay down calmly and without rushing'

(10) Ona neponimajusce i vse esce vsxlipyvaja podnjala ne nego  
    lico (Rasputin)  
    'She lifted her face to him uncomprehendingly and still sobbing'

4.1 Syntactic Differences. Despite the fact that gerunds and sce-adverbs belong to the same category and have similar functions, there is a crucial syntactic difference between them. Gerunds have the same objects, modifiers, and complements that the corresponding finite verb does, whereas sce-adverbs do not. For example, a gerund formed from a transitive verb takes a direct object noun phrase in the accusative case, and, like the finite verb, its direct object is marked genitive rather than accusative if it is in the scope of sentence negation. But sce-adverbs formed from the same transitive verb cannot take an object noun phrase in any case. In the following examples, uspokaivaja is the gerund and uspokaivajusce is the sce-adverb formed from the transitive verb uspokaivat' 'to calm, sooth'; nas 'us' is the direct object.

(11) a. On govoril medlenno, tixo, uspokaivaja nas (svoim nizkim golosom).  
    'He spoke slowly, quietly, soothing us (with his low voice).

    b. *On govoril medlenno, tixo, uspokaivajusce nas (svoim nizkim golosom).

    c. On govoril medlenno, tixo, uspokaivajusce.  
    'He spoke slowly, quietly, soothingly'

(12) a. On kivnu1, obodrijaja nas prodolzat'.  
    'He nodded, encouraging us to continue'
b. *On kivnul, obodorjajusce nas prodolzat'.

c. On kivnul obodorjajusce.
'He nodded encouragingly'

Note also that gerunds, like finite verbs, can occur with the voice morpheme -sja, and can be used in either aspect; sce-adverbs cannot be inflected for voice and are formed from imperfective verbs only. On the other hand, sce-adverbs, like manner adverbs formed from primary adjectives, can be used to modify adjectives and adverbs (see (7)); gerunds cannot.

We can conclude on the basis of these syntactic properties that gerunds are heads of complete verb phrases, while sce-adverbs are not; they behave syntactically like simple adverbs.

sciij-participles also have the same objects, modifiers, complements, voice morphology, etc. as the corresponding gerund and finite verb. We can therefore conclude that gerunds head phrases that have the "internal" structure of Verb phrases, but are "externally" adverb phrases, and that sciij-participles head phrases that are internally verb phrases and externally adjective phrases. In contrast, sce-adverbs head phrases that are both internally and externally adverb phrases. These structures can be schematically represented as follows (V- stands for a verb stem and AP for 'adjective phrase').

```
(13)  a. AdvP
      VP
      V  NP
      V- a

b. AP
    VP
    V  NP
    V- sc- ij

PARTICIPLE

SCE-ADVERB

GERUND
```

Given the structure in (13c), sce-adverbs associated with transitive verb stems do not have direct objects because they do not have the internal structure of a verb phrase.

The schematic representations in (13) are intended to capture the fact that sciij-participles phrases and gerund phrases are full of verb phrases whose heads are verb stems to which have been affixed nonfinite suffixes that determine the phrases's overall adjectival or adverbial function in the sentence. But sce-adverbs are verb stems which are made adverbs when the suffix -sc-e is affixed to them; they cannot therefore have any of the
properties of verb phrases (object noun phrases, complements, voice, etc).

Note finally that while scij-participles and gerunds can be formed from all regular verb stems, this is not the case with sce-adverbs, which appear to have various kinds of restrictions on their formation (e.g., not all verbs denote actions that can be used as adverbial modifiers, cf. *citajusce 'readingly', sidjasce 'sittingly' etc.). Thus the formation of scij-participle phrases and gerund phrases appears to be a productive morphosyntactic process, while the formation of sce-adverbs appears to be a restricted lexical process, i.e., appears to be a product of word formation rather than phrase formation (this distinction is reminiscent of the distinction between gerundive and derived nominals made in Chomsky, 1970).

5.0 Formal Representation.

The first part of this paper (sections 1-4) contains an informal discussion of sce-adverbs and their relation to gerunds and participles. In this section we shall explore the theoretical implications of the relations between these verbal categories.

5.1 The most straightforward approach to the relation between sce-adverbs and scij-participles is this: A rule combines an imperfective verb stem V- with the (derivational) suffix -sc- to form a derived adjectival stem (umoljajusc-, utesajusc-, protestujusc- etc.), i.e.:

\[(14) \quad \begin{array} {c}
A \\
\text{V-} \\
\text{-sc-} \\
\end{array} \] or \[[ V - sc - ]_A \]

These deverbal adjectives then behave like primary adjectives with respect to their inflectional endings: the suffix /-o/ is added to form manner adverbs, and the long form ending -ij (masc. sg. nom.), -emu (masc. sg. dat.), etc. are added to produce attributive forms, i.e., participles. Under this hypothesis, -sc- in participles and -sc- in sce-adverbs are the same suffix.

5.2 This approach works perfectly well for sce-adverbs. If we assume that Russian manner adverbs in /-o/ are adjectives that are used in the verb phrase to modify verbs, then /-o/ (realized as e after sc) is the neuter singular short form inflectional suffix that is normally used in Russian to mark the absence of agreement (see (15a)). If, on the other hand, we assume that manner adverbs are deadjectival adverbs, then /-o/ must be a derivational suffix (homophonous with the neuter singular short form ending) that marks the derivation of an adverb from an adjective (see (15b)).
It is assumed in (15) that inflectional suffixes do not affect the stem's category.

(15)

```
a. A
  V- sc-e

b. Adv
  A
    V- sc- e
```

There is considerable evidence from Russian and other languages (esp. Polish) that manner adverbs are not merely adjectives used as a verbal modifier, but are a separate category (see (15)); but space does not allow for further discussion of this point.

5.3 But the hypothesis outlined above in section 5.1 is patently incorrect when applied to scij-participles. If we start out with a derived structure like (14), then scij-participle phrases would have to have the internal structure of an adjective phrase (see 16)) since, according to X-bar theory (Jackendoff, 1977), the phrasal category that dominates all the phrase's constituents must be a projection of the head.

(16)

```
    A3 (=AP)
    /    \
   /     \
  A2     \
    /     \
   /      \
  A1      \
    /      \
   /       \
  A        \
    /      \
   /       \
  V   sc   ij
```

But, as we saw above in section 4.1, scij-participle phrases have the internal organization of verb phrases, not adjective phrases. We must therefore abandon the hypothesis that sce-adverbs and scij-particiles share a commonly derived stem (see (14)) and consider an alternative hypothesis according to which the -sc- in sce-adverbs and scij-particiles are different suffixes in Modern Russian. This hypothesis must somehow capture the fact that the -sc- suffix in participles and the -a suffix in gerunds (and the -ti suffix on infinitives for that matter) are suffixes that are associated with entire verb phrases (i.e., affixed only to verbs that head verb phrases), while the -sc- suffix in sce-adverbs is associated with the verb stem only, not with verb phrases (i.e., it cannot be affixed to a verb that heads a verb phrase). This alternative hypothesis should also ideally explain the obvious diachronic relation between -sc- in sce-adverbs and -sc- in participles.
5.4 The same kinds of problems that we have been considering above arise in the analysis of gerundive nominals in English. While they have the internal organization of a verb phrase, they have the "external" distribution of a noun phrase (e.g., *We were all against John's buying a new house*). Although the suffix -ing is affixed to the verb, its function is to convert a verb phrase into a superficial noun phrase; the same is true of the suffix -DIK- in Turkish. The solution to the problem of nonfinite verbal categories in Russian therefore has significance beyond the boundaries of Russian grammar; it can contribute to the characterization of "hybrid" category in universal grammar. In the next section we will look briefly at R. Jackendoff's treatment of English gerundive nominals within the X-bar framework. I will argue that the deverbalization rules he proposes account remarkably well for Russian data presented in this paper.4

6.0 Deverbalizing Rules and X-Bar Theory.

In his 1977 book on phrase structure (X-bar theory), R. Jackendoff proposed the Uniform Three-Level Hypothesis, which is a universal constraint on the form of phrase structure. According to this hypothesis, a phrase headed by the lexical category X will have the following skeletal structure (determiners, complements, and quantifiers are ignored).

\[
\begin{array}{c}
X^3 \\
\downarrow \\
X^2 \\
\downarrow \\
X^1 \\
\downarrow \\
X \\
\end{array}
\]

(17)

In other words, (17) claims that between the lexical category X and its maximal projection X^3 there are two intermediate categories (levels), each with its own determiners, complements, etc.5

In Chapter Nine Jackendoff introduces deverbalizing rules, which, he notes, constitute a principled class of exceptions to (17) since they generate structures in which the phrase's head (V) and "maximal projection" belong to different categories. These rules are also appropriately referred to as category changing rules, and they can be schematically represented as follows.

(18) \[X^1 \rightarrow af \ V\]

Jackendoff notes (p.221) that the rule in (18) "expands a super-category of the lexical category X as a supercategory of the verb of the same level, plus a grammatical formant or affix" (af in (18) stands for affix). An X^3 involving a deverbalizing rule will display some properties of X^3 and some properties of verb phrases.
The possible skeletal structures of phrases involving category switching rules in a theory in which the maximal projection of a phrase is $X^3$ are (see p.221):

\[(19) \quad a. \quad X^3 \quad b. \quad X^3 \quad c. \quad X^3\]

\[\begin{array}{c}
\text{af} \\
V^1 \\
V \\
\end{array} \quad \begin{array}{c}
\text{af} \\
V^1 \\
V \\
\end{array} \quad \begin{array}{c}
af \\
v^3 \\
v^2 \\
V \\
\end{array}
\]

The structures grow less $X$-like and more verb-like as $i$ in (18) goes from 1 to 3, i.e., the higher the level at which the category switching rule operates, the more verb phrase-like and the less $X$-like the phrase will become. At the level where a category is switched by a deverbalizing rule, there are no complements or determiners. This means, for example, that a phrase with the structure represented in (19c) will have the "internal organization" of a $V^3$, but will have the syntactic distribution ("external structure") of an $X$; it will have no $X$-type determiners or complements since the category switch takes place at $X^3$. In (19a) and (19b), however, there will be determiners and complements associated with both $X$-phrases and verb phrases.

6.1 Gerundive Nominals in English. Gerundive nominals in English can serve as a concrete example of a category switching rule. They have the structure of a verb phrase up to the $V^2$ level and that of a noun phrase above, i.e., $X^3 = NP$ (see p.223). The phrase structure rule generating such a structure can be represented as follows: $N^2 \quad \text{ing} \quad V^2$; the structure of the gerundive nominal in (20a) can accordingly be represented by (20b).

\[(20) \quad a. \quad \text{Noam's inventing a new theory.} \quad \quad \quad \quad \quad \quad b. \quad N^3 \quad N^2 \quad \text{ing} \quad V^2 \quad \text{invent a new theory}\]

The deverbalizing suffix (or, from another perspective, the nominalizing suffix) -ing is positioned after the verb invent by a transformational rule.

This analysis is appealing because it provides a relatively straightforward way of capturing the fact that gerundive nominals
are "hybrid" categories, i.e., that they are "internally" verb phrases and "externally" noun phrases; it also succeeds in representing the deverbalizing suffix -ing as associated with the entire V\textsuperscript{2} rather than just the lexical head of V\textsuperscript{2}, to which it is eventually affixed.

6.2 Word Formation and Phrase Formation. Jackendoff also notes that \textit{i} in (18) can be zero, i.e.:

(21) \[ X \rightarrow \text{af} V \]

Category switching rules like (21) are "congruent with a subset of the word formation rules in the lexicon, for example, those relating derived nominals to verbs" (see p.235). Consider, for example, the word building, which is either a noun (derived nominal), as in (22a) or a gerundive nominal, as in (22b).

(22) a. This building is very old.

b. John's building a new house is news to me.

The skeletal structures of (22a) and (22b) can be represented by (23a) and (23b).

(23) \begin{align*}
\text{DERIVED NOMINAL} & \quad \text{GERUNDIVE NOMINAL} \\
\text{a.} & \quad \text{b.} \\
N^3 & \quad N^3 \\
N^2 & \quad N^2 \\
N^1 & \quad \text{ing} \\
N & \quad V^2 \\
V & \quad \text{build-} \\
\text{build} & \quad \text{ing}
\end{align*}

Jackendoff considers (23b) to be the result of a diachronic process, i.e., a word formation rule (see (23a)) develops into a phrase structure rule (see (23b)) (see p.235).

7.0 Deverbalizing Rules in Russian.

The English deverbalizing rules presented above are able to represent precisely the relations we have observed in Russian between \textit{scij}-participles and \textit{sce}-adverbs. \textit{scij}-Participles, like all true participles, have the internal structure of a verb phrase and the external structure of an adjective phrase. This fact can be expressed in Jackendoff's framework by means of the following
deverbalizing rule (assuming the maximal projection of both adjective phrases and verb phrases to be \( A^3 \) and \( V^3 \) respectively).

\[
(24) \quad A^3 \rightarrow \text{af } V^3 \quad (\text{or } A^3 \rightarrow \text{-sc- } V^3)
\]

The endings -ij (m. sg. nom.), -aja (f. sg. nom.), -uju (f. sg. acc.), etc. are inflectional; they are identical to the endings of primary attributive adjectives (i.e., long forms), and their values are determined by the same principles of noun phrase-inter-

The skeletal structure of a scij-participle is given in (25a) and a concrete example in (25b); since the category switch takes place at the \( A^3 \) level, scij-participle phrases do not have any of the determiners or complements associated with adjective phrases.

\[
(25a)
\]

\[
\]

(25b)

Despite the fact that scij-participles have adjectival inflectional morphology (i.e., -ij, -aja, etc.), they "govern" the accusative case on their direct objects, just as finite forms, gerunds, and infinitives do (primary adjectives do not have accusative comple-

This is because, according to (25), the scij-participle
is a V that heads a V^3, which contains the syntactic configuration that determines accusative marking on the objects of transitive verbs (see Babby 1980). In other words, the case marking on A^3 (nominative in 25b) percolates to the participial head (citajusciij (nom. sg. m.)), but not to its direct object (knigu (acc)) (cf. mal'ciku (dat.), citajuscemu (dat.) knigu (acc) / *knige (dat.)).

(24) and (25) capture precisely what we set out to capture at the beginning of this article, namely, that the participle suffix -sc- is associated with the entire verb phrase, not just the verb, and that scij-participle phrases have the internal structure of a verb phrase, but the syntactic distribution and morphology of an adjective phrase.

7.1 sce-adverbs and Deverbalizing Rules. We established above in section 4.1 that the manner adverb suffix -sce is associated with verbs, not verb phrases (recall that they do not have any of the determiners or complements found in verb phrases (cf. (11) and (12))). This can be represented by the following deverbalizing rule (cf. section 6.2):

(26) A → af V (or A → -sc- V)

The skeletal structure of a Russian sce-manner adverb is given in (27a) and a concrete example in (27b).

(27) a. ADV^3
   \   \                b. ADV^3
  /   /               /    /
ADV1 ADV1
   \   \             \    \           
ADV V -sc- e       ADV V -sc- e

(26) and (27) capture the crucial fact that the sce-adverb suffix is associated with the verb, not the verb phrase (cf. (25a)), and that sce-adverbs have the distribution, function, and morphology of manner adverbs. See section 5.2.

7.2 According to the analysis presented above, the suffix -sc- is introduced by two different rules at two different bar-levels, at the word level (lexical V level) in the case of sce-adverbs, and at the phrase level (V^3 level) in the case of participles. Thus the deverbalizing suffix -sc- in Russian is similar to the suffix -ing in English, which combines with verb stems at the word
level (to form nouns) and combines with phrasal categories (to form gerundive nominals) (see the discussion of the word building above in section 6.2).

But there does appear to be one significant difference between -ing in English and -sc- in Russian. According to Jackendoff, gerundive nominals resulted from a diachronic process whereby a word formation rule developed into a phrase structure rule (see 6.2). The opposite appears to have taken place in Russian: a phrase structure rule \((A^3 \rightarrow V^3 \rightarrow \text{sc-})\) developed into a word formation rule \((A \rightarrow V \rightarrow \text{sc-})\); Jackendoff explicitly mentions this possibility on page 237.

7.3 Gerunds and Deverbalizing Rules. It is now a relatively simple matter to account for the structure of gerunds (умолажа) and their relation to both participles (умолажуск) and sce-adverbs (умолажусес). Like скъ-participles, gerunds have the internal structure of a verb phrase, and, like sce-adverbs, they have the function and distribution of an adverb (adverbial clause). These properties can be captured by the deverbalizing rule in (28); the skeletal structure of a gerund phrase is given in (29).

\[
\begin{align*}
(28) & \quad \text{ADV}^3 \rightarrow \text{af} \quad V^3 \quad \text{(or} \quad \text{ADV}^3 \rightarrow -a \quad V^3) \\
(29) & \quad \text{ADV}^3 \\
& \quad \quad \text{af} \quad V^3 \\
& \quad \quad \quad \text{af} \quad V^3 \\
& \quad \quad \quad \quad \text{af} \quad V^3
\end{align*}
\]

Since скъ-participles are externally adjective phrases (see (25a)), they have the same inflectional morphology as primary adjectives, i.e., they are inflected for gender, number, and case; both sce-adverbs and gerunds are externally adverbs (see (27) and (29)), and, accordingly, both are uninfl ected (primary adverbs in Russian are all uninfl ected). Note finally that participles and gerunds (and infinitives) are formed by phrase structure rules and, therefore, they are completely productive, as we would expect them to be. But sce-adverbs are generated by a word structure rule which combines -sc- with a specific lexical item, and, semantic constraints naturally come into play; sce-adverbs are therefore only semi-productive (cf. derived nominals in English).

7.4 Summary. The derivational suffix -sc-, like -ing in English (see (23)), is introduced by two different deverbalizing rules, one a phrase structure rule (which combines -sc- with \(V^3\), the
other a word structure (word formation) rule (which combines -sc- with a verb stem, forming a morphologically complex word).

8.0 Conclusions

I have argued in this paper that the theory of deverbalizing rules proposed in Jackendoff 1977 is an important contribution to the characterization of hybrid categories in universal grammar. This is primarily because it enables us to explicitly represent the fact that verbal suffixes can be associated either with verb phrases (i.e., with verbs that head verb phrases) or with simple verb stems (i.e., with verbs that do not head verb phrases). The former can be exemplified by scij-participles, gerunds, and infinitives in Russian, participles and gerundive nominals in Turkish, and gerundive nominals in English; the latter can be exemplified by sce-adverbs in Russian. But there are a number of problems with Jackendoff's approach to hybrid categories, some of them rather obvious, and it will therefore either have to be radically revised, or his insights will have to be incorporated into another theory. Since space does not allow for adequate discussion, I will limit myself to a few general observations.

8.1 The most obvious problem with deverbalizing rules is that, as Jackendoff himself points out, they violate a basic principle of X-bar theory, namely, in structures like those in (19), (25a), (27), and (29), V, the head of the hybrid phrase (i.e., the phrase containing a category switching rule), and the phrase's highest node belong to different categories (cf. the Uniform Three-Level Hypothesis in (17)). For example, English gerundive nominal phrases are headed by a V, but the phrase's highest node is N^3 (=NP).

According to the deverbalizing rules proposed in Jackendoff, 1977, derivational suffixes are introduced by phrase structure rules at various bar-levels (cf. (18)) and subsequently affixed to the lexical verb stems heading these phrases by means of specialized syntactic rules. Since it stands to reason that not all derivational suffixes are to be introduced by phrase structure rules and positioned by transformations (see Selkirk 1982), Jackendoff's theory entails a rather heterogeneous, unintuitive model of derivational morphology. J. Bowers makes the same point about the treatment of inflectional morphology in recent theories of syntax (see Bowers 1984) (note that deverbalizing rules say nothing about inflectional morphology). The following quote from Bowers deals with inflectional morphology, but it can nevertheless serve as a valid criticism of the treatment of derivational morphology in Jackendoff's theory.

...such approaches are quite unconstrained, since inflectional features can be generated in a variety of different places in syntactic representations of
the categorial component and may be related to actual morphological forms in ways that are quite indirect. Analyses such as those mentioned above, permit, in effect, no principled distinction at all to be made between syntax and morphology (Bowers 1984:24)

Note finally that since both primary adjective phrases and participle phrases have the same "maximal projections" (A3), it follows from Jackendoff's theory that both should have the same syntactic distribution. But, as was noted in sections 3.0 and 3.1, they do not: participle phrases have only an attributive function (and therefore have only long form endings), while primary adjectives have both an attributive and predicate function (and therefore have short form as well as long form endings).

8.2 Autonomous Morphology. Bowers argues that morphology is autonomous, i.e., it constitutes "an independent module whose basic units and principles of organization are distinct from those of any other component of the grammar" (Bowers 1984:24). Morphologically complex words, i.e., words consisting of a stem + derivational suffix + inflectional suffix, are accordingly formed in an autonomous morphological component and only then are inserted into the syntactic representation of phrases and sentences. The acid test of the theory of autonomous morphology is whether or not it can account for the properties of hybrid verbal categories discussed above in a natural, insightful way.

If we assume that lexical categories (V, A, N, etc.) are composed of category features (see Chomsky 1970, Jackendoff 1977), and, furthermore, if we assume that derivational as well as inflectional suffixes have features associated with them, and that these features percolate (or "project") up to the phrase's maximal projection along with the head's features, then it seems, at least in principle, that such a theory is capable of capturing the same insights as Jackendoff's but without the defects mentioned above in section 8.1.

scij-participles would be formed by combining a verb stem, the derivational suffix -sc-, which contributes an adjectival feature, and an inflectional ending, which contributes the features of gender, number, and case. The resulting word (formed entirely in the morphological component) will head a phrase whose maximal projection is composed of an adjectival as well as a verbal feature (whence its "hybrid" nature), in addition to inflectional features of gender, number, and case. This phrase does not violate the Uniform Three-Level Hypothesis since the feature complexes of the head and maximal projection are identical. Note too that according to this theory, the maximal projections of participle phrases and adjective phrases are similar, but are not identical; we would therefore not expect their distribution in the sentence to be
identical.

sce-adverbs would be formed as follows: the verb stem would combine with the derivational suffix -sc- to form a deverbal adjective (cf. sciij-participles), and this structure would in turn combine with the derivational suffix -o to form an adverb, i.e., \[[V + sc]_A + o]\ADV, which then serves as the head of an adverb phrase, just as primary adverbs do.

According to this "autonomous" analysis, -sc- is the "same" derivational suffix in sce-adverbs and sciij-participles, i.e., in both cases it combines with a verb stem, contributing an adjectival feature to the resulting derived lexical category. The major difference between sce-adverbs and sciij-participles is this: the former is less verb-like because two derivational (deverbalizing) suffixes have been combined with a verb stem in the morphological component; the latter is more verb-like (and has the same determiners and complements as a finite verb phrase) because its formation involves only one derivational (deverbalizing) suffix. Thus sce-adverbs have been completely deverbalized, while sciij-participles have been only partially deverbalized in the morphological component.

This analysis of deverbal participles and adverbs in the framework of Bowers' theory of autonomous morphology is intentionally sketchy---it is meant only to serve as the basis for future discussion of hybrid categories and their contribution to our understanding of the proper relation between morphology (word structure) and syntax (phrase structure). See Babby, forthcoming.

FOOTNOTES

1In Babby 1978 I argue that "active" participles in Russian are not always in the active voice, and "passive" participles are not inherently passive.

The short forms of primary adjectives and "passive" participles have an exclusively predicate function, i.e., they cannot be NP constituents; they are therefore inflected for number and gender only, not case. Long forms of primary adjectives and participles are NP constituents and accordingly are marked for case (see Babby 1973, 1974, 1975, 1976).

2The term "primary adjective" is used to designate adjectives listed in the lexicon. It contrasts with "derived adjective" or "deverbal adjective", which is derived from the corresponding verb stem by means of a productive morphological or syntactic process. Since deverbal adjectives are part of the verb's paradigm, their form and meaning are entirely predictable, and there is no need to list them in the lexicon.
It appears to be a universal for productively derived, paradigmatic verbal forms to acquire specialized lexical meanings and be reanalysed as independent words with their own lexical entries. Turkish causatives are a particularly good example of this diachronic process. For example, art-tir-mak, the causative of art-mak 'to increase (intransitive)', must have its own lexical entry since, in addition to its predictable, causative meaning (make/let increase), it has acquired the meaning 'to save, economise' (see Turkce-Ingilizce Buyuk Lugat, Ankara, 1959).

I learned after writing the first draft of this paper that a similar proposal has been made for Latin participles (see J. Jensen 1981).

I have argued elsewhere that the maximal projection of N in Russian is N5, not N3 (see Babby 1985), but, since nothing hinges on this in the following discussion, I will adopt Jackendoff's more familiar hypothesis.

There must of course be some way to indicate that the phrase is predominantly verbal (not adjectival), and, therefore, has the determiners and complements associated with finite verb phrases (e.g., accusative direct objects). An adequate discussion of this formalism would have to include the notion "head of the word" and is therefore beyond the scope of this paper (see Selkirk 1982).

REFERENCES


THE PROBLEM OF TRANSFER IN NONLINEAR MORPHOLOGY

G. N. CLEMENTS

This study addresses certain mutual inconsistencies in the theories of phonological representation and morphological reduplication, involving the treatment of syllabicity and length. It is shown that these inconsistencies can be resolved if we assume that reduplication is not a concatenative word formation process which joins an affix to the left or right of a base, but is instead a nonconcatenative word formation process in the sense of McCarthy (1981), which joins an affix in parallel to the base. A formal theory of reduplication is presented accounting for the manner in which relevant phonological properties of the base are transferred to reduplicative affixes prior to their actual sequencing (concatenation).

1. A Prosodic Theory of Reduplication.

The study of reduplication processes has recently received new attention as a result of the proposal by Marantz (1982) to treat reduplication within the context of the prosodic theory of morphology developed by McCarthy (1979, 1981, etc.). Marantz's proposal will not be summarized in detail here since his own presentation is readily accessible. The main points are the following:

(1) a. reduplicative affixes are represented as uniform CV-skeleta, whose form is independent of the phonological properties of the stem to which they are attached.
b. reduplicative affixes are assigned their phonetic properties through a process of "melody" copying and association, involving universal principles of autosegmental representation.

c. affixation and copying constitute a single step, thus no rules (phonological or morphological) intervene between them.

The first of these proposals must be qualified in the light of Marantz's own observations (p. 440, note 5) and the more recent work of Carden and Michelson (1984), Williams (1984), and McCarthy (no date) showing that reduplicative CV-skeleta may show contextually-conditioned alternants in some languages. This result does not weaken the substance of Marantz's claim, but reinforces it, since if there is truly "nothing special about reduplication other than the resemblance between the affix and the stem to which it is attached" (Marantz, p. 436), we would expect reduplicative affixes to show contextually-conditioned alternation just like all other affix types. The third proposal, which is logically independent of the other two, may have to be revised in the light of observations by Carrier-Duncan (1984) and Odden and Odden (1985), who show that in some languages, phonological processes may intervene between the affixing stage (1a) and the copying/association stage (1b). The second proposal (1b), in contrast to the others, has received little critical attention, and it is this aspect of Marantz's theory that I would like to address in these remarks.

Marantz suggests that phonetic content is assigned to empty CV-skeleta by copying the phonemic melody of the base under the affix, and then associating the individual phonemes to C/V slots by the following conditions, which I summarize from the discussion in Marantz (1982, 446-7):

(2)  

a. create a copy of the phonemic melody of the base under the CV skeleton.

b. link melody units to CV slots one to one from left to right (in the case of prefixes) or from right to left (in the case of suffixes).

c. unless overridden by a special proviso, feature complexes containing the feature [-syllabic] can be linked only to C slots in the skeleton, and feature complexes containing the feature [+syllabic] can be linked only to V slots in the skeleton.

d. the association of phonemic melodies and CV reduplicating affixes is "phoneme-drive" in the sense that, for each phoneme encountered linking from left to right, or from right to left, the association procedure scans along the skeleton to find a CV slot eligible for association.
e. after as many phonemes as possible are linked to CV slots, extra phonemes and CV slots are discarded.

Each of these conditions is defended in turn by Marantz. The following example, from Agta, will serve as an illustration of the special conditions (c), (d), and (e). Agta forms plurals by prefixing a CVC skeleton; thus bari ‘body’ is reduplicated as bar-bar. Notice, however, that when the stem is vowel-initial, only the material dominated by the initial VC of the stem is copied: ulu ‘head’ reduplicates as ul-ulu.

\[
(3) \quad \text{VCV} \to \text{CVC} + \text{VCV} \to \text{CVC} + \text{VCV} \to \text{CVC} + \text{VCV} \to \text{VC} + \text{VCV} \\
\text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \\
\]

The first figure in (3) represents the base. In the second figure, the CVC skeleton has been prefixed. In the third stage of the derivation, the phonemic melody of the base is copied under the reduplicative prefix. In the fourth stage, the melody units ul associate from left to right with the skeletal units V.C. Finally, the extra phonemes and C-V slots are discarded.

Notice the crucial role played by conditions (c) and (d) in the fourth stage. What prevents us from associating the initial u of the melody with the initial C, giving the incorrect derivation (4a), is principle (c), together with the assumption that vowels are underlingly characterized by the feature [+syllabic]. What prevents us from associating the initial C to the / of the melody as the first step of the association process, giving the incorrect derivation in (4b), is condition (d).

\[
(4) \quad \text{a. CVC} + \text{VCV} \to \text{CVC} + \text{VCV} \to \text{CVC} + \text{VCV} \to \text{*CVC} + \text{VCV} = [w\text{ulu}] \\
\text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \\
\]

\[
\text{b. CVC} + \text{VCV} \to \text{CVC} + \text{VCV} \to \text{CVC} + \text{VCV} \to \text{*CV} + \text{VCV} = [lu-ulu] \\
\text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \quad \text{ulu} \\
\]

C/V skeletal reduplication is not the only kind of reduplication recognized by Marantz. In addition, rules of reduplication copy whole syllables and morphemes. The formalism proposed for these cases is much the same: an “empty” constituent (syllable node or morpheme node) is affixed to the base, and all material occurring
under the domination of that category in the base is then copied under the affix. I will return to a discussion of these reduplication types later in section 4.1.

2. The Problem of Transfer

As Marantz points out, a theory of this type is superior to earlier, transformational accounts of reduplication on grounds of restrictiveness. The use of transformational rules allows the linguist to state virtually any imaginable type of reduplication rule, including many that have never been recorded and which should be excluded in any reasonable universal theory of reduplication processes: Marantz's account excludes such rule types without the need for special stipulation. This argument is particularly forceful in the light of the fact that transformational rules are not required in the statement of any other type of morphological process (McCarthy 1981). The formalism assumed by Marantz, on the other hand, makes use of independently motivated principles of autosegmental phonology and morphology, and thus involves an extension of these principles to new ground, rather than the introduction of wholly unmotivated formal devices.

It is nevertheless the case that Marantz's account is forced to make certain special assumptions that are distinct from those made by McCarthy and other writers within the framework of autosegmental phonology. Marantz discusses one of them in the following terms (p. 444): "McCarthy claims that the phonemes (i.e. feature matrices) in a phonemic melody are unspecified for the feature [+syllabic]. The feature is acquired by phonemes through their attachment to the C-V skeleton, where C is equivalent to [-syllabic] and V to [+syllabic]." In Marantz's account, in contrast, we must assume that phonemes are specified for the feature [+syllabic] in the melody tier, in order to exclude incorrect derivations such as (4a).

It might at first appear that we could do without the feature [+syllabic], even in Marantz's account, if we adopt the association principle stated in Clements and Keyser (1983:63) according to which [+consonantal] segments map to C-elements and [-consonantal] elements map to V-elements. If Condition (2c) were replaced with a principle of this sort, derivation (4a) would be correctly excluded. The other examples cited by Marantz in support of the feature [+syllabic] would also be derived correctly. This solution does not solve all the problem cases, however, as is shown by the fact that vowels normally preserve their status as vowels under reduplication, while glides normally preserve their status as glides (abstracting from the possible effect of independent rules accounting for glide/vowel alternations). This can be illustrated by the rule of distributive reduplication in Klamath, which (among other things) forms the plural of verbs. The reduplicative
prefix in this language is CCV, as is shown by forms like donna 'hear' (sg. subject), reduplicated as dodonna (with stem-internal ablaut), and smo:la 'smoke a hide' (sg. subject), which has the reduplicated form smosmo:la. Stem-initial glides are reduplicated as glides, not vowels: thus ya:mi' 'admire' reduplicates as ya:ma, and wi:pga 'escape' as wi:pga. Since both glides and vowels are [-consonantal] segments, the revised version of Condition (2c) is still insufficient to exclude incorrect derivations:

\[
\begin{align*}
(5) \quad & CCV + CVVCV \rightarrow \quad CCV + CVVCV \rightarrow \quad CCV + CVVCV \quad \Rightarrow \quad [i:\text{ya:ma}] \\
& \qquad \quad i\text{ama} \quad i\text{ama} \quad i\text{ama} \quad i\text{ama} \quad i\text{ama} 
\end{align*}
\]

We must ensure that the / of the copied melody associates with the first C, not the V. Thus it would appear that the feature [\textit{t}syllabic] is motivated after all by the facts of Klamath reduplication, which seem to require us to distinguish vowels and glides on the melody tier. Yet as Clements and Keyser show elsewhere (1983, chapters 4 and 5), this feature is not otherwise required in Klamath phonology, in spite of its rich set of alternations, many of which involve vowels and glides.

To the extent that the feature [\textit{t}syllabic] is crucially required only in the theory of reduplication, it weakens the claim that the prosodic theory makes use only of independently motivated principles. Further considerations argue that the feature [\textit{t}syllabic] should be entirely excluded from phonological representations. First, it has no well-defined status in the theory of phonological features, which requires that all features should be associated with a set of physical (articulatory and acoustic) correlates. As is well known, the property of forming a syllable peak does not derive from any intrinsic physical property of syllabic segments themselves, but is dependent upon general conditions of sonority and prominence determined by the nature of the phonological context. Second, in theories of syllable structure incorporating the CV tier (such as the theory assumed by Marantz), syllable peakhood is entirely determined by the distinction between V and C, and there is no further motivation for assigning a feature [\textit{t}syllabic] to segments on the melody tier. This feature is thus superfluous, and can be eliminated from phonological theory altogether. In the context of Marantz's assumptions, therefore, the feature [\textit{t}syllabic], as a binary feature assigned to melody units, has no independent phonological justification.

A second departure from independently-motivated assumptions lies in the characterization of phonological length. There are reasons to think that long segments are characterized as in (6a), with (6b) as a marked option (perhaps
restricted to heteromorphemic sequences), but not as in (6c). For example, it is widely found that geminate or long consonants pattern with CC sequences rather than with single consonants in syllabification rules. Similarly, in languages whose prosodic rules distinguish between short vowels and diphthongs, long vowels typically pattern with diphthongs, not with short vowels. If geminate sounds are represented as in (6a) or (6b) these generalizations can be explained; but if they are represented as in (6c) they are unaccounted for ([ ] represents any feature matrix, X represents C or V).

(6) a. b. c. [+long]

\[
\begin{array}{c|c|c}
X & X & X \\
\hline
\\ & \\ & \\ \\
[ ] & [ ] & [ ]
\end{array}
\]

Marantz's account of reduplication, however, leads him to represent segmental length as in (6c). The reason for this will become apparent with an example.

In Tagalog, the rule called R2 reduplication by Carrier (1979) has two variants; here we are interested in the one that applies before a stem beginning with a trisyllabic morpheme. In such cases, the R2 prefix copies the stem melody up to the second vowel and no further, even if the following consonant closes the syllable. The final vowel of R2 in such cases is always long, regardless of the length of the corresponding vowel in the base. For example, under R2 reduplication *baluktot* 'crooked' is copied as *balu:-baluktot*. In some cases, the second vowel of the base is itself long, and then it remains long as in *tali:nonh* 'intelligent' which is reduplicated as *tali:-tali:nonh*. In Marantz's treatment, the R2 prefix must be represented as CVCCV, in which the second V is associated with the feature [+long]. The reason for this is apparent when we consider the alternative derivations of *tali:tali:nonh*, the first characterizing length with the feature [+long], the second by associating a segment with two skeletal positions:

(7) a. [+long] [+long] [+long] [+long]

\[
\begin{array}{c|c|c|c|c}
| & | & | & |
\hline
\text{CVCCV} & \text{CVCVVC} & \text{CVCCV} & \text{CVCVVC} \\
\hline
\text{tali:nonh} & \text{tali:nonh} & \text{tali:nonh} & \text{tali:nonh}
\end{array}
\]
b. CVCCVV + CVVVVCVC → CVCCVV + CVVVVCVC "[taliotani:noh]  
\[\begin{array}{cccc}
\text{V} & \text{V} & \text{V} & \text{V} \\
\text{tali} & \text{i noh} & \text{tali} & \text{(n)oh} \\
\end{array}\]

The problem in (7b) derives from Condition (2b), which prevents us from linking one melody unit to two C/V elements. Once the phoneme melody of the base has been copied, all its members link in one-to-one fashion under the normal association conventions. In particular, once the vowel i links to a V position, we must attempt to link the n, and failing to do so under Condition (2c), we pass on to the vowel o, linking that to the final V. The result is the incorrect form "taliotani:noh.  
(Similarly, baluktot is reduplicated as "balobaletot."

This problem is remarked upon by Marantz as follows (451-2, note 13):

(8) The use of the feature [+long] in (31) [=my (7a), GNC] is somewhat problematical... Because the linking of phonemes to C-V slots in reduplication is "phoneme-driven", as specified in Condition D, we cannot give the Tagalog reduplicating prefix in (31a) the skeleton CVCCVV, avoiding the [+long] feature. According to the linking principles, a CVCCVV skeleton would yield the form "taliotani:noh in (31a). One might replace the final V in the skeleton in (31a) with the following notation:

(ii) \[\begin{array}{cc}
V & V \\
\end{array}\]

This notation would be read to indicate that a single phoneme must attach to both of the connected V slots... Since it is tangential to the main points of this article, I will not pursue here the analysis of vowel length in Tagalog.

The problem may not be unique to Tagalog, however, but will arise in any language in which one element of a reduplicative affix is always long, regardless of the length of the corresponding unit in the base. Thus the implications of the notation proposed in (ii) extend beyond the particular nature of reduplication in Tagalog.

I have summarized two respects in which Marantz's proposal for the treatment of reduplication makes use of assumptions which are not independently motivated in a theory of phonology making use of CV skeleta, such as that of Halle and Vergnaud (1980), Sterlade (1982), or Clements and Keyser (1983). What is significant about these assumptions is not just that they have no independent motivation, but that they
are inconsistent with independently-motivated principles of phonology. One might argue in reply that the theory of morphology and the theory of phonology are partly disjoint, and make use of partly distinct vocabularies. Under this view, one might assume that at the point when the phonology takes over from the morphology, features specific to morphological representation are replaced with features specific to phonological representation. What makes such a view problematical is the evidence that morphology and phonology are not separate components of the grammar, but interactive systems of rules subject to similar principles and constraints (Mohanan and Mohanan (1984)). Especially troublesome to this view is the fact that the copying and association principles assumed by the prosodic account of reduplication must apply in some languages after certain rules of the phonology, crucially involving length and syllabification (see references given earlier).

What I will show in the discussion that follows is that the problems discussed above are part of a more general problem which I will call that of melodic transfer. If we examine the incorrect derivations in (4a) and (7b) more closely, we see that they involve a common property. Derivation (4a) has incorrectly copied a link between a melody unit $u$ and a timing unit $V$ as a link between $u$ and $C$, in effect copying a syllabic peak as a nonpeak. Derivation (7b) has incorrectly copied a heterosyllabic vowel sequence as a tautosyllabic vowel sequence. In both cases, the false step has involved the failure to carry over relevant aspects of syllable organization from the base to the affix. This result follows directly from the formalism itself: once the melody has been copied under the affix, we have no way of recovering the nature of the original autosegmental linkage between the melody and higher-level prosodic structure. From this standpoint we see that the use of the features $[\pm\text{syllabic}]$ and $[\pm\text{long}]$ amounts to tacit recognition that the information provided by the melody alone is insufficient to provide a fully adequate account of reduplication, and must be supplemented by additional mechanisms.

It should not be supposed that the standard theory of reduplication is any more adequate than the prosodic theory in handling problems such as these. The standard theory is also unable to rule out the incorrect derivations without additional principles or stipulations constraining the power of the transformational format. Derivation (4a) is generated in analyses which adopt the transformational rule (9a) below, while (7b) is generated in analyses adopting (9b):
(9) a. Pseudo-Agta:

\[ \text{[\text{\text{-syl}}]} \text{ [\text{\text{-syl}}]} \text{ [\text{\text{-}}]} \text{ X] \]

SD: \hspace{1cm} 1 \hspace{0.5cm} 2 \hspace{0.5cm} 3 \hspace{0.5cm} 4

SC: \hspace{1cm} 1 \hspace{0.5cm} 2 \hspace{0.5cm} 3 \hspace{0.5cm} 1 \hspace{0.5cm} 2 \hspace{0.5cm} 3 \hspace{0.5cm} 4

[\text{\text{-syl}}] \hspace{0.5cm} [\text{\text{+syl}}] \hspace{0.5cm} [\text{\text{-syl}}]

b. Pseudo-Tagalog:

\[ \text{C V C}_1 \text{ V C}_1 \text{ V X} \]

SD: \hspace{1cm} 1 \hspace{0.5cm} 2 \hspace{0.5cm} 3 \hspace{0.5cm} 4 \hspace{0.5cm} 5

SC: \hspace{1cm} 1 \hspace{0.5cm} 2 \hspace{0.5cm} 4 \hspace{0.5cm} 1 \hspace{0.5cm} 2 \hspace{0.5cm} 3 \hspace{0.5cm} 4 \hspace{0.5cm} 5

[\text{\text{-long}}]

There is no obvious way in which rules such as (9a) and (9b) can be excluded in standard theory other than by ad hoc stipulations.

In the next section I will present an alternative account of reduplication, which preserves the essence of Marantz’s claim that reduplicative affixes are uniform CV-skeleta whose form is independent of the phonological properties of the base. I will show, however, that the problem of transfer can be solved if we adopt a different account of the mechanism by which the melody is assigned to the skeleton. I will show that this account preserves the restrictiveness of Marantz’s account, while accounting for a full range of reduplication data.

3. A Formal Account of Transfer.

Let us reexamine an assumption which underlies most previous work on reduplication, namely that reduplication involves the adjunction of an element to the left or right of a particular base (or perhaps in the middle, in case of infixation); in other words, that reduplication is essentially a \textit{concatenative} operation. Now concatenation is just one of the possible relations that holds between the elements involved in word formation rules. Another is what might be termed “adjunction-in-parallel,” characterized in nonlinear phonology and morphology by the placement of elements on distinct tiers.

Familiar examples of adjunction-in-parallel include the insertion of a tone characterizing a grammatical category, such as a verb tense, in parallel with the nontonal material making up a stem. For example, many African languages form tenses by the use of “mobile” tone affixes which are inserted into the tonal tier characterizing a certain stem, which may be otherwise toneless. Such affixes are
not concatenated with the stem, but are adjoined "in parallel" with it, on a separate
tier; their sequential realization depends on the particular association rules
governing that language. See Clements (1984) for a discussion of one such system.

Similarly, in McCarthy's account of Arabic verb morphology (1981), a stem is
formed by the conjunction-in-parallel of several morphemes, each assigned to a
distinct tier. In certain cases, phonetic material of the same type may be assigned
to separate tiers. For example, the binyan VIII perfect active involves the
assignment of a consonantal melody representing the lexical root to one tier, and
another representing the category 'reflexive', consisting only of the phoneme \( t \), to
another tier. The root melody, prior to its association to the CV template, cannot
be regarded as "preceding" or "following" the reflexive melody, nor is there any
sense in which it is "above" or "below" it; it simply exists in parallel to it:

\[
(10) \ \text{binyan VIII (perfective active)}:
\begin{align*}
\text{root tier:} & \quad k \ t \ b \\
\text{CV tier:} & \quad C \ C \ V \ C \ V \ C \quad \rightarrow \quad [k\text{t\texttildetilde a\texttildetilde b}] \\
\text{reflexive tier:} & \quad t
\end{align*}
\]

I will term affixes of this type \textit{paraffixes}. It is only through later sequencing that
they are realized as prefixes, infixes, or suffixes. For example, in binyan VIII the
reflexive paraffix is associated with the second C of the CV template in (10),
becoming realized as an infix.

I will suggest that reduplicative affixes are paraffixes as well, introduced on
parallel tiers to their base, and associated with elements of the base by principles
of directional, one-to-one association similar to those which apply elsewhere in
autosegmental representation. It is by virtue of the nature of their associations that
they acquire a "copy" of a portion of the phonetic material of the base. Once they
have acquired phonetic content, they are sequenced with respect to the CV skeleton
of the base, and are realized as prefixes, infixes, or suffixes. This view has
several advantages, as we shall see shortly. But first, let us examine the principles
involved more closely.

The theory of reduplication proposed here involves the following steps:

\[
(11) \quad \text{i. Affixation: adjoin a reduplicative affix in parallel to the CV tier of the}
\text{base.}
\]

\[
\text{ii. Reduplication:}
\begin{align*}
\text{a. associate} & \quad \text{Cs to Cs and Vs to Vs on the adjacent CV tiers;}
\end{align*}
\]
b. *transfer* the melody of the base to the associated portion of the affix;

c. *sequence* the affix skeleton to the base skeleton, as a prefix, infix, or suffix.

I assume that the first of these steps is simply an instance of morphological affixation, and belongs to the set of word formation rules. The second step, on the other hand, is responsible for assigning phonological properties to the affix, and so I take this to be a phonological rule, ordered among other phonological rules. In this view, there is no reason to assume that (ii) must apply immediately after (i), and we will see in the later discussion (section 4.3) that in fact other (phonological) rules may intervene between the two steps.

The three parts of (ii) constitute a single operation of "reduplication" which copies relevant material from the base and assigns the affix its correct place in sequence. This three-part operation may be illustrated with the example *bula-bula* given earlier from Agta, as follows:

\[
\begin{array}{cccccc}
\text{CVC} & \text{CVC} & \text{CVC} & \text{CVC} \\
\rightarrow & ||| & \rightarrow & ||| & \rightarrow \\
\text{CVCV} & \text{CVCV} & \text{CVCV} & \text{CVC} + \text{CVCV} \\
||| & ||| & ||| & || | ||| \\
\text{bula} & \text{bula} & \text{bula} & \text{bul} & \text{bula}
\end{array}
\]

(affixation) (association) (transfer) (sequencing)

The initial representation is the representation after adjunction, (11i). The second figure shows the effect of association, which in Agta is left-to-right. The third figure illustrates the process of transfer, in which the melody units dominated by a given C (respectively V) are copied to the C (respectively V) which is associated with it on the affix tier. The final figure shows the end result of the reduplication process, after sequencing.

It will be seen that four types of information must be specified in any particular reduplication rule: (i) the item attached; (ii) conditions on the base to which it attaches; (iii) the direction of mapping; (iv) where the item is inserted. Thus a reduplication rule can be stated as a set of options involving four parameters, as follows:
(13)  (i) item: (specify a template)
(ii) base: morpheme, syllable, foot, stem, word
(iii) mapping direction: left-to-right or right-to-left
(iv) insertion site: left/right of base; internal to base (specify where)

A reduplicative parafix is sequenced as a prefix if the rule selects the first option under (iv), and as a suffix if it chooses the second. Otherwise it is sequenced as an infix. An immediate advantage of this treatment is that the troublesome problem of deciding where reduplicative infixes originate in derivational processes is solved in a nonarbitrary fashion, since we no longer require that a linear relation hold between an affix and its base at all levels of description. Infixation is simply a special case of the general sequencing operation that specifies the order of prefixes and suffixes as well.

While the association process (11 iia) may seem fairly intuitive, we must specify it more closely in order to handle more complex cases in which the pattern of association is not simply one-to-one. Consider a hypothetical pair of CV tiers such as the following, where VV characterizes a long vowel:

\[
\begin{array}{c}
\text{(14)} \\
\text{C V V C V} \\
\text{V C V C V}
\end{array}
\]

Suppose we were to assume a principle of left-to-right linking such that all Cs are linked first, and then all Vs, in a second pass. The result would be the pattern shown in (15a) below. If all Vs were linked first, and then Cs, we would get the pattern in (15b). In fact, as we will see shortly, neither of these patterns is correct. What we want to obtain is the pattern in (15c):

\[
\begin{array}{ccc}
\text{(15) a. C V V C V} & \text{b. C V V C V} & \text{c. C V V C V} \\
/ / / / & / / / / & / / \\
V C V C V & V C V C V & V C V C V
\end{array}
\]

The following principle is sufficient to obtain this pattern:
(16) Association:

a. link Vs to Vs pairwise in the direction of mapping, skipping no eligible V.

Condition: if $V_j$, $V_k$ are adjacent elements of the affix, their associates $a(V_j)$, $a(V_k)$ of the base are also adjacent.

b. link Cs to Cs pairwise in the direction of mapping, skipping no eligible Cs.

Consider how this mapping principle applies to (14). We begin by linking the leftmost V on the top tier to the leftmost V on the bottom tier:

\[
\begin{array}{cccc}
C & V & V & C & V \\
\mid & \\
V & C & V & C & V
\end{array}
\]

We now attempt to link the two following Vs. However, we are prevented from doing so by the condition stated in (16a), which does not allow the members of a tautosyllabic VV sequence to be linked to the members of a heterosyllabic VV sequence. By this criterion, the second V of the top tier cannot be linked to any other V on the bottom tier, and is thus ineligible for further linking. The next well-formed linkage (proceeding in the direction of the mapping) is the following:

\[
\begin{array}{cccc}
C & V & V & C & V \\
\mid & \\
V & C & V & C & V
\end{array}
\]

At this point, no further one-to-one linkages of Vs are possible, and we pass on to (16b). The leftmost C on the top tier is ineligible for linking due to the well-formedness condition on autosegmental representation prohibiting the crossing of association lines. The first and only well-formed linkage of Cs is therefore that between the second C on the top tier and the first C on the bottom tier, giving us the desired result in (15c).

The condition on (16a) plays an obvious rule is preventing derivations in which adjacent VV elements of the affix map onto nonadjacent V...V sequences of the base; this will guarantee that VV is always interpreted as a long vowel. However, this condition is too general as it stands. As we shall see below, the Nakanai language has a prefix of the form CVV which consistently maps onto nonadjacent V...V sequences on the base, creating e.g. paimpati from the base pati. We should notice, however, that Nakanai does not have long vowels; all syllables in this
language are of the form (C)V, in which the V is a single short vowel. Accordingly, the CVV prefix can only be realized as disyllabic. It seems appropriate to limit the condition on (16a), then, to all and only those languages which have distinctively long vowels, such as Tagalog. This analysis makes the further prediction that in such a language, a prefix of the form CVV will reduplicate pati as paapati and disyllabic pai as paapai, not paipai. At present, I have no evidence bearing directly upon this prediction; note that Tagalog does not provide us with a test case, since all Tagalog syllables are consonant-initial (Schachter and Otanes 1972).

The mapping principle in (16) is an instantiation of the familiar left-to-right mapping principle of autosegmental phonology, except that it is generalized in two respects: first, to allow for cases of right-to-left mapping, which are required in some reduplication systems; and second, to account for the case in which two sets of elements (Cs and Vs) are paired off, rather than just one, as in the more familiar cases. Unlike the association principle in Marantz's system, principle (16) builds relevant aspects of syllable structure into the mapping principle itself. The requirement that Cs map onto Cs and Vs onto Vs guarantees the correct transfer of syllability, while the condition on (16a) guarantees that VV sequences in the reduplicative parafixed dominate long vowels.

The process of transfer is mitosis-like in effect, recreating the structure on the affix skeleton that we find on the associated root skeleton. Formally, this process may be stated as follows:

(19) Transfer:

Let x be an element on the affix tier, and a(x) its associate on the base tier. If a(x) dominates elements e₁,...,eₙ on the melody tier of the base (n ≥ 0), then x dominates a replica of e₁,...,eₙ on the melody tier of the affix, preserving order and structure.

The affix skeleton with its associated material is then sequenced by the sequencing rule, and finally any unused Cs and Vs are discarded.

We illustrate the reduplication procedure with three of our earlier examples, the Agta form ul-ulul and the Klamath forms smo-smoa'a and ya-ya:ma.
(20) a. Agta: Klamath:

\[
\begin{array}{ccc}
\text{CVC} & \text{CCV} & \text{CCV} \\
\text{VCV} & \text{CCVCCV} & \text{CVCCV} \\
\text{ulu} & \text{smola} & \text{iama} \\
\end{array}
\]

(20) b. Agta: Klamath:

\[
\begin{array}{ccc}
\text{CVC} & \text{CCV} & \text{CCV} \\
\text{VCV} & \text{CCVCCV} & \text{CVVCV} \\
\text{ulu} & \text{smola} & \text{iama} \\
\end{array}
\]

Association (16)

(20) c. Agta: Klamath:

\[
\begin{array}{ccc}
\text{ul} & \text{smo} & \text{i a} \\
\text{CVC} & \text{CCV} & \text{CCV} \\
\text{VCV} & \text{CCVCCV} & \text{CVVCV} \\
\text{ulu} & \text{smola} & \text{iama} \\
\end{array}
\]

Transfer (19)

(20) d. Agta: Klamath:

\[
\begin{array}{ccc}
\text{CVC} + \text{VCV} & \text{CCV+CCVCCV} & \text{CVV + CVVCV} \\
\text{VCV} & \text{CCVCCV} & \text{CVVCV} \\
\text{ulu} & \text{smola} & \text{iama} \\
\end{array}
\]

Sequencing

[ululu] [smosmo:la] [yaya]ma

At this point, the unused Cs in the first and third examples are discarded.

We turn next to the R2 affix of Tagalog, illustrating the treatment of vowel length.

(21) a. CVCCVVV

\[
\begin{array}{ccc}
\text{CVCVVVCVC} & \text{III} & \text{VIII} \\
\text{ta} & \text{i} & \text{noh} \\
\end{array}
\]

(after adjunction)
b. CVCCVV
   \[\text{CVC VVCVC}\]
   \[\text{tal inoh}\]

Transfer (19)

The above derivations demonstrate that the formalism correctly preserves relations of syllability and length. In fact this proves to be a general result of the present theory, allowing us to account for more complex types of reduplication phenomena that would be otherwise quite perplexing.

As an example, let us consider some very interesting data from the Ponapean language that have been discussed in this context by McCarthy (no date). The reduplicative prefix in Ponapean shows a number of allomorphs conditioned by the syllable and mora structure of the base. Here I will consider only a set of forms representing Patterns XI, VII, X, examples of which are given below (all forms are taken from Rehg and Sohl (1981)):

(22) Pattern XI:

<table>
<thead>
<tr>
<th>Form</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>rere</td>
<td>'to skin'</td>
</tr>
<tr>
<td>dune</td>
<td>'to attach in sequence'</td>
</tr>
<tr>
<td>dilip</td>
<td>'to mend thatch'</td>
</tr>
<tr>
<td>sarek</td>
<td>'to uproot'</td>
</tr>
</tbody>
</table>

\[\text{CVCCVV} + \text{CVCVVCVC}\]
\[\text{tal i} \text{tal inoh} = [\text{tali:tali:inoh}]\]
(23) a. Pattern VIII:

- Illyan    illiliyan  'outgoing'
- Riyaala   riiriyaala  'to be cursed'
- Luwak     luuluwak    'jealous'
- Luwet     luuluwet    'weak'

b. Pattern X:

- Mpek     mpimppek    'to look for lice'
- Mmed     mmimmed     'full'
- Nget     nqinqnet    'to pant'
- Nda      ndinda      'to say'

Some comments are in order concerning aspects of the phonology that are independent of reduplication proper. Ponapean has a set of regular processes that nasalize the first member of certain consonant clusters, including /ld-/nd/, /rs-/ns/, illustrated in (22). Second, a glide is inserted between a high vowel and an adjacent non-high vowel, the glide being homorganic to the high vowel. Following McCarthy's analysis, I will assume that such glides are present underlyingly in nonalternating forms, such as those in (23a). Thirdly, clusters consisting of a nasal followed by a homorganic obstruent or nasal occur both word-initially and word-externally. Word-initially, as in (23b), the nasal member constitutes a syllable of its own, as is shown by several independent considerations, both phonetic and phonological. Such nasals optionally trigger a rule inserting an epenthetic vowel /i/ or /u/, depending on the nature of the nasal and the following vowel, giving rise to alternations like nda ~ nda. A word-internal nasal is never syllabic.

(22) establishes that the reduplicative affix in these forms is the sequence CVC.

More interesting are the forms in (23). Recall that the vowels and glide are homorganic in these forms. We may account for this fact by assuming underlying representations such as the following:

(24)  CVCVVC  CVCVC
      /\ /\    /\ /\  
     l i a n    l u a k

These representations undergo the glide insertion rule, which I take to have the following form (C' is an "empty" C-element):
(25) \( V \ C^i \)  
\[
\text{e.g. } CVCVVC \rightarrow CVCVVC
\]
\[
\begin{array}{ll}
\text{CVC} & \text{CVC} \\
\text{CVCVVC} & \text{CVCVVC} \\
\text{CVCVVC} & \text{CVCVVC} \\
\text{CVCVVC} & \text{CVC+CVVVC} \\
\end{array}
\]
\[
\begin{array}{llll}
\text{l i a n} & \text{l i a n} & \text{l i a n} & \text{l i i i l} \text{y i a n}
\end{array}
\]

Such an analysis of glide insertion expresses the generalization that the unmarked hiatus-breaking glide is homorganic with an adjacent vowel, and seems well motivated in other languages (see especially the analysis of Tigrinya glide formation in Kenstowicz (1982), and the analysis of Onondaga glide formation in Michelson (1983)). The reduplication of the forms in (23b) is illustrated below:

(26) 
\[
\begin{array}{ll}
\text{CVC} & \text{CVC} \\
\text{CVCVVC} & \text{CVCVVC} \\
\text{CVCVVC} & \text{CVCVVC} \\
\text{CVCVVC} & \text{CVC+CVVVC} \\
\end{array}
\]
\[
\begin{array}{llll}
\text{l i a n} & \text{l i a n} & \text{l i a n} & \text{l i i i l} \text{y i a n}
\end{array}
\]

The representation of the long prefix vowel as a single \( i \) dominated by the sequence VC is unproblematical, since Ponapean does not contrast homorganic vowel-glide sequences with long vowels. The fact that some vowels have the analysis VV and others VC is consistent with the independent evidence that VV and VC sequences in the Ponapean syllable nucleus account for minimal contrasts (Rehg and Sohl, p. 50).

These forms would be particularly difficult to derive under the alternative theory of reduplication considered earlier, assuming our account of the homorganic glides to be correct. We would have to find some means of preventing derivations like the following:

(27) \( \text{CVC+CVVVC} \rightarrow \text{CVC+CVVVC} \rightarrow \text{CV C} + \text{CVVVC} \)
\[
\begin{array}{llll}
\text{l i a n} & \text{l i a n} & \text{l i a n} & \text{l i i i l} \text{y i a n}
\end{array}
\]

The problem here, as in the earlier cases, involves the failure of the association mechanism to preserve relevant information concerning length and syllabicity.

The forms in (23b) are of interest in showing the behavior of reduplicated syllabic consonants.
The surface form illustrates the operation of the rule of l-insertion, obligatory in a word-internal nasal+consonant cluster, in which the nasal element is never syllabic. Crucially to the correct account of this form, the transfer process preserves the information that m is syllabic, requiring it to link to the V element of the reduplicative affix, rather than to the C element.

The analysis of reduplication proposed here provides a correct account of melody transfer in these and all other cases I know of. It requires no unmotivated assumptions about phonological representation. Significantly, it does not require us to add a feature [±syllabic] to our set of features, and requires no weakening of the theory of phonological length, according to which long vowels and consonants are universally dominated by two elements of the CV tier.

4. Some consequences of the analysis.

4.1. Higher-level prosodic units in reduplicative templates.

Marantz (1982) and McCarthy (1984) show that other units than CV-templates may constitute reduplicative parafixes, specifically the syllable, the morpheme, and the foot. Evidence presented by Odden and Odden (1985) suggests that the stem may also be such a category. Here I will show that the present theory of transfer allows a highly desirable integration of these higher-level units into a single theory of reduplication, requiring no special stipulation.

Marantz proposes to analyze syllable reduplication in YidinY as the prefixation of a syllabic skeleton [ɔɑ] to a stem, as shown below. (See Dixon (1977: 156, 233-6) for fuller presentation and discussion of the data.)
In Marantz's account, the syllabic skeleton borrows both its phonemic melody and its CV skeleton from the stem to which it attaches. The process of transfer does not involve a simple extension of the formalism developed earlier for CV templates, however, since no account has yet been given as to how the appropriate CV elements are associated with σ nodes. Suppose we were to assume a two-stage process in which the CV skeleton of the base (with associated material) is first copied under the σ nodes of the prefix, and then the copied skeleton is assigned to the σ nodes. The first step would yield the following:

\[(29) \quad \sigma \sigma + \sigma \sigma \sigma \quad \sigma \sigma + \sigma \sigma \sigma \]
\[
\begin{array}{c}
CV \quad CV \quad CV \\
\| \quad \| \quad \| \\
di \quad mu \quad rU
\end{array}
\begin{array}{c}
CV \quad CV \quad CV \quad CV \\
\| \quad \| \quad \| \quad \| \\
di \quad mu \quad di \quad mu \quad rU
\end{array}
\]

At this point a problem arises. The correct form is *dimu-*dimurU as shown in (29), not "dimur-*dimurU. To prevent the latter from being derived we must not associate the r of the copied melody as the final member of the second syllable. Closed syllables are well-formed in reduplicative prefixes, but only if the corresponding syllable in the base is also closed: cf. gindal-gindalba ‘lizards.’

The approach presented here offers a straightforward solution to this problem. In effect, the particular formulation of transfer given earlier carries over all relevant aspects of syllable structure into the reduplicated form, as we have seen. The same formulation will give us the correct results here.

Let us assume, following Marantz, that the reduplicative prefix in YidinY is the sequence [20]. Just as CV templates are adjoined in parallel to the CV tier of the base, so syllable templates are adjoined in parallel to the syllable tier of the base. Derivations then proceed normally:
No special stipulations are required, other than an obvious generalization of the mapping principle (16) to the case of related tiers containing identical elements, such as σ nodes. Notice in particular that the formulation of the transfer process given in (19) generalizes correctly to the present case.

Morpheme and stem reduplication are treated in just the same way. Consider, for example, the following examples of stem reduplication from Kihehe, a Bantu language discussed by Odden and Odden (1985). As these writers point out, what is reduplicated in Kihehe is the root, any number of following suffixes, and the "final vowel" morpheme, a sequence usually recognized as the "stem" in Bantu linguistics. Some examples follow (tone omitted):

(32)  mi-doodo 'little'  midoododoodo 'fairly little'
tu-gul-lte 'we shopped'  tugulitegulite 'we shopped a bit'
kue-ceeng-a  'to build'  kuceengaceenga 'to build a bit'
kue-ceeng-el-a  'to build for'  kuceengelaceengela 'to build for a bit'

I will assume that the "stem" relevant to reduplication is a unit of the prosodic hierarchy which dominates the unit "syllable", and which comprises all syllables dominating material in the (morphologically defined) stem (Odden and Odden discuss further facts motivating this definition of the prosodic stem, although details of their analysis are different from mine). Stem reduplication, in Marantz's model, would involve prefixing one stem node (represented here as σ), and then copying all material falling under the domination of the stem node of the base, as follows:
At this point a problem arises. The association conventions require one-to-one linkages, but all three of the copied σ nodes must be associated to the reduplicative θ node. Apparently, then, we require a special convention allowing a linked θ node to spread to unlinked σ nodes. Recall that we earlier required a special provision for the case of syllable reduplication. Apparently, then, the formalism for CV template reduplication does not extend in a straightforward way to other prosodic categories; instead, each prosodic category requires a separate association principle.

This problem does not arise in the framework proposed here. We assume that the affixal θ node is a parafix, adjoined in parallel to the θ node of the base. Association (as generalized above to provide for the case in which each tier contains elements of only one type) and transfer provide correctly for the rest of the derivation.
The analysis of higher-level prosodic affixes given here shows that these types of affixes behave just like CV template affixes, and require no modification of the theory. In addition, it offers particularly strong evidence for the view that such higher-level prosodic units are indeed constituents in the formal sense, as argued by Selkirk (1978) and Nespor and Vogel (1982); for if they were not, it is difficult to see how one could account for the strict parallel between their behavior and that of CV templates.

4.2. Internal Reduplication.

Broselow and McCarthy (1983) present an analysis of internal reduplication following the general lines of Marantz's theory of external (prefixing and suffixing) reduplication. They show that Marantz's framework, with little modification, provides an elegant account of a substantial range of internal reduplication phenomena. A major typological distinction is posited between true infixing reduplication, in which the infix is inserted within a morphologically-defined stem, and prefixation of the infix to a prosodic constituent, in which the reduplicative affix is adjoined to the left or right of a prosodically-defined base, which may be internal to the stem. I will now show that the present theory of reduplication generalizes in a straightforward way to the phenomena discussed by Broselow and McCarthy, supporting their typological distinction while solving a number of problems arising under their account.

Broselow and McCarthy's treatment of true infixing reduplication can be illustrated by Zuni. As B&M state the rule, "verbs of a particular morphological class and of the canonical pattern CVCV... insert a copy of the root-initial consonant in the context [CVCV] to express a 'mediopassive repetitive function'." This rule may be stated as follows, in terms of the rule schema given in (13):

\[(35)\] Zuni internal reduplication:
  item: C
  base: verb of form [CVCV]
  direction: L-R
  insertion site: V

Thus *tomo* reduplicates as *tonto*, *colo* as *colco*, etc. B&M assume that C is first infixed before the final V, and subsequently the melody of the base is copied onto a separate tier. Left-to-right association of the type proposed by Marantz then assigns the first consonant of the melody to the infixed C slot.
(36) \[
\begin{array}{c}
t o m o \rightarrow t o m o \\
CVC+C+V \quad CVC+C+V \quad CVC+C+V \\
\end{array}
\]
= [tomto]

Internal reduplication consisting of prefixing to a prosodic constituent can be illustrated by B&M’s analysis of Chamorro. One type of reduplication in this language consists of reduplication of the first (C)V of the stressed syllable - the penultimate in Chamorro. For example, sága is reduplicated as sásaga, égga as éégga, and hugándo as hugágando. We may state the rule as follows:

(37) Chamorro internal reduplication:

- item: CV
- base: foot
- direction: L-R
- insert: left of base

In this type of reduplication, as in other types, the melody of the base (the constituent to which the affix is attached) is copied and associated. Since the base in Chamorro is the foot, comprising the penultimate and final syllables, only the melody characterizing these two syllables is copied. The following derivation illustrates this approach (π=foot):

(38)

\[
\begin{array}{c}
\sigma \quad \pi \\
CV + CV + CVC \rightarrow \pi \\
\sigma \quad \pi \\
\end{array}
\]

\[
\begin{array}{c}
\sigma \quad \pi \\
CV + CV + CVC \rightarrow \pi \\
\sigma \quad \pi \\
\end{array}
\]

hu gan do = [hugágando]

B&M are careful to discuss a number of cases in which the output is not that which we would expect from a straightforward application of their principles. In
certain cases, they argue that the aberrance is only apparent, explained by
independent facts of the language; in other cases, they conclude that the theory
must be enriched by further principles. I will now show that in all problem cases
cited by them, no special assumptions or new principles are called for: the outputs
are exactly what one would expect, given the theory of reduplication proposed here.

In Washo, as argued by B&M, the reduplication rule involves the infixation of a
VCV template to a polysyllabic root after its initial consonant, if there should be
one, otherwise initially. (The VV sequence resulting from this process is reduced
to a single vowel by a subsequent coalescence rule.) Association is from right to
left. This is illustrated by forms such as mókgo 'shoe', reduplicated as mopókgo:

\[(39) \quad \text{m o k g o} \quad \text{m o k g o} \]
\[
C+VCV+VCCV \rightarrow C+VCV+VCCV \rightarrow C+VCV+VCCV
\]
\[
m \quad \text{okgo} \quad m \quad \text{okgo} \quad m \quad \text{okgo}
\]

\[\text{(affixation)} \quad \text{(copying)} \quad \text{(association)}\]

\[(40) \quad \text{Washo internal reduplication:} \]
\[\text{item: VCV} \]
\[\text{base: polysyllabic root} \]
\[\text{direction: R-L} \]
\[\text{insert: } [C_0 — — ] \]

The problem arises with roots containing final consonants, which in all cases fail to
associate as we would expect; dámá, which reduplicates as damámá, illustrates:

\[(41) \quad \text{correct: damá} \quad \text{incorrect: damá} \]
\[
C+VCV+VCVC \rightarrow C+VCV+VCVC
\]
\[
d \quad \text{amá} \quad d \quad \text{amá}
\]

B&M suggest that final consonants in Washo may be extrametrical (specifically,
extrasyllabic) elements, and thus exempt from association. In support of this they
point out that word-final consonants in Washo have a more restricted distribution
than syllable-final ones. This argument is not extremely strong, however, since
consonants may show restricted distribution syllable-internally as well, where extrasyllabic cannot be called upon as an explanation. B&M also point out that the three attested monosyllabic stems of the language exceptionally reduplicate the final consonant, paralleling in this regard the behavior of monosyllabic words cross-linguistically, which normally lose their extrametricality with respect to stress rules. However, since all three of the monosyllables cited by B&M show further irregularities under any analysis (éːm ‘to hit with a body part’, pl. máːm; pæːm ‘son’, pl. pæːmː; ëːs ‘in. into’, pl. dæːs) one might just as well regard these patterns as lexicalized. Whether or not an explanation involving extrasyllabic can be ultimately maintained, it is interesting to find that the theory of reduplication proposed here accounts for the behavior of final consonants regardless of our assumptions concerning syllabification:

\[
\begin{array}{cccc}
\text{ama} & \text{VCV} & \text{VCV} & \text{CVCV} \\
\text{CVCV} & \text{CVCV} & \text{CVCV} & \text{dama} \\
\text{dama} & \text{dama} & \text{dama} & \text{dama}
\end{array}
\]

(affixation) (association, transfer) (sequencing)

The reason for this is that no phonemic material is copied other than that which corresponds to the portion of the base template which is analyzed by the affixal template. Here lies the crucial distinction between this model and B&M's, one which, as we shall see, makes just the correct predictions in all other cases where the two approaches make distinct claims.

Let consider one of the cases which appears to motivate a language-specific suspension of the "phoneme-driven" character of association, in B&M's model. Takelma has the following rule of internal reduplication, among others:

(43) Takelma internal reduplication:

item: VC
base: verb stem of form [CVCC]
direction: (see below)
insertion site: -C]
An example is \textit{hemg} - 'take out', reduplicated as \textit{hememg} - (frequentative). The problem for the B&M account lies in the fact that whether the mapping direction is left-to-right or right-to-left, we obtain the wrong result:

\begin{center}
\begin{tabular}{c|c|c}

(44) L-R: & \textit{hemg} & R-L: \textit{hemg} \\
\hline
CVC+VC+C & \hline
\hline
\textit{hem} & \textit{g} & \textit{hem} & \textit{g} \\

= *[hemhg] & = *[hemegg]
\end{tabular}
\end{center}

Here there are no grounds for postulating that the final consonant is extrametrical, as B&M are careful to point out. Their solution is to propose that Takelma has a special association rule, taking precedence over the universal one, which first links the vowel of the copied melody to the V slot; subsequently the normal association principle applies, from left to right. (One could obtain the same result by claiming that in Takelma, association is not phoneme-driven but slot-driven, proceeding from left to right. Such a solution would also carry over to the Washo forms.)

Once again, however, no special statements are needed under the present account, as the following derivation shows:

\begin{center}
\begin{tabular}{c|c|c|c|c|c|c|c}

(45) & e & m & V C & V C & \hline
\hline
C V C C & \rightarrow & C V C C & \rightarrow & C V C + V C + C \\
\hline
\hline
\textit{hemg} & \textit{hemg} & \textit{hem} & \textit{em} & \textit{g}
\end{tabular}
\end{center}

(affixation) (association, transfer) (sequencing)

A particularly interesting and difficult set of problems is raised by the Nakanai language of New Britain in Papua New Guinea, whose system of reduplication has been described in some detail by Johnston (1980) and reanalyzed by Williams (1984), whose work forms the point of departure for B&M's own account. In this language, the shape of the reduplicative affix is controlled by phonological properties of the base. This system involves prefixation to a prosodic constituent,
consisting of the final metrical foot (normally, the final two syllables of the word). The major generalizations are as follows:

(46) a. if the base is of the form [VCV], the prefix is VC:

<table>
<thead>
<tr>
<th>Base</th>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>abi</td>
<td>ababi</td>
<td>'getting'</td>
</tr>
<tr>
<td>kaiamo</td>
<td>kaiamamo</td>
<td>'residents of Kaiamo village'</td>
</tr>
</tbody>
</table>

b. if the base is of the form [CVV], the prefix is optionally CV (if this option is not taken, total reduplication (46g) is used):

<table>
<thead>
<tr>
<th>Base</th>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>baa</td>
<td>ba-baa</td>
<td>'spaces'</td>
</tr>
<tr>
<td>bilau</td>
<td>bilalau</td>
<td>'songs'</td>
</tr>
</tbody>
</table>

c. if the base is of the form [CVCV], in which the first C is a continuant, the second C a sonorant, and the first V is nonround, the prefix is VC, inserted before the stressed (penultimate) vowel:

<table>
<thead>
<tr>
<th>Base</th>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>hari</td>
<td>harari</td>
<td>'running'</td>
</tr>
<tr>
<td>baharu</td>
<td>bahararu</td>
<td>'widows'</td>
</tr>
</tbody>
</table>

d. if the base is of the form [CVCV], and both Cs are obstruents, the first vowel is nonhigh, and the second is not identical to the first, the prefix is CVV:

<table>
<thead>
<tr>
<th>Base</th>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>gapu</td>
<td>gaugapu</td>
<td>'beads'</td>
</tr>
<tr>
<td>pati</td>
<td>paipati</td>
<td>'floating'</td>
</tr>
</tbody>
</table>

e. if the base is of the form [CVCV], and both syllables are identical, the prefix is CV:

<table>
<thead>
<tr>
<th>Base</th>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>bebe</td>
<td>bebebe</td>
<td>'butterflies'</td>
</tr>
<tr>
<td>burulele</td>
<td>burulelele</td>
<td>'sliding on buttocks'</td>
</tr>
</tbody>
</table>

f. in a lexically marked class of words with bases of the form [CV(C)V], the prefix is CV:

<table>
<thead>
<tr>
<th>Base</th>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>taga</td>
<td>tataga</td>
<td>'afraid'</td>
</tr>
<tr>
<td>mapa</td>
<td>mamapa</td>
<td>'payments'</td>
</tr>
<tr>
<td>suvi</td>
<td>susuvi</td>
<td>'digging'</td>
</tr>
<tr>
<td>mota</td>
<td>mamota</td>
<td>'vines'</td>
</tr>
<tr>
<td>sile</td>
<td>sesile</td>
<td>'tearing'</td>
</tr>
<tr>
<td>sio</td>
<td>sosio</td>
<td>'carrying on ceremonial litter'</td>
</tr>
</tbody>
</table>

g. otherwise, the entire bisyllabic base is reduplicated:

<table>
<thead>
<tr>
<th>Base</th>
<th>Prefix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>mila</td>
<td>milamila</td>
<td>'salty'</td>
</tr>
<tr>
<td>kuruve</td>
<td>kuruveruve</td>
<td>'many sweet potatoes'</td>
</tr>
<tr>
<td>baa</td>
<td>baabaa</td>
<td>'spaces' (alternate form)</td>
</tr>
<tr>
<td>au</td>
<td>auau</td>
<td>'steering'</td>
</tr>
</tbody>
</table>
I pass over many interesting details, for which the reader is referred to the sources cited above; the summary given above presents the essentials of the system, however.

One problem presented by this data concerns the forms in (46c). In the B&M approach, prefixation of VC before the stressed vowel will trigger the copying of the melody of the base, e.g. haru in the case of the second example, and left-to-right phoneme-driven association will yield *bahharu, since the first consonant of the melody links to the C of the prefix. B&M suggest that a language-particular association rule is needed to link the first vowel in the copied melody, prior to the operation of the universal association conventions which will then correctly link the second consonant of the melody, giving bahharu.

A further problem concerns the forms of (46f). As these examples illustrate, just in case the first vowel is nonlow and the second vowel is nonhigh, the final V of the CV prefix unexpectedly links to the final V of the base; otherwise, association proceeds in the normal left-to-right direction. (There is also an “intensive” adverb that falls under rule (46f), which fails to undergo the special linking rule: papasi “very”, from pasi. To judge from Johnston’s data, “intensive” adverbs may all have been of this pattern historically, though it subsequently ceased to be productive, surviving only in “frozen” reduplicated forms and in the single alternation pasi ~ papasi.) B&M propose another language-particular association rule to account for this case.

The theory of transfer proposed here accounts for the first of these cases in a straightforward manner. The rule for the VC allomorph of the reduplicative prefix is the following:

\[
\begin{align*}
\text{item: VC} \\
\text{base: foot (with the phonological conditions noted in (46a,c))} \\
\text{direction: left-to-right} \\
\text{insertion site: } \_\checkmark
\end{align*}
\]

The reader may easily verify that this statement derives the correct result.

More challenging, however, are the forms in (46f) that satisfy the conditions for association of the V of the prefix to the final vowel, such as mamota. What is relevant here is the fact these forms are a special, lexically marked class. There are numerous forms cited in Johnston (1980) in which the base is of the form [CV(C)V] and which meet the phonological condition for copying the final vowel of the base, but that take total reduplication; for example, the first two forms cited in (46g). Moreover, nearly all forms cited by Johnston that undergo rule (46f) also
meet the description of the special linking rule; the first three forms cited in (46f) are among the few exceptions I have found (others include reduplicated forms of buli ‘roll’, kapu ‘pulp’, suki ‘strip’, which reduplicate as bubuli, kakapu, and susuki, respectively), and these are not explicitly noted as such by Johnston, suggesting that they should be regarded as unusual forms. The upshot of this is that if we adopt the view that these forms undergo a special linking rule, we are forced to state the same, quite specific phonological condition twice: once as part of the redundancy rule characterizing the special class of forms with [CVCV] bases that idiosyncratically select the CV prefix even though they fail to meet the conditions of (46e), and secondly as the structural condition on the special linking rule, in order to prevent it from applying to forms selecting the CV prefix under another rule but which fail to undergo the linking rule (e.g. po-pou ‘sitting’, be-beu ‘returning’). This duplication suggests that an analysis incorporating a special linking rule is not the correct one.

We may find a solution to this problem if we reconsider an assumption we have made up to this point, namely that the process of association (16) is a part of the phonology, rather than the morphology of reduplication. If we assume that association is simultaneous with affixation, affixation will create a linked structure that will not receive any phonological properties until it has been passed to the phonology. Total reduplication, for example, will proceed as follows in the morphological part of the derivation:

\[
\begin{align*}
(48) & \quad \text{CVCV} \quad \text{CVCV} \\
\text{CVCV} & \quad \rightarrow \quad \text{CVCV} \quad \rightarrow \quad \text{CVCV} \\
\text{mila} & \quad \rightarrow \quad \text{mila} \quad \rightarrow \quad \text{mila} \\
\text{(base)} & \quad \text{(affixation)} \quad \text{(association)}
\end{align*}
\]

Here I follow B&M in assuming that a prosodic template of the form CVCV is affixed, rather than a foot, or two syllables; this is consistent with the fact that all the other reduplicative affixes involve prosodic CV-templates, rather than higher-level constituents. Now let us reconsider the forms in (46f). Suppose we say that these forms do not, after all, idiosyncratically select the affix CV, but rather fall under the regular case of total reduplication. In that case the result of applying the reduplicative affix to a form like mota will be exactly parallel to (48). To account for the surface form, in which the medial VC sequence is missing, we will postulate a rule of morphological truncation which deletes this sequence just in case the
phonological condition for what we earlier termed "special linking" is satisfied, the one which requires the first vowel of the base to be nonlow and the second to be nonhigh. The derivation thus goes as follows:

\[
\begin{array}{cccc}
49 & CVCV & CVCV & CV \\
CVCV & \rightarrow & CVCV & \rightarrow & CVCV & \rightarrow & CVCV \\
\mid\mid\mid & \mid\mid\mid & \mid\mid\mid & \mid\mid\mid \\
\text{mota} & \text{mota} & \text{mota} & \text{mota} \\
\text{(base)} & \text{(affixation)} & \text{(association)} & \text{(truncation)}
\end{array}
\]

This form is passed on to the phonology, where it is eventually interpreted as *mamota*. This analysis, which is essentially that of Johnston (1980), allows us to preserve the claim that the association procedures required for reduplication have no special, language-particular exceptions. One might feel some dissatisfaction with this result, since a theory permitting rules of truncation applying to the output of affixation introduces considerable new power into the descriptive machinery. Since we cannot exclude truncation rules from morphology in the general case, however (cf. Aronoff (1976) and, for the specific case of reduplication, Clements (in preparation)), this solution seems preferable to the alternative discussed above. Most significantly, it avoids the problem of duplication mentioned earlier, since the special condition on vowel height need only be stated once, as part of the structural description of the truncation rule.

It can easily be verified that the two remaining problem cases examined by B&M, involving data from Shuswap and Lushootseed, receive a straightforward analysis under the present account. We may conclude that if the reanalysis of Nakanai suggested above is correct, there remain no known cases of rules of internal reduplication that require any modification of the nonconcatenative framework independently required for the treatment of external reduplication.

4.3. A Problem Involving "Overapplication".

I would now like to consider a problem in the analysis of reduplication pointed out by Carrier-Duncan (1984), involving the apparent "overapplication" of a reduplication rule in Tagalog. The rule of R1 reduplication copies the first CV sequence of the base (the stem). The copied vowel is always short regardless of the length of the vowel of the stem, which follows if we assume that we are dealing with a CV skeleton. Carrier-Duncan points out that the rule assigning a phonemic melody
to this prefix must apply at a later point in the derivation than that at which the morphological conditions for its insertion are satisfied.

The facts are as follows. Occupational nouns in Tagalog are formed by adding mag- and R1 to either a noun or a verb root. For example:

(50) a. bayan 'country' mam-ba-ba-yan 'citizen'
b. sayaw 'dance' ma-na-nayaw 'dancer'

Both formatives are inseparable parts of the word formation rule in the sense that adding either alone does not form an intermediate word from which the occupational noun could plausibly be derived.

By a lexical process of Nasal Substitution, certain sequences of nasal + consonant are reduced to a single nasal homorganic to the second consonant; for example [ŋs] is reduced to [n]. In the formation of ma-na-nayaw 'dancer' from the base sayaw (50b), we note that R1 has applied to the output of Nasal Substitution, in spite of the fact that it intervenes, in the surface form, between the prefix mag- and the stem. This could be explained if we assumed that mag- is added to the base first, Nasal Substitution then applies to give ma-nayaw, and finally R1 inserts the reduplicative prefix between the two elements. But this violates well-motivated principles of word formation. In effect, we would be forced to the unusual claim that the two parts of a single word formation process may be interrupted by the application of an extraneous phonological rule, one which applies not only in forms created by the word formation process in question but in other forms as well.

Carrier-Duncan's proposal is to account for reduplication phenomena in Tagalog in two steps. First, a rule feature such as [+R1] is assigned to the root; and subsequently, the (transformational) rule corresponding to the rule feature applies to "spell out" the phonemic shape of the reduplicative prefix. These two steps need not take place simultaneously. In the case of words like ma-na-nayaw, the derivation proceeds as follows:

(51) sayaw → maŋ + sayaw → ma + nayaw → ma + na + nayaw
   [+R1]            [+R1]
   (base)           (WFR)    (Nasal Substitution)    (R1 "spell-out")

This analysis overcomes the problems pointed out by Carrier-Duncan. It retains the excessive power of solutions involving transformational rules, however, and for this reason we would prefer to find an alternative, compatible with her observations.
It should be clear that the analysis of reduplication proposed in this paper provides a solution to this problem. RI reduplication can be described as follows:

(52) Tagalog RI reduplication:

item: CV
base: noun or verb stem
direction: L-R
insertion site: left of base

Our analysis of forms like *ma*na*naiau* is isomorphic to Carrier-Duncan’s, in just the relevant respect. The WFR specific to “occupational” nouns assigns the two formatives *ma*- and CV in a single step. Subsequently, Nasal Substitution applies. Finally, the CV parafix undergoes association, transfer, and sequencing in the usual way. The derivation proceeds as follows:

(53)

```
    na
    \|
   CV  CV  CV
  ||  ||  ||
CVC + CVCVC → CV + CVCVC → CV + CVCVC → CV+CV+CVCVC
ma   saiu  ma  naiau  ma  naiau  ma  na  naiau
(affixation)  (Nasal Substitution)  (transfer)  (sequencing)
```

Odden and Odden (1985) discuss similar problem cases in Kihehe, which can be treated in the same way.

5. Summary and Conclusions

I have shown that a closer examination of reduplication phenomena motivates a nonconcatenative account of reduplication, rather than the concatenative account originally proposed by Marantz (1982). The essential difference between the two accounts lies in their treatments of the process by which phonemic features of the base are assigned to the reduplicative affix. We have seen that by assuming a process of melody transfer rather than melody copying, we can solve a number of problems in the theory of reduplication which require independent and otherwise unmotivated mechanisms within the melody-copying approach.
The approach proposed here retains the virtues of the accounts of reduplication given by Marantz (1982) and Carrier-Duncan (1979, 1984), showing that these views are not as opposed to each other as they at first appeared. We retain from Marantz's account the essential insight that reduplicative affixes have the form of empty CV skeleta, which explains the cross-linguistic generalization noted by Moravcsik (1978:315):

(54) There is no reduplication pattern that would involve reference to phonological properties other than syllable number, consonantality-vowelhood, and absolute linear position. [Added in footnote:] It is possible that stress is significant in some languages in determining which part of the stem be reduplicated.

We retain from Carrier-Duncan's account the treatment of reduplication as involving two steps: affixation and phonological copying, which may be separated by other rules of the phonology. This explains cases of apparent "overapplication" of reduplication rules, in which a phonological rule appears to apply to an affix even though its structural condition is not met.

The most significant result, from the point of view of phonology, is that apparent discrepancies between the account of phonological representation required by morphological rules and the one required by phonological rules are shown to be an artefact of a particular view of reduplication. Once our account of reduplication is appropriately revised, we can maintain that as far as phonological properties are concerned, rules of morphology and rules of phonology apply to a uniform set of representations.

ACKNOWLEDGEMENTS

In preparing this paper I have benefited from discussions with John Bowers, Wayles Browne, Jay Keyser and Karin Michelson. I would particularly like to thank John McCarthy for pointing out the relevance of Ponapean reduplication to the theory proposed here. This study forms part of a longer work in progress.
REFERENCES


McCarthy, J. (no date) "Ponapean Reduplication," unpublished manuscript, Bell Laboratories and University of Massachusetts.
Nominative Nonsubjects in Choctaw

William D. Davies

One of the most salient aspects of Choctaw morphosyntax and probably the most frequently discussed with much confidence is the nominative case marker, -(a)t. Linguists who study Choctaw agree that this suffix marks the "subject" of a sentence. In fact, overt subjects in all simple Choctaw sentences must take the nominative case suffix.

(1) Ohoyo-t nowa-tok.
   woman-NOM walk-PST
   'The woman walked.'

(2) Ofi-yat towa lhioli-tok.
   dog-NOM ball chase-PST
   'The dog chased the ball.'

(3) Hattak-at iti chāli-h.
   man-NOM wood INC-chop-PRED
   'The man is chopping wood.'

(4) Katos-at hohchafo-h.
   cat-NOM hungry-PRED
   'The cat is hungry.'

The sentences in (1-4) would be ungrammatical (although understood) if the NPs with nominative case were not so marked.
The ungrammaticality of sentences in which nonsubjects take nominative case provides support for the association of nominative case with subjects.

(5) a. Ofi yat katos kopoli-tok.
    dog-NOM cat bite-PST
    'The dog bit the cat.'
    b. *Ofi yat katos-at kopoli-tok.

(6) a. Ohoyo yat hattak im anopoli-tok.
    woman-NOM man 3DAT-talk-PST
    'The woman talked to the man.'
    b. *Ohoyo yat hattak-at im anopoli-tok.

The sentences in (5b) and (6b) are ungrammatical precisely because nonsubjects, the direct object and indirect object, respectively, occur in nominative case.

In Choctaw, nominative case contrasts with oblique case, which can be marked on nonsubject NPs in a sentence.

(7) Ohoyo yat alla yä iskali mä im a: tok.
    woman-NOM child money-DAT give-PST
    'The woman gave that money to the child.'

(8) Alla nakni-t alla ti kä napakälä-yä
    child male-NOM child male-OBL flower-OBL
    3Ben buy-PST
    'The boy bought flowers for the girl.'

Oblique case, unlike nominative case, is optionally marked; the nonsubjects in (2-3), (5a), and (6a) are not marked for oblique case.

Based on the preceding data, we can informally state a rule of nominative case marking as in (9).

(9) Nominative Case Marking (Obligatory)
    The subject NP of a clause is marked for nominative case.

The disproportionate concern with the nominative case marker belies the confidence with which it should be approached, however. For example, despite the fact that many current syntactic theories limit to one the number of subjects a particular sentence may have, Choctaw contains more than one clause-type that admits multiple nominative NPs (which contrast with (5b) and (6b) above). The sentences in (10-11) exemplify one such construction.
(10) Allayat chim-iskal-yat I-kania-tok.
    child-NOM 2POSS-money-NOM 3DAT-lose-PST
    'The child lost your money.'

    John-NOM 1PLPOSS-book-NOM 3DAT-forget-PST
    'John forgot our book.'

In Davies 1981, 1984 I propose an Inversion analysis in which both
NPs in these sentences are in fact subjects, although at different
levels of structure. We consider this construction no further
here.

Of chief concern to the present discussion is another
"double nominative" construction, illustrated in (12-13), which has
received more attention in the literature. In this construction, a
possessor of a subject is also marked for nominative case.

    chief-NOM 3POSS-dog-NOM run-PST
    'The chief's dog ran.'

(13) Ohoyo-mat im-alla-yat takkon apa-tok.
    woman-DT-NOM 3POSS-child-NOM apple eat-PST
    'The woman's child ate the apple.'

Some have taken the nominative case on MIko 'chief' and ohoyo
'woman' to indicate that these NPs are subjects, derived by rais-
ing the possessor of a subject to subject position (Nicklas 1974,
Stemberger 1979). However, in this article I present evidence
that a Possessor Raising analysis lacks motivation; although the
possessors in (12-13) take nominative case marking, they exhibit
no other behavior characteristic of Choctaw subjects. I propose
instead that a possessor can be marked for the case of the highest
NP dominating it.

In section 1 I make explicit the Possessor Raising analysis. In
section 2 I show that possessors marked for nominative case fail
three diagnostics of subjecthood in Choctaw. In section 3 I
outline an account of nominative case marking on possessors that
is consistent with the facts, drawing a parallel between these
constructions and nominative case marking of conjoined subjects.
I then extend this analysis to case marking of possessors of non-
subjects.

1. The Possessor Raising Analysis

Under the analysis proposed by Nicklas (1974) and Stemberger
(1979), a possessor is raised out of a base-generated subject NP
to bear the subject relation in a sentence. Thus, (14b), in which
the possessor is marked for nominative case, is derived from (14a), in which the possessor takes no case marking.

(14) a. Ohoyo-ma im-alla-yat ishko-h.
   woman-DDT 3POSS-child-NOM drink-PRED
   'The woman's child is drinking (it).'

     b. Ohoyo-ma-t im-alla-yat ishko-h.
     woman-DDT-NOM 3POSS-child-NOM drink-PRED
     'The woman's child is drinking (it).'

Both (a) and (b) are grammatical; functionally speaking, in (b) the possessor ohoyo 'woman' is more emphasized than in (a). In a derivational transformational framework, one might represent the effect of Possessor Raising in (14) as deriving (15b) from (15a).7

(15) a.

   S
  /     \
 NP   NP
    /   \
   NP N NP
  /       \
 ohoyo alla UNSPEC iskoh

b.

   S
   /   \
 NP NP V
  /       \
 ohoyo alla UNSPEC iskoh

A rule of Possessor Raising of this kind would obey the Relational Succession Law proposed by Perlmutter and Postal (1972), which states that a nominal which ascends (raises) into a clause bears the grammatical relation of its host (the constituent from which it ascends). Possessor Raising of this type has been proposed for Cebuano (Bell 1976), Chamorro (Crain 1979), and other languages. Under this analysis, one could account for nominative case marking on both ohoyo 'woman' and imalla 'her child' by stipulating that the rule of nominative case marking in (9) applies to any NP which bears the subject relation at any point in the derivation.

However, this rule would incorrectly predict (16) to be ungrammatical.

(16) Ohoyo-ma-t im-alla-ya ishko-h.
    woman-DDT-NOM 3POSS-child-DT drink-PRED
    'The woman's child is drinking (it).'

In (16), a variant of (14), the possessor is marked for nominative case, but the possessed is not. The possessor has the same amount
of emphasis as in (14b), in which both the possessor and the possessed are marked. Presumably (16) has the structure in (15b) since ohoyo takes nominative case. However, given the absence of nominative case on imalla, we would have to further modify our rule for nominative case to optionally leave "ex-subjects" unmarked.

Another aspect of this construction is the fact that the possessive prefix remains on the possessed NP.

(17) a. Ohoyo-ma-t alla-yat ishko-h.
    woman-DDT-NOM child-NOM drink-PRED
   (The woman's child is drinking (it).)
   b. Ohoyo-ma-t alla-ya ishko-h.
    woman-DDT-NOM child-DT drink-PRED
   'The woman is drinking the child.'

In (17a), both ohoyo and alla are marked for nominative case, but the possessive prefix is absent. This sentence is ungrammatical (cf. (5b) and (6b)). In (17b), only ohoyo is marked for nominative case and again the possessive prefix is absent. However, (17b) no longer conveys the meaning that the child belongs to the woman and the child is doing the drinking; (17b) has only the rather fantastic interpretation 'The woman is drinking the child'. It is therefore necessary to specify that when a possessor is raised, a pronominal copy remains on the possessed NP in the form of a possessive prefix. Raising constructions in which a pronominal form remains in the host has been referred to as "copy raising" in the literature (cf. Frantz 1978, Marlett 1976). We can informally state a rule of Possessor Raising as in (18).

(18) Possessor Raising
    A possessor may ascend to bear the grammatical relation of its host, leaving a pronominal copy in the form of a possessive prefix.

2. Counterevidence to Possessor Raising

The sole motivation for proposing a rule of Possessor Raising such as (18) is the nominative case that sometimes occurs on possessors of subjects. In this section I show that possessors which are marked for nominative case fail to exhibit other characteristics of Choctaw subjects.

2.1 Verb Agreement

Choctaw contains a rich inflectional system for morphologically marking the arguments of a predicate on that predicate. Thus, the subject of the verb apa 'eat' is marked by a nominative agreement marker indicating the person and number of the subject.
(19) Takkon apa-li-tok.
apple eat-1NOM-PST
'I ate the apple.'

In (19), li '1Nom' signals that the subject of the clause is first person singular. This first person singular subject can be emphasized by placing it in focus.

(20) Anakosh takkon apa-li-tok.
1=F0=NOM apple eat-1NOM-PST
'I was the one who ate the apple.'

In Davies 1981 I propose that any NP which bears the subject relation and does not bear the direct object or indirect object relation determines nominative agreement on the predicate.

Given these agreement facts, one would expect that possessors which are raised out of subjects by the rule in (18) should determine nominative agreement. As (21) shows, this is not the case.

(21) a. Anakosh am-all-a-ya takkon apa-tok.
1=F0=NOM 1POSS-child-DT apple eat-PST
'My child ate the apple.'

b.*Anakosh am-all-a-ya takkon apa-li-tok.
1=F0=NOM 1POSS-child-DT apple eat-1NOM-PST
(My child ate the apple.)

Presumably (21a) would be a case of Possessor Raising; the possessor occurs in the nominative case, which should signal its subjecthood. However, as (21b) shows, if the first person singular possessor behaves as other subjects and determines nominative agreement, the clause is ungrammatical. The situation is (22) is parallel.

(22) a. Chishnakosh chim-ofi-yat kopoli-tok.
2=F0=NOM 2POSS-dog-NOM bite-PST
'Your dog bit it.'

b.*Chishnakosh chim-ofi-yat ish-kopoli-tok.
2=F0=NOM 2POSS-dog-NOM 2NOM-bit-PST
(Your dog bit it.)

In (22b), the putative raised possessor determines nominative agreement and the sentence is ungrammatical.

The agreement facts are inconsistent with a Possessor Raising analysis. Since a possessor raised out of a subject would bear only the subject relation, given the rules accounting for agreement elsewhere in the language, one expects that the raised possessor should determine nominative (or at least some type of) agreement. The fact that it does not is problematic for the
raising analysis.

2.2 Reflexives

Choctaw reflexives are marked on the predicate by the affix \textit{ili}, which occurs as \textit{ilim/ilif} in the dative and \textit{ilimi} in the benefactive. Only subjects can be antecedents of such reflexives.

(23) Am-ofi-yat ili-kallichi-tok.
  1POSS-dog-NOM REFL-scratch-PST
  'My dog scratched itself.'

(24) Ili-noksho:pa-li-h.
  REFL=DAT-fear-1NOM-PRED
  'I am afraid of myself.'

  man-NOM child REFL=DAT-sell-PST
  'The man \textsubscript{i} sold the child \textsubscript{j} to himself\textsubscript{i}/\textsubscript{j}.'

(26) Chan holiso iliim i-kächi-li-tok.
  John book REFL=BEN 3DAT-sell-1NOM-PST
  'I sold the book to John for myself/\textsubscript{#}himself.'

The only possible antecedents in (23–26) are the subjects of the sentences. In particular, the direct object in (25), \textit{alla} 'child', and the indirect object in (26), \textit{Chan} 'John', are not possible antecedents of the reflexives. In Davies 1981 I provide evidence that antecedents may be subjects at any level of structure.

Given the condition on antecedents, we would predict from the raising analysis outlined in section 1 that possessors raised out of subject NPs should be potential antecedents of reflexives. However, this prediction is not borne out.

    2=FO=NOM 2POSS-dog-NOM 2ACC-bite-PST
    'Your dog bit you.'

  b. Chishnakosh chim-ofi(-yat) ili-kopoli-tok.
    2=FO=NOM 2POSS-dog-NOM REFL-bite-PST
    'Your dog bit itself.'

Crucially, (27b) cannot mean 'Your dog bit you(rself)', which we would predict it could if the raised possessor, \textit{chishno} 'you', were a potential antecedent of reflexives. Thus, the raised possessor fails another diagnostic of Choctaw subjecthood.

2.3 Switch-Reference

Choctaw morphologically marks whether linked clauses have
coreferent subjects by suffixing a same-subject or different-subject marker to embedded clauses and the first of two conjoined clauses. I have provided evidence in Davies 1981, 1984 that coreferent subjects can trigger same-subject marking regardless of the level at which they are subjects. Same-subject and different-subject marking on embedded clauses are illustrated in (28) and (29), respectively.

(28) Bali:li-ka-t ikhana-li-h.
run-COMP-SS know-NOM-PRED
'I know I ran.'

run-COMP=DS know-NOM-PRED
'I know s/he ran.'

Given the switch-reference marking facts, if a possessor raised out of a subject NP in an embedded clause were coreferent with the matrix clause subject, same-subject marking should be possible. However, the data in (30) show that same-subject marking is not possible here.

(30) a. Anakosh am-alla-yat takkon apa-kā
1=FO=NOM 1POSS-child-NOM apple eat-COMP=DS
ikhana-li-h.
know-NOM-PRED
'I am the one who knows my child ate the apple.'

b. *Anakosh am-alla-yat takkon apa-ka-t ikhana-li-h.

If amakosh were a raised possessor in the embedded clause, based on the Possessor Raising rule in (18), it would be a subject of the embedded clause since it would be raised out of a subject NP. Thus, an embedded subject would be coreferent with the matrix subject (both first person singular), and same-subject marking should be possible on the embedded clause. However, as (30b) shows, it is not. Only different-subject marking is possible, (30a).

The data in (31) provide an additional example.

(31) a. Ohoyo-ma-t im-alla-yat ishko-kā
woman-DDT-NOM 3POSS-child-NOM drink-COMP=DS
ikhana-h.
know-PRED
'The woman knows her child is drinking.'

b. Ohoyo-ma-t im-alla-yat ishko-ka-t
woman-DDT-NOM 3POSS-child-NOM drink-Comp-SS
ikhana-h.
know-PRED
'The woman's child knows s/he is drinking.'

* 'The woman knows hēr child is drinking.'
** 'The woman's child knows she is drinking.'
If oho oy 'woman' were a raised possessor bearing the subject relation in the embedded clause as well as the matrix subject, same-subject marking should be possible in (31b) with the meaning 'The woman knows her child is drinking'. Additionally, if oho oy were raised out of the matrix subject and were also the embedded subject, one should be able to interpret (31b) as 'The woman's i child knows she i is drinking'. The impossibility of these interpretations is problematic for the Possessor Raising proposal.

2.4 Two Options

The data considered in this section show that possessors marked for nominative case consistently fail to display behavior characteristic of Choctaw subjects. These facts run counter to the proposed Possessor Raising analysis, given otherwise well-motivated rules of the language. There are two options open to the analyst. First, one could reformulate the rules of verb agreement, reflexivization, and same-subject marking to ensure that raised possessors, while still subjects, would not fall under the scope of these rules. Although this may be possible, the desirability of such a move is questionable if the only subject property these NPs display is nominative case. The second and perhaps more advisable option is to abandon the Possessor Raising proposal and seek an alternative account for the nominative case marked on possessors. This second option is pursued and justified in the following section.

3. A Proposal for Nominative Case Marking

The Possessor Raising analysis is rejected on the grounds that the only subject property of the possessor is nominative case. In fact, a straightforward account of the case marking puzzle is available, an account necessary to handle conjoined NP phenomena.

When two or more conjoined NPs serve as the subject of a sentence, any or all of the NPs can be marked for nominative case. The only restriction is that one of the NPs be marked. This is illustrated by the multiple variants in (32).
(32) a. Ofi, katos, micha alla-t washoha-tok.
   dog cat and child-NOM play-PST
   'The dog, the cat, and the child played.'

b. Ofi, katos-at, micha alla-t washoha-tok.
c. Ofi-yat, katos-at, micha alla-t washoha-tok.
d. Ofi, katos-at, micha alla washoha-tok.
e. Ofi-yat, katos-at, micha alla washoha-tok.
f. Ofi-yat, katos, micha alla washoha-tok.
g. Ofi-yat, katos, micha alla-t washoha-tok.
h. Ofi, katos, micha alla washoha-tok.

(32) can be represented as in (33).

\[
\begin{array}{c}
S \\
\downarrow \\
NP_4 \\
\downarrow \\
NP_2 \quad NP_3 \quad NP_4 \\
\downarrow \\
ofi \quad katos \quad alla \quad washoha
\end{array}
\]

The rule of nominative case marking in (9) cannot account for the case marking possibilities in (32). In (33) NP₄ is the subject NP. Thus, given (9), we predict that nominative case can be marked only on the entire conjoined NP, i.e., suffixed to the final element of NP₁. This is the result in (32a), in which only the final conjunct, alla 'child', is marked. Left unexplained is the grammaticality of the variants in (32b-g).

To account for the case facts in (32), I introduce the notion of "direct subject dependent" and modify the rule in (9).

(34) Direct Subject Dependent

NP₄ is a direct subject dependent of S if and only if NP₄ is the subject of S and a path traced from NPₙ to NP₄ does not cross any category node ≠ NPₙ.

In (33), NP₂ dominating ofi 'dog', NP₃ dominating katos 'cat', and NP₄ dominating alla 'child' all satisfy the definition of direct subject dependent, as does NP₁ when we consider the case i = n in (34). We can now informally state a rule of nominative case marking as:

(35) Nominative Case Marking (Obligatory)

At least one direct subject dependent in a clause is marked for nominative case.

As each NP in (33) is a direct subject dependent, the rule in (35)
ensures that any or all of the NPs can be marked for nominative case. Additionally, since (35) is obligatory, we can account for the ungrammaticality of (32h), in which no NP is marked for nominative case, as well as the ungrammaticality of simple sentences with unmarked subjects.

Returning to nominative case on possessors, we find that the pattern of possible nominative case marking on multiple possession constructions in subject position is the same as the pattern with conjoined subjects.

    woman-DDT 3POSS-child-DT 3POSS-bird-NOM Sg=fly-PST
    'That woman's child's bird flew.'

b. Ohoyo-ma im-alla-ya-t I-hoshi-t hika-tok.
c. Ohoyo-ma-t im-alla-ya-t I-hoshi-t hika-tok.15
e. Ohoyo-ma-t im-alla-ya-t I-hoshi hika-tok.
g. Ohoyo-ma-t im-alla-ya I-hoshi-t hika-tok.

(36) can be represented as (37).

(37)

There are three NPs which satisfy (35). First, NP₁, ohoyo-
oma imallaya Ihoshi 'that woman's child's bird', is the subject
NP of the sentence. Second, NP₂, the possessive construction mod-
ifying hoshi 'bird', ohoyo-ma imallaya 'that woman's child', is a
direct subject dependent. Finally, NP₃, ohoyo 'that woman' is
also a direct subject dependent since there is no non-NP node that
dominate it but does not dominate the subject NP. Thus, it is
possible to account for the nominative case marking on possessors
of subjects by the rule in (35) without resorting to a rule of
Possessor Raising.

There is one more instance of nominative case marking that
should be noted. Consider the sentences in (38).
(38) a. Nita chito lakna-t hattak malhalli-tok.
   bear large brown-NOM man frighten-PST
   'The big, brown bear frightened the man.'

b. Nita-t chito lakna-t hattak malhalli-tok.
c. Nita chito-t lakna-t hattak malhalli-tok.
d. Nita-t chito-t lakna-t hattak malhalli-tok.
e. Nita chito-t lakna hattak malhalli-tok.
f. Nita-t chito-t lakna hattak malhalli-tok.
g. Nita-t chito lakna hattak malhalli-tok.
h. Nita chito lakna hattak malhalli-tok.

The pattern of nominative case marking in (38) differs slightly from the predictions we would make based on data analyzed thus far. We can represent (38) as in (39). 16

(39)

We would predict on the basis of the structure in (39) that only NP could be marked for nominative case, as in (38a). However, as (38b) shows it is also possible for the head noun to take nominative case marking. Thus we must also make provisions in the grammar of Choctaw to account for this case marking possibility. 17 However, as the ungrammaticality of (38g) shows, regardless of whether the head noun is marked with nominative case, the entire subject NP must take nominative case marking. Our rule of nominative case marking in (35) will ensure this since some NP must be marked for nominative case.

4. Oblique Case

The account of nominative case marking generalizes to oblique case as well. The same case marking phenomena in possessive constructions occur when the NP bears a grammatical relation other than subject.
(40) a. Hattak-at chim-alla-ya İ-katos-ä
    man-NOM 2POSS-child-DT 3POSS-cat-OBL
    hottopali-tok.
    hurt-PST
    'The man hurt your child's cat.'

b. Hattak-at chim-alla-yä İ-katos-ä
    -DT=OBL
    hottopali-tok.

(40) can be represented as in (41).

(41)

```
S
  /
/   \   
NP   NP   V
    /
   /   
NP   N
    /
   /   
NP   N
```

hattak chishno alla katos hottopali

The possessive construction in (40) is reminiscent of that in (37), that is, oblique case can be marked on the possessor of a nonsubject whether the possessed noun is marked (40b) or unmarked (40c) for case. We could define a notion "direct direct object dependent" paralleling direct subject dependent in order to account for data such as (40). Thus, chimallaya 'your child' is a direct direct object dependent of S and can take oblique case marking, in the same way that ohoyoma imallaya 'that woman's child' is marked for nominative case as a direct subject dependent in (36).

At this point it is obvious that the notion of "direct dependent" generalizes to any given grammatical relation. Thus, I propose the general formulation of "direct GRx dependent", where "GRx" is taken as a variable over grammatical relations.

(42) Direct GRx Dependent

\[ NP_i \text{ is a direct GRx dependent of S if and only if } \]
\[ NP_i \text{ is the GRx of S and a path traced from } NP_i \text{ to } \]
\[ NP_i \text{ does not cross any category node } \neq NP. \]

The application of this notion to Choctaw case marking has been made plain. Further research should be brought to bear to determine the applicability of this notion in linguistic theory.

The oblique case marking facts are somewhat less dramatic than those of nominative case marking since oblique case marking is optional (or discourse related) and occurs infrequently.
However, since the facts are similar to those of nominative case marking, the option to mark direct dependents bearing a particular grammatical relation can be generalized to cover all case marking.

5. Conclusion

The proposal for nominative case marking outlined in section 3 shows that nominative case on possessors of subjects can be handled without resorting to a rule of Possessor Raising. The advantages are threefold. First, it is possible to unify the treatment of nominative case on possessors and conjoined NPs, constructions exhibiting the same range of case patterns. Second, under the Possessor Raising analysis, it is necessary to state that the possessed NPs (which in most theories would no longer be considered subjects) can but need not be marked for nominative case; this statement is unnecessary in the proposed analysis. Third, since the possessors are never subjects, the fact that they fail to behave as subjects with respect to verb agreement, reflexivization, and same-subject marking is not surprising.

While it is undeniable that nominative case is inextricably bound to the notion "subject" in Choctaw, one cannot assume that all NPs marked for nominative case are indeed full-fledged subjects. However, to conclude in a more positive vein, it appears likely that the selective use of nominative case is related to discourse functions. Recall that when the possessor of a subject is marked for nominative case, it is more emphasized, it plays a more prominent role. Munro and Gordon 1982 and Munro 1983 propose a discourse-related explanation for the application of the Chickasaw Possessor Raising rule (argued to be inappropriate for Choctaw in section 2), claiming that the rule applies when the focus of attention is the possessor as opposed to the possessed. One might propose for Choctaw then that when there are case marking options, the speaker marks nominative case according to some overlaid discourse notion(s) (be it 'focus of attention' or some other). Thus, while the notion 'direct subject dependent' is a necessary condition for nominative case marking (35), discourse notions may hold the key to a clear understanding of certain manifestations of it.

FOOTNOTES

* This work was supported in part by the National Science Foundation through grant no. BNS 78-17498 to the University of California, San Diego, the American Philosophical Society through a Phillips Fund grant, and Cornell University through a Mellon Postdoctoral Fellowship. I would like to thank Wayne Harbert, Stan Dubinsky, Steven Franks, and Carol Rosen for comments on an
earlier draft of this paper. Responsibility for errors and omissions is mine alone.

1As shown in later sections of the paper, nominative case is also marked by -sh in focus constructions. The nominative ending -at often occurs as -t with concomitant lengthening of a noun-final vowel (as in (1)). However, in the data this vowel length is not marked. One final caution about the data: the article or determiner system in Choctaw is complex and relatively poorly understood; no attempt is made in this work to provide an authoritative comment about determiners. Rather the focus is on conditions for nominative case marking.

2This has led many to refer to this affix as the "subject marker" (Nicklas 1974; Jacob, Nicklas, and Spencer 1977; Heath 1977; McClaran and Herrod 1977; Munro and Gordon 1982). In this work I follow Byington 1870 and use the term "nominative".

3I speak of "overt subjects" because pronominal subjects need not occur overtly. The following abbreviations are used in the morphemic glosses: ACC - accusative, BEN - benefactive, COMP - complementizer, DAT - dative, DT - Determiner, DDT - distal determiner, DS - different-subject, FO - Focus, INC - incompletive aspect, NOM - nominative, OBL - oblique, Pl - plural, POSS - possessive, PRED - predicative, PST - past tense, REFL - reflexive, Sg - singular, SS - same-subject, 1 - first person, 2 - second person, 3 - third person.

4Marking of oblique case appears to be related to definiteness and discourse notions. We will not formulate the precise conditions for marking oblique case here.

5Munro and Gordon (1982) make the same claim for Choctaw by extension of their analysis of Chickasaw, the Muskogean language most closely related to Choctaw.

6Stemberger (1979) claims that possessors can be raised from nonsubjects as well. Such cases are considered in section 4.

7Due to lack of convincing evidence for a VP node including the verb and its objects, in phrase-structure representations of Choctaw I assume a VP-less structure. Regardless of any implications this may have for other parts of the grammar or any particular theory, this issue is peripheral to the present discussion. In addition, I assume that grammatical relations can be identified in the structures.

8Choctaw predicates take agreement markers for subjects, direct objects, indirect objects, and beneficiaries. There are four paradigms of agreement markers: nominative, accusative, dative, and benefactive. I have proposed elsewhere that the type
of agreement marker determined by an NP depends on the grammatical relation(s) that it bears in the sentence (Davies 1981). Cf. Davies 1981, 1983 for more detailed discussion of Choctaw agreement phenomena.

9 Third person nominative (and accusative) agreement markers are Ø-morphemes; thus, where we find li '1Nom' marking the subject of apa 'eat' in (19-20), we find no phonetic material marking the third person subject on the predicate in (21).

10 Although not a preferred reading, (31a) can also mean 'Someone knows the woman's child is drinking', thus showing that nominative case can be marked on possessors of embedded subjects. This is reinforced by the grammaticality of (i), which more clearly shows nominative case marked on the possessor of an embedded subject.

(i) Ohoyo-ma-t im-alla-yat ishko-kš
woman-DDT-NOM 3POSS-child-NOM drink-COMP=DS
ikhana-li-h.
know-1NOM-PRED
'I know the woman's child is drinking.'

11 Sentences in which three or more conjoined NPs are all marked for nominative case are considered less acceptable than other variants by some speakers.

12 This particular formulation of direct subject dependent was suggested by Wayne Harbert.

13 Although one might at first consider the notion "direct subject dependent" as defined in (34) an ad hoc aberration forced on the analyst by the collision of data and theory, the notion is essentially the same as that of NP-containment appealed to by Mohanan (1982). Mohanan notes that in Malayalam (a Dravidian language) the "nonpronominal anaphor" swa- 'self' can take an antecedent outside its immediate clause provided it is dominated by a subject "with no intervening nodes which are not NP's" (1982, 178). Thus, languages as diverse as Choctaw and Malayalam must appeal to the same somewhat unusual configurational statement. In addition, Dubinsky (this volume) formulates a restriction on 'adversative passives' in Japanese in terms of the notion "direct subject dependent".

14 It is necessary to incorporate some sort of morphological filtering device to ensure against two contiguous nominative case markers since both NP₁ and NP₄ satisfy the rule in (35) but both cannot be overtly marked with nominative case.

15 The same speakers who have reservations about the acceptability of sentences in which three or more conjoined NPs are
marked for nominative case express a similar reservation about three or more NPs in possessive constructions taking nominative case marking.

16 There is no evidence that Choctaw contains a category "adjective" distinct from "verb". Thus, in (39) the subject NP dominates a head noun and conjoined verbal construction which modifies the head noun.

17 Allowing head nouns to take the case of the dominating NP again raises the issue of predicting the possibility of two adjacent nominative case markers. Consider the instance of a simple NP in subject position of a clause.

    man-NOM run-PST
    'The man ran.'

    b. 
    \[ S \]
    \[ NP \]
    \[ V \]
    hattak bali:li

Following rule (35), the NP gets nominative case. Additionally, a rule optionally marking head nouns with the NP case, necessary for our account of (38), would allow the N to get nominative case, predicting the possibility of:

(ii) #Hattak-at-at bali:li-tok.

Again, we need some sort of filtering device referred to in note 14 to block the undesired phenomena.

REFERENCES


Dubinsky, S. this volume. "A Union Analysis for Japanese 'Adversative Passives'."


A Union Analysis for Japanese 'Adversative Passives' *

Stanley Dubinsky
Cornell University

1.0 Introduction

Japanese possesses two distinct types of passive constructions, 'indirect' or 'adversative,' and 'direct' or 'personal.' In this paper I argue that adversative passives can be accounted for as a type of union construction, analogous to other union constructions, such as causative union. The syntactic behavior of these constructions is shown to be largely predictable from the universals stated in RG theory that pertain to clause union. Other characteristics are accounted for by language-specific constraints easily statable under the union analysis. I henceforth refer to these 'adversative' or 'indirect' passive constructions as Affective Union (AU) passives.

The constructions I will examine are illustrated in (1-6), along with the RNs which represent their structure. (1) is a direct passive. (3) and (5) are both adversative passives, having a three argument and two argument structure, respectively. They are alike in that they contain the verbal inflection -rare, as well as ga- and ni-marked NPs.

(1) Taroo wa sensei ni yobareta.
    TOP teacher DAT call-PAS-PRF
    'Taroo was called by the teacher.'
In the analysis that I am proposing -rare passives, both direct and adversative, are alike in that their RNs contain a 2-1 advancement out of a transitive stratum. In the adversative constructions, a union predicate is present, which takes a 2 as its initial argument. This predicate has the meaning 'befall,' and the adversative passive can be construed as meaning, roughly, 'something befalls someone.'

In the following discussion, some of the syntactic differences observed between the two constructions will be attributed to the fact that passive advancement in the adversative construction occurs in a post-union stratum. Thus, while the ni-marked
nominals in both types of passive are 1-chomeurs in the matrix clause, those of the Affective Union passives also head final 1-arcs in the downstairs clause. Further, since the nominal argument subcategorized by the union predicate heads an initial 2-arc, any downstairs 2 is put en chomage.

The structure that I am attributing to the AU passives involves two assumptions. The first assumption is that the AU predicate is a Union Predicate and that it subcategorizes a direct object. The second assumption is that all -rare constructions which have a l-Cho possess RNs which contain passive. In the case of the AU passives, the 2-1 advancement occurs in the upstairs clause.

These RNs necessarily entail Clause Union with no revaluation of any of the downstairs arguments. According to Gibson/Raposo (1983), the only nominals that can undergo revaluation in a Clause Union structure are pre-Union final 1s. Furthermore, downstairs 1s themselves should only be candidates for revaluation in case there is a 1 present in the initial stratum of the upstairs clause [Rosen (personal comm.)]. Thus, a no-revaluation union is predicted here. The downstairs final 1 heads a 1-arc upstairs by the Inheritance Principle [Gibson/Raposo (1983)], and the 2 of the union predicate motivates the chomage of any 2 contained in the downstairs final stratum in accordance with the Inheritance Principle and the Stratal Uniqueness Law. The chomage of the pre-Union 1 is motivated by the advancement to 1 of the 2 introduced in the union stratum.

2.0 Accounting for the facts of rare constructions

I now explain how this analysis is able to account for the differences between direct and Affective Union passives. First, I discuss evidence that there is an additional predicate in the Affective Union passives. Then, I examine the differences in the syntactic behaviour of the ni-marked nominals in the two constructions. Finally, I explain how positing an initial direct object for the Affective Union predicate accounts for the inadmissibility of double passives.

2.1 Motivations for the Affective Union predicate

There are three reasons for positing a distinct union predicate in Affective Union passives. The presence of additional argument structure, an independent selectional restriction imposed on its final subject, and the semantic characteristics associated with the construction.
2.1.1 Distinct argument structure

Affective Union passives differ from direct passives in that they lack 'active analogs' [Kuno (1973:299–304,345–6)]. More explicitly, these structures entail the introduction of an additional NP argument which does not bear any identifiable GR in the downstairs clause. We can compare (7), (8) and (9) to (1), (3), and (5). Only the active analog of (1) is grammatical. The hypothetical active analogs of the -rare constructions in (3) and (5) are both ill-formed.

(7) Sensei ga Taroo o yonda.
    teacher NOM    ACC call-PRF
    'The teacher called Taroo.'

(8) *Sensei ga Tanaka-san [ o / ni ] kodomo o sikatta.
    teacher NOM Mr. Tanaka   ACC DAT child ACC scold-PRF

(9) *Ame ga Taroo [ o / ni ] hutta.
    rain NOM       ACC DAT      fall-PRF

Even when the subject of the Affective Union is capable of bearing some GR in the downstairs clause, it is never an obligatory argument of that verb. On the other hand, while this NP is not in the obligatory argument structure of the inflected verb, it is in fact a required argument of all Affective Union passives. Under this analysis, the Affective Union passives are all two predicate structures, with the matrix final subject of these constructions subcategorized by the union predicate.

2.1.2 Selectional restrictions on AU passive subjects

There are selectional restrictions which delimit the possible range of subjects for Affective Union passives, but do not similarly restrict the class of subjects of direct passives. The semantic condition I will refer to here is stated in (10).

(10) Selectional Restriction for AU Passive Subjects

In an indirect passive construction,
    a Direct Subject Dependent must be [+animate].

In the Affective Union passives in (11), (12), and (13), the final subjects all satisfy this restriction. In (11) and (12), both Hanako ga and Hanako no suutukeesu ga contain an animate Direct Subject Dependent, as does the subject in (13), in which a zero-pronominal possessor of suutukeesu is co-referent with the speaker.
(11) Hanako ga basu ni doro o hanerareta.
    NOM bus DAT mud ACC splash-PAS-PRF
    'Hanako was splashed mud by the bus.'

(12) Hanako no suutukeesu ga basu ni doro o kakerareta.
    GEN suitcase NOM bus DAT mud ACC splash-PAS-PRF
    'Hanako's suitcases were splashed mud by the bus.'

(13) Suutukeesu ga basu ni doro o kakerareta.
    suitcase NOM bus DAT mud ACC splash-PAS-PRF
    '(My) suitcases were splashed mud by the bus.'

We can now contrast an Affective Union passive in (14) with
the personal passive in (15). In (14) and (15), neither the sub-
ject of the Affective Union passive, hodoo, nor that of the per-
sonal passive, sono biru, satisfy the stated semantic conditions,
yet only the Affective Union is ill-formed.

(14) *Hodoo ga basu ni doro o kakerareta.
    sidewalk NOM bus DAT mud ACC splash-PAS-PRF
    'The sidewalk was splashed mud by the bus.'

(15) Sono biru wa Haruki-san ni sekkai-sareta.
    that bldg. TOP DAT design-PAS-PRF
    'That building was designed by Mr. Haruki.'

This restriction on the subject of Affective Unions can be
handled in a quite straightforward manner, when the constructions
are taken to contain an independent union predicate. This predi-
cate, like any other, imposes selectional restrictions on the
arguments which it subcategorizes. Accordingly, semantically
unacceptable subjects of Affective Unions can be most reasonably
excluded by the assumption that they are the initial arguments of
a distinct predicate. Under a union analysis, such as that pro-
posed here, this needs no special stipulation.

2.1.3 Adversative meaning

In the literature, 'indirect' passive constructions are
alternately referred to as 'adversative' passives. This is
because when the semantic qualities of the embedded verb are neu-
tral, the sentence is understood as having an adversative connota-
tion for the subject. On the other hand, such added meaning is
not necessarily implicit in direct passives. Thus, while (16)
indicates merely that Ziroo was 'brought along,' (17) conveys the
idea that 'bringing along' Ziroo caused some embarrassment or
other discomfiture to Taroo.

(16) Ziroo wa Hanako ni turete korareta.
    TOP DAT bring-PRG come-PAS-PRF
    'Ziroo was brought along by Hanako.'
(17) Taroo wa Hanako ni Ziroo o turete korareta.
   TOP DAT ACC bring-PRG come-PAS-PRF 'Taroo had Hanako bring Ziroo along on him.'

The fact that the -rare inflection in (17) imparts added meaning is an argument for assigning distinct RNs to Affective Union passives and direct passives. It is true, of course, that there are Affective Union passives which do not possess any adversative connotation, as well as direct passives which do. The lexical meaning of the embedded predicate can override that of the Union predicate, so it is not surprising to find that a direct passive containing the verb korosu 'murder' is adversative, nor that an Affective Union passive containing the verb tasukeru 'rescue' is not. I am only claiming that the Union predicate contributes to the meaning of the construction, not that it determines it in an extremely rigid way. What I have proposed here is that the Affective Union predicate possesses the rather amorphous meaning of 'befall' or 'happen to' and in the Affective Union passives subcategorizes an initial 2. The adversative nature of the construction is thereby due to the fact that, in the absence of contradictory semantic features, the custom in Japanese is to interpret negatively the notion of 'something befalling or happening to someone.' Under favorable conditions, however, the construction is open to other interpretations.

2.2 Performance of ni-nominals

I will now discuss some differences that can be observed between the ni-marked nominal in direct passives as opposed to that of Affective Union passives. I will take up the alternation of the postposition ni with ni-yotte, the ability to float a quantifier, and the ability to antecede the reflexive pronoun, zibun.

2.2.1 Acceptability of ni-yotte

Kuno (1973:346) noted that the alternation of ni and ni-yotte marking on the agentive NP of -rare constructions is only allowable with the direct passive, and never with Affective Union passives. The direct passive in (18) optionally allows ni-yotte marking, while Affective Union passive in (19) does not.

(18) Taroo wa Asako ni(-yotte) korosareta.
   TOP DAT(-rely) kill-PAS-PRF 'Taroo was killed by Asako.'

(19) Taroo wa titori ni(*-yotte) sinareta.
   TOP father DAT(-rely) die-PAS-PRF 'Taroo was died on by [his] father.'

In (19), the ni-marking in the Affective Union passive cannot be replaced by ni-yotte.
Condition (20) accounts for the occurrence of ni-yotte in direct passives, and its non-occurrence in Affective Union passives:

(20) **Ni-yotte** Marking Condition

In order to be marked by ni-yotte, a nominal must not head a final 1-arc.

Recalling the RNs illustrated in (2), (4), and (6), we note that the 1-chomeurs of Affective Union passives head final 1-arcs in the downstairs clause. Thus, of the two types of -rare constructions, only direct passives contain a chomeur that does not also head a final 1-arc. Accordingly, ni-yotte may appear as its post-position, provided certain other semantic conditions are met.

2.2.2 Quantifier floating

It is generally recognized in the literature that quantifiers may be floated only from subject and direct object NPs [Masuoka (1979:228)]. The relationally based condition that best accounts for the range of Quantifier Floating among all other constructions in Japanese is as follows:

(21) Quantifier Floating Condition

In order to float a quantifier, a nominal must
(A) head a final 1-arc, or
(B) head a 2-arc.

Turning to -rare constructions, however, we find that this condition, as stated, is no longer adequate.

It is pointed out by Otsuka (1980:130) that the ni-nominals of certain indirect passives may launch a quantifier, while those of direct passives never do. We can see this contrast in the pair of Affective Union passives in (22) and (23) as opposed to the direct passives in (24) and (25). The Affective Union passive allows a floated quantifier in (23), while the direct passive in (25) does not.

(22) Tanaka wa san-nin no kodomo ni sinareta.  
TOP three-CNT GEN child DAT die-PAS-PRF  
'Tanaka suffered three children dying on him.'

(23) Tanaka wa kodomo ni san-nin sinareta.  
TOP child DAT three-CNT die-PAS-PRF  
'Tanaka suffered three children dying on him.'
(24) Yamada-sensei wa san-nin no gakusei ni
teacher TOP three-CNT GEN student DAT

hihan-sareta.
criticize-PAS-PRF

'Professor Yamada was criticized by three students.'

(25) *Yamada-sensei wa gakusei ni san-nin
teacher TOP student DAT three-CNT

hihan-sareta.
criticize-PAS-PRF

'Professor Yamada was criticized by three students.'

On the other hand, it is also the case that the only Affective
Unions in which the ni-nominal can float a quantifier are those
having an intransitive embedded complement.

(26) ??Tanaka ga itumo kinjyo no hito ni san-nin
NOM always close GEN person DAT 3-CNT

ie o ziman-sareta.
house ACC boast-PAS-PRF

'Tanaka always suffers three neighbors
boasting about their houses.'

Obviously, the condition stated in (21) can not account for both
(23) and (26). The ni-nominals of both constructions fulfill con-
dition (A) of (21), yet that of (26) is not able to float a quan-
tifier. The ni-nominal in (23), which does float a quantifier,
cannot be said to fulfill part (B) of the disjunction. Thus, the
condition, as set out in (21), cannot account for the ungrammati-
cality of (26). To remedy this, I have proposed a revision of
this condition [Dubinsky (ms.)]:

(27) Quantifier Floating Condition

In order to float a quantifier, a nominal must:
(A) head a matrix final l-arc, or
(B) head an Absolutive arc.

This accounts for the Quantifier Floating facts, while at the same
time providing further motivation for this analysis. None of the
ni-marked nominals in any of the passive constructions satisfy
part (A) of the condition. The 1-Cho of the intransitive Affec-
tive Union passive, however, floats a quantifier because it heads
an absolutive arc. Since it is also an initial 1, it could only
be said to head an absolutive arc with respect to a predicate if
that predicate's initial stratum were intransitive. This would, in turn, require that the initial 2 of the construction be introduced in a distinct clause. Needless to say, the 1-Cho of the direct passive (25) cannot float a quantifier because it neither heads a matrix final 1-arc, nor does it, due to the presence of an initial 2 in the same clause, head an Absolutive arc.

2.2.3 Reflexive antecedence

The _ni_-marked adjunct of a direct passive construction cannot antecedes the reflexive pronoun zibun, while that of an Affective Union passive can [Kuno (1973:305)]. Thus, there may be two interpretations for Affective Union passive sentences in which both a _ga_-marked adjunct and a _ni_-marked adjunct antecede the reflexive:

(28) Mary wa John ni zibun no uti de korosareta.
    TOP DAT self GEN home LOC kill-PAS-PRF
    'Mary was killed by John in self's home.'

(29) John wa Mary ni zibun no koto o ziman-sareta.
    TOP DAT self GEN matter ACC boast-PAS-PRF
    'John suffered Mary's boasting about self's matters.'

(30) Taroo wa titi ni zibun no uti de sinareta.
    TOP father DAT self GEN home LOC die-PAS-PRF
    'Taroo was died on by [his] father in self's home.'

In (28), only 'Mary' is interpretable as the antecedent of zibun, while in (29), either 'Mary' or 'John' may be interpreted as anteceding the reflexive, and in (30) either 'Taroo' or 'father' may be so construed.

The disjunctive condition restricting the class of acceptable antecedents for zibun is:

(31) **Zibun Antecedence Condition**

The antecedent of a reflexive pronominal must minimally be:

(A) a final 1, or
(B) semantically, an experiencer or a causee.

In (28), the dative-marked nominal, John, does not fulfill either part of the disjunction. Since the direct passive is held to be a single predicate construction having no downstairs clause, it heads no final 1-arc anywhere in its RN. This nominal, obviously, does not fulfill the semantic condition (B) either. Expectedly, it cannot antecede zibun. On the other hand, since the _ni_-marked nominals of (29) and (30) do not fulfill the semantic condition for antecedence, we must conclude that the reason that Mary ni and *titi ni* can antecede *zibun* in (29) and (30) is that they head
final 1-arcs in the downstairs clause of their respective RNs. In the union construction, any nominal which heads a GRx arc in the pre-union stratum is said to head a final GRx in the downstairs clause. The union analysis for AU passives provides for the 1-Chos of direct and AU passives to differ in precisely this way (cf. – (2), (4), and (6)).

2.3 Double passive constructions

There is one additional phenomenon which distinguishes between these two types of passives. This is that double -rare constructions (double passives) are ill-formed in Japanese. Thus, the direct object of a transitive Affective Union passive cannot itself be passivized. In (32-33), we note that the 2 of a transitive construction can be passivized, while in (34-35), that of an Affective Union passive having a transitive downstairs clause cannot.

(32) Raifu-seeba ga Tanaka no kodomo o tasuketa.
    lifeguard NOM GEN child ACC save-PRF
    'The lifeguard rescued Tanaka's child.'

(33) Tanaka no kodomo ga raifu-seeba ni tasukerareta.
    GEN child NOM lifeguard DAT save-PAS-PRF
    'Tanaka's child was rescued by a lifeguard.'

(34) Tanaka ga raifu-seeba ni kodomo o tasukerareta.
    NOM lifeguard DAT child ACC save-PAS-PRF
    'Tanaka was rescued his child by a life-guard.'

(35) *Kodomo ga raifu-seeba ni-yotte Tanaka ni tasukerarerareta.
    child NOM lifeguard DAT-rely DAT save-PAS-PAS-PRF

If Japanese is thought to uniformly allow 2-1 advancements out of transitive strata, then there would be nothing to rule out the direct passivization of the o marked nominal in (35) if that nominal headed a matrix final 2-arc in (34). My analysis of Affective Union passives, however, predicts the ill-formedness of such constructions, since the direct object introduced by the Affective Union predicate puts en chomage any downstairs final 2. The ungrammaticality of (35) thus falls out as a consequence of the Chomeur Advancement Ban, and needs no special constraint.

3.0 Conclusions

In this paper, I have demonstrated that there are at least seven arguments for assigning distinct RNs to AU passives and direct passives. They are: the special adversative meaning implicit in the AU passive, the selection restrictions on the subject of an AU passive, the fact that the AU passive possesses addition argument structure, the potential for optionally marking
ni-nominals with ni-yotte, the ability of the ni-nominal to float a quantifier, the ability of the ni-nominal to antecede the reflexive zibun, and the inability of the Ω-marked nominal of an AU passive itself to undergo direct passivization. The analysis that I have provided for the AU passives provides an adequate account of the differences between the two classes of passives. In addition, it attributes to the AU passives a structure which is already well motivated for a host of other languages, as well as for Japanese itself (Causative Union), and which is constrained by known universals.

FOOTNOTES

*I would like to acknowledge the advice and assistance of the following persons, in helping me bring this paper to its present state: Professor Carol Rosen, for her unending help in developing the ideas presented here and for her editorial advice; Professor Wayne Harbert, for his advice and support over the past year; Dr. William Davies, for his comments, suggestions, and sympathetic ear; Ms. Yuziko Yamashita Shooji of Cornell, Ms. Yuuko Mogami of Kobe University, and Ms. Mariko Udo also of Kobe University, who were my primary informants in arriving at this analysis, for their great patience in working with me. Any omissions and errors are, of course, my responsibility alone.

1 I owe this notion to Davies (1985). A Direct Subject Dependent is defined as follows:

Direct Subject Dependent

NP_1 is a direct subject dependent of S if and only if NP_n is the subject of S and a path traced from NP_n to NP_1 does not cross any category y node = NP.

2 Mamoru Saito (1982) presents an apparent counterexample to this restriction. In (a), the subject nihonsya is understood as possessing the quality keizaimei. This fact is confirmed in (b) and (c), in which only the sentence containing nihonsya no kei-

2 Saito (1982)]

(a) [Saito (1982)]

Nihonsya wa sono keizaimei o takaku hyookasarete-iru.
Japanese cars TOP its economy ACC highly regard-PAS-PRG-IMP
'Japanese cars are appreciated for their low cost.'

(b) [cf.(a)]

Sekai wa nihonsya no keizaimei o takaku hyooka-site-iru.
world TOP Japanese car GEN economy ACC high regard-PRG-IMP
'The world highly regards the low cost of Japanese cars.'
(c) [cf.(a)]

?Sekai wa keizaisei o takaku hyouka-site-iru.
world TOP economy ACC highly regard-PRG-IMP
?'The world highly regards the low cost.'

The possessor relation is implicit and obligatory in apparent counterexamples of the type presented by Saito. Furthermore, the subject in sentences such as (a) is definitely not construed as being an affectee. 'Japanese cars' are in no way affected by having their economy 'highly regarded.' It is for these reasons that I would posit a possessor ascension analysis for (a), claiming that, in Japanese, possessor ascension out of a 2 is followed, obligatorily, by a 2-1 advancement. The RN claimed here for (a) is illustrated below in (d).

(d)

The obligatory advancement to 1 in (d), resulting in a passive RN, can be stated as a necessary condition for all possessor ascendees in Japanese.

(e) Possessor Ascension Condition

A possessor ascende must head a 1-arc finally.

This condition seems to apply for at least one other language besides Japanese. Malagasy [Keenan (1976), Perlmutter/Postal (1972/1983)] appears to be even more restrictive in delimiting the class of nominals available for possessor ascension. In Malagasy, the host of possessor ascension must head a 2-arc initially. Thus, possessor ascension is possible out of the initial 2 of an unaccusative predicate, but not out of the initial 1 of an unergative. (f) through (h) illustrate this contrast, where (f) and (g) are taken to have an unaccusative initial strata.

(f)

i. marary ny zanan- dRabe
   sick the child of-Rabe
   'The child of Rabe is sick.'
ii. marary zanaka Rabe
    child
    'Rabe has a sick child.'
(g) i. nianjera ny tranon-dRabe
   fell the house of-Rabe
   'Rabe's house fell.'
ii. nianjera trano Rabe
    house
    'Rabe had his house fall.'

(h) i. mihira ny zanan- dRabe
    sings the child of-Rabe
    'Rabe's child is singing.'
ii. *=mihira zanaka Rabe

The ascendees, as in Japanese, must also head a final l-arc. This
results in passive constructions for all possessor ascensions in
which the predicate is transitive. Only the passive sentence in
(i) and (j) allow possessor ascension.

(i) i. manadino ny anaran' ny mpianatra aho
    forget the names-of the students I
    'I forget the names of the students.'
ii. *=manadino anarana mpianatra aho

(j) i. hadino-ko ny anaran' ny mpianatra
    forgotten-by-me the names-of the students
    'The names of the students are forgotten by me.'
ii. hadino-ko anarana ny mpianatra
    name
    'The students had their names forgotten by me.'

As we have seen above, in the case of Saito's apparent counterex-
ample, Japanese is similar to Malagasy in at least this latter
respect.

3 The argumentation for this condition is fully laid out in
Chapter 2 of Dubinsky (ms.), and is much too involved to present
here.

4 As with the Quantifier Floating Condition, the argumenta-
tion for this disjunction is too detailed for a paper of this
length, and is presented in Dubinsky (ms.).

REFERENCES

Cyrus, Edward (1983). "Japanese Constructions Marked by -Rare,

Davies, William (1985). "Nominative Nonsubjects in Choctaw," Cor-
nell Working Papers in Linguistics 7:(this volume).


Gibson, Jeanne, and Eduardo Raposo (to appear). "Clause Union, the Stratal Uniqueness Law and the Chomeur Relation."


GEMINATES IN INTENSIVE AND ITERATIVE
GERMANIC CLASS II WEAK VERBS

Sarah M.B. Fagan
Cornell University

1. Introduction

The origin of geminate obstruents in Germanic has long been a
topic of investigation.1 Although the Indo-European parent
language did possess *tt (< t+t and d+t), which appeared in
Germanic (and Italic and Celtic) as *ss (OHG giwiss, OE gewiss
'certain', Go. unwiss 'uncertain' < IE *uid-tō-), the geminate
obstruents pp, tt, kk, bb, dd, and gg do not correspond to
etymologically related geminates in any other IE language, and are
therefore to be viewed as an innovation within Germanic.2,3

The geminates occur in both nouns (OHG tropfo (pf < pp)
'drop'; ON knøtr 'ball'; OHG smocko 'shirt') and in verbs (OE
hoppian 'hop'; OHG krazzōn (zz < tt) 'scratch'; ON hlakka
'scream'). This study, however, examines only the geminates which
occur in verbs - more specifically, those which are found in the
intensives and iteratives of class II weak verbs. Table 1
provides a sample of these intensives and iteratives.

What is striking about the list in Table 1 is the fact that
it contains no Gothic examples: the geminates in question simply
do not exist in any verbs in Gothic.4 Geminate obstruents do
occur in the language, but only across morpheme boundaries
TABLE 1

Class II Weak Intensives and Iteratives with Geminate Obstruents

<table>
<thead>
<tr>
<th>ON</th>
<th>flakka</th>
<th>'flutter, flicker'</th>
<th>ON</th>
<th>rugga</th>
<th>'shake, rock'</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>hlakka</td>
<td>'scream'</td>
<td>MHG</td>
<td>snitzen</td>
<td>'carve'</td>
</tr>
<tr>
<td>ON</td>
<td>hnippa</td>
<td>'push'</td>
<td>OE</td>
<td>soppiam</td>
<td>'soak, sop'</td>
</tr>
<tr>
<td>OE</td>
<td>hnoppian</td>
<td>'pluck'</td>
<td>OGH</td>
<td>stapfôn</td>
<td>'stride'</td>
</tr>
<tr>
<td>OE</td>
<td>hoppan</td>
<td>'hop'</td>
<td>OE</td>
<td>stroccian</td>
<td>'stroke'</td>
</tr>
<tr>
<td>OGH</td>
<td>krazzôn</td>
<td>'scratch'</td>
<td>OGH</td>
<td>tocchôn</td>
<td>'dive repeatedly'</td>
</tr>
<tr>
<td>OGE</td>
<td>liccian</td>
<td>'lick'</td>
<td>OGH</td>
<td>troppôn</td>
<td>'drip'</td>
</tr>
<tr>
<td>OGH</td>
<td>locchôn</td>
<td>'allure, entice'</td>
<td>OGH</td>
<td>tropfôn</td>
<td>'drip'</td>
</tr>
<tr>
<td>OGH</td>
<td>rizzôn</td>
<td>'scratch'</td>
<td>OSw.</td>
<td>vagga</td>
<td>'rock, sway'</td>
</tr>
<tr>
<td>OGH</td>
<td>ropfôn</td>
<td>'tear up, shred'</td>
<td>OGH</td>
<td>zocchôn</td>
<td>'snatch'</td>
</tr>
</tbody>
</table>

(mib+pan+ei 'while', att+tiuhan 'draw') and only in the words atta 'father', skatts 'money', sakkus 'sack', and smakka 'fig' (the etymology of the first two words is uncertain, although atta is generally viewed as having its origin in child language; the latter two words are loans). The absence of Gothic forms in Table 1 is thus an important aspect of the problem of geminate obstruents in class II intensives and iteratives.

A second important point to consider with respect to class II intensives and iteratives involves the phonetic properties of their geminates. A number of these intensives/iteratives are deverbative. When one compares these derived verbs with their related (strong) verbs (examples (1)-(3)), one notes that corresponding to three different types of single stem-final obstruents in the latter, only voiceless geminate stops appear in the former:

1. *t ON ríta 'engrave' *tt OGH rizzôn 'scratch'
2. *p Go. sneipan 'cut' *tt OGH *snizzôn 'carve'
3. *g Go. bilaigon 'lick' *kk OE liccian 'lick'

There is also a case in which a single, stem-final voiced stop in a strong verb corresponds to a geminate voiced stop in a related weak verb:

4. *d OE tredan 'tread' *dd OE treddian 'tread'
An explanation for the origin of geminate obstruents in class II intensives and iteratives will have to account for the seemingly anomalous correspondences illustrated in (1) through (4).

This paper presents the four main types of explanation which have been proposed for the origin of geminate obstruents in iterative and intensive class II weak verbs, and discusses the problems each must confront. The four types of explanation are: 1) n-assimilation, 2) expressive gemination, 3) a combination of n-assimilation and expressive gemination, and 4) morphological gemination. The solution to be suggested here is based on expressive gemination, which appears to be the most viable of all the explanations proposed for the appearance of geminate obstruents in class II intensives and iteratives.

2. N-Assimilation

The first explanation offered for the development of geminate obstruents in Germanic was n-assimilation: gemination was believed to be the result of the assimilation of an n to a preceding obstruent. Kluge (1884) was the first to offer a detailed account of this approach to the origin of geminates in Germanic. 5

Kluge assumed an n-suffix to be responsible for gemination of obstruents because 1) ŋ was not involved in other assimilations in Germanic (ll < ln in Ge. fulls = Sk. pūrnā < *pūno- 'full'; Go. wulla = Sk. ūrnā < *ūrnā- 'wool'), 2) no other consonant existed which could have produced geminates in this way in Germanic times, and 3) relatively seldom was a single stop found which was followed by an n; where such a stop was found, the (IE) accent was not on the n-suffix. Thus Kluge concluded that geminate obstruents were the result of assimilation of an n to a preceding obstruent when the n-suffix was accented.

Kluge explained the appearance of geminate voiceless stops in Germanic as a result of the interaction of n-assimilation, the Germanic sound shift, and Verner's Law. In order to account for geminate voiced stops and geminate voiceless fricatives, he appealed to the process of analogy. 6 Thus, although Kluge did not explicitly deal with the problem of correspondences like those in (1) through (4), his approach to the phonetic properties of geminate obstruents in Germanic would account for such correspondences by means of phonological processes and analogy.

There are a number of shortcomings in the n-assimilation theory - not only as an explanation for the appearance of geminate obstruents in Germanic in general, but also as an explanation for their appearance in class II weak intensives and iteratives. One of the main difficulties with n-assimilation is the scarcity of
evidence for this process. According to Streitberg et al. (1936:332), the only possible evidence for n-assimilation to a preceding stop is ON lokkr 'lock of hair': Lit. lugnas 'flexible', where the IE accent can only be inferred, and OHG lecchôn 'lick': Gk. λιγνας 'sweet-toothed'.

Not only is the evidence for n-assimilation very scarce, there is also counterevidence. In class IV weak verbs in Gothic, for example, where one expects suffix accent and therefore geminate obstruents and loss of n, one nevertheless finds single obstruents and retention of n (Gō. gawaknan 'awaken'; cf. also ON vaknà, OE wæcnan).

Another significant problem facing the n-assimilation theory is the absence of verbs in Germanic with geminate obstruents which correspond to verbs with present n-suffixes in other IE languages. That this cannot be accidental is suggested by the fact that there are -nōn verbs in Germanic which retain n and have cognates in other IE languages: OHG spornōn 'kick': Lat. spernere 'reject, despise' (Wissmann 1932:161).

Also problematic is the fact that most n-presents in Germanic have an inchoative meaning, whereas the verbs in Germanic with geminates are clearly intensives/iteratives (Wissmann 1932:161). Although it is possible for a single language to assign a special meaning to a given suffix/sound sequence (cf. /gl/ in Eng. glimmer, gleam, glitter, etc.), it is not at all clear why some n-presents in Germanic retain an inchoative meaning, whereas others, those with geminate obstruents, develop an intensive/iterative meaning.

In his critique of the n-assimilation theory, Martinet (1937:98-103) points out that assimilation of an obstruent to a following n is phonetically improbable in Germanic. He notes that of the assimilations which can be attributed with certainty to Germanic, the only one which can truly be characterized as a progressive assimilation is that of ln to ll.

A final problem with the n-assimilation theory is the absence of geminates in Gothic verbs. If the development of geminate voiceless stops in Germanic was a direct result of regular sound change, as proponents of the n-assimilation theory claim, the complete absence of these geminates in Gothic verbs, and the scarcity of such geminates in nouns as well, can hardly be considered accidental, given the significant number of verbs and nouns with geminate obstruents in other Germanic dialects. However, the proponents of the n-assimilation theory offer no explanation for the absence of these geminates in Gothic verbs.

To sum up the problems with the n-assimilation theory:
WHEREAS THERE IS VERY LITTLE EVIDENCE FOR THE N-ASSIMILATION PROCESS, THERE IS ALSO COUNTEREVIDENCE. FURTHERMORE, THIS SORT OF PROGRESSIVE ASSIMILATION IS PHONETICALLY IMPROBABLE IN GERMANIC. ARGUING EVEN MORE STRONGLY AGAINST THE THEORY WITH RESPECT TO CLASS II INTENSIVES AND ITERATIVES IS THE COMPLETE ABSENCE OF EXTRA-GERMANIC EQUATIONS. THE LACK OF CONGRUITY BETWEEN THE SEMANTIC CHARACTERISTICS OF THE GERMANIC VERBS WITH GEMINATES AND THOSE OF THEIR N-PRESENT COUNTERPARTS ALSO PUTS INTO DOUBT THE POSSIBILITY THAT THE VERBS WITH GEMINATES EVER CONTAINED N-SUFFIXES: MOST GERMANIC N-PRESENTS ARE INCHOATIVE IN MEANING, WHILE THE GERMANIC VERBS WITH GEMINATES ARE INTENSIVES/ITERATIVES. FINALLY, NO EXPLANATION IS PROVIDED BY THE PROponents OF THE N-ASSIMILATION THEORY FOR THE ABSENCE OF GEMINATES IN GOTIC VERBS.

3. EXPRESSIVE GEMINATION

THE TWO MAJOR WORKS WHICH TREAT GEMINATION IN INTENSIVE AND ITERATIVE CLASS II WEAK VERBS IN GERMANIC AS EXPRESSIVE GEMINATION ARE WISSMANN (1932) AND MARTINET (1937). TO DEMONSTRATE THAT THE GEMINATION IN THESE VERBS CAN BE VIEWED AS EXPRESSIVE, WISSMANN PRESENTS VARIOUS CATEGORIES OF WORDS WITH EXPRESSIVE GEMINATION AND EXPLAINS WHAT THESE WORDS HAVE IN COMMON WITH INTENSIVES AND ITERATIVES.

SOME OF THE CATEGORIES OF WORDS WHICH WISSMANN DISCUSSES ARE:
1) 'LALLWORT', ENG. DADDY, LAT. ATTA, GO. ATTA 'FATHER';
2) 'KURZNAMEN', SICCO (FOR SIGMAR), FRIEDRICH (TZ < *TT; FOR FRIEDRICH); 3) ANIMAL NAMES, LAT. CATT 'CAT', COCCUS 'COCK', ON BOKKR 'BUCK'; 4) WORDS FOR WORTHLESS OR DISGUSTING THINGS, LAT. Muccus 'MUCUS', ON Brekkr 'FILTH', ON Spotti 'LITTLE PIECE'; AND 5) ONOMATOPOETIC WORDS, OE Clappian 'THROB, BEAT', ENG. HICUP, OE Rabba 'BABBLE'. WISSMANN EXPLAINS THAT WHAT ALL OF THE WORDS IN THESE CATEGORIES HAVE IN COMMON IS 'GEFÜHLSBETONTHEIT', EMOTIVE EMPHASIS.

ACCORDING TO WISSMANN, INTENSIVES AND ITERATIVES WITH GEMINATE OBSTRUENTS BELONG TO THIS SPHERE OF WORDS, AND, IN PARTICULAR, ARE CLOSELY RELATED TO ONOMATOPOETIC WORDS. WISSMANN NOTES THAT THE GEMINATES IN INTENSIVES AND INTENSIVE-ITERATIVES ARE GENERALLY VOICELESS STOPS. HE MAINTAINS THAT THE ENERGETIC ARTICULATION OF THESE GEMINATES IS IMITATIVE OF THE INTENSITY OF THE ACTION WHICH IS EXPRESSED BY THE VERB IN WHICH THEY APPEAR (OE Hopppian 'HOP', OHG ropfôn 'TEAR UP, SHRED', OHG zocchôn 'STEAL, GRAB'). SUCH VERBS ARE SIMILAR TO ONOMATOPOETIC WORDS IN THAT THEY ARE IMITATIVE, ALTHOUGH THEY ARE IMITATIVE OF ACTION RATHER THAN SOUND.

CLASS II WEAK ITERATIVES ON THE OTHER HAND - ESPECIALLY THOSE WHICH CHARACTERIZE AN IMPRECISE, CARELESS, IRREGULAR MOVEMENT OR ACTION - GENERALLY EXHIBIT GEMINATE VOICED STOPS OR GEMINATE
fricatives (ON rugga 'joggle', OSw. vagga 'rock, sway', OE treddian 'tread, step'). Wiseman maintains that such verbs do not express energy of action because the geminates they contain are not articulated with particular force (Wiseman 1932:169-72). In order to explain the existence of geminate voiceless stops in itatives, Wiseman notes that iteratives are closely related to intensives: the effect of a repeated action is often equivalent to that of a single, energetic action. There are verbs which have both an intensive as well as an iterative meaning; these verbs express not only a repeated action, but a repeated, short, and often energetic action. The NHG verb hüpfen, for example, does not simply mean to repeatedly bend one's knees and jump, but to move jerkily, in short leaps (Wiseman 1932:172-3).

Following are the important points of Martinet and Wiseman's discussion of the phonetic properties of geminate obstruents in intensives and iteratives. First of all, as Martinet (1937:26 ff.) notes, geminate voiced stops tend, in general, to be devoiced. Thus, the preponderance of geminate voiceless stops in Germanic (and in class II weak intensives and iteratives) can be viewed as a result (in part) of natural phonological processes. Second, geminate voiceless stops may simply have been used to form intensives and iteratives because of their inherent sound-symbolism. Likewise, the use of geminate voiced stops in certain verbs (cf. OE treddian 'tread') may have been due to the fact that this type of sound sequence was perceived as most appropriate for expressing the particular meanings associated with those verbs. Thus, correspondences like those illustrated in (1) through (4) are explained within the theory of expressive gemination as resulting from semantic influence as well as phonological processes.

Martinet provides an explanation for the lack of a class of intensives and iteratives with geminate obstruents in Gothic by pointing out that the language exhibits virtually no expressive gemination. He argues that the lack of expressive gemination in Gothic cannot be accidental, since there are many instances in the Gothic texts of words expressing notions for which the other Germanic dialects employ forms with expressive gemination (Go. kukjan 'kiss', frijon 'love', OE coss, OHG cuss (gen. cusses), ON koss 'kiss', and derived verbs; Go. bilaikan 'mock', OHG spotsun, ON spotta 'mock'; and especially Go. klismjan 'resound, ring, peal' instead of a verb corresponding to OE giellan, OHG gellan, ON gjalla 'sound, sound loudly', a verb which very likely existed in Gothic (Martinet 1937:64-5)). According to Martinet, the absence of expressive gemination is an indication that in 4th century Gothic, the phenomenon simply had not yet become as widespread or acquired the perfectly normal character as it did later in the other Germanic dialects (Martinet 1937:114).
Although the theory of expressive gemination provides a reasonable account for the phonetic characteristics of Germanic intensives and iteratives with geminate obstruents and for the lack of such intensives and iteratives in Gothic, there is one problem which has not been addressed directly by either Wissmann or Martinet (or any other proponent of expressive gemination). What remains to be clarified is the motivation for the use of geminates to form intensives and iteratives in Germanic. Why were these geminate obstruents perceived to be capable of expressing intensity and iterativity? How did they acquire their special expressive characteristics?

4. N-Assimilation and Expressive Gemination

Although scholars were eventually forced to admit that, at some point in time, geminates had acquired an expressive function and were used as a word formation device, there were those who were reluctant to abandon the n-assimilation theory entirely, given the problem of motivation for the use of geminates in Germanic to express intensity, iteration, etc.

Hellquist suggested that several isolated cases of assimilation (in verbs with -nā-suffixes, for example) contributed to the spread of gemination in intensives and iteratives (Hellquist 1908, as discussed in Martinet 1937:93).

Bloomfield (1925:93) argues that one cannot say for sure that assimilation of an n to a preceding obstruent was the process which first produced the geminates pp, tt, and kk in Germanic, since some other sound change may have produced them. However, he argues that the uncertainty of the n-assimilation theory does not prove that expressive gemination was the original source of Gmc. pp, tt, and kk. To account for the introduction of geminate voiced stops and geminate fricatives in Germanic, he appeals to the process of analogy. However, Bloomfield does not attempt to account for all cases of gemination by regular phonological processes or analogy. He does admit that certain types of geminates did acquire special meanings and were used in the creation of new words with these meanings.

Marchand (1956) argues that there was no Proto-Germanic n-assimilation and that *pp, *tt, and *kk did not exist in Proto-Germanic. However, he claims that n-assimilation did take place in West Germanic. To explain the existence of geminates in verbs, he claims that the geminates in the West Germanic counterparts to the Gothic and ON inchoative/perfective verbs with the suffix -na- (Go. gawaknan, ON vakna 'awake', Go. gabatnan 'profit', ON batnā 'get better', Go. fulnān 'become full', ON fullna 'fulfill, finish', ON kvikna 'quicken, come to life', ON sakna 'lack, feel the loss of', etc.) acquired a phonesthemic function of forming
perfectives 'since they had already been used to indicate punctiliar action when they were *Cn' (Marchand 1956:56).

It is not necessary, for the discussion at hand, to present Marchand's explanation for the appearance of geminates in ON. It will suffice to point out the difficulties with his account of the development of geminates in West Germanic. First of all, there is no clear example of n-assimilation in West Germanic. Second, if gemination of stops before n did occur in West Germanic, why do we find OE wæcnan 'awake' and Regnian 'rain'? Third, even if one is to admit the possibility of a perfective meaning in verbs such as those listed above (Go. gawaknan, etc.) and the possibility that geminate stops which arose from the Cn sequence in these verbs acquired a perfective meaning, it is very difficult to see the perfective meaning these phonesthemic geminates gave to new creations such as NHG bücken 'bow, stoop, bend', nicken 'nod', schmücken 'drown' (< MHG smücken, smucken 'press into something, cling to, slip into a dress'), zücken 'jerk', schupfen 'shove', schnitzen 'whittle'.

Marchand's explanation for the development of geminate obstruents in West Germanic cannot be viewed as an improvement over the theories of n-assimilation or expressive gemination. Similarly, the explanations offered by Hellquist and Bloomfield for geminates in Germanic as a whole cannot be viewed as superior to previous theories. Because it has not been demonstrated that n-assimilation or any other regular phonological process gave rise to geminates in Germanic, these theories offer us nothing more than the theory of expressive gemination.

5. Morphological Gemination

Kuryłowicz (1957) proposed the theory of morphological gemination to account for geminate obstruents in Germanic (and Celtic), a theory which is similar to that of expressive gemination in that gemination is viewed as a morphological device, but which differs from the latter in that the theory provides the motivation for the use of geminates to form intensives and iteratives.

The ultimate source for geminate obstruents in Germanic is, according to Kuryłowicz, the geminate sonorants (liquids/nasals) which appear in class III strong verbs:

5. a. OHG bellan < *-ln- 'bark'
b. OHG kerran < *-rs- 'groan'
c. OE hlimman < ? 'sound'
d. Go. brinnan < *-nŋ- 'burn'
The geminates in (5) were originally restricted to the present, being the result of assimilation of the stem-final consonant and a present suffix, but were eventually generalized throughout the entire verbal paradigm (cf. the preterite-present Go. kann, kunnun 'know'). These geminates also found their way into deverbative derivatives: OE cramman 'cram, stuff' (< *krimm- OE crimman 'cram, insert'), ON kurra 'growl, grumble' (< *ker- OHG kerran 'groan'), OHG *bullōn (3rd pers. sg. pres. pullōt) 'roar, bellow' (< *bell- OE bellan 'bellow, bark').

According to Kuryłowicz, at some point in time, derived forms with a single stem-final consonant (built upon the verbal root, not the present stem; cf. ON brenna 'burn' : ON bruni 'burning'; OE swellan 'swell' : OE swyle 'swell, swelling') appeared alongside forms with geminate consonants (derived from the present stem; cf. OE cramman, etc., above): *kurōn : *kurrōn (< OHG kerran). The double consonant in such forms was perceived as "expressive" not in virtue of its phonologically marked character but as the carrier of the primary semantic function (causative, iterative, etc.), whereas the secondary functions were still, during a certain time, rendered by not geminated forms' (Kuryłowicz 1957:135). The temporary opposition single consonant/double consonant became productive and brought about the creation of new forms with geminates: *kurōn : *kurrōn (< OHG kerran) = *tugōn : *tukkōn (< OHG tiuhan).

Kuryłowicz accounts for the correspondences in (1) through (4) by assuming that morphological gemination occurred in several stages in Germanic: pp, tt, and kk result from the first stage of gemination; bb, dd, gg, ff, bb, and hh belong to more recent stages.

Kuryłowicz acknowledges the fact that although forms with expressive gemination (as defined by Martinet, Wissmann, etc.) may not have been judged to be appropriate in the Gothic translation of the Bible, one ought to find an occasional iterative verb in -ōn in Gothic, for example, with morphological gemination. In order to account for the absence of such verbs in Gothic, Kuryłowicz concludes that morphological gemination was a feature common only to North and West Germanic, developed during the period of the linguistic community of these two branches of Germanic between 200 and 600 AD (Kuryłowicz 957:140).

Kuryłowicz's theory of morphological gemination does attempt to provide the motivation for the use of geminates in iteratives and intensives in Germanic. It also provides an account for the correspondences in (1) through (4) and for the lack of gemination in Gothic. However, the theory is weakened considerably because of the scarcity of evidence for the existence of a period in which
forms such as *kurōn and *kurrōn coexisted, a period which provides the crucial stage for the introduction of gemination as a morphological device in Germanic.

Krämer (1971:42) claims that the coexistence of forms such as *kurōn and *kurrōn can only be hypothetical. He maintains (1971:111) that forms corresponding to *kurōn are not attested, and are not even posited as reconstructed forms in Falk and Torp (1909) or in any etymological dictionary of a Germanic dialect. In Seebold (1970), however, we do find two pairs exhibiting a pattern parallel to that in *kurōn and *kurrōn: OS hlamōn 'rage, roar': OWN hlamma 'sound, resound' (< *hlamma- 'sound, resound'); OWN gola 'howl, scream': OS gellōn 'grumble, mutter' (< *gell- 'sound shrill, resound'). One must ask, though, if these two pairs provide sufficient evidence for the existence of a period which might have given rise to the productive use of gemination as a morphological device. Because there are only two pairs such as *kurōn: *kurrōn to be found in the older Germanic dialects, this puts into serious doubt the possibility that there were ever enough equations of this sort such that geminates would have been perceived as being 'expressive' in Kuryłowicz's sense.

6. A Solution

6.1 Motivation for Expressive Gemination. The most viable explanation presented above for the origin of geminate obstruents in class II weak intensives and iteratives is that of expressive gemination. However, if one accepts expressive gemination as an explanation for the appearance of geminates in these verbs, one is still faced with the problem of determining the motivation for the use of geminates as an expressive device to form intensives and iteratives.

When discussing expressive gemination in strong verbs with geminate liquids and nasals, Martinet suggests a possible starting point for the use of gemination as an expressive device in the formation of (weak) intensives and iteratives, but never pursues the topic in any detail. He points out (Martinet 1937:143) that a comparison of OHG strong verbs exhibiting single stem-final liquids with those exhibiting geminate liquids reveals that a clear majority of verbs belonging to the former group do not have a meaning which is particularly expressive, whereas in the latter group there are four onomatopoetic verbs (bellan 'bark, bay', gellan 'sound shrill', scellan 'sound, resound', kerran 'creak, rattle') and a number of other verbs for which an expressive form is not surprising (scerran 'scrape, scratch', werran 'confuse, jumble up', wellan 'roll, turn about', quellan 'gush, burst out', swellan 'swell'). He does suggest that gemination in some verbs could be the result of regular phonological processes (-ll- < -ln-, -rr- < -rs-), whereas in others it is probably
expressive in origin (OHG gellan, OE giellan, ON gialla 'sound shrill'; cf. OE, OHG galan, ON gala 'sing'). He concludes, however, that one is left entirely to speculation regarding the origin of such geminates, and that it is of little importance to know whether all onomatopoetic verbs with geminate liquids or nasals owe their consonantism to expressivity or whether gemination in these verbs arose as the result of regular sound change and was only secondarily perceived of as expressive because of its appearance in such words. According to Martinet, what is of importance is the fact that a certain number of strong verbs exhibit expressive gemination and that this gemination had to be produced earlier for liquids and nasals than for obstruents, otherwise one would not be able to explain why all verbs with geminate obstruents are weak, whereas those with geminate liquids/nasals which exhibit expressivity with the most regularity are strong (Martinet 1937:143-4).

The relative chronology of expressive gemination of liquids (and nasals) in comparison to that of obstruents is clearly of importance. However, it is of more importance than Martinet brings out, since it is very likely that the gemination of liquids in strong verbs provided the point of departure for the gemination of obstruents in the creation of weak intensives and iteratives.

If one examines all the strong verbs with geminate liquids which have been reconstructed for Germanic in Seebold (1970), a clear majority exhibit sound symbolism. These verbs are listed in Table 2. The only verbs with geminate liquids which are not associated with sound are *bell- 'hit, strike', *fall- 'fall', and

<table>
<thead>
<tr>
<th>Strong Onomatopoetic Verbs with Geminate Liquids</th>
</tr>
</thead>
<tbody>
<tr>
<td>*bell- 'bark'</td>
</tr>
<tr>
<td>*gell- 'sound shrill'</td>
</tr>
<tr>
<td>*gerr- 'creak'</td>
</tr>
<tr>
<td>*gnell- 'scream'</td>
</tr>
<tr>
<td>*hell- 'sound'</td>
</tr>
<tr>
<td>*kerr- 'creak, groan'</td>
</tr>
<tr>
<td>*kwell- 'gush, burst out'</td>
</tr>
<tr>
<td>*kwerr- 'gulp down, devour'</td>
</tr>
<tr>
<td>*skell- 'sound'</td>
</tr>
<tr>
<td>*skerr- 'scrape, scratch'</td>
</tr>
<tr>
<td>*skrell- 'sound shrill'</td>
</tr>
<tr>
<td>*smell- 'burst, explode'</td>
</tr>
<tr>
<td>*swell- 'swell'</td>
</tr>
<tr>
<td>*wall- 'undulate, bubble, seethe'</td>
</tr>
<tr>
<td>*well- 'roll, undulate, bubble'</td>
</tr>
<tr>
<td>*werr- 'confuse, jumble up'</td>
</tr>
</tbody>
</table>

* werr- 'wither, shrink'.

The vast majority of verbs with a single stem-final liquid, however, do not exhibit meanings associated with sound. One finds only *gal- 'sing', *wul- 'undulate, bubble', and *kwer- 'sigh' (possibly also *mal- 'grind', and *ter- 'tear'), as opposed to *al- 'feed', *dweľ- 'remain', *hel- 'hide', *kal- 'freeze', *kwel- 'suffer', *stel- 'steal', *ber- 'carry', *far- 'travel', *sker- 'shear', *swer- 'fester', and *pwer- 'incite'.

Thus we can conclude that there were a significant number of verbs in Germanic which were related formally - through gemination of their stem-final liquids - and semantically - through meanings associated with sound.

Given this significant number of onomatopoetic verbs with geminate liquids, it is very likely that the geminates in these verbs were eventually felt to be the specific verbal element which expressed meanings associated with sound, and that these geminates were used in the production of new verbs which were sound symbolic.19

In fact, at a time when the second weak verbal class was productive (well after the class of strong verbs had been established), new sound symbolic verbs were produced, not only with geminate liquids, but also with geminate obstruents. Verbs with geminate liquids found their way into this class as derivatives of strong verbs with geminates (cf. OS gellōn 'grumble, mutter': Gmc. *gell- 'sound shrill'; OHG pellōn 'bray': Gmc. *bell- 'bark'; OHG karrōn 'buzz', ON kurra 'creak, rattle': Gmc. *kerr- 'creak, rattle'; etc.), so that it is possible that the geminates in these verbs, as well as those in strong verbs, contributed to the spread of gemination of obstruents in other verbs in this class. It is not surprising that geminate obstruents should have been used, since a good number of sound symbolic verbs with geminate liquids already existed (both weak and strong). The list of class II weak verbs with geminate obstruents which appears in Wissmann (932:173-92) reveals a number of verbs which are onomatopoetic. A sample of these verbs is given in Table 3.

Thus far we have seen a likely source for the introduction of geminate obstruents in class II weak onomatopoetic verbs: The group of strong onomatopoetic verbs with geminate liquids (cf. Table 2) and their class II weak derivatives (see the discussion above) very likely provided the pattern (geminate for sound symbolism) on which class II weak onomatopoetic verbs with geminate obstruents were formed. In order to account for the use of geminate obstruents to form class II intensives and iteratives, I will elaborate on Wissmann's characterization of the relationship between intensives and iteratives on the one hand, and onomatopoetic verbs on the other (cf. also the discussion in
TABLE 3

Class II Weak Onomatopoetic Verbs with Geminate Obstruents

*hikkōn OSw. hikka 'hiccup' *snakkōn MLG snakken 'chatter'
*klappōn ON klappa 'clap' *snappōn MDu. snappen 'chatter'
*kloppōn OFr. kloppia 'knock' *snuppōn OSw. snuppa 'sob'
*klukkōn OE cluccian 'cluck' *sputtōn OSw. sutta 'spit'
*okkōn ON okka 'sigh' *tikkōn Du. tikken 'tick'

section 3).

Intensives and iteratives with geminates are like onomatopoetic verbs with geminates in that they are imitative. However, intensives and iteratives are imitative of movement (action) rather than sound. The 'lengthening' (doubling) of consonants in intensives can be viewed as imitative of the 'lengthened' (intensified) action expressed by these verbs (cf. ON hnippa 'push'). The doubling of consonants in iteratives can be viewed as imitative of repeated action (cf. ON yappa 'move back and forth'). Likewise, the doubling of consonants in onomatopoetic verbs can be viewed as expressing the intensity (cf. ON hliakka 'scream'), the repetition (cf. OSw. hikka 'hiccup'), or the particular quality (cf. OHG wēllōn 'bubble, boil') of sound associated with these verbs. As Wissmann notes, it is often difficult to separate intensives and iteratives, which are imitative of movement, from those which are imitative of sound: *snappōn and *snakkōn do not simply mean 'chatter', but also 'snatch, snap'; *tikkōn means 'tap' as well as 'tick' (cf. Table 3). Many of the verbs in Table 2 (those classified as onomatopoetic) can be viewed as imitative of movement as well as sound (cf. *skerr- 'scrape, scratch', *smell- 'burst, explode', *well- 'roll, undulate, bubble'). It is verbs such as these, that is, verbs which are imitative of both sound and movement, which provide the (semantic) bridge between verbs which are clearly imitative of sound (onomatopoetic) and those which are clearly imitative of movement, namely intensives and iteratives. Given the semantic similarities between onomatopoetic verbs and intensives and iteratives, it is not surprising to find both types well represented in the second weak class in Germanic.

Furthermore, it is not difficult to see that the use of geminates to form class II weak onomatopoetic verbs would be adopted in the formation of class II intensives and iteratives.

One cannot deny the expressive, symbolic, character of
geminates in onomatopoetic formations. Similarly, the use of
geminates in intensives and iteratives can also be attributed a
symbolic function. The use of geminates in onomatopoetic words
and in intensives and iteratives in Germanic may be due in part to
the cross-linguistic tendency to lengthen consonants in such words
because of the symbolic effect. In a discussion of sound
symbolism, Jespersen (1922:404) notes:

... one may mention the natural tendency to lengthen and to
strengthen single sounds under the influence of strong feeling
and in order to intensify the effect of the spoken word; thus,
in 'it's very cold' both the diphthong [ou] and the [1] may be
pronounced extremely long, in 'terribly dull' the [1] is
lengthened, in 'extremely long' either the vowel [ɔ] or the [ŋ]
(or both) may be lengthened. In Fr. 'c'était horrible' the
trill of the [r] becomes very long and intense ... In some
cases a lengthening due to such a psychological cause may
permanently alter a word, as when Lat totus in It. has become
tutto (Fr. tout, toute goes back to the same form, while Sp.
todo has preserved the form corresponding to the Lat. single
consonant).

However, the regularity with which geminates were used in
Germanic in onomatopoetic verbs and intensives probably cannot be
attributed to a sporadic lengthening of this sort. The
significant number of sound symbolic verbs with geminate liquids
suggests that on the basis of these verbs, gemination of liquids
(and then obstruents) came to be associated directly with meanings
associated with sound and were subsequently used to form new words
expressing meanings associated with sound. Given the large number
of onomatopoetic verbs in the second weak class in Germanic, and
the semantic similarity of onomatopoetic verbs and intensives and
iteratives, it is not surprising that intensives and iteratives
with geminates found their way into this class alongside
onomatopoetic verbs with geminates.

6.2 Phonetic Properties of Class II Weak Intensives/Iteratives.
If, as is claimed here, the phonetic properties of the obstruents
in Class II weak intensives and iteratives are not solely the
result of regular phonological processes, but due in part to word
formation processes, which were themselves influenced by semantic
factors, then the correspondences in (1) through (4) cease to be
an anomaly. That is, if semantic factors influenced the type of
geminates which appeared in these intensives and iteratives, then
one should not expect correspondences like those in (1) through
(4) to exhibit straightforward phonological equations.

Semantic factors do appear to have played a role in
determining the phonetic characteristics of the geminates in class
II weak intensives and iteratives. Wissmann (1932:192-8) presents
evidence in support of this; I will expand here upon his discussion. If one examines the list of these verbs in Table 1, and compares the type of geminate which appears in each verb with the meaning expressed by that verb, a distinct pattern emerges: geminate voiceless obstruents appear to correspond to meanings associated with quick, light, or intense movements (cf. ON flakka 'flutter, flicker', OE liccian 'lick', OHG zocchôn 'snatch'); geminate voiced obstruents correspond to meanings associated with slow, heavy movements (cf. ON rugga 'shake, rock', OSw. vagga 'rock, sway', OE treddian 'tread').

Thus, it is possible that in deriving OE liccian 'lick' from the verbal stem *lig- (cf. Go. bilaigon 'lick'), a voiceless geminate was selected rather than a voiced, because voiceless sounds were perceived as especially suitable for expressing the action associated with licking - more so than voiced sounds. (It is of course also possible that voiced obstruents were chosen, but that these were subject to later phonological processes and were eventually devoiced.)

Similarly, a voiced geminate may have been selected in forming OE treddian 'tread' from *tred- (cf. OE tredan 'tread'), even though other iteratives contained voiceless geminates (cf. OHG trofpôn 'drip', OE stroccian 'stroke'), because voiced sounds were perceived as best able to imitate the type of movement associated with treading. According to Wissmann (1932:197), none of the class II verbs with geminate voiced stops (of which there are relatively few) are intensives. Thus it appears very likely that geminate voiced stops were not felt to be particularly suited to expressing intense actions, but more appropriate for certain types of iteratives.

It will of course be impossible to produce a clear history of the development of all the geminate obstruents in class II weak intensives and iteratives. However, what is important with respect to the phonetic properties of the geminates in these verbs is the fact that semantic factors do appear to have played a role in determining the type of geminate which appeared in a particular verb.

6.3 Absence of Expressive Gemination in Gothic. As Martinet points out, the Gothic corpus reveals virtually no expressive gemination. Although geminate sonorants, for example, occur quite naturally in the language (Go. minniza 'smaller' (nn < *nw), imma 'him' (mm < *zm), fulls 'full' (ll < *lN), urrints 'resurrection' (rr < *zr)), there is very little evidence of expressive forms with geminate sonorants. Martinet does not explain the absence of expressive gemination in Gothic as accidental, but argues that expressive forms were probably marked and thus felt to be inappropriate in a translation of the Bible. This explanation is
certainly viable and does in fact find support. (For the purposes of this discussion, we will consider only expressive forms with geminate obstruents.)

According to Martinet, Gothic expressive forms with geminate stops were probably quite marked, since geminate voiced stops appeared only in the combination -ddj- and -ggw-, and geminate voiceless stops were extremely rare in the language. Martinet maintains, though, that gemination in Gothic was clearly a phonetic reality, given the consistency with which Wulfila represented geminates. But because gemination was so rare for obstruents, words with such geminates which were expressive in origin were marked because of their phonetic form, so that they were probably considered too familiar to be used in a translation of the Bible (Martinet 1937:64).

This explanation finds support in the fact that expressive gemination is very well represented in Old Norse and in the West Germanic dialects, where a large number of geminate obstruents developed as a result of regular phonological processes (cf. ON pp < *mp in soppr 'ball', dd < *zd in gaddr 'thorn', tt < *ht in döttir 'daughter', gg < *gj in hyggja 'think', kk < *kj in rekka 'bed'; cf. also the geminate obstruents produced by the West Germanic consonant doubling, OS settian 'set', liggian 'lie', sibbia 'kin', akkar 'field' < *Cj).

However, it is also possible that the expressive gemination found in class II weak intensives and iteratives is a phenomenon known only to the North and West branches of the Germanic family. That is, it is possible that the word formation process which yielded the verbs in question was productive in Germanic only after the separation of the Goths from the remaining Germanic tribes.

Although it is impossible to choose between the two explanations offered here for the absence of Gothic intensives and iteratives with geminate obstruents, the important points to consider are 1) viable solutions to this problem are available, and 2) these solutions are compatible with the explanation offered here for the origin of geminate obstruents in class II weak intensives and iteratives.

6.4 Conclusion. Despite the numerous difficulties with the theory of n-assimilation as a solution to the origin of geminate obstruents in class II intensives and iteratives, scholars were reluctant to abandon it entirely and give their full support to theories based solely on expressive gemination. Although scholars could not deny that these geminates had, at some point in time, acquired an expressive function, they could not fully accept the various theories of expressive gemination, since these theories
did not provide a satisfactory explanation for the manner in which geminate obstruents had acquired their expressive character.

I have outlined here a solution to the problem of the origin of geminate obstruents in class II weak intensives and iteratives which incorporates the ideas and observations of a number of scholars: Wisßmann's analysis of the relationship between onomatopoietic verbs and intensives and iteratives; Martinet's observation that a number of OHG strong verbs with geminate liquids exhibited meanings which could be considered expressive; Kuryłowicz's idea that verbs with geminate sonorants provided the pattern according to which intensives and iteratives were formed. I have simply reworked these ideas and insights to provide the theory of expressive gemination with the motivation for the use of geminates as an expressive device in the formation of intensives and iteratives.

NOTES

*I would like to thank Jay Jasanoñ for helpful comments on earlier versions of this paper. All errors are of course my own.

1Martinet (1937:84-103) and Streitberg et al. (1936:329-35) provide reviews of earlier work done on geminate obstruents in Germanic; bibliography of earlier work can also be found in Wisßmann (1932:160).

2Following a long vowel, *ss, of whatever origin, was shortened to *s (cf. OE, OHG wis, Go. -weis, ON vis (nom. sg. masc. viiss) 'wise').


4The geminates -dd- and -gg- are not considered here, since their development from Gmc. *-jj- and *-ww- is not disputed.

5Bezzenberger (1876:1374) was the first to derive -kk- in ON lokkr 'lock of hair' from Pre-Germanic *-gn- (cf. Lit. lúgnas
'flexible'). Osthoff (1882:297) first suggested n-assimilation as the origin of geminates in verbs such as OHG zocChon 'move conulsively, jerk'.

6See Kluge (1884) for a detailed account of this approach to the development of the various types of geminate obstruents in Germanic.

7Van Helten (1905:230-1) argues that the Sanskrit accent pattern in -nā-stems is to be assumed for the pre-Germanic verbal paradigms of verbs such as gawaknana, with suffix accent in the sg. and 3rd pers. pl. and therefore gemination and loss of n, and without suffix accent in the 1st and 2nd pers. pl. forms and thus lack of gemination and retention of n. According to van Helten, leveling took place following gemination, in some verbs in favor of the singular (and 3rd pers. pl.) forms, yielding verbs with geminates, in others in favor of the 1st and 2nd pers. pl. forms, yielding verbs such as Go. gawaknan, ON slitna 'tear up', ON hnippna 'become sad', etc. See, however, the following discussion.

8Although Martinet (1937:148-200) is not in total agreement with Wissmann's approach to classifying verbs and nouns with expressive gemination, Wissmann's approach is nevertheless sufficient for exemplifying the relationship between intensives and iteratives with geminate obstruents and other words with expressive gemination.

9The examples here are not solely from Wissmann (1932:162-8).

10In his critique of the theory of expressive gemination, Marchand finds fault with the phonological aspect of the theory, but only because he equates expressive gemination with sound change: 'The assumption of a spontaneous creation of expressive sound sequences . . . entails the assumption of spontaneous sound change, and would mean the relinquishment of the hard-won advances of historical linguistics since the middle of the last century' (Marchand 1956:61-2). It cannot be denied that sound change very likely played a role in producing the particular phonetic quality of the geminates found in words with expressive gemination (see the discussion above). However, the creation of words with expressive sound sequences has no more to do with sound change (whether spontaneous or not) than does the creation of words with phonesthemes (the means with which Marchand claims to account for a number of geminates in Germanic), unless one is to deny the possibility that certain types of sounds or sound sequences can have semantic associations in the way that specific sound sequences can (for example, /gl/ in Eng. glow, glare, glimmer, etc., and /sl/ in Eng. slink, slide, slip, slick, etc.).

11A general problem with Marchand's approach to geminate
obstruents in Germanic involves his claim that *pp, *tt, and *kk did not exist in Proto-Germanic. If this is the case, how does one explain Go. atta 'father', smakka 'fig', sakuss 'sack', (ON sekkr, NHG Sack, OE sæcc), and skatts 'money' (ON skattr, OHG scaz, OE sceatt)?

German trocken 'dry' is not an example of n-assimilation; it is very likely a rare example of gemination before n, similar to the West Germanic gemination of consonants before ū and (sporadically) before l and r (cf. Go. skapjan, OE scieppan 'create'; Go. baı̂rs, OE bı̂ttor 'bitter'; Norw. eple, Eng. apple 'apple'). For an explanation for this type of gemination, see Murray and Vennemann (1983).

These verbs are from Marchand (1956:54). He claims (1956:55) that 'the concept of "intensive" has to be stretched somewhat to include some of the verbs cited.' However, in the case of schmücken, for example, he does not provide the reader with the MHG definitions of the verb, which clearly indicate that the verb was originally an intensive formation.

Kuryłowicz does not, in fact, present *kurōn or *kurōn as reconstructed forms. He simply cites them as kurōn and kurrōn.

For a discussion of the terms 'primary semantic function' vs. 'secondary semantic function' see Kuryłowicz (1964:10-7, 54-5).

Kuryłowicz also cites *tugōn and *tukkōn as tugōn and tukkōn.

See Kuryłowicz (1957:140-1) for a more detailed account of the phonetic aspect of gemination in Germanic.

Verbs which are not attested in the older dialects and those which are not clearly strong have not been taken into consideration here. Gmc. *w威尔 has been treated as a single root with the meanings 'undulate, bubble' and 'roll', although Seebold posits two roots *w威尔, one meaning 'undulate, bubble (wallen)' and the other 'roll (Wälzen)' (Seebold 1970:553).

Although many of the verbs with geminate liquids in Table 2 are probably onomatopoetic creations, it is very likely that the geminates in some of these verbs arose as the result of regular phonological processes. For example, some geminates may be the result of assimilation of a liquid to a following nasal. Thus Gmc. *w威尔 'undulate, bubble, seethe' and *w威尔 'roll, undulate, bubble' may have been formed under the influence of OHG wella 'wave', where -il- < *-in- (cf. Lit. vilius 'wave'). Lühr (1976:74-7), on the other hand, derives the geminates in *w威尔-
and *well-, as well as those in *bell- 'bark', *hell- 'sound',
*kwerr- 'gulp down, devour', *skell- 'sound', and *skerr- 'scrape,
scratch' from *-RH- clusters (R = liquid). However, the regular
development in Germanic of *-RH- > *-RR- is questionable (cf. the
counterexamples *malan 'grind' < *melh₁-, *anan 'breathe' <
*h₂ənιh₁-, and *tammon 'subdue' < *dəməh₂- cited in Jasanoff
(1978:88)).

20 References to additional studies which treat the cross-
linguistic characteristics of sound symbolism can be found in

21 There are many iteratives in the second weak class in
Germanic which do not exhibit geminates (Go. wlaton 'scout, look
around', ON raka 'rake', OHG greifon 'grop'). Such verbs may
represent an older stage of the language; that is, they may have
been created before geminates were used as a word-forming device.

22 There are also class II weak onomatopoetic verbs which
contain geminate voiced stops (cf. ON gagga 'howl', ON rabba
'babble', etc.).

23 According to Martinet, Go. ufswalleins 'that which is
swollen, pride' is a possible example of expressive gemination.

REFERENCES

Bezzenberger, Adalbert. 1876. Review of Die Nominalsuffixe a und å
in den Germanischen Sprachen, by Heinrich Zimmer.
Göttingische gelehrte Anzeigen 2.1365-76.

Germanica, Eduard Sievers zum 75. Geburtstag, 90-106. Halle:
Niemeyer.

Falk, Hjalmar and Alf Torp. 1909. Wortschatz der germanischen
Spracheinheit. (Vergleichendes Wörterbuch der
indogermanischen Sprachen, 4th ed., part 3) Göttingen:
Vandenhoeck & Ruprecht.

Hellquist, Elov. 1908. Några anmärkningar om de nordiska verben


I. Introduction

Chinese is known to be lacking in case marking. The only undisputed case marker is the genitive de, such as in shao nainai de shanzi (literally 'young-madame's fan', a Chinese translation for Wilde's 'Lady Windermere's Fan'). But the usage of this simple character is far richer. It does not always indicate possession. For instance, tian shang de niao (literally 'sky-top's bird') refers to 'birds in the sky'. This, however, can be generalized from the narrow sense of 'owning something' to the broader sense of 'having the property of'. The element preceding de ascribes some property to the head noun of the possessive construction, just as another case of modification. Ross (1983) provides the following schema for NPs with de (MOD = Modifier):

(1) \[
\begin{array}{c}
\text{NP} \\
\text{[ [ X ] de NP ]} \\
\text{NP MOD}
\end{array}
\]

Although this seems to capture the intuitions of native speakers for a large proportion of the occurrences of de, it is not explicit enough to be incorporated in a formal system of grammar.
and fails to account for all the variations of possible semantic interpretations.

One particular difficulty such a generalized schema may face, and one such we are interested in solving, involves pseudo-possessive sentences like the following. There is no straightforward mechanism in this highly generalized schema to account for the grammatical relations in 2.[1]

(2) Yunmen wuji de wu tiao de zhen bang Cloud-gate dance-ensemble DE dance dance DE really good 'Cloud-gate ensemble dances splendidly.'

Yunmen wuji is the logical subject in 2, while the noun wu immediately after de is the logical object of the verb tiao. Furthermore, since such sentences do show a two-way ambiguity between a real possessive reading and a pseudo-possessive reading, as exemplified by 3, an adequate formal analysis would have to represent the two readings either syntactically or semantically.

(3) XiaoLi de bianzhang zuo de hen haoci XiaoLi DE box-lunch make DE very good-eat a. 'XiaoLi makes delicious box-lunches.' b. 'XiaoLi's box-lunch is deliciously made (by somebody).' Lastly, it has been observed that the sentences with pseudo-possessive NPs coincide semantically with the corresponding sentences in two other paradigms; namely, SOV sentences (double nominative in Teng (1974)), and resultative VP sequences with identical verbs (verb reduplication in J. Huang (1982a)).[2]

(4) a. XiaoLi bianzhang zuo de hen haoci XiaoLi box-lunch make DE very delicious b. XiaoLi zuo bianzhang zuo de hen haoci XiaoLi make box-lunch make DE very delicious 'XiaoLi makes delicious box-lunches.' (cf. 3a)

The goal of this paper is to correctly represent the grammatical relations of the pseudo-possessive NPs and the related structures, and to account for the identity of semantic meanings among them. We will follow the theoretical framework of lexical-functional grammar (LFG), developed and explained in detail by Kaplan and Bresnan (1982). As suggested by its name, LFG is a formal system of grammatical representations which allows natural languages to be studied in terms of grammatical functions, and generalizations in linguistics to be captured with lexical rules. In this framework, transformations are rendered unnecessary. The syntactic representations in LFG consist of two parts: c(ons-
tituent)–structures and f(unctional)–structures. A c-structure is the counterpart of the constituent tree commonly used in all varieties of generative grammars. It is also constructed from a set of phrase structure rules. The only difference between them is that some rules representing grammatical functions, called f(unctional)–descriptions, are annotated to each node. The f-descriptions map c-structures to f-structures. A f-structure is a formal representation of grammatical functions from which direct mapping to semantics can be achieved. The justification for using f-structures is that there is no one-to-one correspondence between constituent nodes and grammatical functions. The better known cases are that a NP can serve either as a SUBJ(ect), an OBEJ(ect), or a COMP(lement), etc., and that a S can also have these functions. The LFG mechanism represents the constituent structure and the grammatical functions separately and claims that such representations help to describe natural languages better. Finally, ↑ (up), and ↓ (down) are the two symbols used in c-structures, f-descriptions, and f-structures to refer to the immediately dominating node and the current node, respectively. The most important function of the two arrows is to convey grammatical informations such that they can be properly interpreted locally and at the sentence level. For instance, the rule ↑ = ↓ requires that the grammatical informations represented on the mother node be merged with the grammatical informations represented on the daughter node. This is how a head is defined in LFG. More explanations of LFG formalism will be given with appropriate examples in this paper.

II. A POSSIBLE SOV STRUCTURE[3]

Before sketching out the structure for the pseudo-possessives, we will take a look at one interesting structure. 5 has the same constituent structure as 4a. They both have overt SOV word order, and both NPs stand in the same logical relation to each other ('logical relation' in a pretheoretical sense).

(5) Ma Yo–Yo datiqin la de hen hao
    Yo–Yo Ma cello pull DE very well
    'Yo–Yo Ma plays cello very well.'

A typical transformational approach to this sentence would be to take datiqin as somehow 'preposed' from the base-generated position immediately after the verb. One such possible solution in this framework would be to take advantage of the fact that multiple topics are allowed in Chinese and postulate that both the subject and the object of 5 are in topic position. One of our arguments against this is based on the analysis of Chao (1968a). Chao argues that pauses are the only reliable indicators of topicalization in Chinese. We observe that there is no natural
pause after the object datig in to indicate that it is a topic (there is also no natural pause after the subject). We may also cite as supporting evidence the way another native speaker punctuates written sentences. In the five groups of related sentences quoted by J. Huang (1982a), he consistently puts a comma after the sentence-initial object, which is obviously used to represent the pause after topics in spoken language. On the other hand, no comma was used in any of the SOV sentences quoted.\[^{4}\]

(6)a. [neizhi ma], ta qi [t] de hen lei 
that horse he ride COMP very tired
'That horse, he rode it until he got tired.'
b. ta [neizhi ma] qi [t] de hen lei 
he that horse ride COMP very tired
'He rode that horse until very tired.'

6b illustrates another possible transformational analysis of our SOV sentences; namely, object raising. Two points can be made about this analysis. First, we observe that the proposed underlying structure is ungrammatical and unmotivated elsewhere. Under the structure-preserving constraint, the sentence cannot be generated without brute force. Even if such underlying structures are allowed, we can argue that they are unfalsifiable since no grammatical rules constrain them. An unfalsifiable theory may be powerful, but it is equally uninteresting in that it is not justifiable.

(7) *ta qi neizhi ma de hen lei 
he ride that horse DE very tired

Second, we also observe that the so-called 'preposed' NP seems to form a VP with the following VP complement rather than standing by itself.

(8) Hong JunZhe langqiu da de hen hao que bu ai shang 
Hong JunZhe basketball hit DE very well but NEG like on 
dianshi
TV
'Hong JunZhe plays basketball well but does not like to be on 
TV.'
(9) a. 

\[ (\uparrow \text{SUBJ}) = \downarrow \]

\[ \downarrow e \uparrow \]

\[ \downarrow \text{CONJ} \uparrow \]

\[ \downarrow \epsilon \uparrow \]

Hong JunZhe langqiu

Hong JunZhe basketball hit DE very well but NEG like on TV

b. *

\[ (\uparrow \text{SUBJ}) = \downarrow \]

\[ \downarrow = \downarrow \]

\[ \downarrow e \uparrow \]

\[ \downarrow \text{CONJ} \uparrow \]

\[ \downarrow \epsilon \uparrow \]

Hong JunZhe langqiu e da de hen hao que bu ai shang dianshi

Hong JunZhe basketball hit DE very well but he NEG like shang dianshi on TV

c. *Hong JunZhe langqiu da de hen hao que ta bu ai shang dianshi

Hong JunZhe basketball hit DE very well but he NEG like shang dianshi on TV

(10) Hong JunZhe shi langqiu da de hen hao

Hong JunZhe shi basketball hit DE very well

"Hong JunZhe does play basketball well."

Three notes can be made on the notations in the c-structures in 9. First, the equation \( \uparrow \text{SUBJ} = \downarrow \) can be read as 'the subject function of the mother node (S in this case) is this node (the NP where this equation is annotated)'. This is how subject and other grammatical functions are encoded in LFG. Second, we notice that in 9b, the object function is specified at a very low level, but the equations \( \uparrow = \downarrow \) and \( \downarrow \epsilon \uparrow \) pass the grammatical information up to the tree top (i.e. the sentence level). Lastly, the symbols \( \downarrow \downarrow \) and \( \uparrow \uparrow \) are used to deal with long-distance dependencies: a \( \downarrow \) must
be linked with a $\uparrow\downarrow$ to get a grammatical interpretation. 8 and 9 are coordination structures represented in LFG. 9c is included to show that this cannot be sentential coordination. The equation $\downarrow \xi \uparrow$ reads as 'this node is a member of the set represented by the mother node', and shows that the two coordinated VPs are elements of a set which is the higher VP. The structures show that the object langiu 'basketball' has to be part of the lower VP. If it is outside the VP, the object will have to distribute to the second VP, and will cause incoherence in the f-structure (i.e., assigning more than one lexical item to the same grammatical function).[5] As for 10, it has been observed and strongly argued for by J. Huang (1982b) that the focus-marker (FM) shi occurs immediately before the constituent it modifies, which must be either a whole predicate or any other maximal category. 10 has two readings, one with contrastive emphasis on langiu 'basketball', the other with focus on the whole predicate 'plays basketball well'. The only natural interpretation for the second reading is that shi modifies the whole following string, including the object, as a VP constituent.

(11) VP $\rightarrow$ NP VP
$\uparrow\downarrow$ $(\uparrow OBJ) = \downarrow (\uparrow\downarrow)$

Though J. Huang (1982a) was not explicit in how he would formulate the preposing rule, we can show that no matter where the 'preposed' object goes, an SOV account, as exemplified by 11, is superior to a movement account. What 11 tells us is simply that the so-called 'preposed' NP forms a VP constituent with the following VP, and that this NP stands for the object function in the sentence. Since we have discovered that the object forms a VP with the following string, a transformation landing the object outside the VP would be making wrong predictions. On the other hand, keeping the object inside the VP after movement predicts no empirical differences, but one would be hardpressed to provide evidence to justify the existence of the trace, since this analysis requires a PS rule unmotivated elsewhere. Again, the structure-preserving constraint can be used to argue against proposing such an underlying structure. All things considered, we may as well let the PS rule do the whole job without so much stipulation. 11 will provide adequate explanation for all the phenomena discussed in this section without encountering the ungrammatical 7.

III. VP Sequences

One further structure we have to examine before going to the pseudo-possessive NPs is the VP sequences with identical verbs as exemplified by 4b. C.-R. Huang (1983) discussed the inadequacy of J. Huang's (1982a) verb reduplication analysis. We will repeat
the major argument here with another supporting argument based on 13. [6]

(12)a. ta qi neizhi ma qi de hen lei
    he ride that horse ride DE very tired
    'That horse, he rode till he was very tired.'

  b. *[neizhi ma], ta qi [t] qi de hen lei (asterisk mine)
      that horse he ride ride DE very tired

  c. ni lao qi, qi de ma lei si le
      you always ride ride DE horse tired die ASP
      'You ride the horse continuously such that the horse is
       (almost) tired to death.'

(13)a. ta qi neizhi ma shuai le xia lai
    he ride that horse fall ASP down come
    'He rode that horse and fell off (it).'  

  b. *[neizhi ma], ta qi [] shuai le xia lai
      that horse he ride fall SAP down come

Presupposing his X-bar filter, which stipulates that phrase structure rules in Chinese must always be head-final except at the single-bar level, and noticing the ungrammatical sentence in 7, J. Huang (1982a) proposes the structure 12b for the topicalized sentence. He postulates that the trace here is 'invisible' so that the extra qi can be deleted by haplology, the rule proposed in Chao (1968) to delete one of the two phonologically identical morphemes when they are right next to each other. This postulation deprives transformational theorists of the only empirical evidence for proposing traces, since the existence of traces, even though 'invisible' in the surface structure, are supposed to block contractions and thus one can always test the existence of traces by whether contraction is possible. I assume that the mechanism of haplology should not differ from that of contraction since both are phonological deletions. It is also not clear to me at this moment what mechanism in the grammatical theory allows one to distinguish 'visible' and 'invisible' traces as proposed by J. Huang. The haplology rule J. Huang has in mind must apply to all adjacent pairs of identical morphemes regardless of the structure, as he puts the two qis in two separate VPs in his analysis. This haplology rule should apply to 12c, but does not. Moreover, with an identical c-structure, we now show that the noun ma in 13a cannot be topicalized. The above arguments imply that 12a and 12b are not derivationally related at all. One proposal to solve the derivational history of 12b was suggested in C.-R. Huang (1983). The basic idea is that 12b is related to the SOV sentence rather than to 12a. We give a simple formulation below.
(14)a. ta neizhi ma qi de hen lei
       he that horse ride DE very tired
       'He rode that horse and was tired from the riding.'

b. [neizhi ma], ta [ ] qi de hen lei
   ↓ = ↓
   ↓ = ↑

The intuition about the resultative VP sequences is that they should have the same c-structure as 13a, and therefore should have a f-structure very similar, if not identical to 13a as well. The c-structure and the f-structure of 13a are shown below as 15a and 15b. This structure, identical to the structure proposed for coordinate structure in English by Bresnan, Kaplan, and Peterson (forthcoming), will be a very powerful tool in analyzing various VP sequences in Mandarin Chinese. The c-structure works for 12a, but the f-structure does not work convincingly. First of all, we are forced to postulate two different predicate argument structures for qi 'ride': 'QI<(SUBJ)(OBJ)>' and 'QI<(SUBJ)(XCOMP)>'. This is far from fully justified. More importantly, the semantic instantiation principle in LF/G says that every single instantiation of a lexical item should be different unless there exists a long-distance dependency. Or, to put it in other words, each instantiation must be uniquely indexed. The principle is obviously necessary and convenient since we do not want the two instances of the verb laugh to be interpreted as the same action in sentences like John laughed the way Jane laughed. Therefore, there is no way for us to make sure in the syntax that the two qis are referring to the same action without violating that principle. How can we then read from the f-structure that the ta 'he' in question does not get tired from some other riding action such as riding a mule rather than the horse-riding reported in the first VP? Our solution to capture the fact that both VPs refer to the very same action requires only one change in the f-descriptions of 16. The two rules of ↓ = ↑ will be replaced by ↑ = ↓. The c-structure and f-structure will now be 17a and 17b. Here we have one f-structure instead of a set of two. We do have to postulate another lexical entry for the verb qi, but this will be taken care of by the redundancy rule required by our discussion of de in the following section. Two consequences follow from this structure. One is that it preserves the structural identity between this particular sentence pattern and the other VP sequences, although the different f-structures places stronger restrictions on the semantics. The second is that this answers in a non-ad hoc way the long puzzling question of why the identical verb is repeated. Assuming that we have the mechanism to solve the problem that the two occurrences are still individually indexed, we may argue that they should be allowed to be interpreted as identical if stipulated in the syntax, since any occurrence of the same verb is carrying exactly the same grammatical information.[8] In this way we can avoid incoherence.
(15a).

\[
S \\
\downarrow \epsilon \uparrow \\
NP \\
\downarrow \epsilon \uparrow \\
VP \\
\downarrow \epsilon \uparrow \\
VP \\
\downarrow \epsilon \uparrow \\
\]

\text{ta} \quad \text{qi ma} \\
\text{he} \quad \text{fall} \\
\text{ride horse} \quad \text{ASPECT down come}

b. \{ \\
\text{SUBJ} \quad [\text{'TA'}] \\
\text{PRED} \quad [\text{'QI<(SUBJ)(OBJ)>'}] \\
\text{OBJ} \quad [\text{'MA'}] \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\}

(16a).

\[
S \\
\downarrow \epsilon \uparrow \\
NP \\
\downarrow \epsilon \uparrow \\
VP \\
\downarrow \epsilon \uparrow \\
VP \\
\downarrow \epsilon \uparrow \\
VP \\
\downarrow \epsilon \uparrow \\
\]

\text{ta} \quad \text{qi neizhi ma} \\
\text{he} \quad \text{qi de hen lei} \\
\text{ride that horse} \quad \text{ride DE very tired}

b. \{ \\
\text{SUBJ} \quad [\text{'TA'}] \\
\text{PRED} \quad [\text{'QI<(SUBJ)(OBJ)>'}] \\
\text{OBJ} \quad [\text{'MA'}] \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
\} \\
IV. On de and Complementation

The last cornerstone we have to lay is an explicit formulation of open complements (which are represented as XCOMP in our previous examples) with de. J. Huang (1982a) glosses de as 'COMP' and treats it as if it directly corresponds to 'that' in English.\[9\] He assigns the following structure to 12a.

\[(18) \quad [\text{ta} [= [\text{qi neizhi ma}][\text{qi}[\text{de}[\text{hen lei}]])]) S \quad V \quad V \quad V \quad S \quad \text{COMP} \quad S\]

We have good reason to believe that this is not the correct structure. Our arguments will show that de hen lei does not form a constituent.

\[(19) \quad \text{ta X(=shi) qi neizhi ma X qi * de X hen lei} \quad \text{he (FM) ride that horse ride DE very tired}\]

\[(20a) \quad \text{hua kai de [you mei you xiang]}\]
\[
\begin{align*}
\text{flower bloom DE CONJ beautiful CONJ fragrant} \\
'\text{Flowers bloom beautifully and fragrantly,}'
\end{align*}
\]
\[(20b) \quad \text{hua [kai de you mei kai de you xiang]}\]
\[
\begin{align*}
\text{flower bloom DE CONJ beautiful bloom DE CONJ fragrant} \\
'\text{Flowers bloom beautifully and fragrantly,}'
\end{align*}
\]
\[(20c) \quad \text{*hua kai [de you mei de you xiang]}\]
\[
\begin{align*}
\text{flower bloom DE CONJ beautiful DE CONJ fragrant} \\
'\text{Flowers bloom DE CONJ beautiful DE CONJ fragrant} '
\end{align*}
\]

\[(21) \quad \text{haizimen [chang de tiao de] dou hen hao} \quad \text{children sing DE dancr DE all very well} \quad \text{'Children sang and danced very well.'} \]

19 applies the test of constituency of maximal categories by the focus-marker shi again. The symbol X marks the positions where
shi can occur, while * indicates where the occurrence of shi leads to ungrammaticality. The distribution shows that de hen lei cannot be a maximal category (which we assume S-bar to be). 20 offers more evidence to support our doubts, since it is assumed that random sequences of words not forming constituents cannot be coordinated. In contrast with 20a and 20b, 20c strongly suggests that de hen lei is not a constituent. 21 suggests that de may form a constituent with the preceding verb.

The problem, then, is to characterize the structure [[ V de] X] and to determine what role is to be assigned to the constituent X. The observation is that it is a control relation and that the subject in X is always the controlled element. This suggests that it has to be an instance of functional control. Secondly, the fact that there is no possible ambiguous interpretation of controllers and that X cannot be omitted (i.e., it is subcategorized) indicates that X should be an open complement (XCOMP).[10]

(22) *ta qi neizhi ma qi de [t]
    he ride that horse ride DE

It follows from LFG control theory, elaborated on in Bresnan (1982a), that the control information about XCOMP should be lexically induced. It is also observed that every verb in Chinese can take a complement when de occurs, and it is exactly the existence of de that tells us the verb is being complemented; we may as well stipulate that the control rule is carried in the lexical entry of de. One point we must not neglect is that the complement after de can sometimes be closed, as demonstrated by 24. If we take COMP as a generalized term (or as a variable) over open and closed complements, we can then represent the behavior of complements in one lexical rule, 23b.[11]

(23)a.          b.          qi : verb
                (↑ PRED)= 'qi<(SUBJ)(OBJ)>'
Or (↑ PRED)= 'qi<(SUBJ)(OBJ)'
                (XCOMP)>'
               de : particle
               (↑ G)= (↑ COMP SUBJ)

(24) ni jiao de wo xin huang
    you call DE I heart fluster
    'Your calling makes me nervous.'

The G here is a variable standing for a controller (in the XCOMP
case), or redundantly the subject of the closed complement itself (in the closed complement case).

One of the desirable consequences derived from 23b is that now we have a formal account for why de hen lei cannot be a constituent. It would be natural to assume that the rule (↑ XCOMP) = ↓ is attached to the node dominating de hen lei. In this case, the control information induced by de can never be passed up to the matrix sentence. The reason is that all functional equations must be locally defined in LFG. In other words, the grammatical information can only be passed up to the immediately dominating node step by step. In this case, there are no function equations such as ↑ = ↓ attached to the de hen lei node to pass the information up.

Another consequence is a supporting argument for choosing ↑ = ↓ over ↓ ε ↑ for the resultative VP sequences with identical verbs. Assuming that we have the proper rule to decide the controller, the rule ↑ = ↓ will give us the empirically correct f-structure. 26b is the desired f-structure of 4b. On the other hand, 25b, as the f-structure derived from the set reading, fails to fill in the SUBJ position of the XCOMP. The only way that position can be filled is by being distributed from the matrix subject. This gives the wrong interpretation. It is the box lunch which is delicious rather than the cook. There is no way to get the right controller from the other f-structure of the set.

(25)a.
V. Pseudo-Possessive Structures

In this section, we first refute the long asserted rule of de-insertion, either as a 'shallow' transformation in Teng (1974) or as a process analogous to English of-insertion in PF proposed by J. Huang (1982a).

(27)a. (=4a) XiaoLi bianrang zuo de hen haochi
XiaoLi box-lunch make DE very delicious

b. (=3) XiaoLi de bianrang zuo de hen haochi
Xiaoli DE box-lunch make DE very delicious

c. Biandang XiaoLi zuo de hen haochi
box-lunch XiaoLi make DE very delicious
'XiaoLi makes delicious box-lunches.'

d. *Biandang de XiaoLi zuo de hen haochi
box-lunch DE XiaoLi make DE very delicious

(28) NP1 + NP2 $\rightarrow$ NP1 de NP2  \hspace{1cm} Teng (1974)
(29) a. $\text{XP} \ N \Rightarrow [ \text{XP} \ N]$  
                  \text{NP}  
                  \text{NP}  

b. $[ \text{XP} \ N] \Rightarrow 1 \text{ de } 2$  
                \text{NP} \ 1 \ 2  

J. Huang’s rule is a restructuring of two adjacent nominals, regardless of the constituency, to form a possessive NP with the internal structure of $[\text{NP} \text{ de } N]$. It should be clear that neither formulation can block the generation of the ungrammatical 27d.

Our strategy will be to generate the whole sequence directly with phrase structure rules. One straightforward way to do this is to have the c-structure and f-description as represented by 30. The concept of having the possessor as the 'subject' of the inclusive NP is not totally new. It 'governs' the head NP in government and binding theory. X-bar theory treats the possessive NP as a 'subject'. Bresnan's (1982a) analysis of English gerunds preceded by genitive NPs is even closer in spirit to our analysis here. Bresnan proposes to treat the genitive NP in a phrase (represented by a $S$ node in the c-structure) like John's walking slowly as the SUBJ function of the $S$, and the gerund as the PRED function. Our stipulation here does something very similar. Namely, the rules are carrying the information about the grammatical functions of the pseudo-possessive NPs in the sentence and have no direct correspondence with their case or other morphological marking.[12]

(30) a.

\begin{align*}
\text{S} & \\
\downarrow & \quad \downarrow \text{NP} \quad \downarrow \\
\uparrow & \text{VP} \quad \uparrow \\
\text{NP} & (\uparrow \text{SUBJ}) \quad (\uparrow \text{OBJ}) \\
\text{XiaoLi} & \text{DE} \quad \text{biandang} \\
\text{XiaoLi} & \text{zuo de} \quad \text{make} \text{DE} \\
\text{hen haochi} & \text{very delicious} \\
\end{align*}

b. \begin{align*}
\text{SUBJ} \quad ['\text{XIAOLI}'] \\
\text{OBJ} \quad ['\text{BIANDANG}'] \\
\text{PRED} \quad '\text{ZUO<} (\text{SUBJ}) (\text{OBJ}) (\text{XCOMP}) >' \\
\text{XCOMP} \quad \text{SUBJ} \\
\text{PRED} \quad '\text{HEN-HAOCHI<} (\text{SUBJ}) >' \\
\end{align*}

We now assume that our stipulation of the lexical rule for de in the previous section applies here. In this case, the control information is stated twice in the f-description, and the required existence of the XCOMP is also stated twice. This neatly explains
why the [NP de NP] structure interpreted as containing a subject and an object occurs only when the sentence is complemented. If this were not the case, the XCOMP place-holder predicted by the control lexical rule would not be filled, and the f-structure would be ill-formed.[13]

(31) wo de tou teng
    I DE head ache
    'My head aches.'

If we look back to the ambiguous 3 again, we can easily resolve the ambiguity by giving the two required lexical entries for de. One is the COMP marker that we formulated earlier, the other will be the genitive marker. The ambiguity is then a lexical ambiguity. The ambiguity occurs when the conditions of 'inalienable possession' (Teng (1974)) or 'conceptual wholeness' (Chu (1976)) are met. This will be supported by the behavior of wh-questions. We cannot question the pseudo-possessive NP with a single wh-word, while questioning the real possessive NP with a single wh-word is perfectly acceptable. 31 is an acceptable answer to 32. But 33 cannot be asked in expectation of answers like 5.

(32)a. nali teng
    where ache
    'Where aches?'

b. sherme teng
    what ache
    'What aches?'

(33). sherme la de hen hao
    what pull DE very well
    'What pulls well?'

32 is straightforward. 32a questions the SUBJ function (or subject, to use a more traditional grammatical terminology) of the sentence, and we get the answer with a specified SUBJ in 32b. In 5, the NP carries information about both the grammatical functions SUBJ and OBJ. That is, we have to read from the phrase Ma Yo-Yo de datiqin that Ma Yo-Yo is the subject of the sentence and that datiqin is the object of the sentence. Intuitively, it is impossible to question two elements with one question word. In LFG theory, this can be explained by noting that the PRED of the verb in 5 takes two arguments, which is inconsistent with 33. 33 requires some PRED that takes one argument only.
VI. Concluding Remarks

It follows from the preceding study that the three groups of sentences in question, namely the pseudo-possessive, the SOV, and the identical verb VP sequence, are structurally different but have identical f-structures for corresponding sentences. We have shown the f-structures of 3 and 4b as 30b and 26b, respectively. The f-structure of 4a will be diagrammed as 34 below. It is obvious that the three f-structures are identical.

(34) 

One feature stands out in our solution. Some of the information is doubly encoded. Examples are the two \( \uparrow = \downarrow \) rules in the f-description of identical verb VP sequences, and the two des carrying the same control information in the pseudo-possessive. Studies in information theory discovered that redundancies are necessary in any communication system.[14] Redundancies in human languages have often been noted at the pragmatic or the phonological level. If our solution turns out to be the optimal one, then we can perhaps do more study on rules containing redundancies, which may turn out to be not at all inefficient.[15]

FOOTNOTES

*I am indebted to Joan Bresnan and Ron Kaplan for teaching me the theories and formalisms of LFG, to Joan Bresnan especially for the discussions that led to this paper, to Carol Rosen for making detailed corrections on my stylistic errors and reading two versions of the draft, and to Wayne Harbert, Louie Mangione, Annie Zaenen, and an anonymous reader for comments. I alone am responsible for any possible mistakes. The first draft of this paper
was written during my two-quarter study at Stanford University through the Exchange Scholar Program sponsored by Cornell University.

¹The second occurrence of de will be discussed later in this paper.

²The fact that any analysis failing to account for this is inadequate was pointed out to me by Ying-Yu Sheu (personal communication).

³The dispute over the emergence of SOV word order in Chinese has been going on for years. What we would like to show here is simply that the SOV word order might be the best formulation for this particular group of sentences. It also has to be pointed out that the PS rule generating the SOV order has to be constrained, since not all types of VPs can take this structure.

i) *maque qiu yin chi
sparrow earthworm eat
'Sparrows eat earthworms.' (The topicalization reading of
Earthworms eat sparrows' is available though semantically anomalous.)

⁴See J. Huang (1982a: 53) for the other sentences not cited here for contrast.

⁵See Bresnan, Kaplan, and Peterson (forthcoming) for the distribution of information in the coordinate structure.

⁶12b is constructed according to the claims made in J. Huang (1983: 52–5, 98–9 footnote 19). He does not give explicit formulations here.

C.–R. Huang (1983) now seems to be an inadequate analysis to me. The PS rule postulated in that paper depends crucially on the terminal symbol [+VN].

i) VP → VP VP
[+VN] [COMP]

However, there are sentences not covered by this rule. The VP with the complex NP ziji de qi does not fit into the string terminal symbol [+VN] which requires the node to be expanded as two simple lexical words, a verb and a noun.

ii) ta sheng ziji de qi sheng le bantian
he bear self DE anger bear ASP half-day
'He was angry at himself for a half-day(=for a long time).'
The exact interpretation of these sentences may have to be the burden of pragmatics. Syntactically they may well be VP coordinations without overt conjunctions, which is very common in Mandarin Chinese. But the logical relation between the two coordinated parts varies too widely to be easily captured.

It is not clear at this moment what mechanism is available to get around the problem caused by the different indexes of the same verb in separate instantiations. One possible way is to stipulate that when the function rule calls for the two f-structures to be collapsed, the index of the PRED of one of the structures is somehow suppressed. Or, seemingly more probable, there might be a mechanism to interpret the two indexes as the same under this condition.

See J. Huang (1982a: chapter 2) for details.

For the theory of control, see Bresnan (1982a).

It is still not clear how the controller should be stipulated in this rule. Though the rule (↑ SUBJ) = (↑ COMP SUBJ) seems to account for the unmarked cases, we do get the following contrasts:

ia) zhe jia niurou chao de hen man
   'This house(classifier) beef stir-fry DE very slow
   'This (restaurant) is very slow in stir-frying beef.'

b) zhe jia niurou chao de hen la
   'This house(classifier) beef stir-fry DE very spicy
   'This (restaurant) makes very spicy stir-fried beef.'

iia) Wang laoban gei zhiyuan xinshui gei de hen gao
    Wang boss give employee salary give DE very high
    'Boss Wang gives high salaries to employees.'

b) Wang laoban gei zhiyuan xinshui gei de hen kangkai
    'Boss Wang give salaries generously to employees.'

The interpretation seems to depend on the subcategorization of the stative verb which functions as PRED of the XCOMP. For example, kangkai is subcategorized to take animate arguments. Xinshui hen kangkai is ungrammatical. It is conceivable that we could leave the controller in the function description rules unspecified, and let the lexicon filter out the ungrammatical interpretations. So the control rule encoded here will be something like (↑ G) = (↑ XCOMP SUBJ), where G varies over the set {SUBJ, OBJ} since we do not get the SUBJ interpretations in sentences like iia and iib.
12Another possible solution, as pointed out to me by Joan Bresnan, is to encode the information about the function arguments in the lexical entry of the verb. The verb *li* ’cut’ will have the following rule in the lexicon.

i) \((↑ \text{FRED}) = 'LI<(OBJ POSS)(OBJ)(XCOMP)>'\)

ii) ta de toufa li de hen hao
    he DE hair cut DE very well
    a. ’His hair was well cut.’
    b. ’He cuts hair very well.’

As the ambiguity in ii suggests, we do get the possessive reading from this structure. One potential problem i may run into is that we have to justify postulating two radically different predicate argument structures which apply to an identical structure. But more crucial is the fact that the interpretation of this sentence requires that the head NP in the pseudo-possessive construction alone be the object. The rule in i takes the whole NP and therefore gives the wrong reading of *’He cuts his own hair very well.’* No mechanism seems to be available to solve this problem at this moment. But this alternative remains in our consideration.

13We are leaving open the question of whether open complements are available with sentences without de in the VP. Conceivably, if the control information is encoded in the NP with de, we should be able to get XCOMP without de. This should be further evidence to support the stipulation of the complement equation in the lexical entry of de. The information is adequately represented by the NP. The following sentence may support our argument.

i) ta de langiu da shu wo
    he DE basketball hit lose I
    ’He plays basketball worse than I.’

14For a comprehensive introduction to these theories, see Chao (1968b).

15One more recent study of the de-construction is C.-R. Huang and L. Mangione (1985). The analysis in this paper is based on the observation that it is the verb after de rather than the one before that behaves like a matrix predicate. This paper seems to have solved the few difficulties we are facing here. Readers are referred to this paper for details.
REFERENCES


Bresnan, Joan, Ronald Kaplan, and P. Peterson (forthcoming). 'Coordination and the Flow of Information through Phrase Structure.'


Huang, Chu-Ren, and Louis Margione (1985). 'A Reanalysis of de: Adjuncts and Subordinate Clauses.' To be presented at the Fourth West Coast Conference on Formal Linguistics at UCIA.


1. Introduction

The phenomenon of preposition-stranding has long been of interest to transformational theory. Although preposition-stranding is apparently rare in natural languages, it is quite free in English and the Scandinavian languages. In English, for example, preposition-stranding is allowed as a result of both wh-movement and NP-movement. This is illustrated in (1):

(1) a. What problems did Robin allude to?

b. Many problems were alluded to.

Let us refer to the construction illustrated in (1b) as the "prepositional passive". Various linguists have suggested that there is a correlation between the two instances of preposition-stranding shown in (1). Working within the theory of Government Binding (GB), which posits a single transformational rule "move α", subject to a single set of conditions, Hornstein & Weinberg (1981, P.55) present a unified account of preposition-stranding, as outlined in (2):
(2) Hornstein & Weinberg's (1981) account of preposition-stranding:

a. a universal Case-marking convention:
   \[ NP \rightarrow [+\text{nom}] \text{ if it is the subject of a tensed } S \]
   \[ NP \rightarrow [+\text{obj}] \text{ if governed by } V \]
   \[ NP \rightarrow [+\text{obl}] \text{ if governed by } P \]

b. a universal filter blocking oblique traces: \(*[NP^e_{\text{oblique}}] \)

c. a language-specific rule of syntactic reanalysis:
   \[ V + [P^e \text{ NP}] \rightarrow [V + P]_V \text{V NP} \]

The intent of the filter in (2b) is to disallow preposition-stranding. The reanalysis rule is what accounts for the preposition-stranding in both passive and wh-movement; it "crucially applies in the base preceding all transformations" (fn. 14), creating a complex verb.

Kayne (1981) follows Hornstein & Weinberg in postulating a language-specific reanalysis rule for English (but not French). His Empty Category Principle (ECP) requires that empty categories be governed by N, V, or A. Since the category P is never a proper governor in any language, the reanalysis rule is needed to make the V a governor of the object of P (p.101). The ECP holds for both "move NP" into argument positions, and for "move wh" into non-argument positions.1

(3) Kayne's (1981) account of preposition-stranding

a. the ECP: empty categories must be governed by N, V, or A

b. a universal constraint that P is not a proper governor

c. a language-specific rule of reanalysis making V a governor of the object of P

Both accounts treat all preposition-stranding as the result of reanalysis, and hence, all other things being equal, we would expect that wh-movement and passive should pattern alike with respect to preposition-stranding.

On the other hand, in a base-generated framework such as Bresnan's Lexical-Functional Grammar (LFG), rules like passive are defined on grammatical relations, whereas rules like wh-movement are defined on constituent-structure. While lexical reanalysis is necessary to account for the prepositional passives, it says nothing about the wh-movement cases, which must be analyzed differently.
So both GB and LFG make use of a reanalysis rule to change the relation between the verb and the prepositional object. In LFG only objects can be passivized, and in GB only NP's governed by the verb can be passivized. Where the two theories differ is in whether reanalysis is also used for the long-distance cases. In LFG no claims are made about the relation between direct objecthood and long-distance control, whereas in GB, at least in Kayne's (1981) version, P's are universally non-governors, and hence non-strandable because stranding would lead to a violation of the ECP. Hence reanalysis is needed even for the wh-movement cases of preposition-stranding.

Now, all things being equal, a unified account of preposition-stranding would be preferable to one which accounts for the phenomenon in two (or more) distinct ways. We will show here that a unified account is in fact not empirically adequate. We will show that Icelandic does not have prepositional passives, even though wh-movement freely strands prepositions. We will further show that the contrast cannot be attributed to such factors as oblique (non-nominative) case-marking in subject position, or to the notion of a "possible semantic word". Finally, we point out that Icelandic is not unique in exhibiting this dichotomy with respect to preposition-stranding, since prepositional passives are also ungrammatical in Swedish and Danish.

2. Icelandic Data

Let's see how the unified analysis of preposition-stranding, extends to modern Icelandic. We first note that wh-movement can freely strand prepositions in Icelandic, as in the other Scandinavian languages. An example is given in (4).

(4) Hann spurði hvern ég herði talað við.
He asked whom(A) I had talked to

Thus, within the GB accounts of preposition-stranding, Icelandic must be assumed to have essentially the same rule of syntactic reanalysis that English has. Therefore, all other things being equal, we are led to expect that Icelandic will also have prepositional passives.

2.1 Prepositional Passives?

Now consider sentences like those in (5), which all have a nonnominative NP in initial position and a stranded P in the VP.

(5) a. Þessa konu er oftast talað vel um.
That woman(A) is usually spoken well of

b. Þennan ref hefur aldrei verið skotið á.
That fox(A) has never been shot at
Such sentences could be analyzed in either of two ways: either they are simply Topicalizations of prepositional objects, resulting in stranded Ps, or they are prepositional passives in which the prepositional object has become a surface subject. How can we tell?

The first fact that one notices about such examples is the surface case-marking. The clause-initial NP is not nominative, but rather retains its oblique case-marking, and the verb morphology is therefore in the unmarked 3rd person, singular, neuter. However, this does not suffice to show that these NPs are not subjects. The same is true when passive applies to dative and genitive objects of verbs, as illustrated in (6).

(6) a. Honum var hjálpað.  "He(D) was helped"
   b. Hans var saknað.  "He(G) was missed"

Yet, as we argued in Zaenen, Maling & Thráinsson (1984), these preverbal oblique NPs are clearly treated like nominative subjects by the various syntactic rules which distinguish subjects from nonsubjects, e.g. by Raising, Reflexivization, etc. Obviously, then, we must look to see how sentences like (5) behave with respect to those syntactic rules with distinguish between subjects and topics. The results for three such rules are given in (7)-(9), where the a-example is the result for an ordinary oblique passive for comparison.

2.1.1 Raising

A first such test is Subject-to-Object Raising.

(7) a. Æg tel honum hafa verið hjálpað í prófinu.
I believe him(D) to-have been helped in the-exam
   b. *Æg tel Vigðís vera oftast talað vel um.
I believe Vigðís to-be most-often spoken well of
   c. *Æg tel refinn aldrei hafa verið skotið á.
I believe the-fox never to-have been shot at
   d. *Æg tel nýju bók Dórbergs hafa verið beðið
eftir med Óþreyju.
I believe new book Thorbergs to-have been waited for with impatience
2.1.2 Reflexivization

A second test is reflexivization. Many speakers of Icelandic allow only subjects to be the antecedents of reflexive pronouns. For such speakers, we find the same sort of contrasts with respect to Reflexivization as we did with respect to Raising. Note that the reflexive is obligatory in (8a), but impossible or extremely marginal in (8b-d).

(8) a. Honum var oft hjálpað af foreldrum sínum/
He(D) was often helped by parents his[+refl]/
*hans.

b. Hana er talð vel um í hennar eigin landi/í
She(A) is spoken well of in her own land/in
landi ?*sínu .

She(A) is spoken well of in her own land/in

Assuming that reflexives are singular.

2.1.3 Topicalization

Thirdly, many speakers of Icelandic do not allow Topicalization in binding domains; in other words, they allow Topicalization to occur in embedded a 'that'-clauses, but not under indirect questions, comparatives, relatives, etc. For such speakers, we expect to find the contrasts illustrated in (9), and we do.

(9) a. Hann spurði, hvemar henni hefði verið hjálpað.
He asked when she(D) had been helped

b. *Hann spurði, hvort Vigðísí varí taladi vel um.
He asked whether Vigðísí was spoken well of

c. *Hann spurði, hvversu lengi nýju bókinni hefdi verið
beðið eftir með ópreyju.
He asked how long new book—the had been waited for with impatience

d. *Hann spurði, hvers vegna bennan samning væri svo miðið rætt um.
He asked why that agreement was so much talked about

By the above three tests, the preverbal NPs in (5) are not subjects, and hence these sentences must be derived by Topicalization applied to impersonal passives, and not by the rule of (personal) Passive. For further tests that could be applied with the same results, see Zaenen, Maling & Thráinsson (1984).

3. Why not P-passives??

How can we account for the contrast between the preposition-stranding in passives and in wh-constructions? The most obvious explanation would be in terms of case-marking: Icelandic has a very productive case-marking system, whereas English has lost virtually all such marking, except in the pronominal system. In other words, we might try to attribute the lack of prepositional passives to an incompatibility between lexically-assigned (non-nominative) case and grammatical subjecthood. However, given that dative and genitive objects can and do undergo passive in Icelandic, despite their distinctive case-marking, this cannot be the right explanation.

Nor does the idea of a "possible semantic word" explain the contrast. Hornstein & Weinberg appeal to this notion to account for the well-known fact that Wh-movement strands prepositions more freely than NP-movement does, as illustrated by the contrast shown in (10).

(10) a. Which problems did you talk to Harry about?

b. *Those problems weren't talked to Harry about.

Hornstein & Weinberg account for this contrast by appealing to a notion of "possible semantic word". As they note, previous analyses of preposition-stranding have restricted the rule of reanalysis to the NP-movement cases. However, Hornstein & Weinberg remove the semantic restriction from the Reanalysis rule and place it on the rule of passive itself. We will not go into the problems that this analysis leads to for English; at the very least, it predicts the ungrammaticality of double stranding such as "Which problems should little children not be talked to about?", "Which book didn't he want to be read to out of?" etc., which require incompatible reanalyses, as they themselves note in fn. 21c. But we would like to point out here the consequences of extending this analysis to Icelandic.
As a syntactic rule, the only constraint on reanalysis is continuity: the words must form a continuous sequence within VP. They argue that the passive in (10b) is ruled out because [talk to Harry about] is not a possible semantic predicate. But for Icelandic, even passives like [talk about] must be ruled out, presumably by appeal to the notion of "possible semantic word" or "natural predicate". But this means that the notion of "possible semantic word" will have to be considerably different in the two languages. In particular, the notion in Icelandic will have to be restricted so as to rule out exactly the class of prepositional passives. This is an unacceptable conclusion. In order to have any explanatory power, the notion of "possible semantic word" must be universal. Why should the semantic constraints on what is a possible word be different in English and Icelandic?

The difference between English and Icelandic can be accounted for easily by assuming that Icelandic lacks the lexical reanalysis rule that English has. In Zaenen & Maling (1983) we have argued that only OBJ passivizes in Icelandic. Hence in our account, the ungrammaticality of the examples in (7)-(9) above is to be expected, on the assumption that prepositional objects have a different grammatical function. In English on the other hand, there is a lexical analysis rule argued for in Bresnan (1982), that reanalyses the V + P as a complex V, and hence turns oblique objects of P into direct objects. Independent evidence for this rule comes from the rule converting participles to adjectives, stated in (11).

(11) Participle-Adjective Conversion

Morphological change: $V_{[Part]} \rightarrow [V_{[Part]}]A$

Operation on lexical form: $P<...(SUBJ)...) \rightarrow \text{STATE-OF}$

Condition: $P<(SUBJ)>$

SUBJ = THEME of P

This rule takes the passive participle and the passive lexical form as its input. There are thematic restrictions on the rule which we will not go into here.

If lexical reanalysis is the source of prepositional passives, then we would expect the participial forms of the complex verbs to be input to the rule in (11). And we do in fact find prenominal modifiers like those in (12).

(12) a much talked about subject

an often alluded to problem

a well spoken of young lady
If this analysis is right, and the difference between English and Icelandic is that Icelandic lacks the reanalysis rule, then we predict that if Icelandic has the participle-adjective conversion rule, it will NOT apply to sequences of V + P. Icelandic does seem to have such a conversion rule, as shown by the examples in (13).

(13) a. nýfallinn snjór
    "newfallen snow"
b. sokkna skipíð
    "the sunken ship"
c. mikið lesin bók
    "a much read book"
d. óskrifuð lög
    "unwritten laws"
e. nýlagð kaffi
    "newly-made coffee"

But the V-P reanalysis rule being language-specific, Icelandic has no equivalent to the prenominal prepositional adjectives shown in (12):

(14) a. Vigdís er talað vel um. "Vigdis(A) is spoken well of"b. **Þetta er [vel tölud um] kona. "This is a well spoken of woman"
c. *Þetta er [vel umtölud] kona.4

This supports our claim that there is no reanalysis rule applying to V + P sequences. On the other hand, in LFG, syntactic binding (i.e., wh-movement) is not restricted to Objects. Thus we are not predicting anything about the possibility of preposition-stranding in wh-movement constructions.

It has often been noted that there seems to be a correlation between preposition-stranding and the existence of the so-called Verb-Particle construction (cf. Stowell (1982), Maling (1977)). This construction does exist in Icelandic, as illustrated in (15). (Note that the particle til takes the genitive case when used as a preposition and vi typically takes accusative case.)

(15) a. Hann hafði búið til matinn.
    He had prepared PRT the-food(A)
b. Hann bætti einum kafla við.
    He added one chapter(D) with

c. Fólk bjóst við verðbólgu.
    people expected PRT inflation(D)

Since these passivize as shown in (16), there is nothing wrong with the surface form of the prepositional passive.
(16) a. Maturinn hafði verið búinn til.
    the-food had been prepared PRT

    b. Einum kafla hefur verið baett við/*viðbaett
    one chapter(D) has been added with/*with added

    c. Heimsókn forsetans hafði ekki verið búist
    visit the-president's had not been expected
    við fyrri en í apríl.
    PRT before than in April.

Furthermore, the verb-particle construction has a prenominal form, in which the particle must be incorporated (prefixed) according to the word-formation rules of the language.

(17) a. Viðbaetti kaflinn gefur bestu upplýsingarnar.
    added chapter-the(N) gives best information-the

    b. Óviðbúin heimsókn forsetans olli miklu
    unexpected visit the-president's caused much
    fjáðrafoki.
    flurry-of-excitement

4. Prepositional Passives in Other Scandinavian Languages

   It is not just Icelandic that has the "unexpected" (from the GB point of view) joint properties of allowing prepositions to be stranded in wh-movement constructions, including topicalization, but not in NP-movement constructions such as passive. The same is true in Swedish and Danish, where prepositional passives are ungrammatical or at best extremely marginal. (For Swedish, see Korner (1948), Ejerhed (1966, 1981); for Danish, see Herslund (1984).)

(18) a. *Hon skrattades at (Sw)
   she was-laughed at

    b. *Handelsen taldes om.
    the-event was-talked about

(19) a. *Han blev leet ad. (Da)
    He was talked about

    b. *Han blev talt om.
    He was talked about

In fact, the distinction between subjects and topics is clearer in Swedish and Danish than it is in Icelandic because of the obligatory presence of the dummy subject (det (Sw), der (Da)) in an impersonal passive, even in a topicalized or questioned ver-
sion. This is illustrated in (20)-(21). (The Danish examples are from Herslund (1984), p.49)

(20) a. Henne skrattades det at. (Sw) Her was-laughed it at
b. Handelsen talades det om the-event was-talked it about

(21) a. Ham blev der leet ad. (Da) him was it smiled at
b. Ham blev der talte om. him was it talked about

5. Conclusion

We have shown that a unified account of preposition-stranding is not empirically adequate for Icelandic. We conclude that an adequate theory of preposition-stranding must allow for two separate parameters: (i) whether prepositions are possible "governors" or "controllers" of empty categories, and (ii) whether or not it has a lexical reanalysis rule. The language-specific parameter of P-stranding is equivalent to the GB notion of P's as proper governors; it determines whether preposition-stranding is allowed in long-distance dependencies. The second parameter determines whether prepositional passives exist.
FOOTNOTES

*This paper was read at the Winter meeting of the Linguistic Society of America, December 28, 1982. We are grateful to Anna Sigurdardóttir, Jóhann G. Jóhannsson, Ragnhildur Hjartardóttir and Sigga Dorgeirsdóttir for their judgments as native speakers. Research for this paper was supported in part by NSF Grant No. BNS 80-14730.

1Kayne (1981) claims that the ECP provides a unified account of four phenomena: "preposition-stranding restrictions and that-trace/NIC-trace restrictions, along with their QP counterparts, will turn out to be different aspects of the same phenomenon. In all of these, there is some empty category lacking a proper governor." (p.100-101). The Icelandic facts show that the four phenomena are not unified.

2See Susan Rothstein (1982) for further discussion of the problems the analysis poses for English.

3Although it is for them a possible "complex verb", it should be noted that their notion of a "complex verb" is considerably more general than any heretofore proposed in the literature. As a syntactic rule, it can apply to any continuous string of elements dominated by VP, as illustrated in (i), where [talk to Harry about] is a complex verb.

(i)Which problems did you[talk to Harry about] [tobj]? Case-marking follows reanalysis, thus turning otherwise oblique NPs into objective NPs to which movement rules can freely apply without leading to violations of the universal filter in (2b), and thereby allowing the stranding of P.

4There is a related participial adjective meaning "renowned", as illustrated in:

(i) Þetta er [mjög umtölud] kona. "This is a renowned woman"

Note that it takes the adverb mjög 'very' rather than vel 'well'.

5Since bound anaphors such as the reflexive sig can occur as prepositional objects in Icelandic (cf. (8a) above), it cannot be argued that the category P always blocks binding.

6McCloskey (pers. comm.) notes the following puzzle for any theory of possible governors in wh-constructions: in Irish and Polish, preposition-stranding is allowed by right-node-raising but not otherwise. This may be true even for French (cf. Kayne).
REFERENCES


Catalan Nominal Markers and Vowel Insertion

Joan Mascaró

Universtat Autònoma de Barcelona
Cornell University

1. In this paper I want to examine briefly the nature of the inflective markers of Catalan nominals, in particular the so-called gender markers. Gender markers consist normally of a single vowel or a zero morpheme. I will distinguish three types of "gender" or "class" markers. The unmarked class consists of zero for the masculine, and the vowel \( \varepsilon \) for the feminine. The marked class is considerably smaller in size than the unmarked one, but it still contains a relatively large number of members; the markers are \( u \) for the masculine and zero for the feminine. Finally, in the exceptional class we find a small number of nominals with an inflectional vowel which is different from the ones already mentioned: \( \epsilon \) or \( i \) for the masc., \( \iota \), \( u \) for the fem. In this class we can also include the other class markers referred to in fn.1 (e.g., in temps 'time' is in bils 'bile').

2. The unmarked, more general sing.-pl., masc.-fem. alternations in Catalan nominal inflection are those illustrated in (1) with the adjective prim 'thin', and the nouns tap 'bottle' and casa 'house':
1. **masc.sg.** a. prím  
   **masc.pl.** prímš  
   **fem.sg.** prímə  
   **fem.pl.** príməs

2. **táp**  
   **táps**

   kázə

   kázəs

   If we assume that [±F] and [±P] are nominal inflective features and that the phonological shape of gender and number markers is spelled out by rule, the rules responsible for the above cases can be formalized as in (2a) and (2b):

2. **GENDER SPELLING** (to be modified)

   a. Ø ---&gt; [ə]/[X]_{+N,+F}
   b. Ø ---&gt; [z]/[X]_{+N,+P}
   c. Ø ---&gt; [ ]/[X]_{+N}

   (2c) is the "Elsewhere" case w.r.t. (2a) and (2b): it will apply disjunctively, i.e. to [−F] and to [−P].

3. There exists a less common pattern for inflected nominals. A minority, though a large number of feminines take no gender marker, and some masculines take u as the gender marker. Thus **fem.sg.** of the adjective final, [fínal] (pl.[fínalš]) 'final' is identical to the masc. form, and the fem. noun [kľaw] 'key' has exactly the same form as the masc. noun [kľaw] 'nail'. Here are some examples of this marked class:

3. a. **Fem.sg.(pl.) Adjectives**

   | finál(s) | 'final' |
   | bulgár(s) | 'vulgar' |
   | indū(s) | 'hindu' |
   | grán(s) | 'big' |
   | kwál(s) | 'which' |
   | suáw(s) | 'smooth' |

   b. **Fem.sg.(pl.) Nouns**

   | kláw(s) | 'nail' |
   | fám(s) | 'hunger' |
   | unitát(s) | 'humidity' |
   | fe(s) | 'faith' |
   | sērp(s) | 'snake' |
   | sál(s) | 'salt' |

c. **Masc.sg.(pl.) Adjectives**

   | fōndu(s) | 'deep' |
   | māru(s) | 'Moorish' |
   | mǐnšu(s) | 'tiny' |
   | jātu(s) | 'snub-nosed' |
   | burātu(s) | 'drunk' |
   | gęnu(s) | 'cross-eyed' |

   d. **Masc.sg.(pl.) Nouns**

   | sůru(s) | 'cork' |
   | klú(s) | 'kilo' |
   | āmu(s) | 'owner' |
   | piánu(s) | 'piano' |
   | ʒitānu(s) | 'gypsy' |
   | ēnumār(u(s) | 'number' |
   | můsklu(s) | 'mussel' |
   | fźalů(s) | 'roll' |
   | kárů(s) | 'chariot' |
In (3c,d) the final \( u \) must be an inflectional element, since it is not present when another inflectional ending is present, as in the feminine (compare [satu] in (3c), fem. [fáta] with [fátu] 'fatuous' fem. (fáta), or in derivatives (compare [numérų] in (3d), and [numér] 'numeral' with [r̃zidu] 'residue' and [r̃zidual] 'residual'). I will return to the distinction between (3d) and (3d') later.

Let's assume that the rules in (2) are Chomsky-adjunctions. Gender Spelling will apply to the morphologically inflected root \([\text{prim}] + N, -F, +P\) to give the form \([\text{primz}]\), with the appropriate morphological structure, as shown in (4). \( E \) represents a phonologically null morphological element.\(^7\)

\[
\begin{align*}
\text{(4) a. } & [\text{prim}] \\
& +N, -F, +P \\
\text{b. } & \\
& +N, -F, +P \\
& [\text{prim}] \\
& +N, -F, +P \\
& [E] \\
& -F \\
\text{c. } & +N, -F, +P \\
& +N, -F, +P \\
& [z] \\
& +P \\
& [\text{prim}] \\
& +N, -F, +P \\
& [E] \\
& -F
\end{align*}
\]

The unmarked cases, like the adjective in (4), or the nouns tap (masc.) and casa lexically with the bare root \([\text{tāp}]_F, [\text{kāz}]_F\) but the marked cases, like \([\text{fām}] \) (fem.) and \([\text{sūru}] \) (masc.) will have something that distinguishes them lexically from the unmarked cases. I propose that their special character is due to the fact that their lexical representation is a gender inflected form similar to the derived ones in (4b,c). I will modify the representation of the masc. \([\text{sūru}]\) directly. Compare the representations of \([\text{fām}] \) and \([\text{sūru}] \) (a) to those of \([\text{fāma}] \) 'fame' and \([\text{sūr}] \) 'South' (b) (I omit morphological structure not directly relevant):

\[
\begin{align*}
\text{(5) a. } & [[\text{fām}[E]]] \\
& +F +F \\
\text{b. } & [\text{fam}] \\
& -F \\
\text{c. } & [[\text{fam}[ə]]] \\
& +F +F \\
& [[\text{sūr}[u]]] \\
& +F -F \\
& [\text{sūr}] \\
& -F \\
& [[\text{sūr}[E]]] \\
& F -F
\end{align*}
\]
Gender Spelling will not be able to apply to these forms (5a) which have their gender marker already expanded. Variable adjectives (1a) will be distinguished in the same way from invariable adjectives like those in (3a). Compare the fem.-masc. pairs tòtila - tòtil 'stupid' (variable) and útil - útil 'useful' (invariable):

(6)

\[
\begin{array}{ll}
\text{Gender Spelling} & ([\text{tòtil}]_{\text{F}}) \\
& ([\text{tòtil}]_{\text{F}}) \\
\end{array}
\]

\[
\begin{array}{ll}
\text{Gender Spelling} & ([\text{util}]_{\text{F}}) \\
& ([\text{util}]_{\text{F}}) \\
\end{array}
\]

But the adjectives in (3c) pose a problem. They are not invariable, they show different final vowels in masc. and fem. forms: [fòndu] - [fònda], [fòfu] - [fòfø], [mòru] - [mòra] (and their plurals [fòndus] - [fòndos], etc.). Phonetically a final u alternates in masc. forms with a final ø in the fem. They should have, on the other hand, their masc. gender marker u in their underlying form, according to our analysis. Since we cannot derive the fem. from the masc., we would need another form for the fem. But a single form for both masc. and fem. is necessary, since they should be an instance of Gender Spelling, being completely regular forms: there is not a single case of an adjective with a masc. form ending in inflective u that alternates with a fem. ending in anything other than ø. And if we are right in assigning the same complexity to invariables (3a) and nominals with masc. forms in u (3c), we should not have one underlying form ([[fònd][u]]) in the first case, and two underlying forms ([[fònd][ø]], [fònd]_{F}) in the second case.

There is a simple solution to this problem. Let's assume that the rule that spells out the fem. marker inserts just a V slot. The marked forms in (3) will be represented lexically with their gender markers, namely [E], for invariables and feminines with no gender vowel, and [V] for nominals whose masculine ends in inflectional u. V will be interpreted as the unmarked vowel, namely ø. The masc. inflectional vowel will be distinguished from the fem. by a rule that specifies it as u. Gender Spelling will have the following revised form:

(7) GENDER SPELLING

a. ø → [V]/[X]_{N,+F}
b. \( \emptyset \rightarrow [E]/[X] \quad +N,+F \)

c. \( \emptyset \rightarrow [u]/[V] \quad -F \)

Now adjectives with \( u \rightarrow \emptyset \) alternation can be represented lexically in their gender inflected form, but just with the \( V \) slot in the gender marker position. The rule that assigns \( u \) to masc. gender vowels will yield the final masc. \( u \) and the (universal) convention that spells \( V \) as \( \emptyset \) in the unmarked case will give the \( \emptyset \) of the feminine.

(8) \[
f\hat{\text{o}}n\hat{d} \quad f\hat{\text{o}}n\hat{d}
[[CVCC][V]] \quad [[CVCC][V]]
-F \quad -F-F \quad +F \quad +F \quad +F
(7c) \quad f\hat{\text{o}}n\hat{d} \ u
[[CVCC][V]] \quad ----
-F \quad -F \quad -F
Un. Conv. \quad ---- \quad f\hat{\text{o}}n\hat{d} \ \emptyset
[[CVCC][V]] \quad +F \quad +F \quad +F

Summing up, a vowel is the regular marker of feminines (rule (7a)), no vowel marks masculines (rule (7b)). In case there is an exceptional masc. vowel, it is the high back vowel (rule (7c)). Unmarked cases consist, underlyingly, of the bare root (4a); Gender Spelling, in particular (7a,b), supplies the appropriate morphological structure, namely \( \emptyset \), to fem. and \( E \) to masc. Exceptionally, underlying structures might contain specifications overriding the regularities expressed in (7), Thus the more marked, but still common cases in (3) have \( V \) or \( E \) underlyingly.

Rule (7c), which introduces \( u \), differentiates the marked cases in the masc. from those in the fem., when a vowel is lexically present, whereas marked cases in which \( E \) is present instead of \( V \) have the same fem. and masc. surface form.

(9) \[
di\acute{a}na \ fem. 'bull's eye' \quad \text{pi\acute{a}no} \ masc. 'piano'
[di\acute{a}n] \quad [[pi\acute{a}n][V]]
+F \quad -F \quad -F \quad +F \quad +F
(7) [[di\acute{a}n][\emptyset]] \quad [[pi\acute{a}n][u]]
+F \quad -F \quad +F \quad -F \quad -F-F
final fem. 'final' final masc. 'end'

[[fíná],[E]] [[fíná]]
+F +F+F -F

----- [[fíná],[E]]
-F -F-F

4. There is a third class of nominals which is still more restricted. In this class masculines end in a vowel which is not u, and feminines end in a vowel which is not a. Since the gender vowel is always unstressed and the unstressed vowel system consists of a, i and u, the final vowel in this class could be a or i in the masc., and u, i in the fem.8

Let's examine first the masc. ending in a. In some cases the a is epenthetic (10a), but in other cases it is clearly not (10c):

(10) a. pusípla 'possible'
   b. *Xpl
   c. unánima 'unanimous'
   d. mágnánim 'magnanimous'

díña 'dign'
   *Xgn
   apáťa 'Apache'
   amápáť 'indigestion'

sóbrə 'envelope'
   *Xbr
   pápe 'pope'
   páp 'gizzard'

ákta 'act'
   *Xkt
   péřsa 'Persian'
   béřs 'verse'

mágma 'magma'
   *Xgm
   puétə 'poet'
   puért 'well' dimin.

(10b) indicates the inexistence of words ending in [pl], [nn], etc. For other consonants, or consonant clusters, however final position is possible (10d). [ákta] will be /ák/ underlyingly, and a will be inserted. [unánima], on the other hand, will be underlyingly /unánima/ (or an equivalent form) with the final a in the root and no gender marker. There is some reason to believe that this a is an inflection marker, since it is not present before derivational suffixes:

(11) a. unánima
   seksə 'sex'
   saksízma 'sexism'
   apáťa
   apatšet 'Apache' dim.
   pāpə
   papál 'papal'
   péřsa
   pěřsik 'Persian'
b. magnánim magnanimitat
márks 'Marx' márksǐzmɔ
empatʃ' empatʃet
griŋ 'flu' griŋɔl
kɔɾs 'Corsican' kɔɾsik

I am assuming however that the a is radical, and that it is truncated before another vowel. The conditions are similar to the deletion across words, where identical vowels or a in contact with another vowel delete under certain conditions. Here are other examples of root vowel truncation in derivatives:

(12) a. prɔpi aprupjɔ aprupɔsim
'own' adj. 'acquire' 'own' superl.
dibɔɾsi dibuɾʃjɔ dibuɾʃistɔ
'divorce' 'to divorce' 'divorcist'
λɔŋgwɔlɔ ɔŋgwɔtɔ ɔŋgut
'tongue' 'tongue' augment. 'tongued'
duəs duɔl dupla
'two' fem. 'dual' 'duplicate'

b. prɔm aprimã primɔsim
'thin' 'to thin' 'thin' superl.
prugrɛs prugɾasã prugɾasistɔ
'progress' 'to progress' 'progressive'
supstituí supstitutɔ
'to substitute' 'substitute'
kintɔs kintɔl kintupla
'fifth' 'quintal' 'quintuple'

In (12a) are roots ending in [i], or [w], which stay before a derivational suffix beginning with a different vowel ([ː] or [t(ə)]), but disappear before an identical vowel (third column). (12b) contains examples of consonant final roots with which the suffixes always show up with their initial vowel.

The cases of exceptional inflectional vowel thus reduce to i in the masc. and i, u in the fem. The following list contains most of them:
(13) a. Masculines

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>munisipi</td>
<td>'county'</td>
</tr>
<tr>
<td>prinsipi</td>
<td>'beginning'</td>
</tr>
<tr>
<td>akilibri</td>
<td>'equilibrium'</td>
</tr>
<tr>
<td>aklipsi</td>
<td>'eclipse'</td>
</tr>
<tr>
<td>bigisti</td>
<td>'moustache'</td>
</tr>
<tr>
<td>trapézi</td>
<td>'trapeze'</td>
</tr>
<tr>
<td>pétrolí</td>
<td>'petroleum'</td>
</tr>
<tr>
<td>uráni</td>
<td>'uranium'</td>
</tr>
</tbody>
</table>

b. Feminines

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>parafræzi</td>
<td>'paraphrase'</td>
</tr>
<tr>
<td>djósæzi</td>
<td>'diocese'</td>
</tr>
<tr>
<td>dži</td>
<td>'dose'</td>
</tr>
<tr>
<td>asklarzí</td>
<td>'sclerosis'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>tribu</td>
<td>'tribe'</td>
</tr>
<tr>
<td>libidu</td>
<td>'libido'</td>
</tr>
<tr>
<td>řádu</td>
<td>'radio'</td>
</tr>
<tr>
<td>dínamu</td>
<td>'dynamo'</td>
</tr>
<tr>
<td>supránu</td>
<td>'soprano'</td>
</tr>
<tr>
<td>měnětu</td>
<td>'magneto'</td>
</tr>
<tr>
<td>fótu</td>
<td>'photograph'</td>
</tr>
<tr>
<td>mótu</td>
<td>'motorcycle'</td>
</tr>
</tbody>
</table>

In all these cases a particular vowel is attached to the V slot that is specified in the lexical representation of the word. Thus the exceptional character of the nominals in this class is due to their "gender inflected" underlying status. Recall that that was also the case in the preceding class, but the latter had a specified V slot, whereas for the former we posit a particular specification for the vowel in addition to the V slot, thus capturing the difference in marking. (14) displays the phonetic form and the underlying form of examples of the unmarked class, the less marked class, and the exceptional class:

(14)

<table>
<thead>
<tr>
<th></th>
<th>Masculine</th>
<th>Feminine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmarked</td>
<td>ám ‘hook’</td>
<td>fámo</td>
</tr>
<tr>
<td></td>
<td>[ám]</td>
<td>[fám]</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>+F</td>
</tr>
<tr>
<td>Marked</td>
<td>ámu</td>
<td>fám</td>
</tr>
<tr>
<td></td>
<td>ám</td>
<td>fám</td>
</tr>
<tr>
<td></td>
<td>[[ VC][V]]</td>
<td>[[CVC][E]]</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>+F</td>
</tr>
<tr>
<td>Exceptional</td>
<td>bigísti</td>
<td>řádu</td>
</tr>
<tr>
<td></td>
<td>bigísti i</td>
<td>řádj</td>
</tr>
<tr>
<td></td>
<td>[[CVCVC][V]]</td>
<td>[[CVCC][V]]</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>+F</td>
</tr>
</tbody>
</table>
In the unmarked class, [ám] and [fám] will get their regular inflective markers Ė and ă, respectively, by Gender Spelling (7). In the marked class the segmentally identical examples, like all other examples in (3), will have the inflective marker present as V or Ė, V being spelled out by (7) as [u]. Notice that the reverse specification would be possible, namely a -F as Ė, and a +F as V, but this would give as a result the unmarked case, for which no marker is necessary underlyingly. Finally, in the exceptional class in addition to the V, a particular vowel is present underlyingly, thus preventing (7) from applying at all to these examples as well as to the rest of the examples in (13).

5. The analysis just outlined covers regular nominal inflection. Let's now consider it in the light of other cases of inflection and word formation.

The most clear case where plurals are not just singulars plus the marker ț involves oxytone masculine nominals ending in sibilant or sibilant plus stop. Thus compare the regular prim in (a) to the examples in (b):

(15) Sg. Pl.

a. prim 'thin' pri.ms

b. řús 'Russian' rúsus
més 'month' mézus
flús 'weak' flúsus
mitš 'half' mitžus
daspätz 'office' daspätzus
batį 'crazy' bátžus
test 'flower pot' téstus
ðisk 'disc' dísku

I will not be concerned here with the regular phonological alternations affecting the final consonant of the root. What is interesting about these cases is that they involve an environment of vowel insertion, but the inserted vowel is not the usual one, ă. Two sibilants across word boundaries or in compounding assimilate regressively and then merge (16a). In inflection, however, ă is inserted between them:

(16) a. trés 'three' sáks 'sack' trésáks
bátj 'past aux.' šjwá 'whistle' bátšjwá
dis neg. prefix žún 'joint' dzún
mitš 'half' ẓ̌orn 'day' middźorn

b. damis 'sleep' Pres.subj.,2sg. damis pres.ind.,2 sg.
bátis 'beat' bát
b'. fúgis 'flee' fúgis
kújís 'sew' kújís
kúnéjís 'know' kúnéjís
túsís 'cough' túsís

In (16b) the verbal root is followed by the inflectional ending in the first column, and by the inflectional ending in the second. This applies to all verbs except those with root final s, z, ũ, or ñ. For these (16b'), endings are added without change in the root normally, but before an epenthetic ñ is inserted.

If we allow V insertion to apply freely between sibilants (or sibilant-stop cluster plus sibilant), it will insert a V in the examples in (15b) (masc.pl. inflection) and (16b') (verbal inflection). The first example in (15b) and the last of (16c') will have the following structure:

(17) a. řús s b. tús s
[[[CVC][V]][C]]
-F -F -F

(17a) will be subject to Gender Spelling, in particular to (7c) which will attach a ũ to the empty V slot, whereas the V in (17b) will not be subject to the rule and will be interpreted as ñ. The separation of the processes of "V spelling" and "u spelling" formalized in (7) that were motivated by the distribution of inflectional vowels, allows us to give a satisfactory account of the appearance of ũ in ñ insertion environments.

This solution can also be tested with another set of cases. Adjectives like [řúš] have masc. pl. [řúšus], as we have seen, and regular fem. [řúša] with nonproblematic pl. [řúšes]. But what happens when an adjective ending in sibilant or sibilant plus stop is invariable? Compare the invariable capás 'capable' with escás 'scarce' which is variable and ends in a sibilant, and fiscal 'fiscal' which is variable but doesn't end in sibilant.

fískál fískál fískál's fískál's
kápás kápás kápásus kápáses
øskás øskás øskásus øskáses

Fiscal being invariable, it will have the structure [[fískál][E]] which will prevent Gender Spelling from inserting a vowel in the feminine forms. Escás is parallel to rus in its masc. forms: vowel epenthesis inserts V which is spelled out by (7) as ũ. Now capás will have to have the structure [[kápás][E]], like fiscal.
([[[fiskál][E]]], both being invariables. But vowel insertion, being a phonological rule, will apply to the plural of capaç making it variable phonetically. I will assume, given these facts, that the morphological processes of Gender Spelling cannot apply to an already "spelled out" structure like (19a), but phonological processes will be able to insert an element in the null position:

(19) a. 
\[+N \rightarrow N\] 
\[
\begin{array}{c}
CVCVC \\
\text{kapás}
\end{array}
\]

b. 
\[+N \rightarrow N\] 
\[
\begin{array}{c}
CVCVC \\
\text{kapás}
\end{array}
\] 

(19c) will apply after V-epenthesis like in the other cases and [[[kapás][E]][s]] will become [kapásus] if masc. and [kapásəs] if fem.

Another piece of evidence in favor of this analysis of inflec-tive vowels has to do with word formation. A desinential vowel appears often at the end of the first element of the complex word. In nominals it can be, exceptionally, the feminine marker, as in deadjectival manner adverbs in -ment:

(20) Adjective (masc.)  Adjective (fem.)  Derived adverb

<table>
<thead>
<tr>
<th>noun</th>
<th>noun</th>
<th>noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>nwá 'new'</td>
<td>nubə</td>
<td>nwəmən</td>
</tr>
<tr>
<td>astrán</td>
<td>astrana</td>
<td>astranəmən</td>
</tr>
<tr>
<td>analak</td>
<td>analuga</td>
<td>analugəmən</td>
</tr>
<tr>
<td>aktual</td>
<td>aktual</td>
<td>aktualmən</td>
</tr>
</tbody>
</table>

But normally the morphologically unmarked form is required. If derivation or compounding don't require a vowel after the stem, the bare stem appears even if the masculine gender-inflected form has a vowel:

(21) prim 'thin'  primisim superl.  
imfamə 'infamous'  imfamisim superl.  
gət 'glass'  gutət dimin.  
bigəti 'moustache'  bigutət dimin.  

But in other cases the suffix requires a vowel to appear before it; in these cases the inflection marker appears on the root (23). Given our analysis, if the morphologically unmarked form, namely masc. sg., is required, and a vowel is also required by the suffix, we will expect the less marked masc. vowel to appear, namely u.
It is rare that stressed suffixes require a vowel. The only case that is reasonably uncontroversial is the deadjectival nominal suffix which has the allophones -dat and -tät. Both can appear after stems with no final vowel added, or with ā, and -tät can also appear after the stem followed by i:

(22) māl 'bad' māldät 'badness'
īgwāl 'equal' īgwāltät 'equality'
šēk 'dry' šēkatät 'dryness'
āskās 'scarce' āskasätät 'scarcity'
ūtil 'useful' utilität 'helpfulness'

But there is a class of derivational suffixes that normally begin with a consonant and require a vowel on the stem:

(23) a. -graf āsānugrafik 'scenographic'
āsēnā 'scene'
lāksikugrafik 'lexicographic'
lēksik 'vocabulary'

-leg/log fānumanuluzīā 'phenomenology'
fānūmān 'phenomenon'
mātuduluzīā 'methodology'
mētuda 'method'

Cases that take a vowel different from ū, or no vowel exist, but they are very restricted (triluzīā 'trilogy' kārnībur 'carnivorous').

Finally, another case where a desinential vowel is required by a specific morphological configuration is found in compounds like anglo-francés fisico-matemática ([ānglufransēs], [fizikumatemátik]). Whereas similar types of compounds do not require a vowel (sudeast 'southeast', sord-mut 'deaf-mute'), when this particular compound structure requires a vowel, it is the unexpected unmarked masc. vowel ū.

7. The three types of nominals, unmarked, marked, and exceptional are thus distinguished by their underlying forms. Unmarked nominals will have their "gender" spelled out by the regular process of Gender Spelling (7): a vowel is inserted in the fem.; the underlying form will consist just of the root (and morphological class features). On the other hand, marked nominals will have slightly more complex underlying representations. The inflective suffix will be present, either as a phonologically empty node for the fem., or as a V slot in the masc. The representations in the unmarked and in the marked class are thus reversed: masculines have the form of feminines (except for the feature F, of course), and conversely. The empty node will surface empty in both marked and unmarked classes; rule (7c), however, will distinguish masc. from fem., by spelling out an unspecified vowel as ū if it has the
feature [-F]. We have finally the exceptional class with fully
specified inflectional markers in underlying representation. The
analysis can also be extended, as argued in sections 5 and 6, to
cases where a V slot appears for independent reasons (phonological
or morphological). In these cases the V is spelled out as u if it
is masc., and @ in case it is fem. or has no gender feature at all.

FOOTNOTES

1 As pointed out for Spanish by Harris (1983:115-116, 1984)
other elements can also function as inflectional markers. He cites
-is, -es, -os, -s as in dosis, diabetes, caos, tóra[ks]. See also
fn. 8.

2 "Class marker" is the term used by Harris (1984).

3 u needs only to have the specifications [-back, -low],
other features being supplied by vowel reduction; see Mascaró
(1978).

4 The phonetic [s] in the plural is the result of finally
devicing an underlying /z/.

5 See Wheeler (1979: 2-8) for an early generative analysis,
and Mascará (forthcoming, section 40) for discussion.

6 In the phonetic transcriptions I don't distinguish between
the spirant and stop variants of b, d, g.

7 Morphological constituent structure makes it possible to
distinguish a root from a stem with a "zero morpheme", e.g., (4a)
from (4b). Notice also that [prim]+N,-F,-p is notationally
equivalent to +N,-F,-p.

8 As pointed out before (fn. 1) markers which don't consist of
a single vowel belong also to this class. Mascaró (forthcoming,
section 40) gives the following examples (the second example in
each pair is a derivative which shows that the missing final seg-
ment is inflective). -is: brindis 'toast' - brindar 'to toast',
glotis 'glottis', -glotal 'glottal', cutis 'skin' - cutani
cutaneous'; -us: porus 'pore' - pords 'porous', anus 'anus' - anal
'anal'; -s: bilis 'bile' - biliar 'biliary', temps 'time'
-temoral 'temporal', fons 'bottom' - fonament 'base'.


10 I am assuming that [w] is represented as a segmental "u"
melody attached to a C slot.
See Mascaró (forthcoming, section 32) for a descriptive analysis.

REFERENCES


1. Introduction. Pedagogical techniques for the teaching of pronunciation to adults range from a code-centered approach, with intensive drills on isolated sounds and instructions for correct articulator shaping, to a message-centered approach, which suggests that proper pronunciation will emerge spontaneously in time as long as the student is engaged in a meaningful use of the language. Proponents of the drill or "focus-on-form" approach fear that lack of intervention will result in the fixing of inappropriate habits which require extensive remedial instruction at the intermediate level, whereas proponents of a "focus-on-meaning" approach fear that intervention before the student is ready will actively disrupt the emergence of proper pronunciation. All agree that there is considerable variation in student achievement, regardless of the techniques employed; and there are no reliable guidelines for judging what length of instructional time is necessary for a given technique to be effective.

The purpose of this paper is to focus on those findings in experimental phonetics which appear to have some bearing on the question of how best to assist the student in achieving acceptable pronunciation. In particular, we wish to know the significance of compensatory articulation in learning to make speech sounds. Variability in motor control to achieve a given effect appears to be the rule rather than the exception in all kinds of skilled
behavior. For example, to keep the eyes fixed on a moving object it may be equally effective to shift the eyes, the head, or the entire body, either singly or in concert. The efficiency of the movement depends on how muscles are orchestrated in a given context to accomplish "intent." It would be surprising if similar effects failed to apply in speaking; and indeed, for even the casual observer there is ample evidence of variation in the way speech sounds are made. Pipe smokers suppress jaw movement without losing the distinction between "open" and "close" vowels. Ventriloquists make clearly perceived "bilabial" sounds without labial movement. Trained singers visibly change lip and jaw configuration in order to maintain vowel quality while changing pitch. One can, within limits, make "back" vowels with the tongue fronted or "rounded" vowels without rounding the lips.¹

There is a considerable body of research in experimental phonetics which suggests that an understanding of the variation phenomena mentioned above is important for the teaching of pronunciation. Particularly important is the fact that speech sounds which are perceived to be the "same" are routinely produced in a variety of ways. The research suggests that pedagogical applications should be based on a model of the vocal tract which allows for context-sensitive adjustments without conscious effort on the part of the speaker. Static models, based on statistical averages, for "correct" articulator position are particularly in question. There is no doubt that some teachers have applied the familiar sound charts for pronunciation drill without enough concern for developmental processes and without an understanding of the significance of individual variation in sound production. It is not clear how a student could integrate instructions about articulator position for a sound in isolation with the proprioceptive and acoustic feedback of sounds in context. Theoretical debates based on normalized models pose questions such as whether the French schwa or "mute e" is rounded or unrounded, as if one were faced with a binary choice. As Lieberman (1977, p. 138 ff.) points out, descriptions of articulator positions were devised by A.M. Bell in 1867 as a pedagogical aid for the deaf, who may lack entirely acoustic feedback for comparison with speech production. For those with normal hearing, learning to speak involves a much more complex integration of meaning, sound, and pronunciation.²

2. Theoretical Background. When Fant (in Malmberg 1968, p. 218) wrote, "An old problem in phonetic theory is whether compensatory forms of articulation exist," he was not so much denying the empirical evidence of variability as stressing the difficulties encountered when one wished to incorporate the data of motor equivalence into existing models of speech production. With the advent of instrumental phonetics after WW II, interest had centered on isolating the acoustic invariants of phoneme perception. After considerable research (among many others, Joos 1948, Jakobson et al. 1963, Ladefoged et al. 1972) the research
focus shifted from articulatory configurations to auditory contrasts. Phoneticians were left with the task of solving how acoustic features were realized in the vocal tract.

The mapping of acoustic formant values onto articulatory configuration turned out to be a complex affair, for a number of reasons. Formant values for a given perceived vowel were observed to vary considerably from trial to trial with a given speaker. Even more variation in formant values was noted between speakers of different dialect, age, or sex. A study by Peterson and Barney (1952), often cited subsequently, convinced theoreticians that the information provided by a sound spectrogram would not relate in a simple way to phoneme identification. They began their article as follows:

Considerable variation is to be found in the processes of speech production because of their complexity and because they depend upon the past experience of the individual. As in much of human behavior there is a self-correcting, or servomechanism type of feedback involved as the speaker hears his own voice and adjusts his articulatory mechanisms.

Only a year before, Peterson (1951) had identified what would become the preoccupation for theoretical phonetics:

A fundamental question in experimental phonetics is whether sustained vowels sounds which are judged aurally to be phonetically equivalent have similar organic formations (and thus similar acoustical patterns) or whether they have similar sensory patterns after the signals have passed the non-linearities and transformations of the auditory apparatus.

Citing Dunn (1950) to the effect that no single acoustic parameter such as formant frequency can be shown to match invariantly a single physiological parameter, Peterson sought to understand the relationship between formant frequencies for a given vowel as produced by a man, a woman, and a child. He found that if he plotted formant ratios \( F_1/F_2 \) against \( F_2/F_3 \), on the mel scale, he obtained good convergence for a given vowel. That is, the ratio of formant values rather than their absolute values provided a degree of invariance. He concluded his 1951 article as follows:

This finding would indicate that the phonetic value of a vowel, and hence also the phonetic equivalent of successive vowels, depends not on the absolute frequencies of the vowel formants but rather on the ratios existing among the formants – specifically, the ratios of the first and second to the third.

The line of research was naturally influenced by concurrent
debates in theoretical linguistics concerning the psychological reality of the phoneme. Since instrumental measurements offered ample evidence of variation in the physical properties (frequency, amplitude, etc.) of the "same" speech sounds, it was necessary to account for both acoustic and articulatory compensation in the hearer-speaker. The phoneme concept provided an abstract unit of analysis which was seen as mediating in both perception and production.

Although the neurological mechanism for perceiving similarity in the face of varying physical stimuli was (and remains) poorly understood, the phenomenon was well documented for various sensory modalities (e.g., facial recognition at different angles and distances). The "simple" task of verbal mimicry was seen to require extraordinarily complex information processing. For example, the child, unable to reproduce the formant values of an adult with an immature vocal tract, apparently transforms what is heard into ratios of vowel formants, and these values are in turn transformed into a set of motor commands for speech.

![Diagram]

Fig. 1 ARTICULATORY AND ACOUSTIC VALUES FOR THE VOWEL /i/. The acoustic values on the right (from Peterson and Barney 1952) represent three spectra of formant frequencies which produce the perception of the phoneme /i/. The schematic on the left illustrates transformations of the vocal tract which preserve proper ratios for phoneme identity.

Figure 1 illustrates schematically the geometric transformations required of a child in mimicking an adult. (The model is greatly simplified. It is based on the observation made by Dunn 1950, p. 749, to the effect that resonant frequencies are almost inversely proportional to the cavity lengths, and independent of
cross sections, provided all are changed at once.) Note that the fundamental frequency (F₀), or basic pitch level, of a child may be twice that of an adult male without affecting phoneme recognition.

Attempts were made to provide physiological explanations for the demonstrated ability of subjects to assign variable tokens of speech sounds to an appropriate class. The motor theory of speech perception, in its strong form, proposed that the perception of speech sounds is mediated primarily by reference to the motor commands that would be required if the listener were to produce the sound. This line of investigation suggested the possibility that invariants for a given speech sound could be found in the EMG potentials of the articulator muscles, as argued by Liberman et al. (in Wathen-Dunn 1967). Quantitative measurements failed to confirm the theory in its strong form, as one would expect from what is now known about variation in articulation. Normal subjects appear to resort to motor "shadowing" of speech sounds only as a secondary aid to perception, as when struggling to comprehend a difficult message.

Interesting questions, however, were phrased in this period of research, and surprising results were obtained. Quantitative acoustic data had shown that vowel formant values vary over a continuum, which suggested gradient rather than discontinuous differences between vowel configurations. But what perceptions result at intermediate values? A series of experiments produced an unequivocal answer: the listener hears in terms of the phoneme classes which have been learned for a particular language, and makes relatively abrupt shifts in vowel identification as values are gradually changed. (The effect is even sharper for consonant identification.) As Lane (1965, p. 300-301) took pains to point out, listeners can make same/different discriminations along a continuum; it is the phonemic labeling which is categorical.

Liberman (1977, p. 166) summarized the theoretical position favored by the cognitive psychologists: "Listeners appear to identify vowels in terms of an auditory 'map' of the vowel space." This auditory map was seen as mediating categorical judgments of an acoustic input which was the result of relatively imprecise articulatory motions. It is as if the listener is equipped with a fretted instrument, like the guitar; the speaker is equipped with an unfretted instrument, like the violin.

The implications of attributing invariance to the sensory level, rather than to the acoustic or articulatory levels, left a great deal to explain, however. MacKay (1967, p. 28), discussing chiefly visual perception, proposed a theoretical model including a "comparator" to provide feedback for same/different judgments, an "organizer" which develops with learning to provide feedforward for making categorical judgments, and a "meta-organizer" to
provide for higher level planning and shifts in strategy. MacKay's model suggested that the capacity of the central nervous system to produce adaptive behavior required an "efference copy" of intent. He equated (ibid., p. 29) learning to adaptation to the environment (linguistic or otherwise).

What I want to point out is the importance of the proper balance of feedforward and feedback in this continual process of adaptation to the redundant features of the pattern of demand.

Cognitive "maps" or "plans" (Miller et al. 1960) were seen as a necessary feature of a model of perception: one must develop an anticipatory set in order to sort out essential features. The same emphasis on feedforward, based on evidence from neurophysiology, was echoed by Pribram (1971, p. 105).

Habituation is not an indication of some loss of sensitivity on the part of the nervous system but rather the development of a neural model of the environment, a representation, an expectancy, a type of memory mechanism against which inputs are constantly matched. The nervous system is thus continually tuned by inputs to process further inputs.

A sensory model of speech perception and production allowed for variation at both the acoustic and articulatory levels and assigned invariance to some higher, cognitive level of information processing. This line of research was naturally influenced by concurrent debates on the psychological reality of generative rules in phonology. The problem remained, however, of how to interpret formally the variables which could be observed. Attention was focused on the function of articulatory motions. It was seen that a given vowel sound, for example, resulted from a properly configured cavity in the vocal tract. By studying the cavities formed by the tongue, lips, etc. in x-ray motion pictures, researchers were able to see that there were obviously different ways of making the "same" sound in different phonetic contexts. Sound production, essentially a dynamic process, had been poorly captured in static models, which did not specify the variables encountered in normal sustained discourse. As is now well known, formant transitions are essential to the perception of consonants, and even vowels are difficult to identify if unnaturally sustained and produced without at least syllable context. It became clear that speech perception and production involved gestalt processes which could not be satisfactorily represented by simple stimulus-response relationships.

The significance of cavity configuration is well illustrated by a brief review of the difficulties encountered in attempting to construct devices for producing intelligible speech sounds. Almost all such models are based on the fundamental insight that
the vocal tract acts as a Helmholtz resonator, modifying the 
output of noise producing sources such as the larynx. The 
difficulties in constructing an analog of the vocal tract are 
enormous, given the extraordinary variety of shapes made possible 
by the intricate musculature of the human sound articulators. Early attempts at simplification explored the possibilities of a 
model based on a double Helmholtz resonator, since it had been 
noted that most of the information necessary for the 
identification of vowels was contained in the first two formants. 
In this model, the lower formant ($F_1$) was assumed to be associated 
with the pharyngeal cavity, whereas the higher formant ($F_2$) was 
assumed to be associated with the mouth cavity. This model has 
been widely used for contrastive linguistics applied to pedagogy 
as in, for example, Delattre 1965), chiefly because of its 
simplicity and the relatively good match between the generally 
accepted articulatory description of tongue position and the 
acoustic specification of vowel position (i.e., a one-to-one 
mapping of place of articulation with vowel position in "acoustic space").

But the interaction of coupled cavities turned out to be 
much more complex. It was discovered that a particular formant 
was not always associated with a particular cavity, as stressed by 
Dunn, Fant, and other experimental investigators. Moreover, the 
successful identification of certain phonemes seemed to require at 
least a third formant, as with nasals or retroflex consonants. Effective models of phoneme production based on the source-filter 
theory had to utilize sophisticated calculations of the 
cross-sectional area functions of the vocal tract. That is, as 
summarized by Lieberman (1977, p. 43), "Formant frequencies are 
always determined by the size, length, and shape and ends of the 
supralaryngeal tract." This meant that tongue position alone did 
not determine vowel quality; one had to consider simultaneously 
the resultant size, length, and shape of the cavities formed, as 
well as the positions of the lips and larynx.

Vocal tract analog models, such as Dunn's Electrical Vocal 
Tract (1950), permitted an input of multiple variables in 
calculating the articulatory configurations for a desired acoustic 
output. However, as noted by Stevens et al. (1953, p. 735), "To 
obtain the desired flexibility in the apparatus, simplicity must 
be sacrificed." That is, successful synthesis of speech sounds 
required control of a number of variables affecting the shape of 
the vocal tract. Once these variables were provided for, the 
model was found to be capable of generating a particular speech 
sound at more than one combination of settings. The implication 
for articulatory phonetics was clear: the human vocal tract 
should be capable of producing certain speech sounds at more than 
one articulatory configuration. In a refined version of a vocal 
tract analog, using the parameters of position of the tongue 
constriction, size of the constriction formed by the tongue, and
dimensions in the vicinity of the mouth opening, Stevens and House (1955, p. 491-492) reported as follows:

In addition to demonstrating the rather obvious fact that a given vowel can be produced by a variety of articulatory configurations, [our 3-parameter plot] indicates a more startling finding. The figure shows the articulatory area for /u/ to possess two separate points which will produce the average adult male formants. Examination of [another plot of data] has already revealed that for the smaller constriction values there is a tendency for the extreme formant contours to be double-valued. Thus, the data suggest that a vowel such as /u/ produced at the extremes of certain articulatory ranges, may have a bimodal articulatory distribution.

Over a decade of research produced theoretical refinements too numerous to catalogue here. By the 1970's it was clear that an understanding of speech production had to be based on a description of the cavities produced as a result of articulatory movement. Lindblom and Sundberg (1971) studied the acoustical consequences of lip, tongue, jaw, and larynx movement and demonstrated how the various articulators cooperated in producing appropriate resonating cavities for a desired acoustical output. They provided a summary of how formant values responded to articulator movement and concluded (p. 1178), "It is likely that the compensatory tongue shapes preserve acoustically relevant aspects of the area functions." In their view (p. 1171), abstract features could not be related to invariant articulatory movements: "In phonological terms, the motor command pattern underlying the realization of [± round] appears to vary with context."

A simplified model for illustrating compensation may be based on the principle that articulatory gestures are variable in order to maintain invariance of the acoustic signal for a given individual speaker. The articulators are adjusted to produce cavities of the appropriate acoustical configuration for a given vowel, and this configuration may vary in response to a number of contextual conditions. Figure 2 illustrates how typical configurations for representative vowels may be achieved. The model demonstrates the correspondence between articulatory states and acoustic values. No attempt is made to illustrate jaw or velum movement or specify the details of tongue raising and lowering; nor is any attempt made to illustrate other kinds of compensation, such as pursing (as opposed to extending) the lips to create a bottle-neck effect in conjunction with a large front cavity. It is reported (see Studdert-Kennedy 1984) that those who do not have a tongue manage to compensate so as to produce quite intelligible speech, but no attempt is made here to illustrate catastrophic kinds of compensation.
Fig. 2 COMPENSATORY ARTICULATION.
The acoustic length of the front and back cavities may
by altered by spreading/bunching the tongue, extending/ retraction the lips, and raising/lowering the larynx.
The three configurations for /u/ are equivalent acoustically.

In going from /i/ to /a/, the tongue shifts back, enlarging
the front cavity and reducing the size of the back cavity. In
going from /a/ to /u/¹, the size of the back cavity is restored by
bunching the tongue and lowering the larynx; the large front
cavity is achieved by both bunching the tongue and extending the
lips. As shown for /u/², the same acoustic configuration may be
achieved by retracting the lips, moving the tongue back, and
lowering further the larynx. (This compensatory configuration
occurs when one wishes to mask lip movement, as in ventriloquism
or in talking out of the side of one's mouth.) As shown for
/u/³, the same acoustic configuration may be achieved with lips
extended and larynx lowered as well, but with the tongue less
bunched. (This configuration occurs when singing at full volume
if the larynx must be lower to accommodate low pitch.) Note that
the acoustic length of the front and back cavities remains
constant for /u/¹, /u/², and /u/³, in spite of considerable
articulatory variation.

Atal et al. (1977) provided an analysis, based on a
computer-sorting technique, which was designed to provide
theoretically for variation in matching acoustic data with
articulatory configurations. As they stated (p. 1535):

The techniques presented here allow one to determine
articulatory regions which map into a single point in the acoustic space, thus enabling one to systematically study the phenomenon of compensatory articulation.

The authors reported some interesting findings: 1) Given the acoustic parameters of a particular vowel, it is not possible to compute the corresponding articulatory configuration directly, as the inversion function may be multi-valued. 2) There may be empty regions in the acoustic space which cannot be obtained for any values in the articulatory space. These are designated as "forbidden" regions. 3) Although a particular articulatory parameter is variable, limiting values must be set for the model to produce acceptable results. The model assisted in focusing attention on important questions such as the function of compensatory articulation in normal speech behavior. The authors gave an indication in this direction with their concluding remarks (p. 1555):

Another hypothesis which seems worthy of investigation concerns contextual effects and coarticulation. It seems reasonable that the particular configuration used to produce a sound depends on the context in which that sound is imbedded. It seems worth investigating whether some minimum motion or minimum energy principle is applied in going from one sound to another.

The relative ease with which one compensates for differences in sensory input suggests an innate neurological mechanism operating across sense modalities. The relatively difficult trial-and-error process of discovering appropriate motor routines for a given language's sound system suggests a learning process with developmental aspects. Of the many implications for applied linguistics which could be explored at this point, let us focus on the achievement of fluency in pronunciation. We know that a prologed period passes before the learner may be said to have acquired the phoneme inventory of a target language. Lapses and puzzling retrogressive tendencies are evident in children's language learning behavior, as demonstrated by Ferguson and Falwell (1975). Non-fluent speech and considerable variation in the quality of phoneme production are the rule rather than the exception. The authors argue that early speech can be interpreted as the learning of word-level pronunciation, and that regularity at the phoneme level stabilizes slowly over time.

Control of a phonological system requires simultaneous information processing, which in turn puts a premium on rapid, context-sensitive articulation. In particular, phonotactic and suprasegmental variables affecting phoneme production must be integrated into the dynamics of speech production. As put by Studdert-Kennedy (1984) in a review of sources of variability in infant speech (p. 13), "Not only the movements, but their relative
timing and sequencing must develop."

As predicted by theoretical models requiring feedforward mechanisms, the learner, in order to develop fluency, is required to master compensatory strategies which anticipate the motor execution of speech plans. For example, Fujimura (1981) was interested in how adult speakers modified speech output in the timing of a phrase. He sought to incorporate insights from both autosegmental theory and metrical theory in showing how "temporal modulation is combined with other suprasegmental modulations, in particular, pitch and intensity contour shaping." He found evidence for relatively fixed articulating gestures, which he called "icebergs," occurring at intervals which could be controlled in a "liquid medium."

Consonantal gestures in transitions to or from (tautosyllabic) vowel gestures, for example, are relatively constant and not readily subject to speed modulation, whereas stationary gestures are generally more responsive to temporal adjustments, except when the duration is a cue for phonological distinction.

The anticipatory set of the vocal tract, or "neutral" position, may be studied as a special case of compensation in articulatory phonetics. Hockett (1976, p. 84 ff.) proposed a feature "onness" to describe the base of articulation of all phonemes in a particular language. Hesitation sounds, in his feature system, are marked by the single feature "on," and assist in determining the readiness state of the vocal tract. The hypothesized neutral position is acquired by the learner as an optimum point of departure for pronouncing the elements of a given phonological system. Delattre (1965) had earlier concluded that acquisition of the hesitation sound of a particular language was important pedagogically and advised (p. 66): "It is important to teach this key position at an early stage in the conditioning period."

The emphasis on anticipatory phenomena highlighted the importance of feedforward mechanisms in speech motor routines. Gay et al. (1981) conducted experiments designed to rule out effects of auditory feedback, and presented evidence showing that speakers whose jaw was fixed on a "bite-block" compensated automatically by elaborations of normal articulator shapes, which they called "supershapes." Noting that these shapes resulted in perfect or near-perfect matches of the vocal tract, and that compensation took place selectively at points of maximum construction, they concluded as follows (p. 810):

Thus it seems possible to infer that vowel targets may be defined in the central nervous system with respect to cavity
shape or area-function features.

Kelso et al. (1984) conducted experiments in which the jaw was unexpectedly perturbed during speech. They found, too, that articulatory compensation was achieved immediately, without learning trials, and concluded that automatic adjustment of the articulators is the "normal mode of operation." Although a detailed model is lacking, it seems clear that speech gestures involve cooperation among all the muscles of articulation, and that articulators do not function separately. They are, presumably with learning, grouped together as "functional synergies" which can be controlled as single units. As they stated (p. 102):

The present data, preliminary though they are, suggest nevertheless that the mode of operation of the speech system is intrinsically task-oriented, and that both rapid local and remote articulatory contributions are involved in the implementation of cooperative action. But most importantly, the adjustments appear to reflect a synergistic organization among articulators that is tailored to the requirements of the spoken act.

The applied aspects of the theoretical research in progress are far from clear at the present moment. A great deal remains to be explained in the learning of pronunciation in the first language, and cross-language effects are even less well understood. It would be instructive to know in detail how the articulatory-acoustic patterns of a foreign language compare with those of a first language in order to understand how listening influences learning the new motor "synergisms" required for speaking. Repp & Liberman (1984) have returned to the issue of "categorical perception" introduced by the motor-theory of speech perception and sought to understand better the interaction between articulatory and acoustic phonetics. They note that category boundaries between phonemes may fall at a point where the "differential sensitivity" of the ear undergoes sudden change. Articulatory gestures, in what they term the "auditory hypothesis," may conceivably develop so as to produce sounds which lie within the boundaries of these categories. On the other hand, one may argue the position that boundaries are determined by articulatorily determined prototypes, i.e., typical configurations of the vocal tract. The authors favor this position, which they call the "phonetic hypothesis" (p.32-33).

The prototypes and boundaries between them need not conform to discontinuities in the auditory system, but are, instead, free to be precisely as flexible as the acoustic consequences of the articulatory gestures require. In fact considerable flexibility may be demanded. The efficiency of phonetic communication depends crucially on the ability of
the several articulators to produce successive phonetic segments at the same time (or with considerable overlap), and also to accommodate in other ways to changes in phonetic context and rate. . . . Our hypothesis is that a link between perception and production (in most general terms) enables the category prototypes to respond appropriately to articulatory or co-articulatory adjustments, and so to mirror the talker's phonetic intent.

3. Conclusions. Strategies for teaching pronunciation must take into account the fact that variation in the way sounds are produced is normal and even necessary in learning to speak a foreign language. The role of variation needs to be understood at two levels. First, fluency at the native-speaker level requires that compensatory mechanisms for making speech sounds be available in order to accommodate the variables of timing and intonation, key elements for meaningful utterances. Complex articulation strategies appear to be mediated at a high level of abstraction and are task oriented. Second, variation in the way speech sounds are made over time in a learning situation (i.e., developmental variation) also appears to be normal, but empirical studies to support a detailed theory of how compensatory mechanisms for a foreign language are learned appear to be lacking.

The task orientation of fluent speech suggests a "natural approach" (Krashen & Terrell 1983) in which learning to make speech sounds occurs in a meaning-focused context. The implication is that practice should be directed at meaning-bearing units, i.e., at levels no smaller than the word. An underlying assumption is that learning is most efficient if it proceeds from the whole to parts, from exercises which preserve the integrity of meaningful activity. As others have noted, this appears to imply that "student pidgin" is a normal and necessary feature in the learner's development. If the learner fails to orchestrate the complex articulatory routines of a native speaker, reluctance to make sounds not in accordance with what is heard is quite understandable. What remains to be defined is how long, and under what conditions, silence is useful.

Since speakers appear to match multiple articulatory configurations to the "same" auditory image, acquisition of the acoustic target assumes a logical priority for those with normal hearing. That is, the task faced by the language learner is to internalize an auditory representation and to mobilize the appropriate, context sensitive, motor routines which produce a successful approximation, as determined by acoustic feedback. Instructor intervention at the feedback stage, in the form of forced speech or instructions for articulator position, may in effect ask the student to rehearse in the absence of an appropriate internalized model. It is possible for the premature speaker to substitute his or her own speech sounds as a model in
rehearsal, shortcircuiting the creation of proper feedforward. Classroom experience indicates that articulatory instructions are not always effective. If we advise a student attempting the French /y/ to position his lips for /u/ and utter /i/, he or she may use compensatory strategies to produce an /i/ with rounded lips! More commonly, the student may succeed in producing an /y/ in isolation, but revert to first language equivalents in word or sentence context.

Articulatory instructions can serve only as a rough guide, since they are based on average values for a number of speakers and do not specify the complex concomitant adjustments of the vocal tract that the individual speaker must learn. The situation is comparable to that of teaching someone to whistle. An instructor can model the sound and show how the lips are (typically) rounded; but the learner himself must discover how to position the tongue, pharynx, etc. so that the desired resonance is produced. Discovery of the proper configuration is only the beginning, however; a prolonged period may pass before the whistler learns how to maintain uninterrupted resonance while changing pitch. Note that telling the would-be whistler to round the lips and blow leaves quite a bit unexplained.

On the other hand, non-intervention provides no assistance for the student who does not spontaneously begin using the target language. It is not at all clear that respecting the student's silence is the only effective teaching strategy. There is no doubt that skilled language teachers have been extremely successful with both form-focused and meaning-focused methodologies, or more commonly a mixture of the two. What appears to be lacking in applied linguistics is both a developmental model and a diagnostic technique for determining an individual student's progress in the period where his or her preferred behavior is silence. Research has demonstrated that one must develop highly sophisticated cooperative motor routines for achieving articulatory targets, which suggests that one must learn modulation routines involving multiple roles for individual articulators. Since motor learning is known to be slow, and a great deal of practice is required to reach high levels of skill, a methodology which offers no form-focused drill may require an inordinate amount of training time, at least for certain students. Students do ask for details of articulatory movement at a given moment in learning, and instructors report occasional sudden successes from just such assistance. Concern for affective factors and respect for individual learning styles need not be sacrificed in a program which incorporates form-focused drill at the appropriate moment.

If we look to basic research in phonetics for applications to FL teaching, certain generalizations emerge which may be helpful. First, the vocal tract functions as a whole. It is
likely that an overall preparatory set for speaking in a given language has to be learned, and that fluency requires "least-effort" solutions to emerge. Under most conditions, the production of an /u/ is facilitated by tongue back, lips rounded, and larynx lowered; /i/ is facilitated by tongue front, lips spread, and larynx raised; /a/ is facilitated by a relatively lax configuration of tongue, lips, and larynx. Given the nearly universal occurrence of these configurations, it is attractive to assume that they represent a least-effort solution for combining the action of several articulators into a single gesture. The basic positions must be modifiable, however. In particular, the prosodic features of timing and intonation, essential for meaningful speech, produce perturbations in the articulator muscles. For example, a pitch prominence in intonation may require an accommodating movement of the larynx, depending on which vowel happens to be accented. The movement of the larynx must then be compensated for by adjustments of the tongue and/or lips, etc. In short, the learning of individual sounds has not been achieved until the sounds can be controlled in a meaningful context.

A second generalization follows from the above, and applies in particular to cross-language learning situations. Since the vocal tract functions as a whole, a great deal of motor learning is involved in mastering the co-articulation effects required by a given language. The French child, for example, presumably learns how to combine the feature "round" with "front" vocal tract configurations to produce the series /y/, /ø/ and /œ/. The French hesitation sound tends to have the acoustic feature "round," perhaps in order to provide an efficient neutral vocal tract configuration for a vowel system in which the feature has a high frequency of occurrence. A speaker of English must in effect learn new combinations of motor gestures in order to make the French sounds, since the feature "round" is never coupled with front vowel tongue configurations. The Frenchman learning English must cope with the so-called "short" vowels, which require an entirely different timing system for vowel nuclei in closed syllables. The English hesitation sound may likewise reflect an efficient neutral vocal tract configuration for a vowel system which requires a high frequency of reduced vowels. In both learning cases it is clear that an efficient vocal tract set is required for ease of articulation of the sound system as a whole. To be effective, form-focused drill must assist in developing the compensatory mechanisms required for achieving co-articulation effects. Thus, in addition to modulation for meaning mentioned in the preceding paragraph, the learner will have to achieve motor routines for meeting the phonotactic demands of new clusters, sequences, and transitions. Again, the learning of new sounds has not been achieved until variable motor routines are available for their production.
The conclusions reached here offer little that is new to experienced teachers, except perhaps an understanding of how methodology relates to theory. We are still far from being able to demonstrate a "natural syllabus" for the teaching of pronunciation, and the really interesting question for applied linguistics is not so much what to do as when to do it. One may look forward to interesting developments in the area of individual variation, aptitude, and the like for increasing the effectiveness of the timing of message-centered or code-centered instruction. Research devoted to an investigation of the optimal moments for meaning-focused and form-focused drill may reveal a great deal about individual language learning styles and help to identify the conditions which favor success or failure in learning pronunciation.
Gay et al. (1981) provide experimental verification of compensation while producing open and close vowels with a fixed jaw. Sundberg (1977) provides a discussion and photographs of compensation for producing vowels while singing.

The deaf can apparently internalize a motor image of sound through visual and proprioceptive feedback. The speech of the deaf trained through motor conditioning is quite impressive, but lacks in particular the subtle control of intonation exhibited by those with normal hearing.

See Stevens (in David and Denes 1972) for a discussion of the "quantal" nature of vowels.

See Lieberman (1977, p. 111-114) for an excellent summary of the interaction of articulatory muscles.

A vocal tract analog model was developed independently by Chiba and Kajiyama (1941).

See Stevens and House (1955, p. 486) for details on calculating area functions with identical acoustical impedance.

See Riordan (1977) for experimental confirmation of larynx lowering as compensation for restricted lip movement.

Atal et al. used four parameters for the vocal tract: point of maximum constriction measured from the glottis, cross-sectional area at the point of constriction, area of the mouth opening, and length of the entire vocal tract, including lip protrusion. As many as four formants were considered for the acoustic parameters.

Leeson (1975) provides a nice summary of the applied aspects of teaching for fluency, including the significance of hesitation phenomena and the importance of semantic factors.

I would like to express appreciation to J.E. Grimes, F. van Coetsem, C.F. Hockett, D.R. Ladd, Jr., and G.N. Clements for their comments and assistance in locating relevant research.
REFERENCES


Fant, G. Analysis and synthesis of speech processes, in Malmberg (1968).


Hockett, C.F. A new point d'appui for phonology, in Reich (1976).


REFERENCES


Liberman, A.M., Cooper, F.S., Harris, K.S., MacNeilage, P.F., and Studdert-Kennedy, M., Some observations on a model for speech perception, in Wathen-Dunn (1967).


Stevens, K.N. Quantal nature of speech, in David and Denes (1972).


ON OBIvation AND SUBJUNCTIVE CLAUSES

Margarita Suñer and José Padilla-Rivera
Cornell University

0. Introduction

The strict complementarity between the pronominal anaphor and a pronoun which characterizes the complement subject position of desire verbs in Romance languages has given rise to speculations about the proper way to capture the facts illustrated in (1) with Spanish.

(1)a. Paco quiere [PRO lavar los platos]
Paco wants to-wash the dishes

b. Paco quiere [que pro lave los platos]
Paco wants that 3s wash (subjunctive) the dishes

In (1a) the embedded PRO subject of the infinitive clause is controlled by the matrix subject and, as a consequence, both subjects can only be interpreted as having the same referent. On the other hand, the pronominal subject of the subjunctive clause in (1b) must be obligatorily disjoint in reference with respect to the matrix subject.

The purpose of this paper is to show: first that the complementarity in (1) can not be taken as an argument for reformulating Binding Theory (Section 1), and second that lexical and semantic factors are responsible for the obligatory disjoint
The reference reading of some subjunctive clause subjects with respect to the matrix subject (Section 2).

1. Binding Theory.

The principles of Binding Theory (Chomsky 1981:188) are stated in (2), and the other definitions pertinent to the discussion are given in (3) (from Chomsky. 1982).

(2)a. An anaphor is bound in its governing category.
   b. A pronominal is free in its governing category.
   c. An R-expression is free.

(3)a. Governing category: \( \beta \) is a governing category for \( \alpha \), iff \( \beta \) is the minimal category containing \( \alpha \), a governor of \( \alpha \), and a SUBJECT accessible to \( \alpha \).

   b. SUBJECT: [+AGR], or [NP, S]

   c. Accessible: \( \alpha \) is accessible to \( \beta \) iff \( \beta \) is in the c-command domain of \( \alpha \) and assignment of the index of \( \alpha \) would not violate \( \emptyset [\emptyset \ldots \emptyset \ldots] \) (where \( \emptyset \) and \( \emptyset \) bear the same index).

   d. \( \alpha \) binds \( \beta \) iff
      (i) \( \alpha \) and \( \beta \) are coindexed, and
      (ii) \( \alpha \) c-commands \( \beta \).

The coreference facts in (1b) have been interpreted as an exception to principle B of the Binding theory (B.T.) in (2). By definition, the embedded clause should constitute the governing category for its subject since it contains both the subject and AGR, an element which both governs and assigns Case to the subject. From this, it has been assumed that B.T. predicts that in (1b) the subject of the subjunctive clause should be able to corefer freely outside of its governing category.

Taking into account examples of the type found in (4), where the referent of the subject of the subordinate indicative clause (4a) as well as the subjects embedded under factive predicates (4b) are free, Meireles and Raposo (1983) hypothesize that in Portuguese the crucial element in determining opacity for the subject position is a semantic operator-like element TENSE, and not AGR.1

(4)a. Bri \( \ddot{j} \) dijo que \( \text{pro}_{j}/j \) iba (indic) al cine.
   Bri said that \( \text{3s} \) was-going to the movies.

   b. (i) [\( \text{pro}_{j} \)] Sentí mucho que \( \text{pro}_{j} \) no lo haya (subj)
   visto cuando... (Obaid 1967:117)
   I was sorry that I have not seen you when...
ON OBVIATION AND SUBJUNCTIVE CLAUSES

(i) Drei lamentaba que pro\textsubscript{j} no pudiera (subj) go to the movies.

They claim that this element TENSE in a complement clause is selected by the main V. Thus querer in (1) is said not to select for TENSE (because this verb must supposedly adhere to a strict sequence of tenses), while decir, sentir, and lamentar in (4) do select for TENSE (because the tense of the embedded clause is free with respect to that of the matrix). Thus Meireles and Raposo propose a correlation between the [\pm TNS] parameter and opacity by advancing the generalization in (5).

(5) The subject of a clause is free within a TENSED domain.

According to (5), the tensed domain of (1b) would be the higher clause from which the lower clause presumably gets its time reference. A consequence of this proposal is that the g.c. for pro in (1b) is now the main clause.

Let us assume that their claim is correct. One would expect that upon looking at the classes of Vs for which stricter restrictions on possible sequence of tenses operate (heretofore referred as 'minus independent tense', i.e. [-IT]), the same correlation would hold for Spanish, i.e., the requirement for obligatory disjoint reference (DR) should obtain for querer (1) and desear as well as for the ignorar-type Vs [-IT], although not for the ordenar or the dudar-type [+IT].

(6) -IT a. pro\textsubscript{j} desea [que pro\textsubscript{j} regrese pronto] 3s wishes that 3s return soon

b. pro\textsubscript{j} ignoraba [que pro\textsubscript{j}/j estuviese 1s/3s ignored that 1s/3s was/were en la lista] in the roster

(7) +IT a. pro\textsubscript{j} dudo [que pro\textsubscript{j}/j reciba 1s doubts that 1s/3s receive una bonificación] a bonus

b. pro\textsubscript{j} le ordené [que pro\textsubscript{j} pinte 1s to-3s ordered that 3s paint el tejado] the roof

This prediction holds for (1b) as well as for (6a) where the
embedded pronominal subject is indeed [+DR] with respect to the matrix subject. However, and contrary to what is anticipated, coreferentiality between the subjects is possible if the main V is ignorar, despite it being [-IT] (6b). As expected, the dudar-type [+IT] (7a) also permits coreferentiality. Suppose that there is an output constraint, such as proposed by Anderson (1982) for Icelandic, whose effect in Spanish would be to filter out unlike sequences of tenses for Vs like ignorar; if so only [+pa...+pa] sequences would surface although the complement would be [+TNS]. This might explain why the complement clause of lack of knowledge Vs is an opaque domain. However, another type of mechanism would be required to account for (7b). In this instance, the opposite situation holds: the requisite for DR between subjects is operative even though the ordenar class selects tensed subjunctive clauses. Thus, of the four possible combinations of IT and DR, all four are instantiated (8).

(8)a. +IT +DR ordenar
    b. +IT -DR dudar
    c. -IT +DR querer
    d. -IT -DR ignorar

The fact that the complement of ignorar and dudar constitute opaque domains for their subjects cannot be attributed to the inherent negative properties of the main V since, for instance, a dudar-type V like esperar 'to hope' also takes opaque complements (9).

(9)    proy espero [que proy j tenga más suerte
       ls hope that ls/3s have more luck
       esta vez] this time

The distribution of the data strongly suggests that (5) cannot account for the facts in a straightforward way. Consequently, we intend to look for the solution elsewhere.

2. The Explanation.

There are two semantic features which are shared by the classes of predicates which express desire or influence; these are [WILL] and [SUBSEQUENCE]. In principle, any of these features or the interplay of both might be responsible for the obviation requirement. It will be argued that it is the feature will [W] which constrains the domain of reference of the subject of some subjunctive complements, and that the feature subsequence is a redundant feature of these predicates. Each of the features is discussed in turn, but before entering into details the necessary background must be set.
In the first place, we see Binding theory as a strictly structural/configurational theory (so that the c-command condition can be fulfilled) of A-binding which applies at S-structure (Chomsky 1981). This theory is blind to semantic factors. What is really at issue in this discussion is principle B, which mandates that a pronominal must be free in its governing category (g.c.). According to the definition in (3a), the g.c. for the embedded pro's in (6) and (7) should be the subordinate clause since it contains o(=pro) and a governor of o(=AGR). B.T. specifies that pro should be free, i.e., not coindexed (cf. (3d)) in its g.c.--the embedded S--and indeed this is the case. Thus, no violation of principle B ensues. And although it would be theoretically ideal to be able to maintain that B.T. therefore predicts that the embedded pro in (6) and (7) should be able to corefer freely outside of its g.c., the facts do not warrant such a blanket statement. Note that strictly speaking B.T. makes no explicit provisions for what could happen outside the pronoun's g.c. Semantic/pragmatic factors might intervene to block one of the possible coindexing relations.45

Second, we assume the existence of a Theory of (free) indexing along the lines of Chomsky (1981) where each NP receives an index. The interpretation of pro as obviative or proximate in (4), (6), and (7) should be captured by checking indices against the semantic content of the relevant predicate.

The background for our proposal having been set, we can now return to the puzzle exemplified by desire and influence Vs.

By the time the derivation reaches S-structure, free indexing gives us structures like those in (10). B.T. is satisfied at this point. It is at the level of LF that the checking of indices to comply with the semantics of the matrix predicate must apply for the S to receive its grammatical interpretation. Unless the S fulfills the obligatory DR condition (11), it is discarded by the grammar.

(10)a. pro₁ quiere [que proₖ llegue...]
  3s wants that 3s arrive

  b. pro₁ (le) ordeno [que proₖ llegue...]
  3s (to-3s) ordered that 3s arrive...

(11) pro₁ V [que proₖ llegue...]  DR: iFk

In essence, the embedded pro has its own referential features but, informally speaking, at LF it is "checked" to ascertain that it has not been assigned the same referent as the matrix subject.
It remains to be determined which lexical feature defines only and exactly the superclass of predicates that command an obligatory disjoint reference reading for the subjects of the subjunctive clauses associated with them, and that such a class is sufficiently described by such a feature.

The feature [SUBSEQUENCE] will be examined first. It must be kept in mind that this lexical feature forms part of the meaning of these Vs. One consequence of this feature is that what is expressed by the subordinate clause must take place in time after the action described by the matrix (RAE 1974, Gili Gaya 1973). Note that for the S to be grammatical this must be realized despite what the V morphology might indicate. For example, if one pays attention just to the V morphology, (12) and (13) could be taken as counterexamples to the aforesaid, because the embedded V displays a form that is morphologically anterior to the matrix.

(12)a. Yo he querido (-pa) que mantuviese (+pa) siempre viva la memoria de lo que pasó. (Farley 1965:550)
   I have wanted that 3s kept always alive the memory of what happened.

   b. Pregunto por qué ha querido (-pa) usted que se los cambiara (+pa). (Farley 1970:472)
   I ask why you have wanted that I exchanged them for you.

(13) Sugirió (pa) que hubiera terminado (pa perf) para las 10.
   3s suggested that 1s/3s had finished by 10.

However, the context makes clear that in (12) the querer must function in actual time previously to the action signalled by the lower V. And in (13) the adverbial para las 10 establishes that the act of "finishing" follows the one of "suggesting". In this reasoning lies the answer for the grammaticality of examples like those in (12), even though they exhibit unlike sequence of tenses.6

Now observe that the requirement for [+SUBSEQUENCE] imposed by the meaning of these Vs, is not exclusive to subjunctive selecting predicates since Vs which do not take this mood may carry this lexical feature also. One such verb is prometer 'to promise'.

(14)a. Prometió que venía/*había venido.
   3s promised that 3s was-coming/*had come (indic.).
b. Prometí haberme vengado antes del anochecer.
Is promised to-have-myself taken-revenge
before evening.

The sentences in (14) make clear that the action expressed in the
embedded clause, regardless of the value of its tense feature,
must be interpreted as subsequent in time from the main V.
Furthermore, since the subjects in (14a) may be coreferential,
the feature [SUBSEQUENCE] cannot be responsible (at least not by
itself) for the DR facts of desire/influence Vs (see also
discussion below on purpose clauses).

The semantic feature [WILL] shared by these predicates is
one that has been the object of discussion of traditional
grammarians. The Vs under consideration express the will of
their subjects that the action designated in the lower clause
take place or not, i.e., VOLO (commands, wish, advice, request),
and NOLO (prohibition, opposition, aversion, repulsion).

It deserves mention that the grouping together of desire
and influence Vs, because of their patterning, is rooted in
diachrony. Greek kept the division inherited from Indo-European
of using the subjunctive for doubtful/possible propositions while
employing the "optative" mood for the desired/needed ones. The
distinction between subjunctive and optative was lost in Latin,
which only had the former. Nevertheless, Spanish traditional
grammarians keep the distinction alive by discussing two types
of subjunctives: the potencial and the optativo. Their
motivation is mainly the different behavior of desire/influence
Vs (subjuntivo optativo) vs. the rest of the predicates which
select for subjunctive (subjuntivo potencial). Moreover, note
that this parcelling out of the predicates is based on their
respective semantic/lexical features since syntactically there is
but one subjunctive in Spanish (and Romance in general).7 Therefore, the feature [WILL] does describe exclusively the class of
Vs which mandate a subject-subject DR reading. In all instances,
a willing entity (instigator)-instigated entity relationship can
be abstracted. Thus, it is reasonable to assume that the con-
straint on coreference between the subjects follows from the
semantic content of these Vs.

The semantic character of the feature [W] is our main moti-
vation for keeping the [DR] facts separate from B.T. even though
if all there was to DR were the feature [W], our findings could
conceivably be incorporated into principle B by making reference
to this feature. However, there is one further piece of evidence
which speaks in favor of our proposal, i.e. in favor of the
independence of B.T. from DR. This evidence has to do with the
Θ-role marking of the matrix subject. In all the examples dis-
cussed so far, the matrix subject is the willful Agent. Agenthood
or more precisely, the feature [+instigator] seems to be a pre-
condition for the DR requirement to operate. Our claim can be
tested by using some relevant instance of Move-α such as passivi-
ation, to exploit the well-known fact that, although movement
rules may alter grammatical relations, they do not change the θ-
roles assigned by the predicate. Since Spanish can only passivize
direct objects, the claim can be tested with a subset of the Vs of
influence (15).^8

(15)a. proj invitaron/persuadieron a X a [que proj
presentara su hipótesis]
3pl invited/persuaded X that 3s present his/her
hypothesis

b. Xj fue invitado/persuadido a [que proj
presentara...]
X was invited/persuaded that 3s present...

Note that in (15a), the matrix subject (an Agent) must be [+DR]
from the embedded pro but crucially, in (15b) the matrix sub-
ject (a Theme) is coreferent with the embedded pro. Thus, the
semantic role of the matrix subject has a bearing on possible
coreference relations.

Confirmation for this line of reasoning is provided by
some adjunct phrases of purpose (or thwarted purpose) introduced
by para que 'so that' and sin que 'without'. Both the RAE and
Gili Gaya (1973) state that these conjunctions pattern with the
Vs that are our concern in this paper. The former are an instance
of VOLO (i.e., WILL) and their clauses are required to be inter-
preted as subsequent to the main clause; the latter, of NOLO
(i.e., ~WILL) where the opposite situation with respect to the
feature [SUBSEQUENCE] materializes; i.e. they must be interpreted
as prior in time to the action expressed in the matrix (cf. (16c)).
However, despite their different values for [SUBSEQUENCE], the
examples in (16) make it clear that DR between subjects is manda-
tory. This outcome supports our claim that it is the feature [W]
the one responsible for the obviation requisite.

Now compare the examples in (16) to the passive sentences
in (17). In all cases in (17), the embedded subjects are not DR.
Note that crucially, only the matrix subjects in (16) have the
relevant θ-role.

(16)a. Suej lo hizo para que proj lo disfrute.
Suej did it so that 3s enjoy it.

b. Brij llamó a Pepej para que proj ayudara a Y.
Brij called Pepej so that 3s help Y.
ON OBVIATION AND SUBJUNCTIVE CLAUSES

c. Mercedes envenenó a Juan sin que \[\text{proj/k se diera/n cuenta.}\]
Mercedes poisoned John without that 3s/pl be aware.

(17)a. Pepe fue llamado/notificado para que \[\text{proj ayudara a Y.}\]
Pepe was called/notified so that 3s help Y.

b. \[Z\] fue pasado por alto...
\[Z\] was ignored...

\[
\begin{align*}
\text{para que } & \text{proj/k se ofendiera.} \\
\text{so that } & \text{3s get offended.}
\end{align*}
\]

\[
\begin{align*}
\text{... para que } & \text{proj empleara a X.} \\
\text{so that } & \text{3s hire X.}
\end{align*}
\]

\[
\begin{align*}
\text{sin que } & \text{proj/k se ofendiera.} \\
\text{without that } & \text{3s get offended.}
\end{align*}
\]

c. Juan fue envenenado sin que \[\text{proj/k se diera/n cuenta.}\]
Juan was poisoned without that 3s/3p1 be aware.

The importance of this last piece of evidence is that if one were to incorporate the DR facts into principle B of B.T., it would be necessary to refer not only to the semantic feature \[\text{[W]}\] but also to the O-role and/or the features of the matrix subject. In our opinion, there is no reason to make such a move.

To conclude, B.T. should be \[\text{left to apply at S-structure un-}
\text{encumbered by semantic conditions.}\] The DR facts are best accounted for at LF as a consequence of the semantic interpretation of these structures which must make reference to the lexical content of the predicates, and to the semantic roles assigned by them.

FOOTNOTES

2 Ignorar 'to be ignorant/not to know' takes a que-subjunctive clause only when the matrix V is in the past tense. However, of the two possible sequences of tenses--[+pa...±pa]-- only [+pa...+pa] is found.

(i) *Ignoraba que esté en la lista.
    I didn't know that 3sg is in the roster.

3 This is a slight simplification of the actual facts. In Súñer and Padilla (1984) we found out that although some predicates obey stricter conditions with respect to sequence of tenses, they still allow for unlike [+past] specifications in certain instances, cf. (12) below.

4 Bouchard (1982) tries to explain the corresponding DR facts for French by appealing to the Avoid Pronoun strategy. His hypothesis fails for Spanish (cf. Súñer (1985)). See also Padilla-Rivera (1985) for more detailed analysis of the facts under discussion in terms of V classes.

5 Even in English for those speakers who still accept want with a subjunctive clause, there are also some readings that are excluded because of semantic factors.

+DR  (i) She wanted that she not take her life.

(ii) He wants that he  {stop playing the horn.
    {fly the plane smoothly.

6 This is also the reason why a mechanical rule of tense copying (Luján 1980, Picallo 1984, Anderson 1982, among others) does not succeed in accounting for the data.

7 It is also interesting to know that the imperative (which uses subjunctive V forms in Spanish) also derives from the optative mood. It is common knowledge that one can only order towards the future.

8 Since passivization in Spanish is a restricted process, not all speakers find (15b) equally acceptable. However, the examples in (17) serve to support our claim.

9 In view of the existence of examples such as (i) where the matrix subject (pro #1) is DR from the one immediately embedded under it (#2) but this pro #2 has the same referent as #3, despite the presence of para que, it seems correct to hypothesize
that for the \([W]\) element to cause DR of the relevant subjects, the upper one must be a \([+\text{initiator}]\) Agent. Note that in (i) it is a coerced or influenced Agent.

\[
(i) \quad \text{pro}_j^1 \text{quiero que } \text{pro}_j^2 \text{ vengas para que } \text{pro}_j^3 \text{ me pagues.}
\]

I want that 2s come so that 2s to-1s pay

While discussing non-clause-bounded reflexives in Icelandic, Maling (1982) concludes that reflexives have two distinct roles. The first, exclusively syntactically determined, is that of a clause-bounded obligatorily bound anaphor. The second, more semantic and discourse influenced, is that of a logophoric pronoun which is correlated (for most speakers) with subjunctive mood in contexts which reflect propositional attitude; it also must be obligatorily bound in a certain (not necessarily clause-bounded) specified domain.

Transposing her conclusions to our point of view, we can suggest that the first use is accounted for by B.T. applying at S-structure while the second, which takes semantics and the individual's attitude into consideration might be better explained at a later stage of the derivation. Note that our proposal does not imply that logophoric pronouns can not be correlated with certain syntactic characteristic(s) (e.g., subjunctive, mood, or a given complementerizer).

REFERENCES


