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Preface

The present issue of *Studies in the Linguistic Sciences* appears in a format slightly revised from previous issues. The 'Times' laser-writer substitution font for 'New York' has been employed for easier reading and interparagraph spacing has been reduced.

In addition, this issue contains a new feature, 'Recent Books', which provides brief indications of contents or linguistic interest for recent books that were sent to us but could not be reviewed in this issue.

Finally, I have the pleasant task of thanking the following faculty members for refereeing submitted papers. Eyamba Bokamba, Jennifer Cole, Braj Kachru, Yamuna Kachru, C.-W. Kim, Charles Kisseberth, and James Yoon (all in Linguistics), and José Hualde (Spanish, Italian, and Portuguese). The Department of Linguistics also is grateful for support from the College of Liberal Arts and Sciences toward publishing this issue, and technical support from the Language Learning Laboratory. Last, but not least, I would like to express my appreciation to Beth Creek, Cathy Huffman, Eileen Sutton, and Amy Cheatham for their help in preparing this issue.

November 1991   Hans Henrich Hock (Editor)
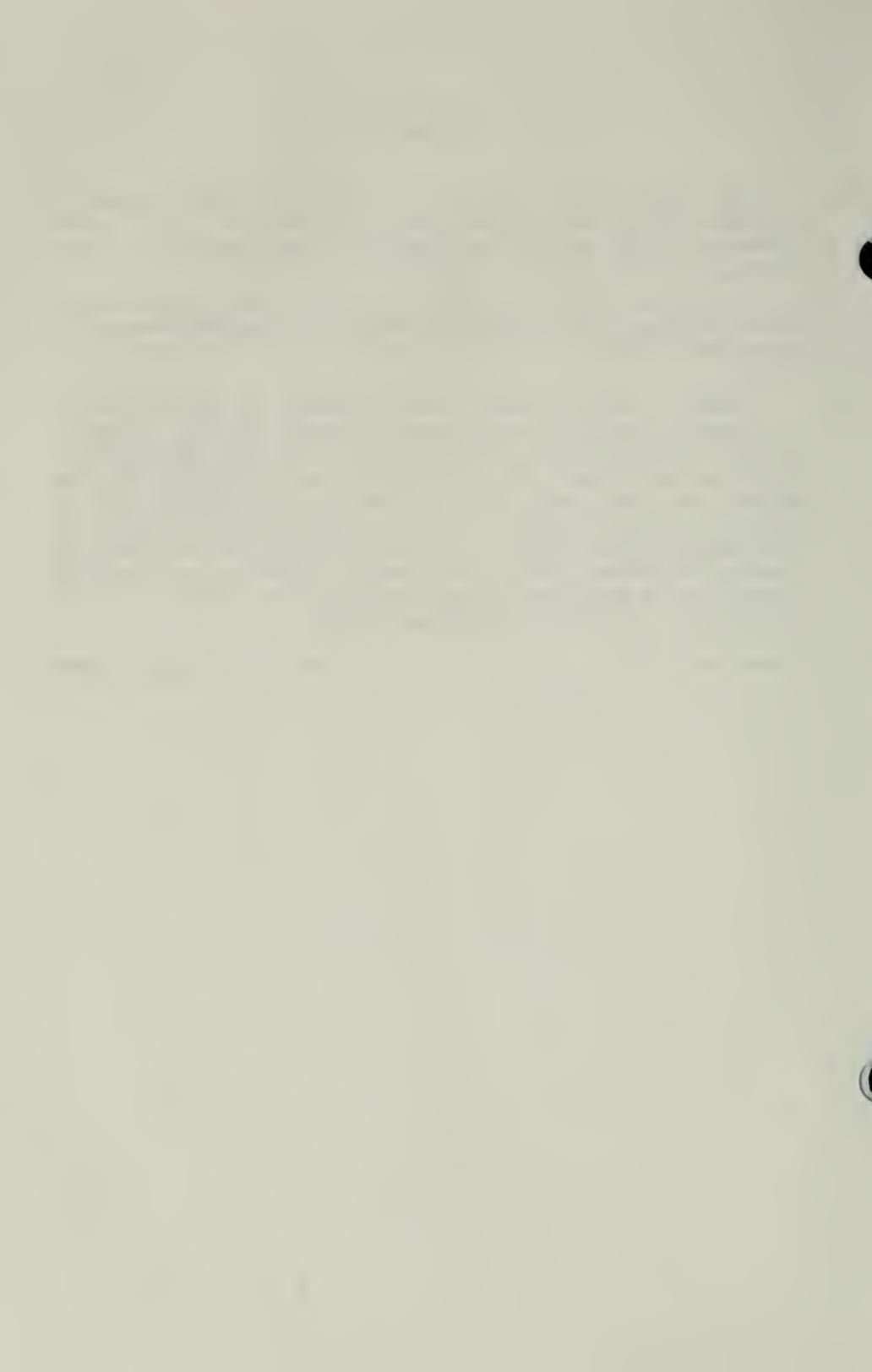
STOP/SPIRANT ALTERNATIONS IN SPANISH:
ON THE REPRESENTATION OF CONTRAST

Zoann Branstine

I argue that Spanish has a maximally simple spirant-ization rule: 'Insert [+continuant].' The distribution of voiced obstruents (stops after homorganic nasal or lateral, spirants elsewhere) falls out naturally from the REPRESENTATION, and not from explicit restrictions on the RULE. I use Contrastive Specification (Steriade 1987) to eliminate target conditions [-sonorant, +voice], and Clements's (1987a) version of Feature Geometry with an oral cavity node to explain why homorganic sonorant-voiced obstruent clusters must share a default feature [-continuant]. The non-assimilatory analysis presented here has a further advantage: The overall grammar is simplified by eliminating the need to order default rules before phonological ones.

1. Introduction

One of the most prevalent topics of discussion in present day phonology is the question of just how much information is present in the Underlying Representation and how much is to be supplied by phonological and default rules — either language-specific or universal. Radical Underspecification (Archangeli and Pulleyblank, 1986, etc.) seeks to eliminate all redundancy from underlying representations by allowing only one value of a feature to be specified in the UR, with the opposite to be filled in by a universal default rule (or a language-specific complement rule). Contrastive Specification (Steriade 1987, Clements 1987b, Mester and Itô 1989), on the other hand, seeks to represent the notion of 'contrast' by allowing both the positive and negative values of a feature which minimally distinguishes two phonemes to appear in the UR and eliminating only redundant feature values. Mohanan (1989) argues that these two versions of Underspecification theory are equivalent, since the opposition [αF] ~ [F] is merely a notational variant of the opposition [αF] ~ [-αF].[1]

However, the stop/spirant alternations in Spanish and other languages such as Basque and Moore provide evidence which distinguishes the two theories. The data which will be discussed in this paper point toward the need for a formal, structural distinction

between segments that contrast for a particular feature and those that do not. 'Contrast' is not directly encoded in the UR in Radical Underspecification, nor in a theory which calls for full specification of features.

Recent treatments of Spanish stop/spirant alternations have ignored the issue of whether a Spirantization (or Fortition) rule should be structure-changing or structure-building, considering this question to be an unimportant detail. However, precisely that 'detail' is central to the analysis I wish to develop here. Contrastive Specification, but not Radical Underspecification, provides a unified account for both the non-alternation of voiceless obstruents and the [-cont] realization of voiced obstruents after a homorganic nasal or lateral. Finally, Contrastive Specification provides a simple and natural account of the alternation which is not available in a theory that requires fully-specified feature matrices in underlying representation.

2. Distribution of Stops and Spirants

An overview of the distribution of the voiced stops and spirants in 'Standard Spanish' is given below[2]. This distribution is most often the object of discussion in analyses of Spanish 'Spirantization' (for example, see Fernandez 1988:121. Harris (1984) refers to it as the 'generalización normativa', and in fact, this is the distribution reflected in the pronunciations given in many dictionaries of Spanish.

(1)

Stops occur in absolute initial position and after· homorganic nasals or laterals:

B	D	G
bello 'beautiful'	dolor 'pain'	gato 'cat'
ambos 'both'	cuando 'when'	taŋgo 'tango'
	caldo 'broth'	

(2)

Spirants occur after a vowel, after a glide, after a non-homorganic lateral, after [r], and after [+cont] obstruents:[3]

haβa 'bean'	haδa 'fairy'	haγa 'do!'
vaiβen 'sway'	traiδor 'traitor'	caiγa 'fall!'
euβolia 'propriety'	deuδa 'debt'	auγusto 'august'
calβo 'bald'	- - -	alγo 'something'
arβol 'tree'	arδe 'burns'	amarγo 'bitter'
aδβerso 'adverse'	aβδomen 'abdomen'	suβγlotal 'subglottal'
esβozo 'sketch'	desδe 'since'	rasγar 'scratch'

The analysis of the spirant/stop alternations is complicated by various factors and thus has been subject of a certain amount of controversy. One complication is the variation in distribution of

stops and spirants, according to speech rate and style. It must be kept in mind, then, that any analysis, including the present, should be seen as a description of tendencies. Another complication is great variation in distribution from dialect to dialect. Thus what one may say for 'Standard' Spanish cannot be interpreted as describing all dialects of Spanish. Finally, in fast speech, Spirantization interacts with several other low-level rules. For the most part, these complications will not be discussed here though I believe that they could be incorporated into the analysis I am developing.

3.   Spirantization or Fortition?

One of the main points of contention between the various analyses of the stop/spirant alternations in Spanish has been that of where to place the 'cost' in the grammar, whether in the rule governing the alternation or in the redundancy rule. The contexts in which stops appear (utterance-initially and after homorganic nasal or lateral) are more restricted than those in which spirants appear, so a Fortition or stop-formation account maximizes simplicity of rule formation but presupposes using the 'marked' default value, [+cont] for voiced obstruents.

In Spirantization accounts, the [+cont] variants are derived, usually by left-to-right spreading from a [+cont] segment, since the alternation appears to be conditioned by material to the left, and not the right, of the target. However, some mechanism[4] must be invoked to block the spreading in just the contexts where Fortition might be said to apply. The universal default rule assigns the unmarked value, [-cont], to any voiced obstruents which remain unspecified after the application of Spirantization.

If Spirantization is stated as left-to-right spreading, it gets a 'free bonus' in that the utterance-initial stops receive their [-cont] value by default, without any special stipulation. But Fortition accounts receive a similar free bonus, since the glides /y/ and /w/ appear as affricates in just the same environments in which the voiced obstruents appear as stops: *sin hielo* [siñ ᵈy̌elo] 'without ice', *son huertas* [soŋ gʷertas] 'they are gardens' (Lozano 1979:19). Thus, the simplicity metric does not appear to be of much help in determining the correct analysis.

This paradox stems from a failure to recognize the intimate way in which underspecification and default are tied in with the alternation. What is desirable is an account that shows how the behavior of all consonants is a natural consequence of their general phonological properties and of the general phonological properties of the structures in which they appear.

A remark by Mester and Itô, having to do with the problems incurred by the apparent necessity of a rule spreading [-voice] in English, is relevant to the current paper: 'The problem here, we believe, can be traced back to a style of phonological thinking which strives to mirror every surface alternation by a language-specific rule responsible for that alternation' (1989:281-2).   Mester and Itô argue for the underlying specification of non-redundant but un-marked features.   Only redundant features are left unspecified.   In discussing the exclusion of one of the coronal consonants, [r], from the class of segments which undergo a certain type of palatalization in Japanese, they remark,

> After all, it is only in virtue of the fact that the other coronals are SPECIFIED for [coronal] that the segment *r* stands out as UNSPECIFIED.   Otherwise the analysis fails to derive the palatalization behavior of the segment *r* from its general phonological properties.   In this respect, no analysis is acceptable that contains any special proviso about *r* and palatalization (p. 276)

Essentially, this is the point that I wish to argue about the asym-metry between voiced and voiceless obstruents in Spanish with regard to Spirantization. Only if non-redundant but unmarked [-cont] is specified in the UR do the voiced obstruents /B,D,G/ stand out as unspecified for [cont].

In the analysis I propose here, neither a specific rule of Forti-tion, nor an explicit statement of blocking environments for Spiranti-zation is needed.   For the data which have received the most atten-tion in the literature, Spirantization and Fortition accounts are nearly completely equivalent, and the question becomes whether an assim-ilatory process is at work at all, or whether both [-] and [+] values for [cont] are supplied by feature-insertion rules.   Further evidence is needed to differentiate the two hypotheses, yet the evidence pre-sented in the literature is at best contradictory. The fact that in certain dialects voiced stops appear not only after a pause and after a homorganic sonorant, but also in a variety of additional contexts (after non-homorganic nasals, after glides, even after [s] (see Harris 1986, Fernandez 1988), seems to point to an assimilatory type of Spirantization, with dialects varying as to which segments serve as triggers to the rule.   Yet Hualde (1990) cites examples of voiced spir-ants following voiceless stops, something not easily accounted for by Continuant Spreading.

Pending closer investigation of the data which might serve to resolve the issue, and given the theoretical problems discussed below which are raised by assimilatory accounts of either the Fortition or Spirantization variety, I opt for a structure-building (slot-filling) rule

of Spirantization similar to that proposed in Hualde 1990 which
freely assigns the feature [+cont].[5] Though I refer to this as Spiranti-
zation in order to be consistent with the name used in the literature,
I withhold judgment as to whether this is properly seen as a phono-
logical rule or a default rule.

4. Some problems with treating Spirantization/Fortition as assimilation

As has been noted by several authors (e.g., Harris, 1986, Hualde
1988, 1990), Spirantization in Spanish clearly cannot take place in
the lexical module: it applies both in underived forms and between
words, and produces segments not present in the UR of the language,
since voiced obstruents do not have an underlying contrast for
continuancy. Thus, Spirantization should not be subject to Structure
Preservation, and should not apply at a stage in the derivation where
Structure Preservation holds. Nevertheless, I suggest that the fact
that only voiced obstruents participate in the alternation is a result
of Spirantization being a slot-filling and not feature-changing rule.
Thus Spirantization must be ordered before the default rule which
assigns [-cont] to voiced consonants.[6]

This presents a considerable problem if Spirantization is seen as
an assimilatory process, since this treatment presupposes the assign-
ment of the default value [+cont] to the rule's triggers, typically
vowels. While certain authors (e.g., Archangeli and Pulleyblank
(1986), Borowsky (1986)) have argued that default rules may or
even must sometimes apply before phonological rules, this particular
case presents a conceptual problem. It is difficult to think of a plaus-
ible or principled way in which to allow vowels, for which the
feature [cont] is completely redundant, to be assigned their default
value of [+cont] while still withholding the default [-cont] from
consonants. Other than including a proliferation of extrinsic ordering
statements between default and phonological rules, there is no way
to present Spirantization as the spreading of [+cont].

If the default rule supplying [+cont] to vowels is ordered prior to
the only point in a derivation where the presence or absence of the
feature is even relevant, this seems identical to specifying vowels as
[+cont] in the UR, a position allowed by neither Radical or Contrastive
Specification. Though Archangeli and Pulleyblank's (1986) Redun-
dancy Rule Ordering Constraint allows default features to be supplied
'as early as necessary' — quite early in the derivation, at the begin-
ning of the lexical component, in fact — it appears to me that this
trick usually has the function of supplying a contrastive, rather than
a redundant, default feature.[7] Further, the default rules V → [+cont]
and C → [-cont] are of different natures. The former is a universal
cooccurence statement: Vowels are always continuant and are not

legitimate bearers of the opposite feature.   The latter is a statement
about markedness.   Ordering the vowel default before the consonant
default does not make sense theoretically.

A Fortition account of the data, such as that given in Goldsmith
(1981) or Hualde (1989), in which voiced obstruents receive a [-cont]
specification by assimilation to a homorganic nasal or lateral, does
not avoid the problem of extrinsically ordering default rules before
phonological rules.   It merely shifts the question to the specification
of default [-cont] for sonorant consonants, since spreading implies the
presence of a feature.   Spreading of the redundant feature [-cont]
from sonorant consonants is no more in line with underspecification
theory than spreading the redundant feature [+cont] from vowels.

5.   Non-assimilatory accounts

Below I discuss two different alternative approaches which have
been proposed to account for the stop/spirant alternations.   Both are
non-assimilatory and thus avoid the problems just discussed. The
first, Amastae's syllable-final lenition, is attractive but untenable.
The second, Hualde's [+cont]-insertion rule (actually proposed for
Basque) is essentially the one I adopt in this paper.   However, it
relies on target conditions and on an explicit statement that the rule
is blocked in homorganic clusters, both of which can be eliminated in
the analysis I propose.

5.1.   Spirantization as syllable-final lenition

Amastae (1986) proposes an account of the stop/spirant alter-
nations as an instance of syllable-final weakening.   This is certainly a
process which has occurred in Spanish: s-aspiration, loss of final con-
sonants such as [d], [r], [l], and nasals, as well as velarization of
syllable-final nasals are all well-known examples of syllable-final
weakening.   Amastae claims that the 'loose ends' that his analysis
does not account for show that 'Spanish Spirantization is a still-
evolving rule' (p. 4).   This may well be the case; all languages are
constantly in flux; however, the basic assumption of generative
linguistics is that a language, at any point in time, has a learnable
and coherent grammar.   Amastaes's analysis fails on its own account,
regardless of what kind of historical change is going on in Spanish.

Though Amastae posits syllable-final weakening, such an analy-
sis does not correctly characterize the data.   In addition to syllable-
final position (e.g. *pare[δ]*, *a[β]-δomen*) voiced spirants often occur in
syllable-initial position. (e.g. *ha-[β]a*, *ha-[δ]a*, *ha-[γ]a aβ-[δ]omen*.

Amastae does not give sufficient evidence for his rule making
intervocalic consonants[8] ambisyllabic (Amastae's figure (6), p. 6):

(3) Associate a $\begin{bmatrix} +\text{obstr} \\ +\text{voiced} \\ +\text{SI} \end{bmatrix}$ segment with a preceding Rhyme

(syllable-initial)

This causes words like *dedo* 'finger' and *hablar* 'to speak' to be syllabified as follows (Amastae's (7) and (9), pp. 6-7):

```
(4)    σ         σ                    σ     σ
       | \       | \                  |     | \
       |  \      |  \                 |     |  \
       O   R     O   R                R     O   R
       |   |     |   |               /|\   / \  /|\
       |   |     |   |              | \|  |  |  | \
       d   e     d   o       (h) a  b  l  a     r
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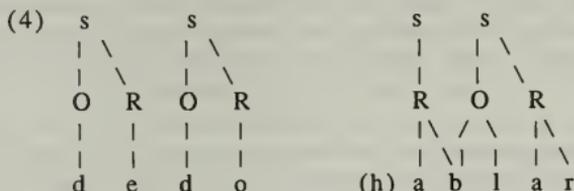
Amastae offers as evidence for the ambisyllabicity of inter-vocalic consonants his finding that a consonant is more likely to spirantize before a stressed vowel than before an unstressed vowel. However, it is generally a stressed syllable rather than an unstressed one that attracts additional consonants (see Borowsky 1986 p. 258). Therefore, the stress of the following syllable is not an argument for ambisyllabicity. Further, though syllable-final lenition is a widely-attested phenomenon in many languages of the world, including Spanish, a look at the principles of Spanish stress assignment shows that there is no independent motivation for regarding syllable-initial voiced obstruents as ambisyllabic.

Spanish stress resembles Latin stress. In particular, stress is limited to one of the last three syllables. A heavy penult blocks stress from being assigned on the antepenult:

(5) sábana, sabána, BUT carámba, *cáramba

Ambisyllabicity of the consonant preceding a stressed vowel would merely make the syllable to the LEFT of the stress heavy. Since metrical structure must be assigned moving from right to left in Spanish, the structure of syllables to the left of the stress is irrelevant. Furthermore, secondary stress, assigned post-cyclically, is not quantity sensitive (see Halle and Vergnaud 1988). Thus the stress-related facts cited by Amastae do not justify making word-internal onset consonants ambisyllabic, since there could be no metrical evidence of whether the newly-created, pretonic heavy syllable was actually heavy.

What's more, a rule of ambisyllabicity obscures the generalization that can be made about words with antepenultimate stress: None have heavy penults. For instance, words such as *cá.ram.ba*, *ré.ser.va*, *dé.sas.tre* are impossible. If an intervocalic consonant must be made ambisyllabic before it can spirantize, words such as

párpado 'eyelid', *náufrago* 'shipwrecked person' would have the same structure as the ones which cannot have antepenultimate stress: they would have a heavy penult.   Although according to Amastae's data, these types of words would presumably be less likely to have spirants than those where the spirant preceded a stressed vowel, nothing in his analysis precludes the spirant from occurring. The ambisyllabicity rule would have to be ordered after stress assignment to keep from incorrectly ruling out words like *párpado*. with antepenultimate stress.   The addition of extrinsic rule ordering of this nature complicates the grammar of the language.

Ambisyllabicity is undesirable for another reason.   Hualde points out (personal communication) that in addition, there is evidence that prefixes constitute an independent domain for syllabification.   Thus *sub.regional* and *sub.liminar* are divided between the obstruent and the liquid, rather than the expected syllabification as in monomorphemic *su.blime* and *so.bre*.   Amastae's rule would obscure such a distinction.

Even if it were not for the other problems with the ambisyllabicity rule, it is unclear how the Spirantization of a series of two voiced obstruents in words such as *su[βγ]lotal* could be seen as a result of syllable-final lenition.   Associating *two* obstruents to the rime of a preceding syllable is contrary to the Sonority Principle, thus the syllabification of *subglotal* could not be *subg.lo.tal*.

As I indicated earlier, Amastae's proposal does hold a certain attraction.   His account is an attempt to find an explanation for the Spirantization facts based on linguistic universals.   As Hock has pointed out, weakening processes such as spirantization usually 'occur in just two environments: medial intervocalic (or intersonorant) position and word- or syllable-final environment' (1986:83). Unfortunately, Spanish also has spirants in syllable-initial position after obstruents, so an appeal to syllable-final weakening as an explanation of the facts is simply not possible.

5.2   Spirantization as continuant-insertion

Hualde (1990)[9] presents   a non-assimilatory rule which freely inserts the feature [+cont] on voiced obstruents[10], except in certain 'strong' contexts (i.e., homorganic clusters and utterance-initially) where it is explicitly blocked.   Hualde argues that the mere homorganicity of the cluster is enough to block Spirantization in Catalan and suggests it may be the case for Spanish as well.[11]

Unfortunately, it does not appear to be true that a voiced obstruent must always appear as a stop when preceded by A N Y homorganic consonant.   Spirantization is not blocked in *desde* [dezðe]. Similarly, [r] does not block Spirantization on a following [d] either.

It could be the case that exact homorganicity is required, down to the non-distinct place features, so that dental spirant [δ] is permissible after the alveolar continuant [z]. However, the examples Hualde gives of voiced stop after a homorganic continuant are of labiodental [f or v] followed by bilabial [b]. These are not totally homorganic clusters, either, but in both the Catalan and the Spanish example, the [b] surfaces as a stop. While for Latin American Spanish there is no dental continuant phoneme, some dialects of Iberian Spanish do have [θ] (spelled *c* or *z*) which contrasts with alveolar [s]. In words such as *Mazda* (the Japanese car) or phrases such as *paz de Diós* 'God's peace', the /d/ is realized as a spirant [δ].

Since the facts about what actually happens in homorganic obstruent-obstruent clusters remain unclear, I will only concentrate on sonorant-obstruent clusters. I propose below that after Nasal and Lateral Assimilation takes place, the clusters share not only a Place node, but also a feature specification for [cont].[12] Since the sonorant member of the cluster cannot be assigned [+cont], the cluster must be [-cont]. Therefore, as will be seen below, it is not necessary to restrict Spirantization by explicit blocking conditions. The fact that it does not apply in homorganic clusters is predicted by independent factors.

6.   The Contrast/Default analysis

6.1.   Against target conditions

Any analysis of the stop/spirant alternations in Standard Spanish must incorporate the following facts:

a) THE ALTERNATION ONLY AFFECTS CONSONANTS THAT DO NOT CONTRAST FOR CONTINUANCY. That is, voiceless consonants are not affected; they contrast both in environments in which voiced obstruents are predictably spirants and those in which voiced obstruents are predictably stops (e.g., *cana[p]é* vs. *ca[f]é*, *pa[t]a* vs. *pa[s]a*, *ta[k]o* vs. *ta[x]o*, *com[p]adre* vs. *con[f]ite*, *en[t]onces* vs. *an[s]iosa*, *ban[k]o* vs. *fran[x]a*, *fal[t]a* vs. *fal[s]o*).

b) SONORANT CONSONANTS (n, m, l, AND r) NEITHER CONTRAST FOR CONTINUANCY NOR PARTICIPATE IN THE ALTERNATION.

Most accounts incorporate (a) and (b) in the form of 'negative environment': The target of the rule is stated as [+voice, -sonorant]. There is nothing unusual about this; after all, the assumption that phonological rules affect natural classes of sounds is the backbone of phonological theory. However, stating these target conditions obscures the relationship between the underlying distribution of the feature [cont] and the rule of Spirantization. Though the features define the natural class which participates in Spirantization, they do

not encode the relationship that exists between this particular natural class and the feature [cont] in the grammar of Spanish.

The feature [-sonorant] excludes sonorants from the alternation, yet this is less a fact about the rule of Spirantization than it is about what sort of segments may occur in natural languages. If nasal fricatives occur, they are very rare and unstable, so clearly the non-spirantization of nasals is a consequence of a universal filter *(+nasal: +consonantal: +continuant).[13]   There is considerable debate about whether the lateral consonant [l] is properly defined as [+cont] or [-cont]; I take this as evidence that languages do not commonly have alternations between a stop [l] and a fricative [l].[14]   Hualde (1988) has argued that, at least for Basque, [l] patterns with [-cont] segments; therefore, a similar filter *(+lateral : (node): +continuant)[15] could be in effect.   Of the sonorant consonants of Spanish, this leaves [r][16].   While [r] is often considered to be [+cont], thus contrasting with [l], which is [-cont], actually the feature [lateral], which is needed for [l] anyway, distinguishes the two, so /r/ and /l/ are unspecified for [cont] in the UR.   Lozano (1979 p. 119) discusses evidence that at least for some speakers, [r] is produced as a stop.   It seems to me, then, that the phonetic status of [r] is very similar to that of [l], and for the present purposes it can be considered to be redundantly [-cont].[17]   Since all of the sonorant consonants are predictably [-cont] in all environments, I propose a constraint *(+sonorant : +consonantal : +continuant), which says that in Spanish, sonorant consonants may not bear the feature [+cont].[18]

The voiced obstruents bear both values for [cont] on the surface, but they do not contrast for this feature.   Sonorant consonants cannot bear [+cont], and voiceless obstruents contrast underlyingly for continuancy.   Nothing prevents voiced obstruents from contrasting for continuancy; it is a fact about the phoneme inventory of Spanish that they do not.

Evidence that it is the underspecification for the feature [cont] which is relevant to the Spirantization rule and not the features [+voice -sonorant] comes from the language Moore, as discussed by James Myers (1989).   Whereas there is a phonemic contrast between b/v, d/z, p/f, t/s, and k/x, there is none between g/γ.   However, there is a surface alternation between [g] and [γ].[19]   If the Spirantization rules of Spanish and Moore list target conditions as [+voice -sonorant] and [+voice -sonorant +back], respectively, then the relationship between Spirantization and the underlying segment inventory of each language is obscured.

In both Spanish and Moore, ALL segments which do not contrast for continuancy and which may legitimately bear both feature values for [cont] undergo the Spirantization rule.   Thus in both languages the

target conditions on the rule are only duplicating information which is represented elsewhere in the grammar.[20]   If target conditions are eliminated, Spanish and Moore share a single rule of Spirantization, i.e., 'Insert [+cont]'. Since Spirantization is quite common in languages of the world, it is reasonable to speculate that such a rule should be a part of UG rather than of individual grammars, similar to Nasal Assimilation and Final Devoicing. This is further reason to look only at the relevant feature, [cont], rather than at the other features which happen to characterize the set of segments which could but do not contrast for continuancy.

Not only do the conditions on the target of the Spirantization rule duplicate a generalization already present in the UR, they are misleading. A Spirantization rule would be no more formally complex nor seem less 'natural' if the target conditions referred to another natural class, say, [-anterior] or [+nasal].   Yet these do not describe natural classes which typically undergo Spirantization in languages.

As we have seen, the non-participation of voiceless consonants and of sonorants in Spirantization in Spanish is not arbitrary.   There is an obvious difference between the segments which do spirantize and those which do not: those which do spirantize are free to associate with either [+cont] or [-cont], while the ones which do not are restricted. Voiceless obstruents show a phonemic contrast for [+/-cont] which is not neutralized.   Sonorant consonants are consistently [-cont].   The former is a fact about the underlying phonemes of Spanish and the latter, I believe, falls out of universal markedness conditions.

Spirantization, then, though clearly postlexical, is not a feature-changing, but rather a slot-filling rule, an option not available in a theory requiring full specification in the Underlying Representation. Seen in this way, it is not necessary to place conditions on the target of the rule.   Furthermore, as is shown below, it is not necessary to state 'blocking' environments, since the rule of Nasal (and lateral) Assimilation creates structures that in and of themselves block [+cont] from associating with the obstruent.   Spirantization can then be reduced to free insertion of the feature [+cont].   The cases where it does not apply do not need to be stated explicitly in the rule — the [+cont] value simply does not associate where it cannot.

6.2   The 'blocking' effect of Nasal/Lateral Assimilation

The generalization that Spirantization does not apply to segments which cannot acquire the feature [+cont], in addition to accounting for the non-participation of voiceless consonants and the sonorants, covers the cases where possible targets, voiced obstruents, surface as stops. Essentially the insight of Fortition analyses such as

Goldsmith 1981 and Hualde 1989 is that the voiced obstruents in ηg, nd, mb, and ld clusters acquire the [-cont] value from their sonorant partner, and the homorganicity of the cluster is somehow crucial. However, stating Fortition as an assimilatory process implies spreading of a redundant value, a theoretically undesirable claim, as has been discussed above.   Furthermore, as argued in Hualde (1989), [+cont] does not appear to be the default value for voiced obstruents. Therefore, the 'Fortition' environments should be analyzed not in terms of contexts where the feature [-cont] is supplied by rule, but rather in terms of contexts where it is impossible for voiced obstruents to receive the feature [+cont].

6.2.1.   Harris's appeal to geminate inalterability

In order to block Spirantization from applying in just the 'Fortition' contexts, one might attempt to appeal to some notion of geminate inalterability, since the structures created by Nasal Assimilation are partial geminates.[21]   In fact, this is the explanation given by Harris, and formalized in his Rule Application Convention (RAC):

(6) RULE APPLICATION CONVENTION: Given a representation REP of linked (including merged) matrices and a rule RUL of the form [αF] → [βF]/SD, RUL applies to REP iff both X and Y of REP meet the structural description SD of RUL. (1985:132).

However, the fact that ns, ηf, and ηx are possible clusters, where the values for [cont] differ in a homorganic cluster, points to independence of the continuant and place of articulation nodes. Additionally, note that the RAC refers explicitly to structure-changing operations.   It cannot apply to slot-filling rules, since the shared place of articulation node does not prevent the nasals in mp, nt, and ηk clusters from receiving the default feature value [+voice], though they are linked to voiceless obstruents which do not meet the SD of the default rule [+son] → [+voice]. Harris's account thus requires that voiced obstruents be assigned their default [-cont] value prior to the application of Spirantization, which is formulated to apply only to segments specified as [-cont].   Not only is such an ordering a violation of the Elsewhere condition, it once again attributes the difference in behavior of voiced and voiceless obstruents to voicing, not to the function of the feature [cont].

I show below that it is in fact not necessary to state a rule separate from the place of articulation assimilation which occurs between nasals (and laterals) and a following obstruent.   In these cases, the important facts are that voiced obstruents themselves are unspecified for [cont], unlike voiceless obstruents, and they become linked to segments which cannot acquire the feature [+cont].   Where a voiced obstruent merely FOLLOWS a sonorant but surfaces as a

spirant, there is no linking: *l[β], l[γ], r[γ], r[δ], r[γ]*. Thus there are two cases where an obstruent may bear the feature [+cont]: (1) if this feature is part of its underlying representation (*f,s,x*) and (2) if the obstruent is independent, not linked to a sonorant consonant.

6.2.2.   The oral cavity node and shared default [-cont]

The question remains of how place and continuancy are related in the feature geometry.   Clearly, at least for Spanish, homorganic clusters do not need to agree for any other non-place feature: they may disagree for [sonorant], [nasal], or [cont] and [voice] as in *ns*, *ɱf*, and *ηx*.   Only clusters which are homorganic and in which both members are *unspecified* for [cont] must share the default value, [-cont].   An insightful analysis of the stop/spirant alternations in Spanish ought to relate this fact to the way in which the default value of [cont] is assigned to clusters which are linked for place of articulation.

Below I give the rule of Nasal and Lateral Assimilation proposed by Hualde (1988:161) for Spanish and Basque.

    (7)   Nasal and Lateral Assimilation
              Operation: Spread
              Argument: P
              Direction: leftwards
              Target Conditions: [-cont], [+son], rime

The target condition [-cont] prevents this rule from applying to /r/, which in Hualde's analysis is [+cont].   I believe that the feature [-cont], being the default for sonorants, is not present at the stage where Nasal and Lateral Assimilation applies.   Therefore, some other device must be used to prevent the rule from applying to /r/, and the target conditions will be just [+son], rime.   The lateral /l/ only assimilates to coronals and not to labials or velars because of the positive constraint requiring laterals to have a coronal articulation (Hualde 1990, p. 160).

The application of this rule creates structures which are linked on the place of articulation node, represented graphically below (only the relevant node structure is represented).

    (8)
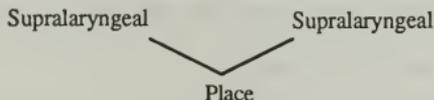
However, it is still not clear how the shared place node is relevant for assignment of continuancy.   In 'standard' feature geometry (Clements 1985, Sagey 1986) these features are not related in any clear way.   However, Clements (1989) proposes an organization of

feature geometry with an oral cavity node which dominates only the continuant node and the place of articulation node.

(9)
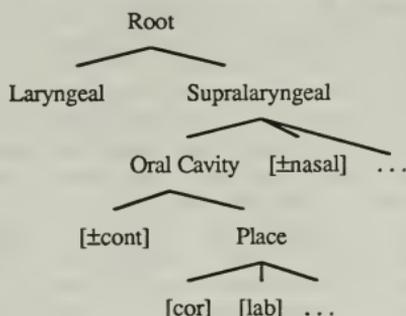
After Nasal and Lateral Assimilation has occurred, I propose that in sonorant-voiced obstruent clusters, the Shared Feature Convention (Steriade 1982) applies, fusing the oral cavity nodes, since in the absence of specification for continuancy they are nondistinct.

(10)

Thus, in the clusters mb, nd, ηg, and ld, since there is only one oral cavity node, there can be only one value for the feature [cont]. In other words, there is only one docking site for the feature [cont], which is shared by the two consonants. The sonorant member of the cluster is not a legitimate bearer of the feature [+cont], so the only possible value for the cluster is [-cont]. (This idea is similar to one presented in a footnote in Borowsky 1986 on voicing agreement in Japanese nasal-obstruent clusters.)

For ns, etc., the Shared Feature Convention will not apply. No fusion can occur since the voiceless fricative carries an underlying value of [-cont]. The oral cavity nodes are distinct. Since there are two oral cavity nodes, nothing prevents the sonorant and obstruent from bearing opposite values for [cont].

(11)

N   s   N   s

SL   SL   →   SL   SL

[+nas] OC   OC   [+nas] OC   OC

Place [+cont]   [-cont] Place [+cont]

[cor]   [cor]
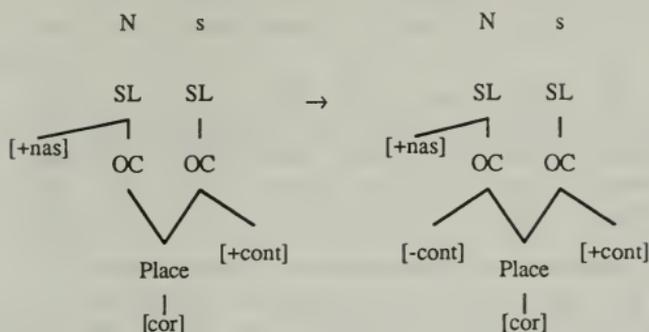
Thus, a voiceless, but not a voiced fricative may follow a homor-
ganic sonorant. This has nothing to do with the voicing, per se, it has
to do with the phonemic inventory of Spanish: only voiceless con-
sonants are specified for [cont] in the UR, because the feature [cont]
only makes lexical contrasts for voiceless consonants. Clusters such
as *nt*, etc. are unproblematic. The fact that both segments are [-cont]
on the surface is a coincidence. The [t] is specified as [-cont] in the
UR, and the [n] is assigned that value by default:

(12)

N   t   N   t

SL   SL   →   SL   SL

[+nas] OC   OC   [+nas] OC   OC

Place [-cont]   [-cont] Place [-cont]

[cor]   [cor]
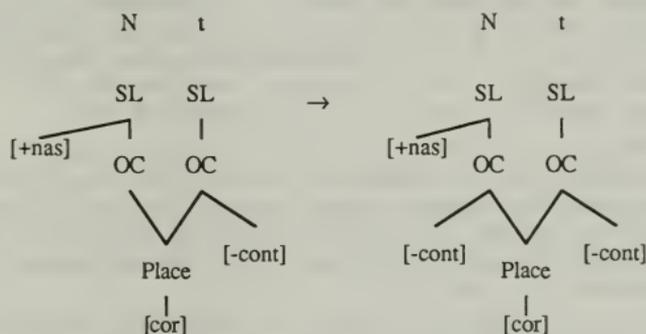
Conceivably, the SFC would apply to this structure and merge
the oral cavity nodes, since they dominate identical material, but as
far as I know nothing crucial depends on the application of the SFC at
this point.

In *lg* and *lb* clusters, since there is no linking, the voiced
obstruents are free to acquire the feature [+cont], and nothing will
prevent Spirantization from applying. Obviously, then [l] is later
assigned its default value of [-cont].

(13)

```
     L        G              L      γ                 l       γ

    OC       OC      →     OC      OC        →       OC      OC
     |        |             |        ⌐[+cont]              ⌐[+cont]
   Place    Place        Place    Place      [-cont]    Place    Place
     |        |             |        |                    |        |
   [cor]    [vel]         [cor]    [vel]                [cor]    [vel]
```
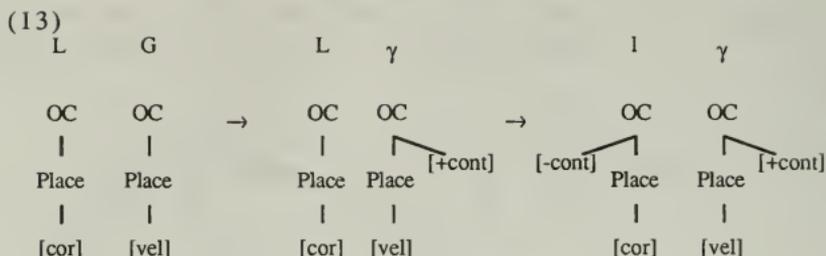
6.3. Statement of the rule of Spirantization

I propose a rule of Spirantization adapted from that i Hualde
(1988), with the crucial difference that neither target condi ns nor
blocking conditions are necessary.

(14)   Spirantization (Continuant Insertion)
         Operation: insert
         Argument: [+cont]

Continuant Insertion rather than Continuant Spreading has
several advantages. First, it eliminates the problem of supplying a
redundant feature value to certain segments without supplying it to
others. Second, it has been claimed that redundant features do not
participate in phonological processes; Continuant Insertion but not
Continuant Spreading is consistent with this claim. Finally, it is no
longer necessary to restrict Spirantization to be a slot-filling but not
a feature-changing rule. Continuant Insertion, by its very nature,
will only supply the value [+cont] to unspecified slots.

Furthermore, as has been noted by Hualde (also by Myers for
the language Moore) sometimes a voiced spirant follows a stop.
Hualde gives the example from Spanish *Bonet ganó* where the /g/
surfaces as a spirant [γ]. If Spirantization is spreading of the feature
[+cont], this /g/ should surface as a stop, since the segment to its left,
[t], is a stop.

Though it might be tempting to abandon the 'contrastive' speci-
fication of both [+] and [-cont] for voiceless consonants in the UR and
claim that this [t] is somehow transparent to the feature [+cont], it is
not possible to avoid the problem by resorting to radical underspeci-
fication here. If voiceless stops as well as voiced obstruents are
underspecified for continuancy, voiceless stops should spirantize.
Even Structure Preservation (though it shouldn't be operative in the
postlexical module) cannot block Spirantization from applying to
voiceless stops, since voiceless continuants occur in the UR. Radical
Underspecification would require the stipulation of target conditions
on Spirantization, which I have argued above to be undesirable, since
the target conditions [+voice -sonorant] really refer to Information

about phonemic contrasts, which should be encoded elsewhere in the grammar and should not be duplicated in phonological rules.

7.0.   Conclusion

In this paper I have shown that the simplest and most explanatory analysis of the stop/spirant alternations in Spanish is possible only within a theory which allows structure-building (slot-filling) rules and clearly distinguishes between segments which contrast for a particular feature and those which do not.   The analysis I have proposed is possible only in Contrastive Specification.   It is not possible either in a theory which requires all predictable information to be omitted from the underlying representation, nor in a theory like that suggested by Mohanan (1989) which has full specification, structure-changing rules, and constraints.

Just like a radically-underspecified account, a fully-specified account cannot represent the asymmetry in behavior between voiced and voiceless obstruents without stating explicit target conditions on the Spirantization rule: since both voiceless fricatives and stops exist in the language, no constraint of the type *(-voice +continuant) can be invoked to keep the voiceless stops from participating in Spirantization, nor, alternatively, can a constraint like *(-voice -continuant) keep voiceless fricatives from participating in Fortition. Neither Radical Underspecification nor a Full Specification provides a formal way to distinguish between segments for which a specific feature is distinctive and those for which it is not.

NOTES

[1]   In his paper, Mohanan shows some of the weaknesses of Underspecification theory and challenges phonologists to compare underspecified accounts with a theory that calls for full specification and either constraints or repair strategies rather than structure-building default rules.   I find such a theory inadequate for dealing with the alternations which are the topic of this paper.

[2]   The symbols [b,d,g] stand for the voiced bilabial, dental, and velar spirants, respectively.   Except for the sounds being discussed, orthographic form is used.   The letter *h* is not pronounced; *v* and *b* both represent the phoneme /B/ (with allophones [b] and [b]); the digraphs *ll* and *ch* represent [l] and [č] respectively; unstressed *i* and *u* become glides [y] and [w] when next to another vowel.

[3]   Few words end in non-coronal consonants, so, in the interests of parallelism, I have not included examples of word-final environment here.   However, word-final *d* is somewhat common and always spirantizes: pare[d] 'wall'.   For an example of a final non-coronal,

Lozano 1979 cites the loanword *club* which is pronounced with a spirant [b].

[4] The 'mechanism' should presumably be some version of the Linking Constraint, or Geminate Inalterability, since the clusters in which Spirantization is blocked are linked for place of articulation. However, Harris's (1986) Rule Application Convention has serious problems (see discussion in Hualde 1988 and below in the text) and Hayes' (1986) Linking Constraint, 'Association lines in a rule are interpreted as exhaustive', does not apply to the structures in which Spirantization is blocked, since the rule does not refer to place of articulation.

[5] If Spirantization/Fortition were feature-changing, and applied to the voiceless obstruents as well, it would be quite easy to decide between Spirantization and Forition: If stops and fricatives contrasted intervocalically, only fortition could be used; if stops and fricatives alternated after homorganic nasals, only Spirantization could be used. The problem is that in Spanish, voiceless stops and fricatives contrast in all environments and voiced obstruents contrast in none.

It appears to me that there is very little difference between an account with a Spirantization rule, which freely assigns [+cont] — except after a pause or homorganic sonorant — and an account which assigns [+cont] by a default rule after some Fortition rule supplied the opposite value after a pause or homorganic sonorant. If [-cont] is the default value, the rule of Spirantization leaves it very few instances in which to apply; what's more, if I am correct in my analysis below of homorganic sonorant-obstruent clusters, voiced stops get the [-cont] parasitically when the [-cont] feature is assigned by a default rule to the sonorant consonants. Thus, a Spirantization account leaves only utterance-initial voiced obstruents to receive the supposed default [-cont] feature, and it must be stated as an explicit condition on the Spirantization rule that it is blocked just in utterance-initial position.

[6] This is in direct contradiction to the analysis proposed by Harris (1986), and does not conform to Archangeli and Pulleyblank's (1986) Default Ordering Conventions, since the default [-cont] rule would apply 'as early as possible' in its component, that is, at the beginning of the postlexical component.

[7] In Contrastive Specification, of course, contrastive features are present in the UR and thus such cases are irrelevant to the present discussion.

[8] It is not clear how Amastae would syllabify the second in a series of two voiced obstruents, for example, in *abdomen, subglotal*, etc. See the discussion in the text below.

[9] This unpublished manuscript was a revision of a chapter of his thesis. Hualde subsequently rejected the continuant-insertion analysis and returned to his earlier Fortition analysis.

[10] This is also the approach adopted by James Myers in his account of the spirantization of /g/ in Moore. While Spirantization occurs as an insertion of the feature [+cont], the blocking conditions in Moore are different than in Spanish. In Moore, preceding consonants are irrelevant. Rather, a preceding [+ATR] vowel is involved in the blocking of Spirantization. I will not discuss the exact formulation of the blocking here.

[11] For Standard Spanish, it is actually very difficult to decide whether Spirantization should be considered a spreading or an insertion rule, since both options have drawbacks. A spreading account requires that the triggers (most typically vowels, but also glides and continuant obstruents, depending on the dialect) be assigned their default [+cont] value in order to spread it, while the target remains underspecified. An insertion account, however, does not provide an easy way to account for the fact that the stop/spirant alternation is determined by the nature of the segments to the left but not the right of the voiced obstruent, or for the dialectal differences in what segments other than vowels may appear to the left of a voiced spirant. In Costa Rican Spanish, for example (Fernandez 1988), voiced spirants appear only after vowels while stops occur not only in homorganic clusters, but also after glides, [l], and [s]. Perhaps dialects choose between spreading/insertion. Since I am concentrating on Standard Spanish here, and the insertion account is consistent both with the facts and with general principles of default-rule ordering, I choose to represent Spirantization as Continuant Insertion.

[12] This has to do with the feature geometry of the structures and with the Shared Feature convention, as will be discussed in the text below.

[13] In languages where nasals do undergo Spirantization, the nasality tends to be lost or shifted onto a vowel. See Hamp (1974) for a discussion of this nasality shift in early Irish, one of the few languages which have had nasal continuants.

[14] Though a fricative lateral occurs in Welsh (for example, in the name *Lloyd*), this sound is also voiceless. It could be that the [+cont]

nature of the lateral is a by product of the voicelessness, and thus redundant.

[15] If it is indeed necessary to treat the Welsh voiceless lateral (see preceding footnote) as having the feature [+cont], the filter could be rewritten *(+lateral: +voice: +cont). Since for Spanish all laterals are voiced this addition would cause no problems.

[16] The trilled [r̄] has been argued to be derived from the single tap [r]. The two only contrast in intervocalic position. A common analysis (which the spelling suggests) is that intervocalic [r̄] is derived from an underlying geminate /rr/, though this would make /rr/ the only geminate in the language. Anyway, the alternation between the two is not conditioned by the same environments as the stop/spirant alternations which are the subject of this paper. For example, /r/ is always [r̄] in word-initial position, not just in phrase-initial position. Also, [r̄] appears after syllable-final consonants: *Israel* [isr̄aél] but *desde* [désde].

[17] Actually, it would be nice to find a way to refer to nasals and /l/ as a natural class, leaving out /r/, since /r/ does not assimilate to a following obstruent but /l/ does (provided the obstruent is coronal). Hock has pointed out (personal communication) that a phonetic feature such as [-interrupted] can be used to distinguish between [r], for which the stop gesture is [+interrupted] and the nasals and laterals, for which it is [-interrupted]. The constraint could be rewritten to say *(-interrupted: +continuant) and thus leave our [r̄], which could then be redundantly [+cont].

[18] I have excluded the glides [y] and [w] from this discussion, as well as palatal consonants. Lozano (1979) treats glides in onset position as obstruents, not sonorants, so they will not be subject to the proposed constraint. In a syllable rime, glides are not [+consonantal], so again, they will not be subject to the constraint.

[19] Though the environment where stop [g] surfaces in Moore is somewhat different than that where stop [b,d,g] surface in Spanish, Myers shows that the blocking of Spirantization is not accomplished by conditions on the rule, but rather falls out from representations created by an independent process of the language. This is exactly the claim I make for Spanish.

[20] In Tigrinya, discussed in Kenstowicz (1982), Spirantization picks out the voiceless velars /k,q/. I do not know the entire phoneme inventory of the language; however, Kenstowicz points out that Spirantization is not a neutralizing rule in Tigrinya. Therefore the feature [cont] is not used contrastively for voiceless velars. If it is not used contrastively for other consonants, which do not

spirantize, this would be a counterargument for the stance I take in this paper.

21 In fact, one of the early arguments in favor of the representation of geminates as multiply-linked structures was in Kenstowicz's (1982) paper on Spirantization in Tigrinya. Whereas single consonants and consonants in ordinary clusters are subject to postvocalic spirantizaion, geminates surface as stops.

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COMPENSATORY LENGTHENING IN MODERN COLLOQUIAL TEHRANI FARSI

Ali Darzi

This paper deals with compensatory lengthening (CL) in the modern colloquial Farsi of Tehran, a process triggered by the deletion of glottal consonants. I show that two points are crucial to an appropriate analysis of CL in Farsi: (i) There is an asymmetry between glottal and non-glottal consonants as far as moraicity is concerned, only glottals being moraic. (ii) In addition to the moraic tier, we need a CV tier (along the lines suggested in Hock 1986) for representing segments in order to properly account for the restrictions on CL. These findings undermine recent claims by Hayes (1989) concerning both the analysis of Farsi syllable structure and the organization of syllabic phonology.

1.0. The phonological structure of Farsi

A number of facts about the phonological structure of Farsi will be necessary for following the subsequent arguments. Needless to state, the present discussion includes only those aspects of the phonological structure of Farsi that are directly related to CL, in the dialect to be described.

To begin with, I give the consonantal and vocalic system of Farsi; cf. (1) and (2). Note that although some of the phonetic symbols differ from IPA, their value is the same as their counterpart in that system.

(1) Consonants

	lab	labio-dent	dent	alveo	alveo-pal	pal	uvul	glottal
stop	p,b		t,d			k,g	q	ʔ
fricative		f,v		s,z		ʃ, ʒ	x	h
affricate					ç,j			
trill				r				
nasal	m			n				
lateral				l				
glide					y			

(2) Vowels

	front	back
high	i	u
mid	e	o
low	æ	a

Both traditional grammarians and modern linguists believe that in Farsi the vowels /i, u, a/ are longer than /e, o, æ/. However the length is not phonologically significant (see Samareh 1977:92).

There are also some diphthongs in Farsi. Samareh (1985) recognizes six diphthongs, viz. /ay, uy, oy, æy, ey, ow/, whereas Meshkat al-Dini (1985) refers only to /ey/ and /ow/. However, both Samareh and Meshkat al-Dini treat diphthongs as a sequence of a vowel and a glide. I will not further discuss diphthongs in this paper.

Since moraic structure and syllable structure are interrelated, I will briefly discuss the syllable structure of Farsi. The structure of the syllable is important in several respects. First, in moraic theory, strings of segments are syllabified before moraic structure is assigned to them. Second, McCarthy (1979) has argued that syllabification rules apply during the derivation whenever their structural description is met. So, if the deletion of a segment on the segmental tier creates the context for syllabification to apply, it will apply.

There is no unitary view among linguists as to the syllable structure of Farsi. Some believe that no syllable can begin with a vowel in Farsi. According to this view, the syllable structure of Farsi consists of CV, CVC, and CVCC. Some other linguists hold that vowels can also begin syllables. In this paper, I will adopt the former view which is supported both by native speakers' intuition and by universal considerations according to which syllabic elements are first linked to the syllable nodes as nuclei, then consonants that precede them are attached to the syllable node in accordance with principles such as the SONORITY SEQUENCING PRINCIPLE, and finally the remaining consonants are projected into the syllable structure. (I should note, however, that Farsi does not respect the sonority sequencing principle.) Note that there are no syllabic consonants in Farsi.

2.0. Moraic phonology

Autosegmental phonology has developed in the past several years into different theories or subtheories such as CV phonology, moraic phonology, etc., all of which have centered around a common core that distinguishes them from linear phonology such as represented in SPE. Although, they all propose multiple levels of phonological representation, they vary in some respects.

McCarthy (1979) proposed an abstract CV tier through the mediation of which consonants and vowels are organized into syllables. This tier characterizes phonological timing relations such as length, syllable weight, mora, etc. Levin (1985) took the units of this tier as purely timing units, proposing to use one symbol such as X for each unit on the CV tier and thus developing what is called X-theory. Hyman (1985) and McCarthy & Prince (To Appear) proposed that the prosodic tier has just one kind of unit, which represents moras rather than segments. According to Hayes, moraic theory is preferable in two respects. First, it captures the distinction between light and heavy syllables, assigning one mora to light syllables and two moras to heavy ones. Second, the mora counts as a phonological position such that a segment is normally represented as doubly linked. In this paper, CL in modern colloquial Tehrani Farsi is analysed within the version of moraic theory proposed by Hayes (1989). However, as I will show later, Hayes's framework and his view regarding the moraic structure of Farsi must be modified.

According to the theory, CL is defined as the lengthening of a segment upon the deletion or shortening of a nearby segment. This process is conditioned both by the position of the segment that undergoes deletion within the syllable and by the choice of the nearby segment that is to be lengthened. As a result of the process, the weight of the syllable in which CL occurs remains intact. It is therefore reasonable to assume that CL occurs in languages that have syllable weight distinctions.

According to Hayes, for a string to be syllabified, certain sonorous moraic segments are assigned a syllable node and other segments in the string are adjoined to this node to form onset and coda. All these are subject to language-specific conditions on syllable wellformedness and language-specific rules that specify weight by position. Such rules however only apply to coda consonants. Onsets are assumed not to be moraic in principle.

CL, as defined above, is triggered by the deletion or shortening of a segment. The theory holds that if a moraic segment is deleted, the stranded mora will be filled by the spreading of an immediately preceding segment, a process which may or may not lead to the delinking of that segment from its own mora. However, if a segment is not moraic, once it is deleted it is all gone, with no stranded moraic slot to be filled by spreading. This is the case when a consonant in the onset position is deleted, since onsets, as mentioned earlier, are not moraic.

Considering the syllable structure of Farsi and its relation to the moraic structure of syllables, Hayes (1989) proposes that syllables in

Farsi may be trimoraic, as Farsi quantitative metrics suggest.   He
puts it this way:

> In this system, the light syllables correspond to a short
> metric position (/⌣/) and heavy syllables to either a long
> metrical position (/‒/) or two shorts (/⌣ ⌣/).   Superheavy
> syllables (CVVC and CVCC) are scanned as /‒ ⌣/. If we
> make the usual assumptions for quantitative metrics (/‒/
> corresponds to two moras, /⌣/ to one), then the superheavy
> syllables must count as trimoraic.   Interestingly, the ultra-
> heavy CVVCC syllables of Persian are scanned as a /‒ ⌣/ as
> well, suggesting that an upper limit of three moras is in
> effect.

He then refers the reader to Elwell-Sutton (1976) and Hayes
(1979) and proposes the moraic structure of Farsi as in (3) below,
where "m" stands for mora.

(3) light   heavy   superheavy   ultraheavy

b e	t a	b æ d	t a b	d æ s t	d a ʃ t
"to"	"till"	"bad"	"swing"	"hand"	"had"
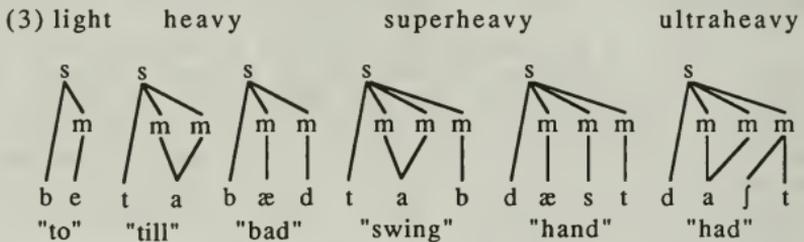
3.0.   Compensatory lengthening in colloquial Tehrani Farsi

With this background of moraic theory and of the phonological
structure of Farsi, let us move to the third part of the paper that
deals with the process of vowel lengthening in modern colloquial
Tehrani Farsi.   The forms in (4) have been divided into three sets for
the sake of later discussion.   For each set, formal conservative forms
are given, together with their corresponding colloquial forms.   Note
that a colon is used to stand for length equal to one mora added to
the inherent moraic length of a vowel.   For example, if /o/ is inher-
ently linked to one mora, then /o:/ would have an extra mora.   In
(4.a) the glottal consonants occur in word-final position.

	(4) a.	formal conservative	colloquial	gloss
		robʔ	ro:b	'quarter'
		næfʔ	næ:f	'benefit'
		qætʔ	qæ:t	'cut'
		ʃæmʔ	ʃæ:m	'candle'
		ʃeyʔ	ʃe:y	'object'
		ʃærʔ	ʃæ:r	'religious law'
		qælʔ	qæ:l	'tin'

mæn?	mæ:n	'prohibition'
fær?	fæ:r	'branch'
su?	su:	'bad'
sær?	sæ:r	'melancholy'
sobh	so:b	'morning'
solh	so:l	'peace'
kuh	ku:	'mountain'

In (4.b) the glottal consonants precede a word-final consonant. These words are significant in that they show that CL is not restricted to word-final position.

(4) b.

qæ?r	qæ:r	'bottom'
læ?n	læ:n	'cursing'
ʃæ?n	ʃæ:n	'dignity'
læ?l	læ:l	'spinel ruby'
ro?b	ro:b	'terror'
bo?d	bo:d	'dimension'
sæ?y	sæ:y	'effort'
bæ?s	bæ:s	(name of a party)
qæhr	qæ:r	'wrath'
læhn	læ:n	'language'
sæhm	sæ:m	'share'
bæhs	bæ:s	'discussion'
ræhn	ræ:n	'mortgage'
fohʃ	fo:ʃ	'foul language'

In (4.c) the glottal consonants occur in syllable-final position within the word.

(4) c.

tæ?mir	tæ:mir	'repair'
næ?leyn	næ:leyn	'slipper'
jæ?fær	jæ:fær	(proper noun)
næ?na	næ:na	'mint'
tæ?liq	tæ:liq	'suspension'
ʃæhla	ʃæ:la	(proper noun)
zæhra	zæ:ra	(proper noun)
pæhna	pæ:na	'width'
væhʃi	væ:ʃi	'wild'
mæhmud	mæ:mud	(proper noun)
me?mar	me:mar	'architect'
?e?zam	?e:zam	'dispatch'
tehran	te:ran/te:run[1]	'Tehran'
behtær	be:tær	'better'
behzad	be:zad	(proper noun)
to?me	to:me	'prey'
ʃo?be	ʃo:be	'branch'
ʃo?le	ʃo:le	'flame'

tohfe	to:fe	'present'
sohbæt	so:bæt	'talk'
zohre	zo:re	(proper noun)
ʃahpur	ʃa:pur	(proper noun)
ʃahrox	ʃa:rox	(proper noun)
ʃahrud	ʃa:rud	(a city in Iran)

Our first task is to determine the underlying representation of the words in the data. If long vowels are treated as a sequence of two vowels, then there is an alternation between /ʔ/ and /æ/, /e/, and /o/. There is also an alternation between /h/ and /æ/, /e/, /o/, /a/, and in a very few cases /u/.

For the sake of the argument, let us assume that /ʔ/ and /h/ are introduced via phonological rules and that the vowels are present underlyingly. If so, then we cannot predict in what contexts the vowels in question change into /ʔ/ and in what contexts they change to /h/, for there are pairs of words in which the contexts for the change would be identical such as [qæ:r] (the surface phonetic form for both /qæhr/, and /qæʔr/), [læ:n] (the surface phonetic form for both /læhn/ and /læʔn/), and /bæ:s/ (the surface phonetic form for both /bæʔs/ and /bæhs/).

Another analysis might be that we take long vowels as underlying and formulate two rules; one to shorten the vowels in question and another to introduce a glottal consonant. This approach will not work either, since again, we would not be able to predict where to introduce /ʔ/ and where to introduce /h/. There are thus two pieces of evidence that prevent us from postulating that the long vowels are present underlyingly and require us instead to take /ʔ/ and /h/ to be present in the underlying representation.

Further support for the hypothesis that glottal consonants are present underlyingly in forms with these long vowels is provided by a language game in which the last syllable of a word is transposed to its beginning.[2] I asked a native speaker of Farsi to switch the last syllable of more than a hundred words that I uttered to the beginning of the strings. There were a great number of words with long vowels among the words that I uttered. As I expected, all the strings the informant produced on the basis of the rules of the game contained a glottal consonant. Below are given the formal conservative forms of a few words from the data in (4), their colloquial forms which I produced, and the response on the part of the consultant. (Dashes indicate syllable boundaries.)

(5) conservative	colloquial	consultant's response
tæʔmir	tæ:mir	mir-tæʔ
jæʔfær	jæ:far	fær-jæʔ
zæhra	zæ:ra	ra-zæh

pæhna	pæ:na	næ-pæh
ʃæhla	ʃæ:la	la-ʃæh
meʔmar	me:mar	mar-meʔ
ʔeʔdam	ʔe:dam	dam-ʔeʔ
ʃoʔbe	ʃo:be	be-ʃoʔ
toʔme	to:me	me-toʔ
ʃoʔle	ʃo:le	le-ʃoʔ
tehran	te:ran/te:run	ran-teh/run-teh
behtær	be:tær	tær-beh
sohbæt	so:bæt	bæt-soh
zohre	zo:re	re-zoh
ʃohræt	ʃo:ræt	ræt-ʃoh
ʃahrox	ʃa:rox	rox-ʃah
ʃahrud	ʃa:rud	rud-ʃah

Now, if there were no underlying glottal consonant in the forms that contain a long vowel, how is it that a glottal consonant shows up when the informant moves the last syllable of the colloquial forms to the beginning of those forms? Even more important, the consonant that shows up is identical to the glottal consonant appearing in the formal conservative forms. These facts can only be accounted for under a hypothesis that posits glottal consonants in the underlying representation of the colloquial forms, a consonant that deletes during the derivation. Moreover, the deletion process in question is accompanied by another phonological process that lengthens a vowel in specific contexts.

The loss of the glottal consonants and the lengthening of preceding vowels have been discussed by several linguists. Samareh (1977, 1985) treats glottal consonants in coda position as weak consonants that are barely perceptible in colloquial speech. According to him, they also lead to the lengthening of the preceding vowel. This is in accordance with Rostargueva's observation (1975) that the glottal stop in Farsi is realized in careful speech as a noticeable stricture, except before a consonant or pause, where it results in lengthening.

Here, three points are in order. First, neither Samareh nor Rostargueva refers to /h/ as behaving in the same way as /ʔ/ as far as vowel lengthening is concerned. This is probably due to the fact that the glottal stop has received more attention because of the controversy over whether it is contrastive in Farsi. Second, Samareh (1985) analyzes syllable-initial glottal stops as strong; as such, they do not trigger vowel lengthening. However, in his 1975 paper he does not rule out the possibility of intervocalic glottal deletion which, according to him, does not lead to vowel lengthening. Third, neither Samareh nor Rostargueva accounts for the lengthening of vowels within a particular phonological theory.

I should note that /h/ usually behaves in the same way as /ʔ/, not only in coda position, but also in syllable-initial position, such as in /maʃhæd/ which is realized as /maʃæd/ with no vowel lengthening. Note however that in the subsequent discussion I will generally ignore syllable-initial glottal consonants for two reasons: (a) There are many words in which syllable-initial glottal consonants are not deleted as in /ʃahed/ 'witness', /maher/ 'skillfull', /ʔæziz/ 'dear', etc. This might be why Rostargueva tends not to say anything about the possibility of syllable-initial glottal stop deletion. (b) Even if glottal consonants in onset position are deleted, they do not result in CL because segments in onset position are not moraic.

To account for the data in (4) in a non-linear approach, we need first of all a rule such as the one in (6) to delete glottal consonants in coda position. Then, if a mora is stranded as a result of glottal deletion, it is either filled by spreading from a preceding segment or, if the deleted consonant does not occur next to the nucleus, the spreading segment is delinked from its mora; cf. (7). These two processes are distinguished as Spread and Flop, respectively. (As the derivations in (9) [next page] illustrate, Flop must apply before Spread.)

(6) $\{ \begin{smallmatrix} h \\ ʔ \end{smallmatrix} \} \rightarrow \emptyset \quad / \underline{\qquad} \quad (C)]s$

(7)
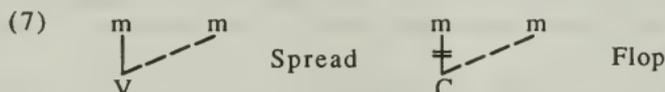
Now, while deletion of a glottal consonant in coda triggers CL, in words such as /sæʔid/, with intervocalic glottal, deletion of the stop does not result in CL. This is of course precisely as predicted, since onset consonants are not moraic, but linked to the following mora. Their deletion therefore does not result in either Spread or Flop, and no CL results.

The two different situations are illustrated in Figures 1 and 2 [next page]. Figure 1 shows how rules (6) and (7) apply to data of the type (4a) and (4c) above, with glottal stop or fricative in the coda. (To save space, I omit derivations for the type (4b) These are substantially the same as those for (4c).) Figure 2 shows that the rules fail to apply to forms with glottal stop in onset position. Note that the examples in both figures are assumed to have been syllabified already.
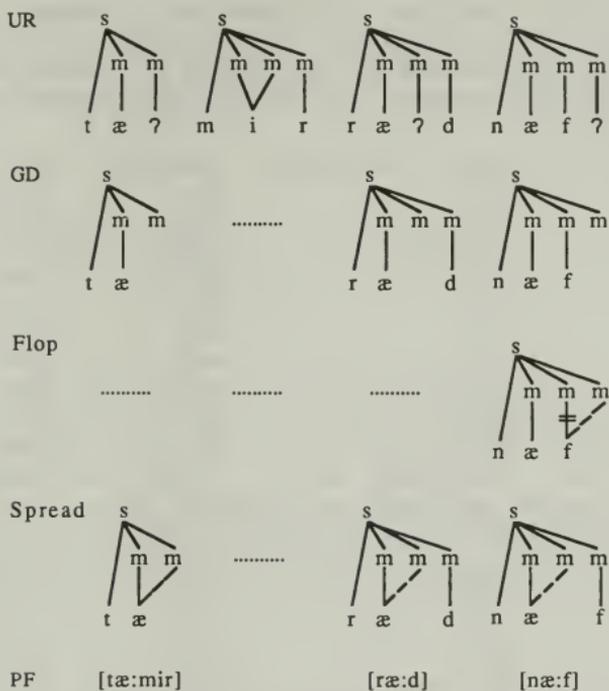
Figure 1
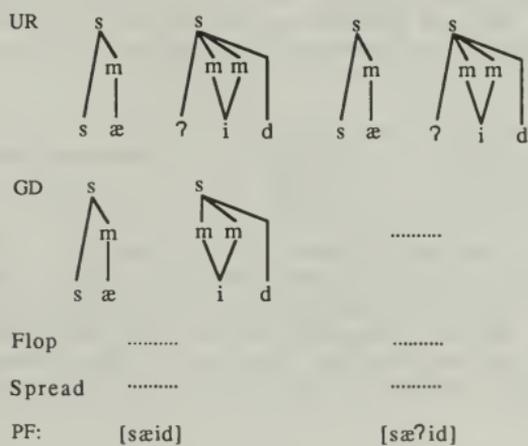
Figure 2

The analysis proposed so far runs into difficulties once we consider the additional data in (8). In these forms a consonant in the coda deletes, but its deletion does not result in CL. The forms in (8.a) show an alternation between a syllable-final stop preceded by a fricative and its absence.

(8) a.	formal conservative	colloquial	gloss'
	dæst	dæs	'hand'
	hæft	hæf	'seven'
	gereft	geref	'(he) got'
	loxt	lox	'naked'
	mozd	moz	'wage'
	bist	bis	'twenty'
	saxt	sax	'(he) built'
	xoʃk	xoʃ	'dry'
	moʃt	moʃ	'fist'
	dozd	doz	'thief'
	dæstgire	dæsgire	'handle'

The forms in (8.b) show an alternation between a [+anterior, +coronal] syllable-final consonant and its absence.

(8) b.	qænd	qæn	'sugar'
	ʔæz	ʔæ	'from'
	fekr	fek	'thought'
	ʃokr	ʃok	'thanks'
	kond	kon	'slow'

Now, an insertion account of the C~Ø alternations clearly is not plausible. We must therefore acccount for the alternations in terms of deletion. We can formulate a rule to delete /t/ and /d/ in coda when preceded by a fricative; cf. (9). Let us call this rule Consonant Deletion (CD).

$$(9) \quad \begin{bmatrix} \text{-con} \\ \text{+cor} \\ \text{+ant} \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} \text{-son} \\ \text{+con} \end{bmatrix} \underline{\quad} \# \quad \text{Consonant Deletion (CD)}$$

However, the problem that is still with us is that although a consonant has been deleted from the coda, there is no CL in the colloquial forms. The analysis proposed earlier, however, predicts that deletion of the final consonant of the word for 'hand' should result in CL just as does the deletion of final glottal consonants in Figure 1 above. Compare the derivation in (10) .

(10) UR
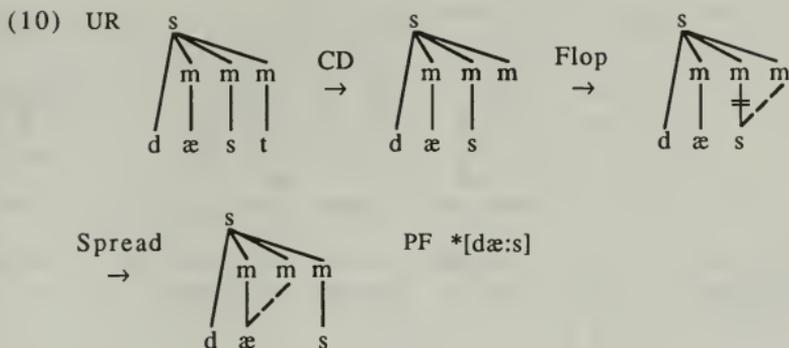
One may hypothesize that syllable-final coronals are extra-syllabic and therefore not moraic. This is not a plausible hypothesis, however, because there are many, many words in colloquial Farsi with syllable-final coronals, such as /qæbr/ 'tomb', /fæqr/ 'poverty', /hæbs/ 'custody', /jens/ 'material', etc. There are two a priori possible alternative analyses for these forms. Under the first analysis, we may assume that the forms in (8.b) are exceptional and that /t/ and /d/ are not moraic. (I ignore /k/ at this point.) So once they delete there would not be a stranded moraic slot to trigger Flop or Spread.

Under the second analysis, we may assume that only glottals are moraic in colloquial Farsi. If we do so, we do not need to treat the forms in (8.b) as exceptional. Moreover, the second analysis is preferable to the first one in that it more highly restricts the assignment of three moraic slots to just those syllables in Farsi that contain glottals in the coda. Given the crosslinguistc markedness of trimoraic syllables, this restriction would seem highly desirable. Note that this approach assumes that the moraicity of consonants is a language-specific phenomenon. But what is important is the fact that such a language-specific approach is dictated by the evidence of colloquial Farsi: As we have seen, only the deletion of glottal coda consonants results in Cl, while the deletion of other coda consonants does not.

If this line of argumentation is correct, then the moraic structure of Farsi as proposed by Hayes (cf. (3) above) will have to be modified as in (11) so as to capture the range of facts in the colloquial version of the language. (Note that following Hayes, I am still assuming that non-moraic consonants in the coda are linked to the preceding moraic slot.)

(11) light   heavy   super heavy


```
        s          s          s          s              s
        |         /|         /|         /|             /||
        m        m m        m m        m m            m m m
        |        | |        | |        | |            \|/ |
        b e      t a b      r o b ?    d a ʃ t        s u   ?
        "to"     "swing"    "quarter"  "had"          "bad"
```
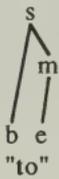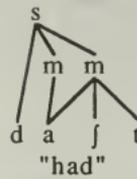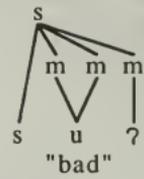
This analysis makes it possible to account for forms such as the word for 'hand', as is clear from the following derivation.

(12) UR
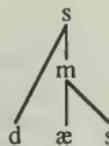

```
        s                      s
        |                      |
        m          CD          m          Flop & Spread inapplicable
       /|\         →          /|
      d æ s t                d æ  s
```

However, if we accept the hypothesis that non-glottal coda consonants are not mora-bearing, the analysis in Figure 1 above for forms of the type (4.a), with vowel + oral consonant + glottal consonant (such as /næf?/ → /næ:f/) becomes unacceptable. Instead of the UR in Figure 1, reproduced as (13.a) below, we now have to postulate a structure as in (13.b), in which /f/ is not mora-bearing, but merely asociated with the preceding mora-bearing element.

(13) a.   b.


```
        s                      s
       /|\                    /|\
      m m m                  m   m
      | | |                  /|  |
      n æ f ?                n æ f ?
```
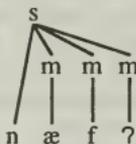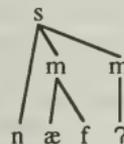
In this form, once the glottal stop is deleted, if /f/ flops to the empty moraic slot, there will not be any empty moraic slot for the vowel to spread to and the vowel length of the surface form /næ:f/ cannot be derived. Moreover, if we assume that because it is not a mora-bearing consonant, /f/ cannot flop to the empty moraic slot left by the loss of the glottal stop, then, according to Hayes (1989), /æ/ cannot spread to this empty position, for this would require crossing the association line between /f/ and the moraic node or between /f/ and the syllable node (if it is linked to the syllable node).

However, there will be no crossing of association lines if (i) following Hock (1986), we assume that in addition to a moraic tier, we have a CV tier as well, and that (ii) non-moraic consonants are not linked to a preceding moraic slot. Once we assume that moras are

not constructed directly on top of segments, but rather are on a tier separate but linked to the skeleton, the spreading of a segment on the moraic tier does not cross the association lines between the elements of the CV tier and the syllable node or moraic slots, because they are on two separate but related tiers or planes.   Under this analysis, we no longer need the flop rule formulated earlier.   The major problem here is one of presentation, of how to present an essentially three-dimensional diagram on a twodimensional sheet of paper.   An attempt to do just that is presented in (14) below in the derivation of the word for 'benefit'.   With a certain loss of information, we can represent the derivation of this word even two-dimensionally, as in (15) below.   Note that in both of these representations there is no crossing of the association lines.   (For ease of exposition, the internal structure of the syllable is here ignored.)

(14)

(15) UR
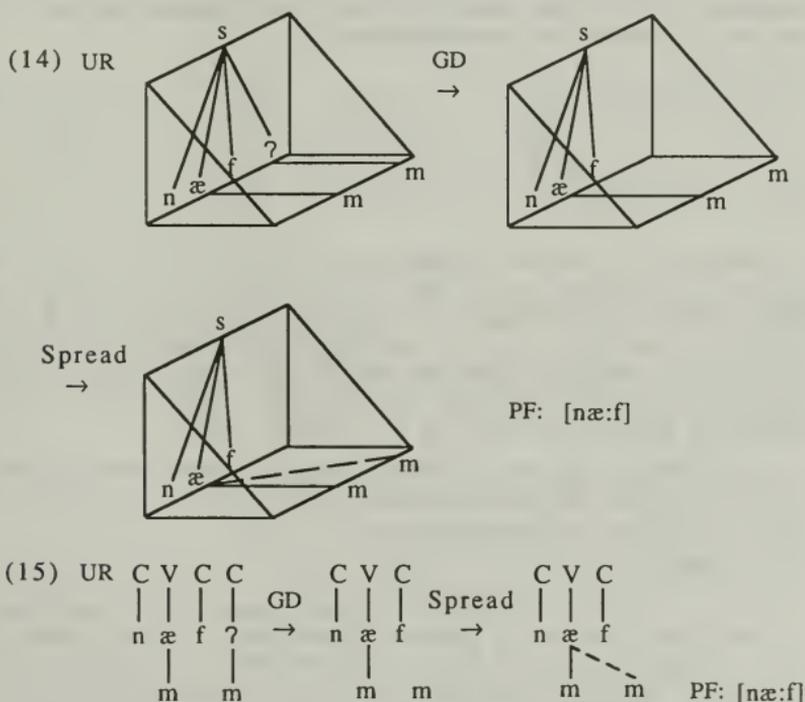
The stipulation of a CV tier in addition to the moraic tier undermines Hayes's argumentation against X-theory and in support of moraic theory.   As is well known, Hayes supports his argument by showing that X-theory would incorrectly predict a change from /əla/ to [la:] in Middle English, for once the [ə] deletes the /l/ would flop to

the empty X-slot, leaving behind another empty X-slot for the final vowel to spread to. Compare (16) below, adapted from Hayes 1989.

(16)
```
      m    m              m               m              m
      |   / \            / \             / \            / \
      N  O   N          O   N           O   N          O   N
      |  |   |          |   |           |   |          |   |
      X  X   X    →     X X X     →     X X X    →     X X X
      |  |   |          |   |           |   |          |   |
      # ə   l   a       #  l   a        l   a          l     a      PF: *[la:]
```
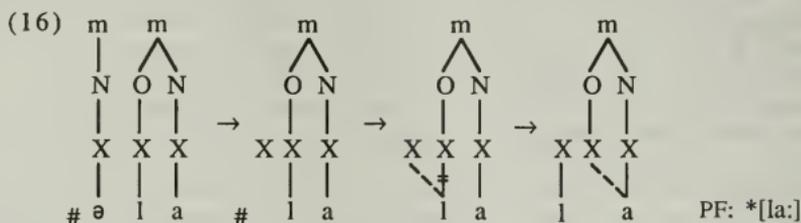
He then gives the derivation in (17), showing that a moraic theory is able to derive the correct form [la], since under this analysis the spreading of /a/ to the stranded moraic slot is impossible due to the ban on the crossing of association lines.

(17)
```
      s         s                 s
      |         |                 |
      m        / m       →   m   / m
      |       /  |           |  /  |
      # ə    l   a           #  l   a       PF: [la]
```
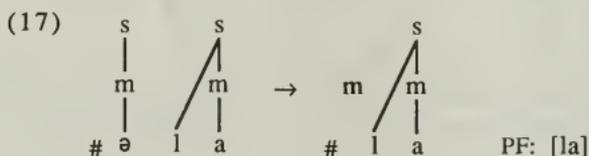
While an approach couched purely in terms of X-theory thus may have to be ruled out, it does not necessarily follow that we must adopt a pure moraic theory. In fact, as noted above, Hock (1986) employs a 'two-tier' approach, combining a skeletal with a separate moraic tier. Although Hayes has chosen not to adopt Hock's proposal he has not ruled it out either, stating merely that he has seen no compelling evidence in favor of the two-tier approach.

By showing that the colloquial Farsi of Tehran requires such a two-tier aproach, the present paper should constitute a first step toward providing such evidence.

4.0.   Summary

This paper has presented an investigation of CL in colloquial Tehrani Farsi within the moraic framework. I have shown that moraic theory runs into serious difficulties if Hayes's proposed account of the moraic structure of Farsi is accepted. His proposal needs to be modified such that among the consonants, only the glottals are taken to be moraic. This modification, in turn, makes it necessary to replace Hayes's exclusively moraic approach by a two-tier analysis along the lines suggested by Hock (1986), with both a skeletal and a moraic tier.

NOTES

*I am indebted to Charles Kisseberth, Hans Henrich Hock, and Jennifer Cole for their comments. Any shortcoming in this paper is mine.

1 The alternation here is not relevant for the purpose of this paper.

2 My friends and I used to play this language game in our neighborhood to call one another when I was 9 years old or so. However, the consultant did not know the game before I taught her. In teaching her the game, I did not include any of the words that involved CL in colloquial Farsi to make sure that she was not given any clue as to how to deal with words such as those in (5).

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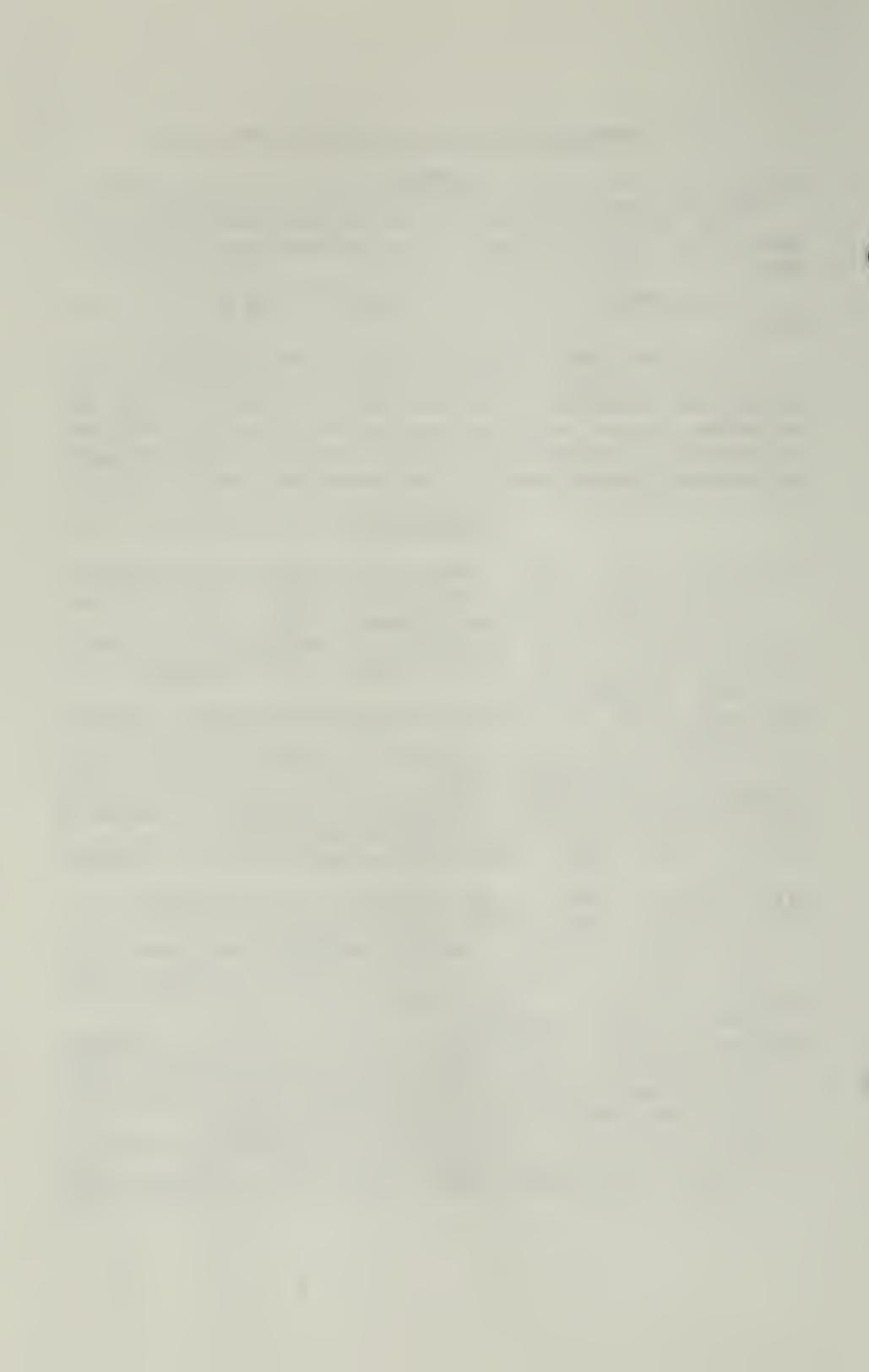
ON THE PHONOLOGY-MORPHOLOGY INTERACTION IN BRAZILIAN PORTUGUESE VOWEL HARMONY*

Barbara J. Hancin

This paper provides an analysis of vowel height harmony in Brazilian Portuguese by adopting a unified account of segment representation, building from current theoretical approaches. It is argued that application of the harmony rule is triggered and constrained by morphological factors. The harmony rule is shown to be noniterative, left-ward spread triggered by suffixation and, contrary to harmony processes in other Romance languages and dialects, is not directly affected by [ATR] specification. Evidence is given for the tautomorphemic nature of the OCP. In short, this analysis provides significant evidence for the dependence of phonology on morphology in Brazilian Portuguese vowel height harmony.

1.   Introduction

The process of vowel height harmony has eluded linguists of Brazilian Portuguese (hereafter, BP) phonology for years. Previous attempts at explaining the phenomenon have failed to capture the significant systematicities underlying the process (Harris 1974, Lemle 1974, Lipski 1973, Redenbarger 1981, Viegas and Assis Veado 1982). The goal of this paper is to show that a principled account of vowel raising in BP is, in fact, possible. What seems to have eluded previous analyses is the strong dependence of the harmony rule on morphological factors. It is argued here that morphological structure plays a critical role in rule application and constraint, going against claims for the autonomy of phonology and morphology. This paper shows that only when we recognize and accept the interaction of phonology and morphology can we explain vowel quality variability in BP.

We begin with a discussion of the theoretical approaches adopted which, taken together, form a unified account of segment structure throughout phonological derivation. In the next section, data is presented and an initial harmony rule is formulated. Then, transparent and opaque segments are discussed. In the final section,

evidence is presented for recognizing a cyclic/noncyclic distinction between suffixes of this language.

2.   Theoretical approaches

This analysis is based on a convergence of three current theoretical approaches in phonology, an interaction which, according to Goldsmith (1990), has proven to be quite productive.   First, with respect to segment structure, it is assumed that segments and features are represented on separate tiers (Goldsmith 1976) and that the distinctive features of a segment are organized in a hierarchical structure, each on independent tiers, interconnected under a root node (see Clements 1985 and Sagey 1986 for approaches to Feature Geometry).   In addition, it is assumed that these hierarchical struc- tures are not fully specified in their underlying representation. Underlyingly, segments only contain unpredictable information on feature specification and predictable information is filled in by rules during phonological derivation (Archangeli 1984, 1988; Archangeli and Pulleyblank 1986, 1987).   Finally, as is shown in section 5, BP offers evidence for positing a grammar in which phonology and morphology interact, similar to the boundary type distinctions made by Chomsky and Halle (1968) or to the cyclic/noncyclic distinction made in Lexical Phonology (Kiparsky 1982, 1985; Mohanan 1985)[1]. By assuming these three general approaches, we not only can claim a unified account of segment representation, but also can emphasize the relationship between phonology and morphology in lexical derivation.

3.   Data and rule formulation

Height harmony in BP is characterized by the agreement in height between root and initial suffix vowels.   As the data in (1) show, root vowels alternate between [-hi] and [+hi] depending on the feature specification of the initial suffix vowel.   Non-verbs (A) and verbs (B) are presented separately here to show the breadth of rule application [For ease of exposition, only vowels are represented phonetically].

(1) (A) Non-verbs[2]

1. gord-óti	'fat person'	gurd-úcha	'fat woman'
2. alegr-éto	'happy way'	aligr-ía	'happiness'
3. tors-edór	'one who cheers'	turs-ilhãu	'a big cheer'
4. tors-ãu	'a big cheer'	turs-iméntu	'cheering'
5. dez	'ten'	diz-i-nóvi	'nineteen'

(B) Verbs

Infinitive	3rd pers. sing. past	3rd pers. sing. imp.	past partic.	gloss
1. beb-ér	beb-éu	bib-ía	bib-ídu	'to drink'
2. trem-ér	trem-éu	trim-ía	trim-ídu	'to tremble'
3. com-ér	com-éu	cum-ía	cum-ídu	'to eat'
4. sofr-ér	sofr-éu	sufr-ía	sufr-ídu	'to suffer'

Given this data, we can consider either of two rules: (1) [-hi] spread, or (2) [+hi] spread. If we posit that [-hi] suffixes are specified underlyingly and that [a] is actually specified as [-hi] in the underlying representation (see (1)A.4), we could posit a rule of [-hi] spread with lexical default values of [+hi]. However, as is shown later (Section 4), [a] does not behave similarly to other [-hi] vowels in the harmony process, whereas both [+hi] vowels do behave similarly. As a working hyypothesis, then, we posit that [+hi] is specified underlyingly and a [+hi] suffix vowel predictably spreads its height feature to an unspecified root vowel. Adopting a [+hi] spread rule for BP is preferred over [-hi] spread because other closely related languages have also been shown to have [+hi] spreading rules (cf. Vago 1988 for Pasiego Montañés Spanish and Hualde 1989 for Tudanca Montañés and Lena Bable). Root vowels which do not receive a height specification by the spreading rule will receive the default value [-hi]. The underlying representation for BP vowels is given in (2).

(2) Underlying representation for vowels[3]

	i	e/ε	a	o/ɔ	u
hi	+				+
lo			+		
back				+	+

The chart suggests that there are two types of mid vowels: [-ATR] and [+ATR]. In fact, these two types do contrast in stressed segments (Harris 1974, Major 1985, Pizzini 1982, Redenbarger 1981, Wetzels 1988). However, it will be argued later that the [ATR] distinction is not an underlying property of the segment, rather it is an underlying property of a morpheme, as first proposed in Wetzels (1988). Thus, the [ATR] feature is not relevant to the above vowel chart.

As shown in the data in (1), the height of the root vowel depends on the height of the initial suffix vowel, so we can posit that the application of the harmony rule is triggered by morphological affixation. The preliminary rule is formulated in (3).

(3) Preliminary harmony rule: [+hi] spread[4]

```
trigger:  [+hi] initial suffix vowel
target:   vowels unspecified for height
domain:
default : insert [-hi]
```

```
b   E   b- i   a        'to drink- 3rd person sing.
|           |   |        imperfect'
X           X   X
  \         |   |
    \       |   |
      \     |   |
       [+hi] [+lo]
```

The domain of the rule is not yet clear. Because a suffix vowel affects a root vowel, we can at least assume left-ward spread. Additional data in (4) show that the rule appears to spread more than once to the left.

(4) 1. formós-a   'beautiful'   furmus-úra 'beauty'
    2. prefer-éncia   'preference'   prifir-ível 'preferable'
    3. repet-énti   'one who repeats' ripit-idór 'same'
    4. merec-ér   'to deserve'   miric-ídu 'deserved'

However, when the targets are not identical, the rule only spreads once to the left, as the data in (5) show.

(5) 1. profet-ánti 'prophet'   profic-ía   'prophesy'
    2. telefon-éma 'phone call' telefun-ísta 'phone operator'
    3. promet-ér   'to promise' promit-ídu   'promised'
    4. oferec-edór 'one who   ofiric-iméntu 'offering'
                   offers'

The difference between the target root vowels of (4) and those of (5) is that the targets of (4) agree in the feature [back] (and are underlying not specified for height). It appears, then, that the features [back] and [hi] demonstrate a kind of relationship which is captured if we assume they are organized on the same articulator node tier, namely the dorsal, as Sagey (1986) has done. By adopting this representation, then, the target segments in (4) will be identical and adjacent on the dorsal tier, a configuration which is disallowed by the Obligatory Contour Principle (OCP) (Goldsmith 1976, 1990; McCarthy 1986; Yip 1988). Because the OCP prohibits adjacent, identical segments, these feature bundles will actually be associated to only one segment underlyingly. Due to the linking of adjacent, identical hierarchical structures (feature bundles) to one segment, it becomes clear that the domain of spread is only once to the left, though the target segment may be multiply-linked.

There is further clarification, however. The OCP predicts that any adjacent, identical feature configurations under the dorsal node will be linked to the same segment which can be a target for the spreading rule. The harmonizing data in (6), then, are not predicted.

(6) (A) Non-verbs

1. fono-lóg-icu   'phonologic'   fono-lug-ía   'phonology'
2. gost-ós-u   'tasty'   gost-us-úra   'tastiness'
3. astro-nóm-icu   'astronomic'   astro-num-ía   'astronomy'

(B) Verbs

Infinitive	3rd pers. sing. imperf.	3rd pers. sing. future conditional (infinitive + ía)	gloss
1. beb-ér	bib-ía	beb-ir-ía	'to drink'
2. tors-ér	turs-ía	tors-ir-ía	'to cheer'
3. comet-ér	comit-ía	comet-ir-ía	'to commit'
4. oferec-ér	ofiric-ía	oferec-ir-ía	'to offer'

Because the vowels to the left of the trigger are identical, they conceivably should be multiply-linked to the same segment which is a target for the spreading rule. However, these data show that segments are not multiply linked across morpheme boundaries. This is evidence that the domain of the OCP is crucially tautomorphemic. The example in (6)B.4 shows that two root vowels are linked to one segment, but that segment is not affected when there is a morpheme intervening between it and the trigger. That the domain of OCP is morpheme-bound provides further evidence for the critical role of morphology in the phonology of BP.

At this point, we can summarize what has been presented by restating the spread rule and filling in the specification for its domain.

(7) Revised harmony rule: [+hi] spread

trigger: [+hi] initial suffix vowel
target: segment unspecified for height
domain: noniterative, left-ward spread
default: insert [-hi]

```
 r  E  p  E  t- i  d  O r        'one who repeats'
     \   /    |      |
       X      X      X
        \     |
         \    |
          \   |
          [+hi]
```

Having posited the basic parameters of the rule, we can now turn to particular phenomena which introduce complications for this analysis, namely transparent and opaque segments.

4.   Transparent and opaque segments

The data in (8) show that [+hi] vowels are transparent to the harmony process; the rule is allowed to affect a segment beyond (to the left of) a [+hi] segment.

(8)
1. medic-olegál   'medicolegal'   midic-ína   'medicine'
2. benefic-aménti 'beneficially'   binific-iál   'beneficial'
3. oportun-aménti 'opportunally'   opurtun-i-dadi[5] 'opportunity'

According to the theoretical postulates of this analysis, a [+hi] segment would not be a target for the spread rule, since it is already specified for height.   Additionally, the height feature could not spread through the underlyingly linked [+hi] segment since that would entail an illicit crossover of association lines.   Even if it could somehow spread past the segment, it would violate the Locality Condition, posited by Archangeli and Pulleyblank (1987), which says that a rule can only apply if a specified target is adjacent to a specified trigger.   In order to solve this, the feature [+hi] will be allowed to spread to any segment to its left, regardless of whether or not the target segment already has a height specification.   If [+hi] spreads to a segment already specified with [+hi], then the target segment gets mobilized to also spread its feature once to the left. That is, if a [+hi] suffix vowel spreads to a [+hi] root vowel, it reinforces the root vowel so that it can also be a trigger when, prior to suffixation, it was not.   This process is represented in (9).

(9) [+hi] feature spread can trigger a root [+hi] to spread

```
    m   E   d   i   c-  i   n   a        'medicine'
        |       |       |       |
        X       X       X       X
         \    | \     |       |
          \   |  \    |       |
           \  |   \   |       |
          [+hi]   [+hi]    [+lo]
```

By redefining the harmony rule to spread [+hi] to any segment on its left, we not only can explain the transparency of [+hi] vowels, but we also make the rule more generalizable.   This account seems to be the simplest one, given the transparency of [+hi] segments in BP.[6,7]

Up to now, we have accounted for spread to segments unspecified for height and to segments specified for [+hi].   What remains to be seen is the [a] or (underlyingly) [+lo] vowel.   The

current rule predicts that segments specified for [+lo] underlyingly will be opaque to [+hi] spread because a segment cannot have a contradictory *[+lo, +hi] specification for height on the dorsal tier. Thus, if a target segment is already specified for a height which is not compatible with [+hi], then [+hi] does not spread. That is exactly what the BP data (10) show.[8]

(10) [+lo] vowels do not undergo harmony

1. mosk-ar-ía	'a bunch of flies'	musk-ínhu	'fly-dim.'
2. telefon-ad-ínha	'phone call-dim.'	telefun-ía	'phone call'
3. neces-ar-ia-ménti	'necessarily'	nicis-it-ár-iu	'necessary'
4. letárg-u	'lethargy'	letarg-ía	'lethargy'
5. morál	'moral'	moral-i-dadi	'morality'
6. compat-ível	'compatible'	compat-ibil-i-dádi	'compatibility'
7. local-iz-ár	'to locate'	local-i-dádi	'locality'

An additional opaque domain in BP is that of a stressed vowel. The data in (11) demonstrate that stressed segments, like [+lo] vowels, are not affected by, nor are they transparent to [+hi] spread. The data show that vowel harmony may occur to the left of a stressed segment ((11).1-6) or to the right of a stressed segment ((11).7-10).

(11) Stressed segments block vowel harmony

1. redónd-u	'round'	redund-ínhu	'round-dim.'
2. benéfic-u	'beneficial'	binific-iál	'beneficial'
3. propós-it-u	'proposal'	prupus-iç-áu	'proposition'
4. formós-u	'handsome'	furmus-úra	'beauty'
5. polút-u	'polluted'	pulu-ír	'to pollute'
6. precíp-it-i	'in danger of falling'	pricip-it-ár(se)	'to rush headlong'
7. periód-icu	'periodic'	períud-u	'period'
8. astro-lóg-icu	'astrologic'	astró-lug-u	'astrologer
9. iconóm-icu	'economic'	icónum-u	'economist'
10. fosfor-ós-u	'phosphorous'	fósfur-u	'match'

A stressed segment does not undergo vowel harmony nor does it allow the height feature to spread any further to the left (see especially examples (11) 2-4 where the stressed segment and the one to its left agree in backness). Given the facts that a trigger does not have to be stressed and that harmony can occur to either side of a stressed segment, we can conclude that stress plays no other role in the harmony process than to prohibit a stressed segment from undergoing raising. However, accounting for the opacity of a stressed segment is quite simply problematic. Even if positing filters were desirable, we could not posit the filter *[+stress, +hi] because BP

clearly allows stressed [+hi] vowels (see (11) 1, 4, 5, and 7). Also, because stress is a suprasegmental feature which is not present underlyingly, but which is admitted to a morpheme by way of predictable rules, we cannot follow the same line of argumentation that was given for the opacity of [+lo] vowels. For now, then, we will simply have to stipulate that target segments are necessarily [stress]. The [+hi] feature does not spread to a stressed segment.

This stipulation presents a problem for adjacent, identical vowels which are proposed to be underlyingly linked to the same segment. The challenge lies in explaining pairs where root vowels are the same in unstressed positions, but are different when one gets stress like in (12).

(12)   A   B

1. prupus-it-ár   'to propose'   propós-it-u   'proposal'
2. icunum-ía   'economy'   icónum-u   'economist
3. fosfor-ísmu[9] 'phosphorism'   fósfur-u   'match'

We will retain the assumption that the OCP links adjacent, identical vowels to the same segment underlyingly, since that is proposed to be a universal principle. What we propose, however, is that stress delinks a vowel from a multiply-linked segment, giving the stressed vowel an independent status on the skeletal tier. That will explain why like root vowels act in concert when unstressed (12A), but lose this property when one gets stressed (12B).

We may now give a final statement of the harmony rule as in (13).

(13) Final harmony rule: [+hi] spread

     trigger: [+hi] initial suffix vowel
     target: unstressed segment
     domain: noniterative, left-ward spread
     default: insert [-hi]

'economy'   'economist'
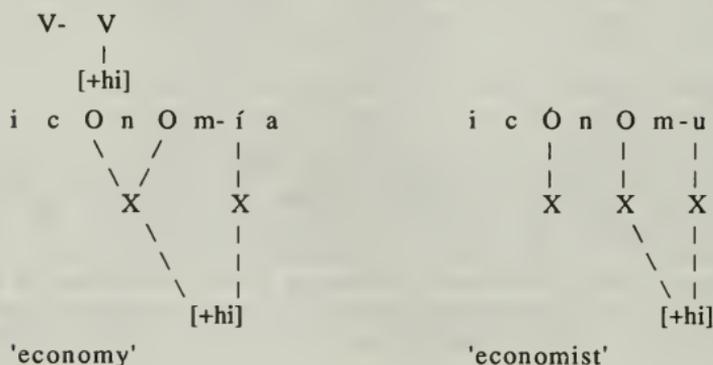
In any discussion of BP vowels, reference must be made to the feature [ATR]. As mentioned earlier, [ATR] is contrastive in stressed positions, and therefore must be present in some form underlyingly. However, the occurrence of [-ATR] is difficult to predict (Cunha 1976, Major 1985, Pizzini 1982, Wetzels 1988). Harris (1974) discussed the verb paradigm and suggested that root vowels that are underlyingly [ɛ] and [ɔ] undergo a combination of rules (like harmony, lowering, and neutralization) in the course of derivation to exhibit surface forms which are [e] and [o] in unstressed positions and [ɛ] and [ɔ] in certain stressed positions, depending on the theme vowel and the verb tense/number/person. Pizzini (1982) and Wetzels (1988) have also discussed these open and closed vowels and have concluded that, aside from a metaphony rule which produces sets like [nóv-u] 'new-masc. sing.', [nɔ́v-a] 'new-fem. sing.', [nɔv-us] 'new-masc. plur.', [nɔ́v-as] 'new-fem. plur.' and [ispant-ózu] 'scary-masc. sing.', [ispant-ɔ́za] 'scary-fem. sing.', [ispant-ɔ́zus] 'scary-masc. plur.', [ispant-ɔ́zas] 'scary-fem. plur.', some morphemes have the [-ATR] specification underlyingly. Wetzels (1988) presents the most comprehensive analysis to date and thus will be the one adopted here. The following presentation of the feature [ATR] in BP will show that this feature does not affect vowel raising, rather it is the quality of stress which disqualifies a segment from the harmony process.

Wetzels, in following similar analyses by Pulleyblank (1986, 1988), Vago (1988), and others, proposes that the feature [ATR] is not a quality of a segment, rather it is a quality of a morpheme. That is, the feature [ATR] has been extracted out of the underlying representation of features and defined as a floating segment in a morpheme. Because [ATR] is contrastive in BP, there are two types of morphemes as represented in (14).

(14) A.   [-ATR]   B.   [+ATR]

μ(   )μ   μ(   )μ

The floating feature is not associated to the morpheme in the underlying representation. Because [-ATR] only appears in a stressed syllable, stress assignment occurs before association of the floating feature. After stress has been assigned, the feature gets associated to the stressed vowel by what Wetzels calls 'floating-feature-to-stress-linking', a rule which he proposes to be part of Universal Grammar (1988:20). Vocalic segments which do not get associated with this floating feature will receive the unmarked default value of [+ATR].

This analysis suggests that root vowels can be underlyingly identical for the features on the dorsal tier. However, when stress is

assigned, the stressed vowel will delink from any segment it shares with another vowel and will relink as an independent segment on the skeletal tier. The floating [ATR] feature gets associated, making the segment either [+ATR] or [-ATR]. However, it is not clear that the floating feature association is ordered with respect to vowel harmony, since it has been shown that [+hi] will not spread to a stressed domain. For the purposes of this analysis, then, there is no ordering constraint between floating feature association and vowel harmony. The examples in (15) and (16) illustrate the phonological derivation of relevant words.

(15)   [-ATR]   [-ATR]

UR   fOsfOr-u   fOsfOr-icu
           \ / | \ / | |
            X   X   X   X X
                | | |
              [+hi]   [+hi][+hi]

Stress   [-ATR]   [-ATR]
assign.
           fÓsfOr-u   fOsfÓr-icu
           \ / | | | | |
            X   X   X X XX
                | | |
              [+hi]   [+hi][+hi]

feature   [-ATR]   [-ATR]
assoc./   / |
vowel   fÓsfOr-u   fOsfÓr-icu
harmony | | | | | | |
           X X X   X X X X
               \ | | |
                \| | |
              [+hi]   [+hi][+hi]

Default   fɔ́sfur-u   fosfɔ́r-icu
rule | | | | | | |
           X X X   X X X X
           | | | | | | \
        [-hi][+hi][+hi]   [-hi][-hi][+hi][+hi]

           'match'   'phosphoric'

(16)

```
              [-ATR]                        [-ATR]
UR            prOpOs-it-u                   prOpOs-it-ar
                \ /  |  |                      \ /  |  |
                 X   X  X                       X   X  X
                     |  |                           |  |
                  [+hi][+hi]                     [+hi][+lo]

Stress        [-ATR]                        [-ATR]
assign.
              prOpÓs-it-u                   prOpOs- it- ár
               |  |  |  |                      \ /   |  |
               X  X  X  X                       X    X  X
                     |  |                            |  |
                  [+hi][+hi]                     [+hi][+lo]

feature       [-ATR]                        [-ATR]
assoc./            \
vowel         prOpÓs-it-u                   prOpOs-it-ár
harmony        |  |  |  |                      \ /  |  |
               X  X  X X                        X   X  X
                     |  |                         \  |  |
                  [+hi][+hi]                       \ |  |
                                                 [+hi][+lo]

Default
rule          propós- it- u                 prupus-it-ár
               |  |   |   |                     \ /  |  |
               X  X   X   X                      X   X  X
               |  |   |   |                      |   |  \
            [-hi][-hi][+hi][+hi]              [+hi][+hi][+lo]

               'proposal'                      'to propose'
```

By analyzing the feature [ATR] as a quality of a morpheme rather than of a segment, we represent its lack of effect on the vowel harmony process. What does affect vowel harmony is stress, which delinks any vowel underlyingly linked to a multiply-linked segment (OCP). The association of the floating feature is to the stressed segment, which is not a target to vowel harmony anyway. In short, due to the lack of interaction between the feature [ATR] with the feature [+hi], we conclude that there is no evidence that the feature [ATR] affects the vowel harmony process.

5.   Evidence for the cyclic/noncyclic distinction

Not all suffixes which begin with a [+hi] vowel trigger the harmony process. Examples in (17) show roots which undergo vowel harmony with some suffixes, but not with others.

(17)	1.	pu[k]-ínhu	'small-dim.'	poc-ísimu	'small-super.'
	2.	amur-zínhu	'love-dim.'	amor-os- i-dádi	'lovingness'
	3.	ofind-ídu	'offended'	ofens-ívu	'offensive'
	4.	fósfur-u	'match'	fosfor-ísmu	'phosphorism'
	5.	is[k]érd-u	'left'	is[k]erd-ísta	'leftist'

Preliminary analysis shows that roots like -ivo, -issimo, -i$_{adj.}$, and -ilho consistently do not trigger harmony, though they have a [+hi] initial vowel. This fact can be explained by recognizing a distinction between different types of derivational morphemes. The suffixes may differ either in boundary type as described in Chomsky and Halle 1968, or in cyclic vs. noncyclic application, as proposed in Kiparsky's 1982, 1985 Lexical Phonology, or generally in being triggers or nontriggers of vowel harmony. For the purpose of illustration, let us adopt a Lexical Phonology approach.

Kiparsky (1982, 1985) proposes that the lexicon is divided into strata on which specific kinds of morphemes can be affixed to a word. Within a stratum, phonological rules apply on the morphological input if the appropriate contexts are available. These rules are subject to the Strict Cycle Condition (SCC) which says that the domain of a rule is restricted to a word derived in the stratum in which the rule is contained. The rules are divided into cyclic, which are contained on one stratum, and noncyclic, which are on a different stratum. We suggest, then, that the vowel harmony rule is cyclic and is contained on the level where morphemes such as -imento, -inho, -it-, -ia are affixed. Suffixes which do not trigger vowel harmony are affixed on a stratum which does not contain the vowel harmony rule. The interesting point about the noncyclic affixes is that they do not change vowel feature specifications set in the previous stratum. The examples in (18 [next page]) will make this more clear. We assume that bracket erasure and tier conflation are the same processes.

Placing certain affixes on a separate cycle explains their inability to trigger vowel harmony. It also explains why [-ATR] segments sometimes DO appear in unstressed positions, such as the case in (18) where an adjective is made into an adverbial with the addition of the suffix -menti, which induces stress reassignment to penultimate position. Compound words, like [mestriskóla] 'school master', also have [-ATR] segments in unstressed positions, further suggesting that some phonological rules occur only at specific states of morphological derivation.

The details of the lexical organization of morphemes in strata are far from being clear and complete. Nevertheless, the preliminary evidence we have for both vowel harmony and [-ATR] distribution offers compelling reasons to pursue a more comprehensive analysis.

(18)	[-ATR]	[-ATR]
stratum 1	brEv-i	a-brEv-i-ar
stress assignment	brÉv-i	a-brEv-i-ár
floating feature assoc./vowel harmony	brév-i	a-briv-i-ár
default rules	brév-i	a-briv-i-ár
bracket erasure	brévi	abriviár
	'brief'	'to make brief'
statum 2	brévi-mEnti	
stress reassignment	brevi-mÉnti	
default rules	brevi-ménti	
bracket erasure	breviménti	
	'briefly'	

6. Conclusion

This paper has presented a principled explanation of a phonological process which was previously believed to be unpredictable, namely vowel height harmony in BP. The presentation of the data and rule formulation showed that the harmony process is wholly dependent on morphology, both in terms of triggering elements and in terms of domain constraints.   Transparent and opaque segments were accounted for within the theoretical approaches adopted in this analysis.   Unlike other harmony processes, [ATR] specification plays no role in height harmony in BP. What does play a major role in BP phonology is morphology.   The obscurity of the phonological process of height harmony lies in its interdependence on morphological affixation.   By recognizing this interdependence, we were able to show the systematicity of a process which was previously not understood.

NOTES

[1] This analysis does not attempt to provide an argument for either approach, that is a theoretical debate beyond the scope of the present discussion.   Rather this analysis attempts to bring forth evidence that certain phonological rules do not apply when certain suffixes are added onto a word, thereby suggesting that phonology and morphology interact during the derivation of a word.

[2] Most of the data have been compiled from the Dicionário da língua Portuguêsa of the Academia Nacional Brasileira (Nascentes 1961) for the sake of standardization.   Verb conjugations and unclear cases were checked with a consultant from Belo Horizonte.   It should be noted that there may be slight variation across dialects (Perrone and Ledford-Miller 1985) and across speech styles (Major 1985).

[3] This representation is taken from Archangeli (1988:193).   Her characterization however does not have both open [ɛ], [ɔ] and closed [e], [o] vowels.

[4] Vowels represented in upper case are vowels unspecified for height and, therefore, potential targets for the spread rule.

[5] That the initial [o] does not undergo vowel harmony is probably due to secondary stress relative to word length.   As is shown later in this paper, stressed segments are opaque to vowel harmony.   This is the only example counter to what is predicted. Subsequent analyses may want to further explore occurrences of initial vowel resilience to harmony in longer words.

[6] This account of transparent segments deviates from the proposal in Archangeli and Pulleyblank (1987) and Archangeli (1988) which says that the transparency effect is obtained from a segment's lack of specification of the spreading feature.   However, we cannot accept that proposal here since [+hi] is underlyingly present and is also transparent in BP.

[7] Alternate analyses for transparent and opaque segments in morphologically-conditioned   harmony   processes   were   also considered (cf. Cole 1987).

[8] That the [+lo] vowel remains unaffected by the spread rule differs from height harmony processes in other Romance languages and dialects.   In Pasiego Montañés, [+lo] vowels are transparent to [+hi] spread (McCarthy 1984).   In Lena Bable (of Asturias), [+lo] vowels are affected by [+hi] spread, becoming [-hi, -lo] (Hualde 1989), which is also the case for the Galician-Leonese dialect of Ancares (Fernández González 1981, cited in Hualde 1989).   In Tudanca Montañés, however, the [+lo] vowel remains unaffected by [+hi] spread.   Because these harmony processes differ in other ways, such as in the conditions on the triggering and target elements

(necessarily being stressed or unstressed), in the domain of feature spread (others exhibiting feature spread across several segments, whereas BP [+hi] spreads just once to the left), and in the spreading rule's interaction with the feature [ATR], we conclude that there is variation across related languages with respect to the nature of their [+hi] spreading rules; and the fact that [+lo] in BP is not affected by [+hi] spread is merely a case in point.

[9] According to what we have already presented, the two root vowels in this word should be [+hi]. However, the -ismo suffix does not appear to be a trigger in the harmony process. This will be discussed further in section 5.

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MORAIC PHONOLOGY AND /l/-IRREGULAR PREDICATES IN KOREAN*

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This paper reexamines the so-called /l/-irregular predicates in Korean in terms of moraic phonology. It has been asserted that /nal-ini/ 'because (it) flies' has two alternations, i.e. [na:ni] and [nallini]. In order to account for this, Kim-Renaud (1973) and Ahn (1985) postulated a double /ll/ in the underlying representation of the stem, i.e. /nall-/. On the other hand, Ahn (1988) asserted that the two types of surface forms are idiolectal variants derived from two different underlying representation of the same word.

In this paper, I claim that their assertions cannot be acceptable for several reasons. I show that [na:ni] and [nallini] are not alternants of one and the same word, but are two different words. The former, which means 'because (it) flies', is derived from /nal-ini/, while the latter, which means 'because (we) carry (it)', is derived from /nalɨ-ɨni/.

1. Introduction

The purpose of this paper is to reexamine the so-called /l/-irregular predicates in Korean. The behavior of the liquid is one of the most complicated aspects in Korean phonology. A verbstem-final /l/ behaves peculiarly before /ɨ/-initial suffix as shown in (1).

(1) (a) Consonant initial suffix: /u:l - ta/ → [u:lda]¹ 'cries'
　　　　　　　　　　　　　　　　　/u:l - ko/ → [u:lgo] 'cry and'
　　(b) /ə/-initial suffix:　　　/u:l - əto/ → [u:rədo]
　　　　　　　　　　　　　　　　　　　　　　　　'though crying'
　　(c) /ɨ/-initial suffix:　　　/u:l - ɨni/ → [u:rɨni] 'because
　　　　　　　　　　　　　　　　　　　　　　/ [u:ni] of crying'

In (1b) /l/ weakens to [r] intervocally, but it is optionally deleted when followed by /ɨ/-initial suffix as in (1c). This /l/-deletion is viewed as an instance of extreme weakening in the intervocalic position (Kim-Renaud 1974).

For /nal-ini/ 'because (it) flies', Kim-Renaud (1973) and Ahn (1985) asserted that it has two alternants, viz. [na:ni] and [nallini]. In order to account for this, they postulated a double /ll/ in the

underlying representation of the stem, i.e. /nall-/.   On the other hand, Ahn (1988) asserted that the two types of surface forms are derived from two different underlying representations of the same word.   Proposing that both /nal/ and /nall/ are correct underlying representations depending upon the speaker, he said that Speaker A with /nal/ would produce [nani], whereas Speaker B with /nall/ would produce [nallini].

This paper attempts to reconsider the problem in the framework of moraic phonology.   I show that Kim-Renaud's and Ahn's proposals cannot be accepted for several reasons.   Following Hyman (1985), Hock (1986), Hayes (1989) and Zec (1989), I also show that compared with the two theories mentioned above, the moraic theory gives a more natural account.   In section 2, Kim-Renaud (1973), Ahn (1985), and Ahn (1988) will be reviewed in detail.   In section 3, I will discuss the problem in the framework of moraic phonology.

2.   Previous analyses

Asserting that /nal-ini/ has two alternants, i.e. [na:ni] and [nallini], Kim-Renaud (1973) postulated a double /ll/ in the underlying representation of the stem as in (2).

(2) /nall - ini/ → [na:ni] / [nallini] 'because (it) flies'

In order to obtain a correct derivation, she proposed the following three rules.

(3) (a)   V   l   l   +   V
          1   2   3   4   5
          1   Ø   3   4   5
          [+long]

(b)   i → Ø   /   [..... Vl]Vb-stem [___ .....]Af
(c)   l → Ø   /   [..... V __]Vb-stem [{n, s, p, o}]Af

[na:ni], for instance, is derived as shown below.

(4) /nall - ini/
      na:l ini   (3a)
      na:l ni   (3b)
      na: ni   (3c)

But her analysis cannot be accepted.   To begin with, the vowel lengthening rule (3a), as Ahn (1985) noticed, does not work in some cases.   In (5), for instance, the deletion of /l/ is not followed by the lengthening of the preceding vowel /a/.

(5) /nall/ + /æ/ 'wing' [naræ], *[na:ræ]
              'device'

And more crucially, she overlooked the fact that [nallini] and [na:ni] are not alternants of the same word.   Rather, [nallini] 'because (we)

carry (it)' should be represented as /nalli-ini/ underlyingly, while [na:ni] 'because (it) flies' should be represented as /nal-ini/, which will be discussed in section 3.

Following Kim-Renaud (1973), Ahn (1985) also claimed that the alternants in (2) can be derived by positing a geminate /ll/ in the underlying representation of the stem. In the framework of lexical and CV phonology, Ahn (1985) derived the alternants as shown below.

```
(6) (a)      $           $   $
           / | \         | / \
          O  R  C       R O   R
          |  |  | \      | |   |         Stratum 4 inflection
          C  V  C C      V C   V
          |  |  | |      | |   |
          n  a  l l      i n   i
          C  V  C C      C     V
          |  |  | |      |     |         Intersonorant /i/-Deletion
          n  a  l l      n     i
          C  V  C        C     V
          |  |  |        |     |         Coda Cluster Simplification
          n  a  l        n     i         (simplification of CCC sequence)
          C  V  C        C     V
          |  | /         |     |         /l/-Deletion & association of /a/
          n  a           n     i         to the empty C
          [na:ni]

    (b)  C V  C C      V C V
         | |  | |      | | |             Stratum 4 inflection
         n a  l l      i n i
         ....................             Intersonorant /i/-Deletion
                                          (optional)
         C V  C   C V C V
         | |  |   | | | |                 Resyllabification
         n a  l   l i n i
         ....................             Coda Cluster Simplification
         [nallini]
```

In this way, he claims, the two alternants, [na:ni] and [nallini], can be explained correctly and the compensatory lengthening (henceforth, CL) in (6) can be given a natural account. As mentioned earlier, however, [na:ni] and [nallini] should be derived from two different words, a fact which will be discussed more fully farther below. Besides, in (6) CL allows the preceding vowel /a/ to lengthen, which gives an awkward representation of a long vowel as a vowel melody linked to VC rather than to VV (Hayes 1989). Finally, the Coda Cluster Simplification deletes C of the CCC sequence. Since this rule

applies only to coda consonant clusters and since Ahn posits the double /ll/ in the underlying representation of the stem, i.e. /nall-/, he cannot account for the following in which the underlying geminate /ll/ still undergoes degemination in spite of the fact that it does not meet the structural description of Coda Cluster Simplification.

(7) /nall-æ/   'wing'   [naræ],   *[nallæ]
    'device'

Under Ahn's analysis, the wrong output *[nallæ], not the correct output [naræ], would be derived.

A few years later, Ahn (1988) argued that [nani][2] and [nallini] 'because (it) flies' are idiolectal variants derived from two different underlying forms of the same word; i.e., the former is derived from /nal-ini/ and the latter from /nall-ini/. In order to derive the surface forms, he proposed the following two rules.

(8) (a) Intersonorant /i/-Deletion (optional)
        i → Ø / l]$_{V/A}$ ___ [+son, +cons]   (domain: inflection)
    (b) /l/-Deletion
        l → Ø / V ___]$_{V/A}$ {n, s}   (domain: inflection)

(9) shows how the rules in (8) derive both [nani] and [nallini].

(9) (a) Speaker A   (b) Speaker B
        C V C V C V   C V C C V C V
        | | | | | | | | | | | | | Inflection
        [[n a l] i n i]   [[n a l l] i n i] 'Since (it) flies'
        C V C C V
        | | | | |
        n a l n i   .... Intersonorant
        C V   C V   /i/-Deletion
        | | | |
        n a   n i   .... /l/-Deletion
        /\   /\   /|\ /\ /\
        C V   C V   C V C C V C V
        | | | | | | | | | | | Resyllabification
        n a   n i   n a l l i n i
        [nani]   [nallini]

However, Ahn's account is not acceptable. First, it is unnatural to say that alternants of one and the same word are derived from different underlying representations. In fact, as will be discussed later, [na:ni] and [nallini] mean 'because (it) flies' and 'because (we) carry (it)', respectively. Second, Ahn's formulation of Intersonorant /i/-Deletion wrongly predicts that /nall-ini/ in (9b) may optionally undergo the change, which would result in the same output as that in (9a).

In the following section, I will reexamine the problem in question in the framework of moraic theory (Hyman 1985, Hock 1986, Hayes 1989, Zec 1989).

3. Alternative analysis

In this section, moraic phonology is briefly reviewed before the problem in question is discussed.

A. Moraic phonology

Hyman (1985), Hock (1986), Hayes (1989) and Zec (1989) have proposed the mora as a unit in the prosodic tier. It has been asserted that the moraic structures of languages vary. A heavy syllable is assigned two moras, whereas a light syllable is assigned one. In languages with constrastive vowel length, long vowels have two moras, and short vowels one, as shown below (Hayes 1989).

$$(10) \quad (a) \quad \begin{matrix} \mu & \mu \\ \backslash & / \\ i & = /i:/ \end{matrix} \qquad (b) \begin{matrix} \mu \\ | \\ i & = /i/ \end{matrix}$$

Unlike vowels, short consonants do not bear any mora underlyingly as in (11a), while geminates bear one mora as in (11b).

$$(11) \quad (a) \quad n = /n/ \qquad (b) \begin{matrix} \mu \\ | \\ n & = /nn/ \end{matrix}$$

In order to account for languages whose closed syllables are heavy, Hayes (1989) proposed the rule of 'Weight by Position', which assigns certain coda consonants a mora in the process of syllabification, as shown in (12).

$$(12) \quad \text{Weight by Position}$$
$$\begin{matrix} \$ & & \$ \\ | & & | \ \backslash \\ \mu & \rightarrow & \mu \ \mu \qquad \text{where } \$ \text{ dominates only } \mu. \\ | & & | \ | \\ a \ \beta & & a \ \beta \end{matrix}$$

In addition, no mora is assigned to an underlying glide at all.

$$(13) \quad i \quad = \quad /y/$$

B. /l/-irregular verbs in moraic phonology

In this section, I will show that the proposals reviewed in section 2 cannot be accepted for reasons beyond those mentioned earlier. Some other examples relevant to the problem in question are given in (14).

(14) (a) [nal-ta]   'to fly'
          [narasə], [narini]   / [na:ni], *[nallasə], *[nallini]
     (a') [nari-ta]   'to carry'
          [nallasə], [nallini]   / [narini], *[na:ni], *[narasə]
     (b) [kil-ta]   'to be long'
          [kirəsə], [kirini]   / [ki:ni], *[killəsə], *[killini]
     (b') [kiri-ta]   'to breed'
          [killəsə], [killini]   / [kirini], *[ki:ni], *[kirəsə]
     (c) [mal-ta]   'to roll up'
          [marasə], [marini]   / [ma:ni], *[mallasə], *[mallini]
     (c') [mari-ta]   'to dry'
          [mallasə], [mallini]   / [marini], *[ma:ni], *[marasə]
     (d) [kkɨl-ta]   'to pull'
          [kkɨrəsə], [kkɨrini]   / [kki:ni], *[kkɨlləsə], *[kkɨllini]
     (d') [kkɨri-ta]   'to unpack'
          [kkɨrəsə], [kkɨllini]   / [kkɨrini], *[kkɨlləsə], *[kkɨllini]

The verb stems in (14a, b, c, d) end with /l/, i.e. /nal-/, /kil-/, /mal-/, and /kkɨl-/, while those in (14a', b', c', d') end in vowel /i/, i.e. /nali-/, /kili-/, /mali-/, and /kkɨli-/. For convenience of exposition, I will call the first class of verbs /nal-/ type and the second /nalli-/ type.

Verbs of the /nal-/ type work differently from those of the /nalli-/ type. First, the former allow only one /l/ in their alternations as in [kirəsə] and no geminate /ll/ as in *[killəsə] in (14b), whereas the latter have geminate /ll/ when they are followed by suffixes beginning with a vowel as in [killəsə] in (14b'). Second, verbs of the /nal-/ type optionally undergo CL (for example, /kkɨl-ini/ → /kkɨl-ni/ (Intersonorant /i/-Deletion) → [kki:ni] (/l/-Deletion and CL)), but those of the /nalli-/ type do not (i.e., *[kki:ni]). The verb stems underlying (14a) and (14a') are thus phonologically entirely distinct. Moreover, as the glosses show, they also have entirely different meanings. We can therefore conclude that [nallini] and [na:ni] are not alternants of the same word but are different phonetic forms of different words. [nallini] has the meaning 'because (we) carry (it)', whereas [na:ni] means 'because (it) flies'. Therefore, neither the assertion that /nal-ini/ 'because (it) flies' has the two alternants, [na:ni] and [nallini] nor the assertion that [na:ni] and [nallini] are idiolectal variants derived from two different underlying forms of the same word and meaning is correct.

Now let us turn to an account in terms of moraic theory. To begin with, consider the alternations in (14a, b, c, d). In order to account for them, I will posit only one /l/ in their stem underlyingly. The stem of the verb in (14c), for instance, is underlyingly represented as follows.

```
(15)  /mal-/
         $
        /|\
       / μ μ
      /  | |
     m   a l -
```

(16) shows how the two alternants in (14c) are derived.

```
(16)  (a)  [marini]          'because (we) roll (it) up'
             $     $    $
            /|\    |   /|
           / μ μ   μ  / μ  →  .......... (Intersorant  /i/-Deletion
          /  | |   |  / |                (optional))
         m   a l - i  n  i
```

surface: [marini]

```
      (b)  [ma:ni]                'because (we) roll (it) up'
             $     $    $              $     $
            /|\    |   /|            /|\    /|
           / μ μ   μ  / μ  →        / μ μ  / μ    (Intersonorant
          /  | |   |  / |          /  | | / |      /i/-Deletion)
         m   a l - i n  i         m  a l n  i
```

```
              $      $                            $        $
             /|\    /|                           /|\      /|
     →      / μ μ  / μ   (/l/-Deletion) →       / μ μ    / μ    (CL)
            /  |   / |                          /  |/    / |
           m   a   n  i                        m   a    n  i
```

surface: [ma:ni]

Intersonorant /i/-Deletion, /l/-Deletion and CL in (16) can be formulated as in (17a, b, c), respectively.

```
(17) (a)  Intersonorant /i/-Deletion (optional)
                                $
           μ          μ         |
           |          |         |
           l ]V/A  -  Ø    [+son, +cons]
     (b)  /l/-Deletion
                       $
           μ           |
           |           |
           Ø ]V/A    {s, n}
```

(c) Compensatory Lengthening (CL)

```
%    μ       μ
      \     /
       \   /
        \ /
         V
```

Rule (17a) says that the suffix-initial /i/ is deleted between stem-final /l/ and [+son] consonants.   And when a stem-final /l/ is followed by an affix-initial /s/ or /n/, it is deleted obligatorily by (17b) (e.g., /til-se/ → [tise] 'let's eat', /həl-ni/ → [həni] '(Do you) destroy (it)?').   Unlike CV theory, moraic theory derives the alternations in (14c) without producing an awkward representation in which a vowel is linked to a C slot, as shown above.

For the verbs in (14a', b', c', d'), a double /ll/ is posited in their underlying representations.   Compared with /mal-/ in (15), for example, the underlying representation of /malli-/ is given in (18).

(18)   /malli-/[3]   'to dry up'
```
         $        $
        /|\      /|
       / μ μ    / μ
      /  |  \/  |
      m  a  l   i   -
```

The two alternants in (14c'), [marini] and [mallini] 'because (it) dries', for instance, are derived as shown in (19a) and (19b), respectively.

(19) (a) [marini]
```
       $       $   $     $              $     $     $
      /|\     /|   |    /|             /|\   /|    /|
     / μ μ   / μ   μ   / μ    →       / μ μ / μ  / μ     (/i/-Deletion)
    /  |  \/  |    |  / |             /  | \/  | / |
    m   a  l  i -  i  n  i            m  a  l  i-n  i

       →   ............   (Intersonorant /i/-Deletion)

                $       $        $
               /|      /|       /|
       →      / μ     / μ      / μ     (/l/-Degemination (optional))
              / |    / |  -   / |
             m  a   l  i     n  i
             [marini]
```

(b) [mallini]

$$
\begin{array}{ccccccc}
\$ & \$ & \$ & \$ & \$ & \$ & \$ \\
/|\backslash & /| & | & /| & /|\backslash & /| & /| \\
/\ \mu\,\mu & /\ \mu & \mu & /\ \mu & /\ \mu\,\mu & /\ \mu & /\ \mu \\
/\ |\ \backslash/ & | & |\ / & | & /\ |\ \backslash/ & |\ / & | \\
m\ a\ l & i\ - & i\ n & i & m\ a\ l & i\ -\ n & i
\end{array}
$$

/i/-Deletion

→ ....   (Intersonorant /i/-Deletion)

→ ....   (/l/-Degemination (optional))

[mallini]

In (19), the vowel /i/ deletes when it is adjacent to another vowel. But there is no CL. This /i/-deletion phenomenon can be expressed in the following way.

(20) /i/-Deletion (obligatory)

$$
\begin{array}{c}
\mu \qquad\qquad \mu \\
| \quad \to \ \varnothing \quad \% \ | \\
i \qquad\qquad [\text{-cons}]\ ]_{-N}\ -\ \underline{\quad}
\end{array}
$$

This rule says that /i/ obligatorily deletes with its mora either when followed by a suffix vowel or when preceded by a stem final vowel. '-N' here means that this rule does not apply to noun stems (cf. /ki-eykey/ → [kkieykey] *[key:key] 'to him', where no deletion applies). Some more examples are given below.

(21)   /ka-ini/   →   [kani]   *[ka:ni]   'because (I) go'
       /ssi-ə/   →   [ssə]   *[ssə:]   'to write'
       /ssi-ini/ →   [ssini]   *[ssi:ni] 'because (I) write (it)'

In (19), the Intersonorant /i/-Deletion (17a) cannot apply, because its structural description is not met, which is predicted by the following constraint proposed by Hayes (1986).

(22) Linking Constraint:
        Association lines in structural descriptions are
        interpreted as exhaustive.

The linking constraint above says that if structures have more association lines than the rule requires, then these structures will not meet the structural description of the rule, for association lines are interpreted as exhaustive.   Since the geminate /l/ in (19) is represented as linked to two different prosodic tiers (i.e., 'μ' and '$') rather than one (i.e., 'μ') required by the Intersonorant /i/-Deletion, the structural description of the Intersonorant /i/-Deletion is not met here.   And the geminate /ll/ in (19a) optionally undergoes the /l/-Degemination rule.   This rule can be formulated as follows.

(23)   /l/-Degemination (optional)

$$
\begin{array}{c}
\$ \\
\varnothing \quad / \\
\backslash \quad / \\
\backslash \, / \\
l
\end{array}
$$

In (23), the geminate liquid /l/ loses its mora by degemination.

Finally, let us turn our attention to the data below, which appear initially to be baffling.

(24)   (a) [ili-ta]   'to arrive'
           [irini], [irəsə], *[i:ni], *[illini], *[illəsə]
       (b) [ttali-ta]   'to follow'
           [ttarini], [ttarasə], *[tta:ni], *[ttallini], *[ttallasə]
       (c) [chili-ta]   'to pay'
           [chirini], [chirəsə], *[chi:ni], *[chillini], *[chilləsə]
       (d) [phuli-ta]   'to be green'
           [phurini], [phurəsə], *[phu:ni], *[phullini], *[phulləsə]

The verbs in (24) seem to be members of the /nalli-/ type above. This, however, is not correct, for they cannot have alternations such as *[illini], *[ttallini], *[chillini], *[phullini], which ought to be possible in verbs of the /nalli-/ type. Since they do not have alternations such as *[i:ni], *[tta:ni], *[chi:ni], *[phu:ni], they do not belong to the /nal-/ type, either. In order to account for the alternations in (24), I will assume that they have an underlying structure which is different both from that of the /nalli-/ type and from that of the /nal-/ type in that unlike the /nalli-/ type their stems have no double /ll/ in underlying representations and unlike the /nal-/ type the stem ends in /i/. /ili-/, for example, is underlyingly represented as the follows.

(25)   /ili- /   'to arrive'
       $$
       \begin{array}{c}
       \$ \quad\quad \$ \\
       |\quad\quad /\,| \\
       \mu \quad /\,\mu \\
       |\quad /\,| \\
       i \quad l \quad i \; -
       \end{array}
       $$

Example (26) shows how [irini] is derived.

(26)   /ili-ini/   'because (we) arrive at'

$$
\begin{array}{ccccccc}
\$ & \$ & \$ & \$ & \$ & \$ & \$ \\
| & /\,| & | & /\,| & & /\,| & \\
\mu & /\,\mu & \mu & /\,\mu \;\rightarrow & \mu & /\,\mu & /\,\mu \quad (/i/\text{-Deletion}) \\
| & /\,| & | & /\,| & | & /\,| & /\,| \\
i\;l & i\;- & i\;n & i & i\;l & i\,-n & i
\end{array}
$$

         → ....   (Intersonorant /i/-Deletion)
         → ....   (/l/-Degemination)
       [irini]

Since the conditions further applications are not met, neither Inter-sonorant /i/-Deletion nor Degemination applies above.   By positing underlying representations as in (25), we can predict all alternations in (24).

4. CONCLUSION

I have discussed /l/-irregular verbs in Korean in terms of moraic theory.   I have shown that compared with both the linear theory and the CV theory, the moraic theory accounts for the phenomena in a more natural way.

In Section 2, previous analyses of /l/-irregular verbs, viz. Kim-Renaud (1973), Ahn (1985), and Ahn (1988), have been reviewed.   I have shown that the underlying forms posited by them cannot be accepted for several reasons.   First, [na:ni] and [nallini] are not derived from the same underlying form but are different words; i.e., [na:ni] 'because (it) flies' is derived from /nal-ini/, while [nallini] 'because (we) carry (it)' is derived from /nalli-ini/.   Finally, [irini] 'because (we) arrive' is derived from the underlying representation /iri-ini/, which has a stem-final vowel /i/ but no geminate liquid.

NOTES

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[1] The non-tense noncontinuant obstruents become voiced between voiced segments (e.g., /kut-ini/ → [kudini] 'as it hardens').

[2] In contradistinction to Ahn 1985, Ahn 1988 assumes that /l/-deletion does not feed CL and accordingly derives [nani], not [na:ni].

[3] (18) is the representation after syllabification applies.   In the process of syllabification an underlying geminate (one mora) con-sonant is syllabified both onto the onset position of the following syllable by the onset formation rule and onto the coda position of the preceding syllable by the coda formation rule (Hayes 1989).

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CORONAL: TRANSPARENT OR OPAQUE?[*]

Yongsoon Kang

It has been claimed that coronals in Korean are opaque in that they block application of the umlaut rule, contrary to the prediction of underspecification theory that coronals are transparent because of their lack of a class or feature node under the place node in feature geometry. Reanalyzing the data within the framework of Dependency Phonology, I claim that this opacity can be ascribed to the Linking Constraint and the Adjacency Condition and that this account is not possible within the framework of underspecification theory and feature geometry.

1.   Introduction

It has been assumed in underspecification theory (UT) that coronal consonants are the most underspecified universally. In feature geometry (FG), this is represented as absence of the coronal node (Avery & Rice 1989) or place node (Paradis & Prunet 1989). In Korean, coronals are also regarded as the most unmarked and underspecified segments (Sohn 1987, Kim 1987) and represented as totally unspecified phonologically both in UT and in FG, with no nodes under the place node. Absence of the coronal or place node for coronals has been justified by such phonological processes as neutralization (Sohn 1987, Kim 1987), epenthesis (Iverson 1989), and transparency of coronals (Paradis & Prunet 1989).

In this paper I argue against the idea that the representation of coronals in the underlying structure lacks the coronal or place node, on the basis of the umlaut phenomena in Korean in which coronal consonants are opaque with regard to feature spreading. In section 2, the problem of the representation will be discussed, in section 3 I will present the representation of Korean segments in terms of Dependency Phonology (DP) (Anderson & Ewen 1987), and in the final section I will suggest an analysis within the framework of DP. Since it is assumed that phonological processes are best explained through focus on the representational component rather than on the rule component (Archangeli 1984, Avery & Rice 1989), it would be natural to evaluate the representational system with respect to the phonological process it predicts.

2.   The representation of coronals

The representation of coronals in Korean has been suggested as follows in the literature of underspecification and FG.

(1) a. / t / (Sohn 1987)   b. / t / (Kim 1987)

```
        x                   x
        |                   |                   R:Root
       [   ]                R                   L:Laryngeal
                           / \                  SL:Supra-
                          L   SL                   laryngeal
                         / \                    M:Manner
                        M   P                   P:Place
```

Sohn follows the FG account of Clements (1985) even though she makes use of this only for neutralization in Korean, while Kim adopts Sagey's account (1986). All the absent features are filled in by universal default and complementary rules of the language. The representation of coronals is justified by phonological rules like neutralization, (which is characterized as the delinking of primary or secondary place features), and consonantal assimilation, (in which coronals assimilate to the following consonant but not vice versa). Since the representation of Sohn is not specific for hierarchical structure, I will follow Kim's in this paper.

In other works, similar representations of coronals has been suggested; cf. (2).

(2) a.   Avery & Rice 1989   b.   Paradis & Prunet 1989

```
        / t /                        / t /
         o      Root                  x
        / |                           |
       o  |     Laryngeal            RN     RN:Root Node
          |                           |
          o      Supralaryngeal     [+cons]
          |
          o      Place
```

As we see above, the internal structure of coronals is characterized by the absence of nodes under the place or root node. Avery and Rice (1989:183) claim that if the secondary content node is the only distinguishing feature between two segments, then the primary feature is activated for the segments distinguished. This is called the Node Activation Convention (NAC). Thus the coronal node is activated only if there is a secondary content node which differentiates the coronal segments. NAC does not apply to Korean because there is no secondary content node under the coronal node. The representation of coronals by Paradis and Prunet is supported by the transparency of coronals in Fula, Guere, and Mau. In those languages, only

coronals are found to be transparent for feature spreading. This can be explained by the above representation: Since they do not have any nodes or features under the place node, they cannot block the spreading of a feature.

The same behavior is predicted for Korean coronals because their representation is the same. Therefore, we should expect that coronals are transparent to the spreading of features. However, the opposite is true for Korean.

In Korean, the following regressive assimilation of vowels before the high vowel /i/ is found. We will call this rule, which is optional, umlaut.

(3) a. / a /   →   / æ /
    /caphita/   →   [cæpʰida]   'to be caught'
    /makhita/   →   [mækʰida]   'to be obstructed'
    /kamkita/   →   [kæmgida]   'to be shut'
    /k'ak'ita/   →   [k'æk'ida]   'to be cut'
    /namkita/   →   [næmgida]   'to leave (sth.)'
    /ankita/   →   [æŋgida]   'to be embraced'
    /api/   →   [æbi]   'father'
    /nampi/   →   [næmbi]   'pan'
    /kalaŋi/   →   [karæŋi]   'crotch'
    /kacami/   →   [kajæmi]   'flatfish'
    /kompʰaŋi/   →   [kompʰæŋi]   'fungus'

    b. / ə /   →   / e /
    /məki/   →   [megi]   'food'
    /məkhita/   →   [mekʰida]   'to be eaten'
    /pəskita/   →   [pek'ida]   'to undress'
    /əmi/   →   [emi]   'mother'

This phonological process can be characterized as the fronting of the back vowels before the following front vowel /i/. However, if a coronal consonant intervenes, umlaut does not take place, as is seen in the following.

(4)
    /palphita/   →   *[pælpʰida]   'to be trodden'
    /allita/   →   *[ællida]   'to let (them) know'
    /palkhita/   →   *[pælkʰida]   'to uncover'
    /mallita/   →   *[mællida]   'stop (s.b.)'
    /mati/   →   *[mæji]   'the first child'
    /katʰi/   →   *[kæcʰi]   'together'
    /pəllita/   →   *[pellida]   'to stretch'
    /əpsi/   →   *[eps'i]   'without'
    /məlli/   →   *[melli]   'far away'

According to UT, umlaut can be represented as the spreading of [-back] to the preceding vowel because the high front vowel /i/ has only the feature [-back] in the underlying representation; cf. (5).

(5)
```
              V         /i/

              x          x
              |          |
              R          R
            / \        / \
          L   SL     L   SL
             / \        / \
           M   P      M   P
           |          |
            dor        dor       dor:dorsal
             \............ |
                      \ |
                   [-back]
```

The underlying representation of coronals in UT and FG cannot block the spreading of the feature [-back] to the preceding vowels, since as we have seen above, no class nodes exist underlyingly under the place node. On the other hand, labials and dorsals are represented as having class nodes such as [labial] and [dorsal] under the place node according to Sagey's framework. Since the spreading of the feature [-back] can be assumed to be blocked only by the feature node under the dorsal node, labials and dorsals don't prevent the umlaut from applying here. Then a problem remains how to explain the opaqueness of coronals in umlaut in Korean.

Before suggesting my analysis, it would be in order to introduce the representational system of DP, which will be used in my analysis.

3. The representation of Korean segments in DP

In the previous section, we have seen a representational problem of UT and FG in accounting for umlaut in Korean. In this section, I will introduce the representation of Korean segments in terms of Dependency Phonology (Anderson & Ewen 1987).

One of the characteristics of DP lies in the idea that a dependency relation between head (governor) and modifier (dependent) is found in every module of grammar. Thus the internal structure of a segment is represented as a dependency relation between components which are atoms for representing internal structure of a segment. A segment consists of two major gestures, articulatory and categorial, and they are connected by an association line.

Categorial gestures are made up of two components, |V| (Vocalic) and |C| (Consonantal), and all the categories needed for Korean are

represented by the dependency relation between them, as given below.[1]

(6)   V   V   V   V:C   C
                      | |
                     V:C   C
         vowel   liquid   nasal   fricative   stop

For the representation of Korean obstruents, we need one more categorial component |O| (Opening glottis). Three different series of Korean obstruents (i.e., lax, tense, and aspirated) are then expressed in the following way (see Anderson & Ewen 1987 for details).

(7)   lax   tense   aspirated
         |C|:|O| |C| |O|
                          | |
                         |O| |C|

In articulatory gestures, there are four components. They are |i| (frontness), |a| (sonority), |u| (roundness), and |l| (linguality). These components combine to represent articulatory gestures of vowels and consonants. We should note here that vowels and consonants can share the same components in articulatory gestures, a fact which will turn out to be crucial in representing the consonant and vowel interaction phenomena.

First, the articulatory gestures of Korean vowels can be represented as follows. (Following Sohn (1987), I will adopt an eight vowel system.)

(8)   (a)   /i/   /ɨ/   /u/
                  /e/
                           /ə/   /o/
                    /æ/
                           /a/

       (b)   {|i|}   {|i,u|}   {|u|}
               {|i;a|}
                         {|i,a,u|}   {|u,a|}
                  {|a;i|}
                         {|a|}

One of the characteristics of the Korean vowel system is its asymmetry between front and back vowels. While two vowels are found between /i/ and /a/, only one vowel /o/ occurs between /u/ and /a/.

The following is the inventory of consonants in Korean.

(9) Consonants in Korean

---

	labial	alveolar	palatoalveolar	velar
stops	p, p^h, p'	t, t^h, t'		k, k^h, k'
fricatives		s, s'		h
affricates			c, c^h, c'	
nasals	m	n		ŋ
lateral		l		

The articulatory gestures of consonants (i.e., places of articulation) are represented as follows.

(10)   labial   alveolar   palato-alveolar   velar
         {|u|}   {|l|}   {|l,i|}   {|l,u|}

Affricates are interpreted as a combination of stops and fricatives and represented as a dependency relation of the two, in which fricatives depend on stops.

(11)   {C}

         {|C:V|}

Finally, the velar fricative /h/ is represented as {O} lacking articulatory gestures. In DP, each segment consists of two major gestures. For instance the word *kæmi* 'ant' is represented as follows.

(12)   / k /   / æ /   / m /   / i /
         categorial   {C}:{O}   {|V|}   {|V;C|}   {|V|}
         gesture   :   :   :   :
                          :   :   :   :
         articulatory   {|l,u|}   {|a;i|}   {|u|}   {|i|}
         gesture

There is no dependency relation between gestures. They are connected by association lines generated by the Universal Association Convention.

4. Umlaut in Korean

In this section, I will show my analysis of umlaut in Korean in terms of the representational system of DP. It will turn out that the blocking effect of coronals can be attributed to the Linking Constraint (LC) (Hayes 1986) and the Adjacency Condition which restrict the

application of spreading and the number of gestures the spreading can pass.[2]

In DP, umlaut can be characterized as the spreading of the component |i|. If it spreads to {|a|} /a/, it becomes a dependent of |a| resulting in {|a;i|} /æ/. If the target of the spreading is {|i,a,u|} /ə/, |i| in the trigger strengthens the power of |i| in the target. As a result, |i| becomes a governor dominating either |a| or |u|. Since there is no segment represented as {|i;u|} in Korean, the result naturally would be {|i;a|} /e/. This rule only affects the preceding vowel and can be represented as follows in the DP framework.

(13)   Umlaut

         Categorial   {|V|} {|V|}
         gesture   : \ :
                              : \ :
         Articulatory   {a} {|i|}
         gesture

However, the spreading of |i| is blocked if there are coronals between trigger and target. In the following, I will analyze the data case by case to show why.

First of all, if a palatoalveolar consonant intervenes, umlaut does not take place. Following are some examples.

(14)   /kaci/   →   *[kæji]   'eggplant'
        /macʰi/   →   *[mæcʰi]   'as if'
        /kacʰi/   →   *[kæcʰi]   'value'
        /macimak/   →   *[mæjimak]   'the last'
        /apəci/   →   *[apeji]   'father'
        /kəci/   →   *[keji]   'beggar'

This case can be explained by the Obligatory Contour Principle (OCP) and the LC. By the OCP, the word /kaci/ can be represented as follows.

(15)   / k /   / a /   / c /   / i /
         {|C|}   {|V|}   {|C|}   {|V|}
          :   :   :\   /
          :   :   : \   /
          :   :   : \   /
        {|I,u|}   {|a|}   {|I|} {|i|}

LC prevents the rule (13) from applying to (15) for it requires the trigger to have only one association line to the categorial gesture.

This fact is not captured in underspecification and feature geometry in which umlaut is formalized as the spreading of the feature [-back], for the feature [-back] is used only for the character-

ization of vowels, not for underlying consonants, and thus there is no [-back] present in the underlying representation of consonants. Instead, palatoalveolars in Korean have a [-anterior] feature under the coronal node.   Thus we cannot get structures like (15) in which the palatoalveor consonant and vowel /i/ share the same component lil.

In DP, the articulatory components of consonants and vowels are not absolutely distinct and so we can see how OCP and LC can apply in this case.

The same effect can result when the preceding coronal consonant is palatalized before /i/.   In Korean, the alveolar consonants /t/ and /tʰ/ become /c/ and /cʰ/, respectively, before /i/.

(16)   /katʰ+i/   →   [kacʰi] *[kæcʰi] 'together'
        /patʰ+i/   →   [pacʰi] *[pæcʰi] 'field (Subj.)'
        /mat +i/   →   [maji] *[mæji] 'the eldest (child)'
                                        +: morpheme boundary

The palatalization rule can be formalized as follows in the framework of DP.

(17)   Palatalization
        {ICI} {IVI}
         : \ .. :
         :   \ :
        {III} {lil}

This rule is also characterized as the spreading of the same component lil, but to the preceding consonant not to the vowel.   Palatalization precedes umlaut since the palatalized consonant is more adjacent to the trigger.   The result of palatalization can be seen in (18).

(18)   / k /   / a /   /cʰ/   / i /
                 {IVI}   {ICI}   {IVI}
                  :   : \ .. :
                  :   :   \ :
                 {lal}   {III}   {lil}

Note however that the configuration in (18) which results from palatalization is of the same nature as that in (15) with underlying palatoalveolar.   As a consequence, here, too, LC prevents umlaut from applying, since the potential trigger lil is associated to two categorial components.

Again, this account is not possible under the framework of underspecification and feature geometry.   Some reasons for this are given below.

First, since alveolars in Korean would have [-back] by the redundancy rules, spreading of [-back] to the preceding alveolars does not lead to the correct result directly. Therefore, we cannot make use of Hayes's Linking Constraint.

Second, since alveolars in Korean, regarded as the most underspecified segments according to UT, have no class nodes under the place node, there is no landing site for the spreading feature [-back]. To overcome this, we might adopt the Node Generation Convention (Archangeli & Pulleyblank Forthcoming), which guarantees the missing intermediate class nodes needed for connecting the terminal features to the upper nodes. However, the notion of NGC is contrary to what Paradis and Prunet (1989) claim concerning the transparency property of coronals, for if we accept the NGC then all spreading features will land on the place node of coronals instead of passing through them.

The other frequently found coronal in this environment is the lateral. It also blocks the application of umlaut.

(19) /allita/ → *[ælλida] [alλida]   'to let (them) know'
      /sallita/ → *[sælλida] [salλida]   'to make (s.b.) alive'
      /callita/ → *[cælλida] [calλida]   'to be cut'
      /kəllita/ → *[kelλida] [kəlλida]   'to be caught'
      /pəllita/ → *[pelλida] [pəlλida]   'to split'

The examples in (19) are cases of Causative (or Passive) in Korean, in which the first verb stem is the head of the word. The phonological structure is shown in (20). Since the Causative (or Passive) morpheme -li appears only after lateral, it is considered total assimilation of the preceding consonant.

(20)   / a /   / l /   / l /   / i /
      {IVI}   {IV;V:Cl}   {IV;V:Cl}   {IVI}
        :   \   /   :
        :   \   /   :
      {lal}   {lll}   {lil}

In (20) the component lil spreads to the preceding coronal resulting in the palatalized lateral [λ], and this is a postlexical rule because [λ] is not a phoneme of Korean. Then the structure would be as follows.

(21)   / l /   / l /   / i /
       {IV;V:Cl}   {IV;V:Cl}   {IVI}
           \   /   \ ... :
            \   /   \   :
             {lll}   {lil}

Again in (21), the Linking Constraint prevents the spreading of the lil component to the preceding vowel.

There are some counterexamples to the assumption that intervening coronals block the application of umlaut.

(22)	/mati/	→	[mædi]	'knot'
	/pəlita/	→	[perida]	'to throw away'
	/cəlita/	→	[cerida]	'to be sore'
	/cʰalita/	→	[cʰærida]	'to prepare (food)'
	/talita/	→	[tærida]	'to iron'

The examples in (22) can be explained in the following way. They do not undergo the palatalization rule because the structural (morphological or phonological) conditions for the rule are not met. In the first case, palatalization does not occur since *mati* has no internal morpheme boundary. Therefore, the |i| component in the trigger cannot spread to the coronal consonant. As a consequence, it is free to spread to the preceding vowel.

The lateral consonant of the remaining examples cannot be palatalized because another phonological condition, requiring two consecutive laterals before /i/ (i.e., l →λ /l__i), is not met. Instead they are weakened to [r]. As a result, |i| can spread to the preceding vowel.

Finally, there are cases in which two different consonants intervene between the trigger and the target of umlaut. In this case, if one of them is coronal, umlaut does not take place.

(23) a.	/namkita/	→	[næŋgida]	'to leave (something)'
	/ankita/	→	[æŋgida]	'to be embraced'
b.	/canti/	→	*[cændi]	'grass'
	/pantispul/	→	*[pæntitp'ul]	'firefly'
	/caŋki/	→	*[cæŋki]	'oriental chess'
c.	/palphita/	→	*[pælpʰida]	'to be trodden'
	/salphita/	→	*[sælpʰida]	'to search into'
	/palkhita/	→	*[pælkʰida]	'to uncover'
	/əpsi/	→	*[epši]	'without'
d.	/capki/	→	*[cæpk'i]	'catching'
	/cappi/	→	*[cæpp'i]	'general cost'

First of all, it is necessary to explain why umlaut takes place in (23a) in spite of two intervening consonants. We should notice here that umlaut occurs after nasal place assimilation (n, m → ŋ). Thus the resulting structure is as follows.

(24)	{|V|}	{|V;C|}	{|C|}	{|V|}
	:	\	/	:
	:	\	/	:
	{|a|}		{|l,u|}	{|i|}

On the basis of (24), I suggest that the spreading of the |i| component cannot cross over two articulatory gestures. This is a kind of Adjacency Condition.

Since only one articulatory gesture is between trigger and target in (23a) = (24), there is no blocking of spreading |i|. However, umlaut is not possible in the examples of (23b) even though their structure looks the same as that of (24) except for the content of the articulatory gesture. This can be explained by the difference in the two structural descriptions. Notice that in (23a) place assimilation applied before umlaut, as a result of which the two consonants share the same articulatory gesture. In contrast, the phonological structure of (23b) is as follows.[3]

(25)   / a /   / n /   / t /   / i /

          {|V;C|}   {|C|}   {|V|}

          ⋮   ⋮   ⋮

          ⋮   ⋮   ⋮

          {|I|}   {|I|}   {|i|}

Here the Adjacency Condition prohibits the crossing of |i| over two articulatory gestures, thus blocking the spreading of |i|.

The last example in (23c) can be explained by s-palatalization -(s → š/__i). The component |i| palatalizes the coronal fricative yielding the surface form [əpši], with the palatoalveolar fricative. This, then, is another example of palatalization in which the LC prevents umlaut from taking place.

The rest of the examples can be explained as violations of the Adjacency Condition which prohibits crossing over two articulatory gestures. The structure of (23d) can be represented as the sharing of a categorial gesture as in (26).

(26)   / a /   / p /   / k /   / i /

          {|V|}   {|C|}   {|V|}

          ⋮   / \   ⋮

          ⋮   /   \   ⋮

          {|a|}   {|u|}   {|l,u|}   {|i|}

5. Conclusion

In this paper, I have argued against the idea that the underlying representation of coronals does not have any nodes or features under the place or coronal node, as was argued by many linguists who favor the theory of underspecification and feature geometry. My argument was based on umlaut in Korean in which only coronals block the application of the rule. I have shown that within the framework of Dependency Phonology, this can be attributed to the

Linking Constraint and the Adjacency Condition, which does not allow the spreading of a component to cross over two articulatory gestures.

NOTES

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[1] In DP, dependency relations are represented by the following conventions:

```
a : b   or   a <=> b        'a is equally preponderant with b'
a ; b   or   a              'a is preponderant over b'
             |
             b
a , b                       'combination of two components'
```

[2] Linking Constraint (Hayes 1986:331):

    Association lines in structural descriptions are
    interpreted as exhaustive.

[3] (25) violates the OCP since two consonants, /n/ and /t/, have the same articulatory gestures.   However, unless this is the correct underlying form, there is no way of explaining why [cændi] is not possible.

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PLURAL MARKER COPYING IN KOREAN

Han-Gyu Lee

When the subject of a Korean sentence is plural, the plural marker *-tul* can be freely suffixed (or copied) to the end of any constituent within the predicate. It is an interesting question whether or not such a freely-copied plural marker (CPM) is different from the inherent nominal plural marker (IPM). This paper takes the position that they are different and that CPM should be treated as an independent grammatical entity. To prove this, I demonstrate grammatical (morphological, syntactic, and semantic) differences between IPM and CPM. A syntactic and semantic analysis of CPM within the GPSG framework is developed, using the head feature TUL.

1. Introduction

Kuh (1986) states that when the subject of a Korean sentence is plural, the plural marker *-tul* can be suffixed to the end of any constituent within the predicate. This phenomenon is called 'Plural Marker Copying'. For the present study, I will refer to the copied plural marker as CPM, and the inherent plural marker, which has the same grammatical function as the English nominal plural morpheme *-s*, as IPM. In (1), whose subject *ai-tul* 'children' is plural, for example, the parentheses indicate possible positions that CPM can take.

(1) ai-**tul**-i   Tom-eykey-()   ppang-ul-()   manhi-()
     child-IPM-NM   to   bread-AC   a-lot
     cwuesseyo-().[1]
     gave
     'The children gave Tom a lot of bread.'

I will argue in this paper that although IPM and CPM have the same phonological form, they show different grammatical (morphological, syntactic, and semantic) behavior. Morphologically, their distributions are different with respect to other suffixes such as case markers and postpositions (§2.1); syntactically, CPM requires its controller to be plural, while IPM has no such a restriction (§2.2); and semantically, the CPM forces a sentence containing it to have a distributive interpretation (distributivity between a subject and its predicate), while the IPM does not (§2.3).

The purpose of this paper is to elucidate the grammatical prop-
erties of CPM and to provide an account for them within the Gazdar,
Klein, Pullum, & Sag (= GKPS) 1985 version of GPSG. To explain the
syntactic number agreement of CPM with its controller, I propose a
HEAD feature TUL which takes NP[PLU +] as its value, which is
introduced by the TUL INTRODUCING METARULE (TIM). The TIM
applies to a VP rewriting ID rule and licenses [AGR NP[+PLU]] on the
VP category so that the controller NP is required to be plural
according to the CAP. The distribution of the CPM is predicted in
accordance with the HEAD FEATURE CONSTRAINT (HFC) and the CONTROL
AGREEMENT PRINCIPLE (CAP (§3.1)). For the morphology of the CPM, I
will treat the grammatical information supplied by TUL as a
morphosyntactic feature, distributed by syntactic rules and
principles but realized as a suffix at the lexical level by a morpho-
logical rule (§3.1). For the semantics of CPM, I will treat the feature
TUL as a semantically potent feature and provide a semantic
interpretation for the distributive reading imposed by the CPM
(§3.2).

There are several important implications of this study. First,
contrary to the general view that CPM is just a copying of the IPM
occurring on the subject of the sentence, as implied by the trans-
formation-based notion 'Plural Marker Copying' (Kuh 1986, Youn
1990), the CPM is a grammatical entity different from the IPM so
that they should be treated distinctly in grammar: There are two
tul's in Korean, IPM and CPM. The present approach to CPM makes
better predictions than an approach where only one *tul* is recognized.

Second, the assumption that the CPM is required to agree with
its clause-mate plural-subject (Kuh 1986, Youn 1990) is abandoned
in this study (§§2.2, 3.1). There are problematic examples with an
object-control verb where the CPM is suffixed to a daughter of an
embedded VP and does not agree with a matrix subject, but with an
object of the matrix verb which is the semantic subject of the
embedded VP. So, instead of the term 'subject', I will use the term
'controller' as defined and used in GKPS 1985: ch. 5. The controller of
the CPM will be predicted by the CAP.

Third, as a result of the second implication, this study supports
the claim in GPSG that the CAP is one of the universal principles.
Even though Plural Marker Copying seems to be a hard-to-predict
agreement phenomenon in Korean in that the number-agreement is
between the CPM (which can attach to any daughter category of VP
such as NP, VP, S, AP, or PP) and its controller, it will be explained
through the independently-motivated CAP given in GKPS 1985
without any modification (§3.1). The work of Kuh (1986), who
proposes a special agreement mechanism for the Korean CPM, will be
critically reviewed in §3.4.

Fourth, this study supports the view that a syntactic phenomenon should be treated without recourse to pragmatic factors (Green 1981, 1982). Pragmatically, CPM has two functions, focus marking and indication of controller-plurality. As a controller-plurality indicator, CPM is used by Korean speakers to inform a hearer that he/she is talking about plural controller referents, observing Gricean conversation principles. This function is crucially related to two characteristic phenomena in Korean. First, the subject (a potential controller) of a sentence in Korean can be freely deleted even though the verb of the sentence does not carry any grammatical information by which the understood subject can be inferred. Second, nominal plural marking in Korean is optional although nominal a plural marker -*tul* exists, so that subject nouns not marked for number may be interpreted as either plural or singular. For these reasons, a Korean speaker uses CPM as a subject-plurality indicator to convey information on the number of the subject NP. And as a focus marker, CPM takes a position in a sentence that is related to new information. Take (1) for example: What position out of four possible ones CPM will take is determined only by conversational context, not by syntactic constraints. To predict such an occurrence of CPM, we could introduce a pragmatic feature [+FOCUS] into syntax and let the feature be instantiated on a syntactic category if a speaker thinks the constituent conveys new information and he/she is talking about more than one subject-referent. But this analysis raises a problem: To what extent are pragmatic factors treated in syntax? Until a satisfactory solution can be found for this problem, I consider it safer not to arbitrarily introduce pragmatic factors into syntax. So, following Green (1981, 1982), I will not consider such pragmatic factors in a syntactic account of the occurrence of CPM.

Finally, CPM as a phrasal suffix has scope (precisely speaking, scope in relation to its pragmatic interpretation associated with its focus function; see the previous paragraph) over the whole phrase it attaches to. On the other hand, it morphologically attaches to the last item of the phrase. This scope discrepancy between syntax and morphology is explained by treating the feature TUL as a morphosyntactic feature.

2.   Morphological, syntactic, and semantic properties of CPM

In this section, I shall discuss the morphological, syntactic, and semantic properties of CPM in comparison with those of IPM. The discussion will provide evidence for the claim that there are two *tul*'s in Korean: IPM and CPM.

2.1.   Morphological properties

IPM and CPM attach to different categories. IPM, as a nominal plural marker, combines only with a noun category (see (2)), while CPM can attach to any syntactic category (see (3)). *Tul* as an IPM pluralizes its preceding constituent as the nominal plural morpheme *-s* in English does, but CPM does not have this function.[2] We can distinguish CPM from IPM in (2)-(3) according to this function. If *tul* in (3a) is an IPM and (3a) means 'apples', then the expression is ungrammatical; for that meaning, *sakwa-tul* is used. Further, categories other than a noun cannot be pluralized (3b)-(3e). So all the underlined *tul*'s in (3) are CPMs.

(2)   haksayng-**tul**
        student   -IPM
        'students'

(3) a. sakwa han kay-lul-**tul**   (NP-CPM)
        apple-one-of   AC CPM
        'an apple'

   b.   ppali-**tul**   (AP-CPM)
        quickly-CPM
        'quickly'

   c.   Urbana-eyse-**tul**   (PP-CPM)
                       in-CPM
        'in Urbana'

   d.   chinkwu-tul-i   Tom-ul [cip-ey   ka-tolok]-**tul**
        friend-IPM-NM   AC house-to   go   CPM
        seltukhayyo.[3]   (VP-CPM)
        persuade
        'Tom's friends persuade him to go home.'

   e.   saram-tul-i [Tom-i   aphuta-ko]-**tul**] malhayyo (S-CPM)
        person-IPM-NM   NM   is-sick-COMP-CPM say
        'People say that Tom is sick.'

IPM and CPM exhibit different distributions in relation to other nominal suffixes. First, IPM precedes all other nominal suffixes such as case markers (4),[4] and postpositions (5).

(4) a. ku haksayng-**tul**-i/ul/uy   (IPM < CM)
        the student   -IPM-NM/AC/GEN
        'the students (NM)/the students (AC)/of the students'

   b.   *ku haksayng-i/ul/uy-**tul**
        the student   -NM/AC/GEN-IPM
        'the students/the students/of the students'

(5) a. ku   haksayng-**tul**-lopwute/eykey (IPM < P)
      the   student   -IPM-from/to
      'from/to the students'
   b. *ku haksayng-ulopwute/eykey-**tul**
      the student   -from/to -   IPM
      'from/to the students'

When *tul* comes after CM or P as seen in (4b) and (5b), those expressions do not have the same meaning as (4a) and (5a). So IPM always precedes other nominal suffixes.

Second, CPM is not in a precedence relation with nominative and accusative case markers; it may precede or follow them.

(6) a. mas-i/ul-**tul**   (NM/AC < CPM)[5]
      taste-NM/AC-CPM
      'taste'
   b. mas-**tul**-i/ul   (CPM < NM/AC)[6]
      taste-CPM-NM/AC
      'taste'

Third, CPM can not cooccur with the genitive case marker -*uy* (7a)-(7b), while IPM can (7d). If CPM cooccurs with -*uy*, (7a)-(7b) should be grammatical and have the same meaning as (7c) where no *tul* occurs, because CPM cannot pluralize its preceding constituent as explained in the discussion related to (2)-(3). But if *tul* in (7b) functions as an IPM so that (7b) has the meaning 'the students' book', (7b) becomes grammatical as shown in (7d).

(7) a. *ku haksayng-uy-**tul**   chayk
      the student-GEN-CPM   book
      'the student's book'
   b. *ku haksayng-**tul**-uy   chayk
      the student-CPM-GEN   book
      'the student's book'
   c. ku haksayng-uy chayk
      the student-GEN   book
      'the student's book'
   d. ku haksayng-**tul**-uy   chayk
      the student-IPM-GEN   book
      'the students' book'

Fourth, CPM comes after all postpositions.

(8) a. Urbana-eyse/pwute/kkaci-**tul**   (P < CPM)
      in/from/to-CPM
      'in/from/to Urbana'
   b. *Urbana-**tul**-eyse/pwute/kkaci
      CPM-in/from/to
      'in/from/to Urbana'

Last, IPM precedes CPM; this means that two *tul*'s can cooccur in one constituent. This precedence can be inferred transitively because IPM precedes postpositions which in turn precede CPM.[7]

(9) a. haksayng-tul-lopwute-tul   (IPM < P < CPM)
       student-IPM-from-CPM
       'from the students'

    b. chayk-tul-i/ul-tul   (IPM < CM < CPM)
       book-IPM-NM/AC-CPM
       'books'

    c. chayk-tul-tul-i/ul   (IPM < CPM < CM)
       book-IPM-CPM-NM/AC
       'books'

In sum, based on their morphological distributions, we can say that IPM and CPM are morphologically different and the transitive order between relevant suffixes is as in (10).[8]

(10) Stem # IPM # Postposition # CPM # CM (CM # CPM)

2.2. Syntactic properties

As predicted in (3), CPM as a suffix can attach to any major category. But its occurrence in a sentence is governed by syntactic restrictions which IPM does not obey. First, CPM requires its controller to be plural. The subject of a sentence is a potential controller in GKPS 1985. So when a subject is plural, CPM can occur (see (11)). However, when a subject is singular, the occurrence of CPM is not legitimate (see (12)).

(11) a. haksayng-tul-i yelsimhi-**tul** kongpwuhayyo.
     b. haksayng-tul-i yelsimhi   kongpwuhayyo-tul.
        student-IPM-NM hard -CPM   study   -CPM
        'The students study hard.'

(12) *Tom-i yelsimhi-**tul** kongpwuhayyo.
        NM   hard-CPM   study
        'Tom studies hard.'

For the case of object control verbs such as *seltukha-* 'persuade', the object of the verb controls the syntactic distribution of CPM occurring within the embedded VP. As illustrated in (13), the controller of CPM is an object of the object control verb *seltukha-* 'persuade', not its subject: 'children' in (13a) and 'Tom' in (13b). In 3.1, I will show that the syntactic distribution of CPM is predicted by the CAP independently motivated in GKPS 1985.

(13) a. Tom-i ai-tul-ul [cip-ey-**tul** ka-tolok] seltukhayyo.
  NM child-IPM-AC house-to-CPM go-comp persuade
  'Tom persuades the children to go home.'
   b. *ai-tul-i Tom-i [cip-ey-**tul** ka-tolok] seltukhayyo.
  child-IPM-NM AC house-to-CPM go-comp persuade
 'The children persuade Tom to go home.'

The second restriction that CPM satisfies is that it should be a clause-mate of its controller which is plural. When the matrix subject is plural and the embedded subject is singular, the occurrence of CPM in the embedded sentence is not permitted (see (14)); the opposite cases show the same results as seen in (15). When two sentences are conjoined and one of them has the plural subject and the other does not, CPM can not occur in the conjunct with the singular subject as seen in (16). In a word, the plural subject does not license the occurrence of CPM across the clause boundary. But IPM is not subject to these syntactic restrictions. As illustrated in (17), IPM occurs even when its clause-mate subject (controller) is singular.

(14) a *haksayng-tul-i [Tom-i manhi-**tul** aphuta-ko]$_S$ malhayyo.
   b. haksayng-tul-i [Tom-i manhi aphuta-ko]$_S$ malhayyo-**tul**.
  student-IPM-NM NM a-lot CPM is-sick-COMP say-CPM
  'The students say that Tom is very sick.'

(15) a *Tom-i [ai-tul-i ppali talinta-ko]$_S$ malhasseyo-**tul**.
   b. Tom-i [ai-tul-i ppali-**tul** talinta-ko]$_S$ malhaysseyo.
  NM child-IPM-NM quickly-CPM run-COMP say-CPM
  'Tom said that the children ran quickly.'

(16) a *ai-tul-i hakkyo-ey ka-ko Tom-i cayo-**tul**.
   b. ai-tul-i hakkyo-ey-**tul** ka-ko Tom-i cayo.
  child-IPM-NM school-to-CPM go-and NM sleep-CPM
  'The children go to school and Tom sleeps.'

(17) Tom-i ku haksayng-**tul**-ul ttayryessta.
  NM the student-IPM-AC h i t
  'Tom hit the students.'

The third restriction on the syntactic distribution of CPM is that CPM cannot attach to its clause-mate subject NP (18); CPM can occur right after any constituent other than the controller in the sentence where it occurs, if it satisfies the two above-mentioned restrictions. In other words, its syntactic distribution is restricted within VP (VP Domain Condition).[10] But IPM can occur on the controller as well as within VP, as seen in (14)-(16b) and (17).

(18) a. *haksayng-tul-i-tul hakkyo-ey kayo.
          student-IPM-NM-CPM school-to   go
          'The students go to school.'
     b. *Tom-i-tul hakkyo-ey kayo.
          NM-CPM school-to   go
          'Tom goes to school.'

Another syntactic difference between IPM and CPM is that IPM pluralizes the NP whose lexical head it attaches to, whereas CPM does not turn the constituent it attaches to into a plural. In GPSG, plurality is represented by the HEAD feature specification [+PLU], whose distribution is governed by the HFC. So the syntactic behavior of IPM is explained by employing the feature specification [+PLU], but that of CPM cannot. According to HFC, the plurality of IPM is percolated up to the NP whose lexical head it attaches to, and [+PLU] is a part of grammatical information that the NP contains, as seen in (19a).

(19) a.   NP [+PLU]   b.   *NP [+PLU]
           | |
          N1 [+PLU] |
         / \ |
        /   \   Tom-ul-tul [+PLU]
       AP   N1 [+PLU]   AC-CPM
       | |
       | N [+PLU]
       | |
     cohun chayk-tul [+PLU]
     good   book-IPM
     'good books'
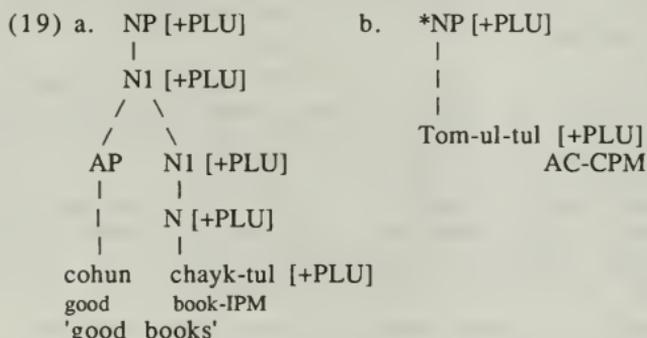
For CPM, however, plurality cannot be treated in the same way as that of IPM, because CPM does not pluralize its preceding constituent. According to the analysis in (19b) of CPM, Korean should allow the pluralization of proper nouns. Furthermore, plural forms of adverbs, postpositions, and verbs should exist in Korean, because CPM can be suffixed to any syntactic category. But this is not true. From the syntactic perspective, the plurality of CPM only shows that its clause-mate controller is plural. For this purpose, I propose a HEAD feature TUL which takes NP[+PLU] as its value. Then the expression *Tom-ul-tul* in (19b) is represented as in (20). The analysis of CPM with [TUL NP[+PLU]] will be provided in section 3.

(20)   NP [TUL NP[+PLU]]
          |
          |
         Tom-ul-tul [TUL NP[+PLU]]
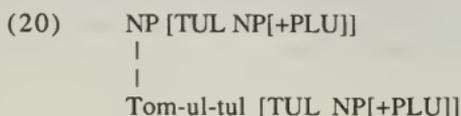
In sum, IPM and CPM show different syntactic behavior; CPM has the clause-mate plural-controller constraint and the VP-domain condition on its occurrence, whereas IPM does not have such constraints.   In addition, IPM pluralizes NP, but CPM does not pluralize its immediately preceding category.   On the basis of these differences, I claim that IPM and CPM should be treated distinctly and I proposed the head feature specification [TUL NP[+PLU]] for the analysis of CPM.

2.3.   Semantic properties

CPM forces the sentences where it occurs to have distributive readings; the distributive relation holds between the subject and its predicate.   But IPM does not have this function.   If each of the students bought a balloon, (21a) is true; that is, the number of students is equal to the number of balloons they bought.   But the sentence (21b), which has no CPM, is semantically ambiguous.   It has both a group reading that there is only one balloon such that the students bought it, and the distributive reading (21a) has.   To capture the contribution of CPM to the distributive reading, I will treat TUL as semantically potent in section 3, and provide its semantic interpretation.

> (21) a. haksayng-tul-i phwungsen hana-lul-tul sasseyo.
>   student-IPM-NM balloon   one-AC-CPM bought
>   'The students bought a balloon each.'
>   b. haksayng-tul-i phwungsen hana-lul sasseyo.
>   student-IPM-NM balloon   one-AC   bought
>   'The students bought a balloon.'

In section 2, I demonstrated the grammatical differences of IPM and CPM and showed why CPM and IPM should be treated distinctly. Based on this, we can conclude that CPM is a grammatical entity different from IPM; i.e., there are two *tul*'s in Korean.

3.   Syntactic and semantic analyses of CPM

In the previous section, I claimed on empirical grounds that there are two *tul*'s in Korean, IPM and CPM, which should be treated distinctly in the grammar.   In this section, syntactic and semantic analyses of CPM will be provided within the GPSG framework.   The syntactic distribution of CPM and its number-agreement with its clause-mate controller will be explained using the HFC, the CAP, a HEAD feature TUL which takes NP[+PLU]] as its value, and the TUL Introducing Metarule (TIM) (3.1).   Treating TUL as a morpho-syntactic feature, distributed by syntactic rules and principles such as the TIM and the HFC but realized as CPM by a morphological rule, I will show that it is possible to explain the scope mismatch between the syntax and morphology of CPM: as a phrasal suffix, CPM

morphologically attaches to the final item of a phrase. The syntactic scope of CPM is represented in terms of the inherited HEAD feature TUL. For the semantics of CPM, I treat TUL as a semantically potent feature and provide its semantic interpretation which assigns a distributive reading to the sentence containing CPM (3.2). I also discuss why I treat TUL as a head feature rather than as a FOOT feature (3.3). Finally, I critically review a previous analysis of CPM (Kuh 1986) in 3.4.

3.1. Syntactic analysis

The HEAD feature TUL proposed in 2.3 is introduced by the TUL Introducing Metarule (TIM), which constitutes a core part of my analysis.

(22) **TUL Introducing Metarule (TIM)**[11]
$$VP \rightarrow W, X$$
$$\Downarrow$$
$$VP[AGR\ NP[+PLU]] \rightarrow W, X[TUL\ NP[+PLU]]$$

This rule says that, for any ID rule that expands VP, there is another rule that permits VP[AGR NP[+PLU]] to dominate the daughters, one of which, including the lexical head daughter, has the feature specification [TUL NP[+PLU]]. This rule can capture the fact that CPM can combine with any major category within VP (see (3)), because the TIM permits [TUL NP[+PLU]] to appear on any daughter of VP. All the rules in (23)-(25) result from the application of TIM (22) to rules (26a), (26b), and (26c), respectively.

(23) a. VP[AGR NP[+PLU]] → NP[TUL NP[+PLU]], PP[eykey],
                                   AP[+ADV], V
     b. VP[AGR NP[+PLU]] → NP, PP[eykey, TUL NP[+PLU]],
                                     AP[+ADV], V
     c. VP[AGR NP[+PLU]] → NP, PP[eykey],
                                     AP[+ADV,TUL NP[+PLU]]], V
     d. VP[AGR NP[+PLU]] → NP, PP[eykey], AP[+ADV],
                                     V[TUL NP[+PLU]]
        ([eykey] = [PFORM eykey 'to'])

(24)   VP[AGR NP[+PLU]] → NP, S[TUL NP[+PLU]], V

(25)   VP[AGR NP[+PLU]] → NP, VP[TUL NP[+PLU]], V

(26) a. VP → NP, PP[eykey], AP[+ADV], V
     b. VP → NP, S, V
     c. VP → NP, VP, V

Furthermore, the TIM in conjunction with the CAP captures the clause-mate controller condition on CPM described in (2.2). The specification [AGR NP[+PLU]] on the VP in the output of TIM (22) requires the VP to take a plural controller because the CAP ensures

the number agreement illustrated in (27), since the plural subject NP is the controller of the VP.

(27)

```
                              S
          ┌───────────────────┴─────────────────────────┐
         NP     ←   CAP (i)   →   VP [AGR NP [+PLU] ]    (= (23c))
                          ┌────────────┼──────────┬────────┐
                      PP [eykey]       NP     AP [+ADV,     V
                         /\                     TUL NP
                        /  \                    [+ PLU] ]
```

a. haksayng-tul-i Tom-eykey ppang-ul manhi-tul cwuessta
    student-IPM-NM to   bread-AC much-CPM gave
b. *Sue-ka   Tom-eykey ppang-ul manhi-tul cwuessta
    NM   to   bread-AC much-CPM gave
a. 'The students gave a lot of bread to Tom.'
b. 'Sue gave a lot of bread to Tom.'
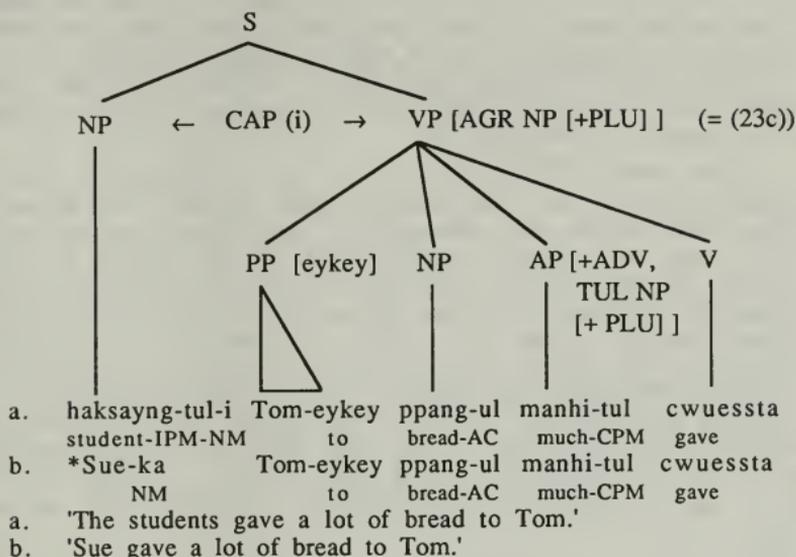
So if a sentence such as (27b) has a singular subject and CPM occurs, it violates the CAP. But (27a) is grammatical because its subject is plural and it satisfies the CAP.

The TIM also captures the 'VP-domain condition' on CPM discussed in (2.2), which says that CPM occurs only within the VP, by introducing [TUL NP[+PLU]] only to a daughter category of the VP.

But my analysis of CPM, in conjunction with the CAP, captures a more important fact. The plural subject condition on CPM proposed by Kuh (1986), that CPM occurs when a subject is plural, cannot predict the syntactic distribution of CPM correctly because, in the case of object-control verbs, CPM occurring within an embedded VP is not controlled by the subject, but by the object which is the semantic subject of the embedded VP, as illustrated in (13).

(13) a. Tom-i ai-tul-ul   [cip-ey-tul ka-tolok] seltukhayyo.
         NM child-IPM-AC   house-to-CPM go-comp   persuade
         'Tom persuades the children to go home.'
     b. *ai-tul-i   Tom-i [cip-ey-tul ka-tolok] seltukhayyo.
         child-IPM-NM AC   house-to-CPM go-comp   persuade
         'The children persuade Tom to go home.'

According to the plural-subject condition, (13a) should be ungrammatical and (13b) grammatical, contrary to fact. This shows that the controller of CPM is determined by the semantic type of a verb. Therefore, I will use the term 'controller' in the way defined by the notion 'control' in GKPS (1985:88). If one adopts the notion of control, the distribution of CPM will be predicted by the CAP. To show this, I will compare two cases of object-control and subject-control verbs, where CPM attaches to the embedded VP and where it occurs within the embedded VP.

First, when CPM occurs within the embedded VP, the TIM applies to the ID rule (26c) which expands that VP. The output rule of the TIM licenses the embedded VP local tree as shown in (28)-(29). And, as explained in GKPS 1985, in the case of the object-control verb, the embedded VP[AGR NP[+PLU]] agrees with its sister plural NP according to the first clause of the CAP (GKPS 1985:89), because that NP is the sister controller of the VP, as illustrated in (28), where the matrix verb is the object-control verb *seltukha-* 'persuade'. (Hereafter, the symbol # will be used for NP[+PLU]: so [AGR #] and [TUL #] will stand for [AGR NP[+PLU]] and [TUL NP[+PLU]], respectively.) On the other hand, for a subject-controlled equi verb, the embedded VP[AGR NP[+PLU]] has no sister controller NP so that its AGR feature specification should agree with that on its

(28)

a) Tom-i   ai-tul-ul   cip-ey-tul   ka-tolok   seltukhayssta.
    NM   children-AC   house-to-CPM   go-COMP   persuaded
b) *Tom-i   Sue-lul   cip-ey-tul   ka-tolok   seltukhayssta.
    NM   AC   house-to-CPM   go-COMP   persuaded
    'Tom persuaded the children/Sue to go home.'

(29)

a. ai-tul-i   Tom-eykey cip-ey-tul   kakessta-ko   yaksokhayssta
    children-NM   to   house-to-CPM will-go-COMP promised
b. *Sue-ka   Tom-eykey cip-ey-tul   kakessta-ko   yaksokhayssta
    NM   to   house-to-CPM will-go-COMP promised
    'The children/Sue promised Tom to go home.'

mother category according to the second clause of CAP (GKPS 1985:89), as illustrated in (29) where the matrix verb is the subject control verb *yaksoka-* 'promise'.[12] VP[AGR#] in (28) requires its sister controller NP to be plural, according to the first clause of the CAP. So the occurrence of CPM in sentence (a) is legitimate because the controller NP is plural, whereas it is not permissible in sentence (b) because its controller is not plural and violates the CAP.

In the case of the subject-control verb *yaksokha-* 'promise' in (29), VP1[AGR#] has no sister controller, so its AGR value is required to agree with that of its mother VP according to the second clause of CAP. In sentence (b), the AGR values are in conflict, violating the CAP. Accordingly, the occurrence of CPM in (29b) is ungrammatical. These predictions are exactly the same as our intuitions.

Next, when CPM attaches to the embedded VP, the matrix subject is required to be plural according to the CAP and the output rule of TIM, for both the object- and subject-controlled verbs. This is illustrated in (30).

The 'plural-subject condition' (Kuh 1986) produces the same predictions for (29)-(30) as my analysis does. However, it predicts that (28a) is ungrammatical because the subject is singular. This incorrect prediction is not produced if we replace the notion 'clause-mate plural-subject' by the notion 'control' motivated independently in GKPS 1985:88; CPM agrees in number with its controller.

(30)

```
                              S
                 _____/ _____
                /                          \
          NP [+PLU]  ←  CAP (i)  →  VP [AGR#]
              |               _____/ _____
              |              /         |             \
              |          NP (PP)    VP [TUL#]          V
              |            |          /\               |
              |            |         /  \              |
```
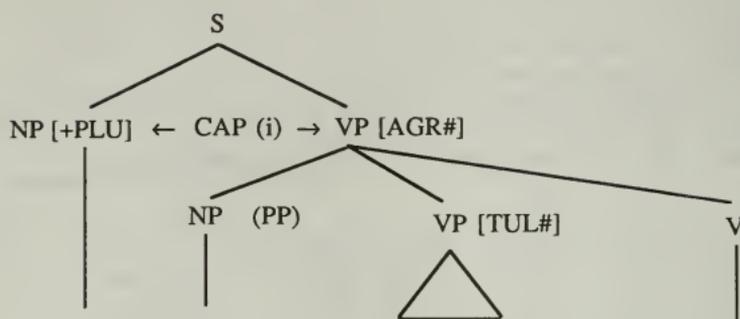
a. ai-tul-i   Tom-ul   [ka-tolok]ᵥₚ-tul seltukhayssta.¹³
    children-NM AC   go COMP   CPM   persuaded
b. ai-tul-i   Tom-eykey   [kanta-ko]ᵥₚ-tul yaksokhayssta.
    children-NM to   go-COMP   CPM   promised
    'The children (a)persuaded/(b)promised Tom to go.'

Up to this point I have not mentioned anything about
instantiations of the feature TUL. Because it is a head feature, its
distribution in a tree is governed by the HFC.   The feature
instantiations of TUL capture several significant predictions about
morphological facts. Discussing the morphological properties of CPM
in 2.1, I mentioned that CPM cannot cooccur with the genitive case
marker -uy (refer to (8)). In my analysis, this is a natural result
because the possessive NP is a prehead modifier.   To see this,
compare (31a) with (31b).

```
(31)   a.    VP[AGR #]            b.    VP[TUL#]
              |                          |
            NP[TUL #]                  NP[TUL #]
             / \                        / \
            /   \                      /   \
           /     \                    /     \
         NP     N1 [TUL#]          NP[TUL#]  N1
          |       |                  |        |
          |       N [TUL#]           |        N
          |       |                  |        |
        Tom-uy  sakwa-lul-tul      *Tom-uy-tul sakwa-lul
            of   apple-AC-CPM         of-CPM   apple-AC
         'Tom's apple'              'Tom's apple'
```

The feature TUL on the higher NP node is percolated down to its
lexical head in (31a) according to the HFC. So the occurrence of CPM
in (31a) is legitimate. On the other hand, (31b) is ungrammatical
because TUL is instantiated on the non-head daughter node, violating

the HFC; the occurrence of CPM in (31b) is not allowed. In this way my analysis predicts how the cooccurrence of CPM and GEN is prohibited.

Likewise, we can explain why CPM does not occur within prenominal APs and quantifiers, as illustrated in (32).

(32) a. *yeppun-tul kay-lul   b. *sey-tul sonyen-ul
         pretty-CPM dog-AC   three-CPM boy-AC

I assume that [TUL NP[+PLU]] is morphologically realized as *tul* at the lexical level by a morphological rule.[14]   Apparently, the surface realization of TUL shows that CPM morphologically attaches to the head noun, for example, in (31a). However the scope of CPM as a phrasal suffix is the whole NP.   This scope mismatch can be explained this way: Although TUL on the lexical head is realized as *tul*, the inherited TUL on, for example, the NP node in (31a) syntactically guarantees the scope of CPM.   The occurrences of CPM in (33a)-(33b) show the scope mismatch more explicitly.

(33) a. haksayng-tul-i [Tom-i aphuta-ko]$_S$-tul   malhayssta.
          student-IPM-NM   NM is-sick-COMP-CPM   said
          'The students said that Tom was sick.'
       b. Tom-i [haksayng-tul-i   aphuta-ko]$_S$-tul   malhayssta.
          NM   student-IPM-NM   is-sick-COMP-CPM   said
          'Tom said that the students were sick.'

In both sentences, CPM morphologically attaches to *aphuta-ko* 'is-sick-COMP'. But the CPMs in (33a)-(33b) have different scopes, S for (33a) and V for (33b); that is, they agree with the matrix plural subject in (33a) and the embedded plural subject in (33b), respectively.   This follows from the fact that, although TULs are morphologically realized at the same surface position in (33), the inherited TULs as shown in the trees in (34) determine the scopes of CPMs.

(34) a.   S   b.   S
        /   \   /   \
      NP   VP[AGR #]   NP   VP
     /   \   /   \
   S[TUL#] V   S   V
                            /   \
                          NP   VP[AGR#]
                                 |
                               V[TUL#]

If CPM in (33b) has V as its scope, then we might expect it to occur before the COMP -*ko*. But a morphological restriction in Korean does not allow this; CPM cannot come immediately after the mood marker -*ta* (see (35)). As the result of this restriction, CPM follows COMP -*ko* in (33b).

(35) *haksayng-tul-i aphu-ta-tul.
      student-IPM-NM is-sick-DEC-CPM
      'The students are sick.'

Finally, CPM can occur multiply in a sentence such as (36). The multiple occurrence of CPM can be explained if we revise TIM(22) to enable more than one daughter of a VP to have the feature specification [TUL NP[+PLU]]. Then the TIM may allow as many [TUL #]s as the number of CPMs in a sentence, which results in licensing trees such as (37).

(36) haksayng-tul-i Tom-eykey-tul ppang-ul-tul
      student-IPM-NM   to-CPM   bread-AC-CPM

      manhi-tul   cwuesseyo-tul.
      much-CPM   gave-CPM

      'The students gave a lot of bread to Tom.'

(37)   VP[AGR#]

      PP[TUL#] NP[TUL#]   AP[TUL#] V[TUL#]
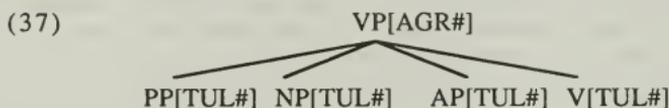
3.2. Semantic analysis of CPM

CPM forces the subject of a sentence containing it to have a distributive relation over its predicate (VP). As explained in (2.3), sentence (21a) is true if each of the students has the property of buying a balloon. To represent this interpretation, I propose to treat the feature specification [TUL NP[+PLU]] as semantically significant. According to the definition of 'semantically potent' given in GKPS (1985:224), the semantically significant feature at the highest point of occurrence in a tree is semantically potent. In (38), the tree of (21a), the circled feature specification [TUL NP[+PLU]] is semantically potent, which is licensed by the output rule of TIM (22). The distributive relation is formed over VP with respect to the referent of the NP which agrees with the value of TUL, NP[+PLU]. So the IL translation TUL' is defined as in (39) and interpreted as in (40).[15]

(38)

haksayng-tul-i phwungsen hana-lul-tul   sassta
student-IPM-NM   balloon   one-AC-CPM   bought
'The students bought a balloon each.'
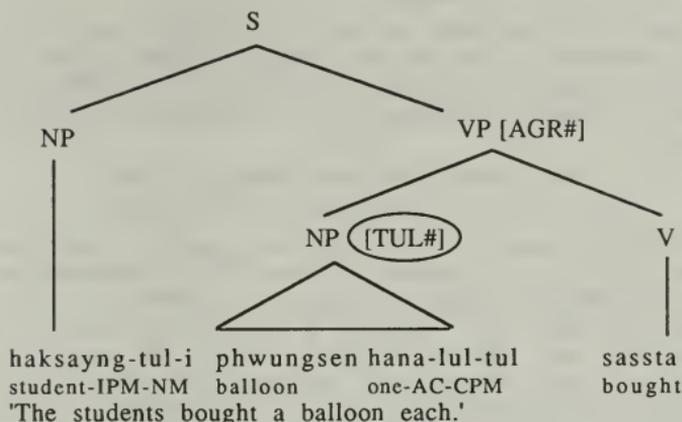
(39)   TUL' = $\forall x\, \lambda\, v^{VP}\, \lambda\, P\, \lambda\, x\, [\, P(x) \rightarrow\, {}^v v^{VP}\, (x^*)]$

(40)   TUL' denotes the function f such that for any
          NP extension a, VP extension b, and $x \in$ a,
          $f(b)(a)= 1$ iff $\forall x f(b)(x) = 1.$

The definition and the interpretation say that TUL' takes as its argument any type of VP which combines with the type NP whose denotations satisfy the extension of the VP. So according to (39)-(40), if we assume that the students in (38) are Tom, Sue, and Mary, (38) is true when Tom bought a balloon, Sue bought a balloon, and Mary bought a balloon. This interpretation is equal to our intuition.[16]

3.3. TUL as a Foot Feature?

We could obtain almost the same predictions as our analysis of CPM in 3.1 if we treated TUL as a foot feature rather than as a head feature. But I reject the treatment of TUL as a foot feature for two reasons, theoretical and empirical. In GPSG, foot features are devised to capture the unbounded dependency relations which reflexives, WH-words, and slash categories show. But the number agreement of CPM is confined, simply speaking, clause-internally, as discussed in 2.2. On an empirical basis, the foot-feature analysis needs feature cooccurrence restrictions such as (41) or other devices to explain the ungrammaticality of (31b) and (32), which the head-feature analysis does not need. Relying on Occam's Razor, I reject the foot-feature analysis.

(41)   FCR 50: ~[TUL & GEN]

3.4.   Kuh's (1986) analysis

Kuh (1986) develops a special agreement mechanism in the GPSG framework to explain the syntactic number agreement of CPM with its controller, as an alternative to the CAP of GKPS (1985). The core of his analysis consists of two statements on agreement pairs in Korean;

(42) a. <NP, VP> is an agreement pair in Korean.
    b. <V, XP> is an agreement pair in Korean.

The first element of each agreement pair is a controller and the second element is a controllee.   Controller and controllee are sisters. (42a) says that a subject NP shares an agreement feature with its predicate VP, and (42b) says that a lexical verb shares an agreement feature with any one of its sister XPs.   His special agreement mechanism works directionally, different from the CAP in GKPS (1985), which is symmetric.   So, for the analysis of CPM, [AGR NP[+PLU]] is inherited from the number feature of NP and [AGR NP[+PLU]] of XP are, respectively.

This analysis faces many empirical problems, because Kuh (1986) does not provide any device to limit the instantiations of [+PLU] on the sisters of the controller NP or V by his agreement pairs. First, in the case of simple sentences such as (43), [+PLU] must be instantiated on every daughter node according to his agreement pairs (42). He assumes that [+PLU] on the preterminal node is mor- phologically realized as *tul*. As far as I understand, Kuh (1986) does not mention anything about what controls the morphological real- ization of the feature specification [+PLU]. His analysis could explain the agreement of CPM with its plural subject in (43) [next page], but it cannot account for why all [+PLU]'s on the daughters of VP are realized as *tul* in (43a), why none of them is in (43b), why one of them, only on PP but not on NP or AP or V, is in (43c).

Putting aside such a problem, Kuh's analysis faces more serious problems when his agreement mechanism (42) applies to sentences with embedded clauses.   As illustrated in (44), the embedded VP and its daughters have two conflicting features, [+PLU] and [-PLU], which is what his agreement pairs predict.   If CPM agrees with [**] (which stands for [+PLU]) in (44), then his analysis would predict correctly; (44) is ungrammatical.   But if CPM agrees with [*] (which stands for [-PLU]), then his analysis would predict (44) to be grammatical against our intuition.   That is, one theory produces two completely conflicting predictions on one sentence at the same time.

(43)

	a.	ai-tul-i	Sue-eykey-tul	ppang-ul-tul	manhi-tul	cwueyo-tul.
	b.	ai-tul-i	Sue-eykey	ppang-ul	manhi	cwueyo.
	c.	ai-tul-i	Sue-eykey-tul	ppang-ul	manhi	cwueyo.
		children-NM	to-CPM	bread-AC-CPM	much-CPM	give -CPM

'The children give a lot of bread to Sue.'

(44)

*ai-tul-i Sue-ka   hakkyo-ey-tul kanta-ko   malhayssta.
children-NM   NM   school-to-CPM   go-COMP   said

'The children said that Sue went to school.'
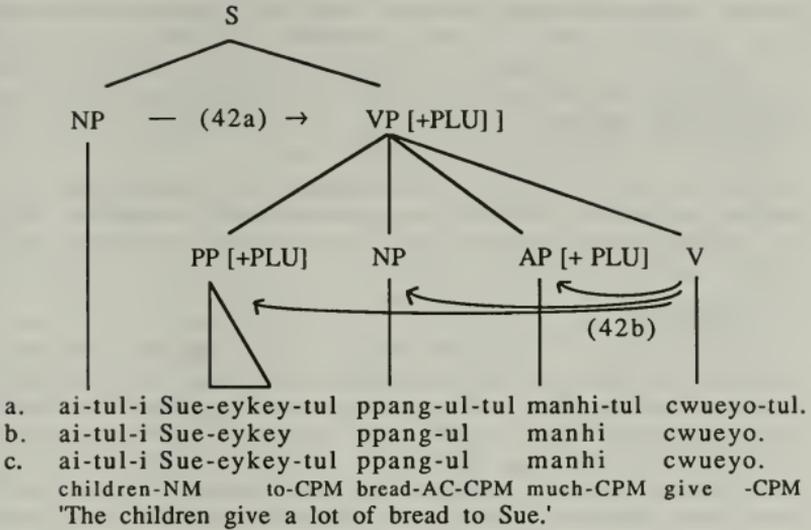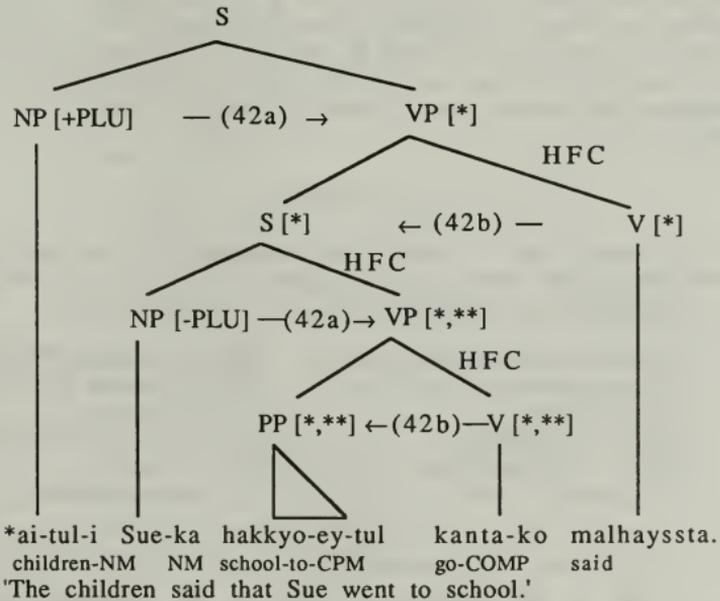
In the case of object-equi verbs, a similar problem arises.   Let me take the grammatical sentence (28a) for example. According to Kuh's agreement pairs (42), the occurrence of CPM in an embedded VP should be ungrammatical, because the matrix subject NP is singular. The upshot is that his analysis is too strong in that it produces ungrammatical sentences such as (44), and too weak in that it cannot produce all the grammatical sentences.

To solve the problems mentioned, some restriction on the application of Kuh's (1986) agreement mechanism would be required. His problems arise from his too special agreement mechanism. My analysis never faces these problems.

4.   Summary

In this paper I developed syntactic and semantic analyses for CPM on the basis of the assumption that there are two *tul*'s in Korean, IPM and CPM.   This assumption was supported in section 2 by demonstrating the morphological, syntactic, and semantic properties of CPM which are different from those of IPM. For the syntactic analysis, in 3.1, I proposed the head feature TUL and the TUL Introducing Metarule (TIM), and showed how they predicted the syntactic agreement of CPM with a plural controller in harmony with the CAP and HFC. Treating TUL as a morphosyntactic feature, I explained the scope discrepancy between syntax and morphology of CPM as a phrasal suffix.   For the distributive reading forced by CPM, I assumed that TUL is semantically potent, and proposed its semantic definition and interpretation.   And I critically reviewed Kuh's (1986) analysis in 3.4.

NOTES

*I would like to express my gratitude to Professors Georgia Green and James Yoon for their valuable comments and suggestions.

[1] The following abbreviations are used in this paper;

NM = Nominative Case Marker,   IPM = Inherent Plural Marker
AC = Accusative Case Marker,   CPM = Copied Plural Marker
GEN = Genitive,   P = Postposition
CM = Case Marker,   DEC = Declarative ending
TIM = TUL Introducing Metarule, DAT = Dative
Q = Question ending,   TP = Topic marker

[2] Actually, this is a semantic property.   However, I put it down here to show how to distinguish CPM from IPM.

[3] CPM in the position of (3d)-(3e) is potentially ambiguous because it can also be controlled by the semantic subject of the embedded VP (3d) and the subject of the embedded clause (3e), if

'Tom' is replaced by a plural NP such as 'Tom and Sue'. For this kind of scope ambiguity of CPM, refer to the discussion relating to (33)-(34).

[4] By saying CM, I refer to NM, AC, and GEN. I will treat the Korean dative case marker (DAT) -*eykey* (to) as a postposition because it, as a nominal suffix, shows behaviors which are different from those of CM but similar to those of postpositions. First, CMs have no consistent thematic roles so that their roles could be changed according to verbs. On the other hand, DAT keeps consistent thematic roles (agent in the passive or recipient in non-passives) as postpositions do (e.g., -*pwute* 'from: (source)', -*lo/ulo* 'with: (instrumental)'). Second, CMs are freely and easily deleted (i), while DAT are not, like postpositions (ii). Third, CMs are not compatible with the topic marker (TP) or delimiters (iii), while DAT and postpositions are (iv). Finally, as Kuh (1986) observed, CMs, on the one hand, and DAT and P, on the other hand, have different behavior with respect to their interaction with the nominal conjunctor -*kwa* (and). CMs are suffixed only to the second conjunct (v), while DAT and P can be suffixed not only to the second conjunct but to both conjuncts (vi). Based on this empirical evidence, I will treat DAT as a P, not as a CM.

(i) Sue-__   Tom-__   ppang-__ mekkess-ni?
         NM   GEN   bread-AC   ate-Q
     'Did Sue eat Tom's bread?'

(ii) a *Sue-ka   Tom-__   malhayssta.
             NM   DAT   talked
        'Sue talked to Tom.'

     b. *Sue-ka payk   peici-__   kongpwuhayssta.
             NM   100   page-from studied
        'Sue studied from page 100.'

(iii) a. *Tom-i/ul-(n)un   b. *Tom-i/ul-man   c. Tom-un/man
             NM/AC-TP   NM/AC-only   TP/only

(iv) a. Tom-eykey-nun/man   b. Tom-ulopwute-nun/man
              DAT -TP/only   from   -TP/only

(v) a. [Tom-kwa Sue]$_{NP}$-ka/lul   b.*Tom-i/ul-kwa Sue-ka/lul
              and   NM/AC   NM/AC-and   NM/AC

(vi) a. [Tom-kwa Sue]$_{NP}$-eykey/lopwute
              and   DAT/from

     b. Tom-eykey/lopwute-wa   Sue-eykey/lopwute
              DAT/from   -and   DAT/from

[5] Some Korean linguists, e.g. Kuh (1986), treat (6a) as un-grammatical. (Actually, Kuh does not consider the cases of NP-NM-

CPM such as (i), which we can find in the Korean Double Nominative Construction where the first NP[NM] is plural.) But many Koreans show different intuitions on (6a)-(6b); some of them judge (6a) and (6b) equally grammatical, some prefer (6a) to (6b), and some say that (6b) is preferable. I think Kuh's (1986) intuition on the precedence between CPM and CM (here CM = NM/AC) is overgeneralized because I often hear sentences containing such expressions as (6a) in Korean movies and dramas. In my opinion, CPM basically follows CM in that it always follows all sorts of suffixes such as postpositions (see (8)) and verbal suffixes (ii). I think the reason why CPM may also precede CM in an NP can be inferred from the fact that CPM has the same phonological form as IPM so that people tend to use CPM in the position of IPM in an NP (that is, before CM) when the NP doesn't have IPM.

  (i) haksayng-tul-i   him-i-tul/-tul-i   seyyo.
       student-IPM-NM   power-NM-UPM/-UPM-NM   be-strong
       'Students are strong.'

  (ii) ip-hi-si-ess-eyo-tul
       wear-Causative-Honorific-Past-Mood-CPM

6 The expression (6b) is ambiguous with respect to the grammatical status of *tul*. If it has the function of IPM, because IPM precedes CM as discussed in (4)-(5), (6b) means 'various kinds of taste'. But when it is a CPM, (6b) means just 'taste' as its gloss shows.

7 According to Kuh (1986), (9b)-(9c) are ungrammatical; two different *tul*'s cannot occur in one NP, but only one kind of *tul* can. His explanation for the ungrammaticality of (9b) is that CPM occurs unlawfully because it should precede CM. But this is not true; refer to (6a) and note 3. In case of (9c), he tries to explain its un-grammaticality either by positing a phonological constraint, keeping two *tul*'s from occurring back to back, or, following Zwicky (1985a), by formulating the morphological realization rule of the plural marker in such a way that two *tul*'s occupy the same slot. But (i) is grammatical for some speakers with the right intonation.

  (i) (nehi-tul)   chayk-tul-tul kaciko-wass-ni?
       you(plu)-IPM book-IPM-CPM bring-came-Q
       'Did each one of you bring your books?'

8 Korean has abundant examples such as (i) where case markers follow postpositions.

  (i) a. Tom-i   Seoul-ey-lul kassta.
          NM   to-AC went
       'Tom went to Seoul.'

    b. Seoul-ey-ka saram-i   manhta.
        in-NM people-NM to-be-many
    'In Seoul, there are a lot of people.'

[9] Subject-to-object raising cases such as *sayngkakha*-'to think' and *mit*-'to believe' are included in the category of object-control verbs, because their sister object controls the occurrence of CPM within the embedded VP as seen in (i).

    (i) a. na-nun haksayng-tul-ul [kyosil-ey-tul issta-ko] mitnunta.
        I-TP   student-IPM-AC classroom-in-CPM be-comp believe
        'I believe that the students are in the classroom.'

      b. *haksayng-tul-un na-lul [kyosil-ey-tul issta-ko] mitnunta
        student-IPM-TP   I-AC classroom-in-CPM be-comp believe
        'The students believe that I am in the classroom.'

However, some group of verbs allows CPM to occur even though the subject is not plural. Such a verb has no sister VP, but its plural object may control CPM occurring in its other sister category, except the verb, as illustrated in (ii)-(iii). Of course, if the subject of the verb is plural, it can license CPM to occur in any constituent within its predicate in the predictable way. In Korean, lexical causatives and some verbs such as *ponay*-'to send (= to cause to go)' and *cwu*-'to give (= to cause to have)' which potentially have causative meanings belong to this group of verbs. I will not deal with these exceptional cases here, leaving them for future study.

    (ii) a. na-ka ai-tul-ul   pap-ul-**tul** mekyesseyo.
        I-NM child-IPM-AC rice-AC-CPM cause-to-eat
        'I made the children eat rice.'

      b. *na-ka ai-tul-ul   pap-ul mekyesseyo-**tul**.
        I-NM child-IPM-AC rice-AC cause-to-eat-CPM
        'I made the children eat rice.'

    (iii) a. na-ka ai-tul-ul   kyosil-ey-**tul** ponaysseyo.
        I-NM child-IPM-AC classroom-to-CPM sent
        'I sent the children to a classroom.'

      b. *na-ka ai-tul-ul   kyosil-ey ponaysseyo-**tul**.
        I-NM child-IPM-AC classroom-to sent-CPM
        'I sent the children to a classroom.'

[10] The VP Domain Condition remains in effect even when CPM occurs in a topicalized category as seen in (i), because the topicalized NP in (i) and its trace share exactly the same feature information according to the CAP and FFP.

    (i) chayk-ul-tul$_i$ ku haksang-tul-i   [t$_i$ ilkesseyo]$_{VP}$.
        book-AC-CPM   the student-IPM-NM   read
    'A book, the students read.'

[11] The TIM (22) allows only one CPM to occur within a VP. However, more than one CPM can appear in a sentence as seen in (36). We can predict this kind of multiple occurrence of CPM within a VP if we revise TIM (22) to enable more than one daughter of a VP to have the feature specification [TUL NP[+PLU]].

[12] In Korean, the object-control verb *seltukha-* 'persuade' and the subject-control verb *yaksokha-* 'promise' subcategorize VP[COMP *tolok*] and VP[COMP *ko*], respectively, as shown in their ID rules (i)-(ii). For simplicity, I do not specify the COMP features in the trees (28)-(29).

  (i) VP → NP, VP[COMP *tolok*], V[18]
  (ii) VP → PP[PFORM eykey], VP[COMP *ko*], V[19]

[13] CPM in this position is potentially ambiguous as mentioned in note 3. This ambiguity will be explained in the discussion relating to the data (33)-(35).

[14] I assume that IPM and CPM are realized by the following morphological rules. As observed in (2)-(3), (i) applies only to a noun category, while (ii) applies to any category.

  (i) IPM Affixation: N ⇒ N-tul
  (ii) CPM Affixation: X ⇒ X-tul

[15] Korean has a distributive marker *-ssik* 'each'. Different from CPM, *ssik* cooccurs only with numerical expressions. Even though CPM and *ssik* both induce the distributive readings, there seems to be some difference in that the distributivity of CPM is rather weaker than that of *ssik*. It would be interesting to investigate why they are different, but a more systematic comparison of CPM and *ssik* must be left for future study.

[16] The exceptional occurrences of CPM such as (ii)-(iii) of note 9 also contribute to the distributive interpretation of a sentence where it occurs. But I think that such distributivity is not triggered grammatically, but pragmatically; distributivity over events with respect to the subject referent. In other words, in a discourse, a speaker presupposes that there are multiple events and the subject referent participates in each event. So, for example, (iiia) of note 9 has an interpretation that there were multiple sending-students-to-a-classroom events and in each event, 'I' sent students to a classroom. It seems that this event-based distributive interpretation for the exceptional cases of CPM could be expanded to the general cases of CPM such as (38); in that case, (38) can be interpreted in the way that there were multiple buying-a-balloon events and all members of the students participated in a buying-a-balloon event each. If this pragmatic analysis of distributivity of CPM is successful, I think we could get a uniform and general way of interpreting CPM without

consideration of the semantics of CPM such as (39)-(40).   But to arrive at this conclusion, we need more systematic study of the distributivity of CPM.

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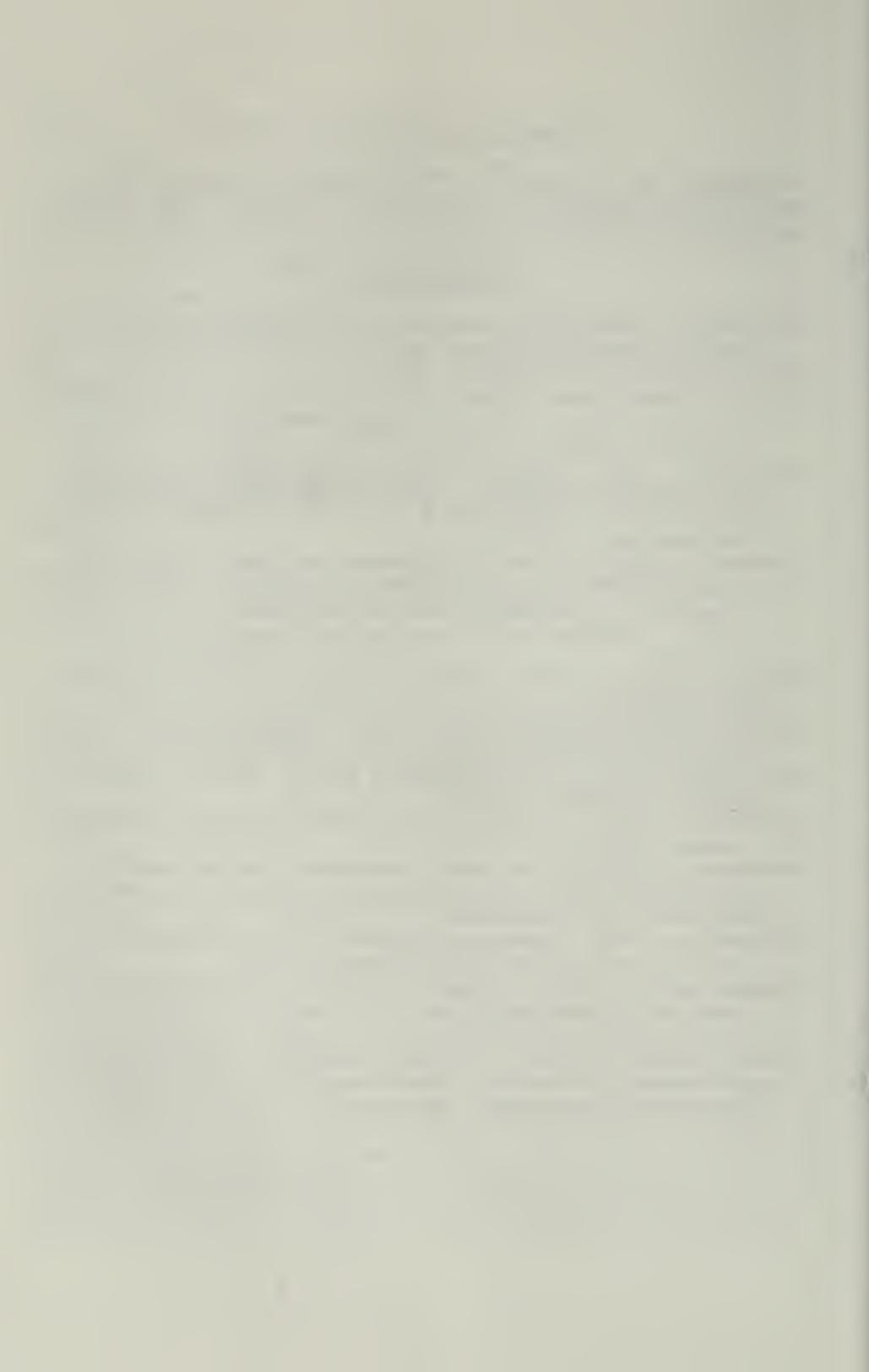
TOWARD AN INTEGRATED APPROACH TO LANGUAGE PLANNING*

Numa Markee

In this paper i) discuss the administrative ecology within which Language Planning (LP) processes occur; ii) define the term 'diffusion of innovations'; iii) link the concept of relative advantage to cost-benefit analysis; and iv) show how this diffusionist perspective on LP provides an integrated framework for managing the diffusion of communicative innovations at different levels and perhaps between different foci of planning.

1. Introduction

Language planners have tended to focus on the language-related problems of large aggregates, such as a community, society, or nation (see Das Gupta 1973, Jernudd & Das Gupta 1971, Neustupny 1983, Karam 1974, Fishman 1974 & Okonkwo 1977). However, Fishman (1974), Kloss (1977), Thorburn (1971), Tollefson (1981) and Brown (1989) either explicitly recognize or imply that there are macro and micro levels of Language Planning (LP), the latter being exemplified by LP for such target groups as factories or educational institutions.

More recently, Cooper (1989) has defined LP as 'the efforts to influence the language behavior of others with respect to the acquisition, structure, or functional allocation of their language codes.' In effect, when Cooper refers to the language behavior of others without specifying who these 'others' might be, he is arguing that an exclusive concern with large aggregates is overly restrictive. Furthermore, this definition expands the scope of the discipline as this is understood by most other authorities[1] in that it claims that the traditional defining foci of LP, namely corpus and status planning, must be complemented by what he calls 'acquisition planning.' (1987; 1989). This additional focus of interest must be incorporated into LP because educational systems and personnel, in particular language educators, are instrumental in diffusing communicative innovations.

This paper will i) discuss the administrative ecology within which LP processes occur, which entails recognizing at least six levels of decision-making that may be involved in the diffusion of a

language or other communicative innovations: the government, the ministry (of education), the region, the institution, the department, and the classroom; ii) define the term 'diffusion of innovations'; iii) link the concept of relative advantage to cost-benefit analysis; and iv) show how this diffusionist perspective on LP provides an integrated framework for managing the diffusion of communicative innovations at different levels and perhaps between different foci of planning.

2. The levels of planning

We may conceptualize macro and micro level LP in terms of a decision-making structure that is constituted as shown in Figure 1 (Kennedy 1982). There are three clarifications I wish to make about this diagram. First, it goes without saying that the number of levels of planning posited here is not exhaustive; the diagram merely attempts to show the kind of administrative system within which communicative innovations must diffuse. Other levels are easily identifiable. For instance, as Tauli (1974) implies, the scope of LP can be international. An example of this type of macro level LP is the Council of Europe's Modern Languages Project. This project seeks to facilitate the movement[2] of individuals within the member states of the European Economic Community (EEC) by developing common communicative goals for instruction in the Community's twelve languages. These goals are known as the Threshold level, which represents the minimum worthwhile educational target learners should achieve. At the other end of the spectrum, the activities of Eliezer Ben Yehuda (who promoted the use of Hebrew among members of his family; see Fellman 1974 and Cooper 1989) represent a type of micro level LP whose scope is even more restricted than that of the classroom. And it is doubtless easy also to identify further intermediate levels of planning within the range identified above.

	Level	
Macro LP	1	Government
	2	Ministry
	3	Regional Authority
	4	Institution
	5	Department
Micro LP	6	Classroom

Figure 1: Macro and micro levels of LP (Kennedy 1982:268)

Second, the types of language-related problems addressed at the various levels of planning are qualitatively though not quantitatively similar. If we equate the notion of planning with what Neustupny (1983) terms language correction, LP at all the levels identified in Figure 1 is concerned with decoding a problem, developing a design for its removal and implementing the design.

This position implies that there is no distinct cut-off point between macro and micro levels of planning. How then can we validly distinguish between the two? We might make an arbitrary decision that macro LP shades into micro LP somewhere between levels 3 and 4. But this is hardly satisfactory. In this regard, Cooper (personal communication) suggests that the distinction between macro and micro LP is best motivated if it is couched in terms of the potential for interaction between individuals.

One criterion for deciding whether a given bit of LP is micro or macro might be whether all or most of the individuals constituting the target are in at least occasional interaction with one another. According to this criterion, LP for a school, a parish church, a neighborhood community center, a family, a department store, a company in the army, etc. would be micro planning, whereas LP for a school system, a religious denomination, a city, a department store chain, an army, etc., would be macro planning.

Third, Figure 1 does not imply that all levels of planning will necessarily be found in all LP contexts; nor does it reflect a predilection for a centralized, bureaucratic approach to LP, in which the role of lower levels is merely to implement prior decisions made by higher levels of decision-making. In relatively decentralized societies such as the United States, for example, there is no central LP agency akin to the Académie Française, nor are most language education programs federally-funded. Thus, (with the exception of bilingual education paid for by Title VII funds, where the full range of levels displayed in Figure 1 obtains), most LP in the US is 'done' at levels 3 through 6. Furthermore, planning is not only a top-down phenomenon (though certainly Figure 1 does not exclude this possibility); it can also involve a bottom-up process of decision-making.

Again, LP of this kind is most likely to occur in relatively decentralized societies. For example, the Graded Objectives phenomenon in Britain is a grassroots movement by language teachers which has been quite successful in changing the national examination system. This movement's goal is to ensure that foreign language instruction and testing should contribute to Britain's continuing integration within a multilingual EEC. However, as Hurreiz (1968) shows, bottom-up decision making can also occur in more centralized societies such as the Sudan. More specifically, in an assertion of nationalist pride,

secondary school teachers took the lead in 1965 in Arabicizing an educational system that had retained English as the medium of instruction after independence from the former colonial power.

In summary, even in highly centralized decision-making systems, macro level decisions serve as input for more detailed planning on qualitatively similar problems at micro levels of decision making. Thus, the major difference between macro and micro level planning is that the scope of the latter is more restricted than that of the former. And this normative view of planning as a cycle of complementary decisions that must be acceptable to all participants involved in the process leads us to consider (a) how innovations diffuse; and (b) what factor(s) impact most on the successful diffusion of a given language policy.

3. The diffusion of innovations

Practical attempts to diffuse or spread languages have a long history (see Bokamba 1984). However, in its modern technical sense, the term 'diffusion of innovations' has been introduced into the LP literature by Cooper (1979, 1982, and In Press), who borrows it from Everett Rogers, a leading scholar in the field of rural sociology. Following Rogers (1983:10), we may define diffusion as 'the process by which 1) an innovation 2) is communicated through certain channels 3) over time 4) among the members of a social system.' This process of adoption is typically described by an S-shaped curve (see Figure 2), which (a) shows the adoption rate for an innovation in terms of the percentage of adopters who take up the innovation within a specific time-frame; and (b) specifies the characteristics of adopters themselves. Thus, depending on where they are placed along the S-shaped curve, individuals may be categorized as ranging from relatively early to late adopters.

%
of
adoption

Time
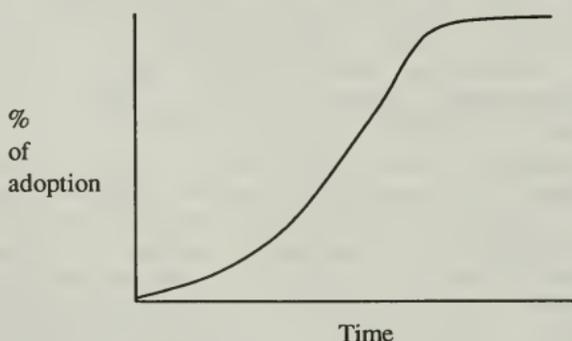
Figure 2:   An S-shaped curve

An innovation is 'an idea, practice, or object that is perceived as new by an individual or other unit of adoption' (Rogers 1983:11). From this perspective, the purpose of corpus planning is to develop and diffuse communicative innovations such as new technical terminology in, say, Arabic, Hebrew, or French among a unit of adoption, whose size may range from a nation-state to an individual. In French, for example, such innovations as *ordinateur* and *logiciel* are objectively new coinings which avoid the necessity of borrowing the English words *computer* and *software* respectively; see Benhamida 1989 and Thogmartin 1989 for further discussion of this issue in relation to French, and Alloni-Fainberg 1974 who discusses the processes of planned lexical innovation in modern Hebrew.   But a phenomenon need not be objectively new to 'count' as an innovation. They can also be subjectively new to potential adopters.   To give a status planning example, a language may enjoy official status in a given country (such as English in India, Singapore, or Kenya), even though it is the native language of few if any citizens of that country. This situation necessitates diffusing this second language through the formal educational system; and in such a context, even though English has objectively existed for some 1500 years, it is still a subjectively new innovation to the individual learners studying and eventually adopting it.

As Cooper (1979) points out, the advantage of viewing LP in this light is that we can compare the spread of these communicative innovations to that of any other types of innovations, such as a new toothpaste, detergent, or vehicle.   But a diffusionist perspective on LP also suggests that decision-making at all the levels identified in Figure 1 is essentially concerned with planning the adoption of a given communicative innovation.

4.   Cost-benefit analysis and relative advantage

A useful technique in this respect is cost-benefit analysis, a procedure which has already been widely used in macro LP to help administrators narrow down policy options.   But cost-benefit analysis can also be used to determine at micro levels of LP whether potential clients perceive adopting a given communicative innovation as being advantageous or disadvantageous to them.   As we will see in Section 5 of this paper, the development of an integrated perspective on LP involves rationalizing potential conflicts revealed by cost-benefit analysis at both macro and micro levels of LP.   And perhaps this can also lead to a better understanding of areas of tension between different foci of planning.

Thorburn (1971:256) defines cost-benefit analysis as 'an attempt to state the differences between two exactly defined alternatives in Language Planning' and illustrates this with a status planning

example.   More specifically, he shows how this technique can be used to select either a Language of Wider Communication (LWC) or an indigenous language as the most appropriate official language for an unspecified developing country.   As Thorburn points out, cost-benefit calculations in LP differ from ordinary economic calculations in that costs and benefits cannot be stated in exclusively economic terms.   A good example of this problem is the inherent conflict between LP that is oriented to promoting economic development and/or nation-building and LP which seeks to cultivate cultural or religious authenticity (Fishman 1968).   The former type of LP (exemplified by Singapore's choice of English as an official language) tends to promote an LWC, often at the expense of an indigenous language or languages. This solution assumes that economic and political benefits will offset the costs of individual and/or national alienation that this choice might provoke.   And the latter form of LP (illustrated by neighboring Malaysia's adoption of Bahasa Malaysia as its official language) tends to choose an indigenous language, often to emphasize its cultural uniqueness and separateness from a former colonial power.   The question for language planners therefore consists of deciding which factors should be included in the calculation, and how much importance should be assigned to variables such as linguistic nationalism that are difficult to quantify.   For these reasons, as Fishman (1974) notes, language is a particularly difficult resource for cost-benefit analysis to handle well.   It is at this juncture that a diffusionist view of LP can provide language planners with some useful insights.   And perhaps these insights can lead to a better understanding of areas of tension between different foci of planning also.

A diffusionist view of LP recognizes that meeting the actual needs and wants of clients is crucial to designing a product that will be attractive to customers.   Thus, cost-benefit analysis must ask the question: 'What range of qualities should communicative innovations possess to ensure their successful spread among potential adopters?'

Following Rogers (1983), there are at least five such qualities: relative advantage; compatibility; complexity; trialability; and ob-servability.   Compatibility is the degree to which there is congruence between the cultural aspects of an innovation and the value systems of its potential adopters.   Where such congruence is lacking, the innovation will likely not be adopted.   For example, efforts to diffuse Arabic in Southern Sudan have failed because Arabic is seen as an instrument of Islamization by predominantly Christian Southerners. Complexity is the degree of difficulty associated with adopting an innovation; the more complicated an innovation is perceived by potential adopters to be, the less likely it is that it will be adopted. Thus, the choice of a script for unwritten language X is often

constrained by what script is used for language Y with which language X is in contact. Trialability is the extent to which it is possible to try out an innovation on an incremental basis. If an innovation need not be adopted wholesale, there is more likelihood of it diffusing successfully. For example, the period of time set aside to implement an orderly change in the official status of one language in relation to another allows adopters to try out the innovation at an acceptable pace. Finally, observability is the extent to which an innovation is visible. The more visible an innovation is, the more likely it is that it will diffuse. Thus, new technical terminology that is not highly visible in the linguistic marketplace (i.e. in widely read journals and other technical publications) is unlikely to diffuse successfully.

Other factors to be considered in relation to the diffusion or non-diffusion of an innovation also include individual personality traits of adopters and systemic constraints. In this paper, however, I will concentrate on the first of these variables, which Rogers (1983:15) defines as 'the degree to which an innovation is perceived as better than the idea it supersedes'. Like Thorburn, Rogers notes that the advantages conferred on those adopting an innovation are often economic; however, adoption may also result in adopters enjoying less tangible rewards of an affective nature, such as feelings of increased social prestige, convenience or personal satisfaction.

5. Toward an integrated perspective on LP: An acquisition planning solution to a status planning-related problem

How might language planners use the notion of relative advantage in cost-benefit analysis to select a particular innovation or innovations and promote their diffusion at macro and micro levels of planning? Let us assume that the language-related problem to be resolved consists of selecting either English or Arabic as the medium of instruction for a technological university in an Arabic-speaking developing country.[3] Significant constraints to be considered in relation to this traditional problem of status planning include i) an Arabic-medium secondary education system that produces students with extremely low entry levels of communicative competence in English; and ii) on-going pressure primarily orchestrated by Muslim fundamentalist groups to Arabicize tertiary education in order to promote cultural authenticity. These factors are considered as constraints at micro levels of planning because in the original context on which this discussion is based, they emerged as important variables after the formulation (and indeed implementation) of the policy at the macro level of policy-making. In this example, therefore, they become particularly significant problems for middle level planners to solve.

Figure 3 shows how a simplified cost-benefit analysis using four variables might be used to analyze the relative advantages and disadvantages of using English as the medium of instruction from the perspective of macro and micro levels of LP. Note that the analysis is simplified to show how such an analysis might work. It does not explicitly consider factors related to issues of language maintenance, which are particularly important in bilingual education, for example.

	Access to science and technology	Economic benefits	Access to graduate education in English-speaking countries	Window on the world
Macro LP	+	+	+	+
Micro LP	−	−	−	+

Figure 3:   Relative advantages and disadvantages of using English as a medium of instruction

From a macro level status planning perspective (in this example, levels 1-4 in Kennedy's diagram in Figure 1), English scores positively on all four variables. That is to say, it provides access to science and technology, since English is the most widely used language of publication in scientific journals. It also provides economic benefits for individuals and the country as a whole, since the economic development of developing countries is contingent in large part on the ability to access science and technology through the medium of English. English-medium instruction also increases the possibility of pursuing graduate studies in English-speaking countries later on in students' careers, particularly when the students' home institution is the recipient of aid packages from donor countries such as the United States or Britain. Furthermore, universities in the US and elsewhere have stringent language proficiency requirements for non-native-speakers of English wishing to study for graduate degrees. Consequently, the more practice learners have with using the language, the more likely they will be able to use it adequately in native-speaker contexts. And finally, English can also provide a window on the world which broadens the learners' world view.[4, 5]

However, from a micro level status planning perspective (in this example, levels 5-6 in Kennedy's diagram), the picture is quite different: English only scores positively in terms of providing a window on the world. With respect to providing access to science and technology, the low entry level of students' communicative competence in this language makes it extremely difficult for them to understand, much less produce English. And as regards the economic benefits and access to graduate education in English-speaking countries which learners might expect to enjoy, these are deferred advantages which have little or no importance in the short term.

Let us now turn to the relative advantages and disadvantages of using Arabic as the medium of instruction for scientific subjects[6] from the perspective of macro and micro levels of status planning as shown in Figure 4.

	Access to science and technology	Economic benefits	Access to graduate education in English-speaking countries	Window on the world
Macro LP	–	–	–	–
Micro LP	+	–	–	–

Figure 4: Relative advantages and disadvantages of using Arabic as a medium of instruction

From a macro level perspective, Arabic scores negatively on all four variables. More specifically, little if any original research in science and technology is published in this language. Furthermore, even science text books written in Arabic are difficult to obtain in many disciplines. Consequently, there are few economic benefits to be derived from studying in Arabic. Studying in this language also makes it more difficult for students to study for graduate degrees in English-speaking countries later on because they will have had less opportunity to use this language than students who have studied in English-medium institutions. And finally, although Arabic provides a means of communicating and identifying with the citizens of other Arabic-speaking countries, it does not provide a window on how other cultures think and act to nearly the same extent as English does (see note 4). On the other hand, the ideological dimension of

this judgement should be recognized. As a REGIONAL language of communication, Arabic would have to be assigned a [+] value rather than a [-] value. And from the perspective of the proponents of Arabicization, the use of this language as medium of instruction might be seen as providing a window on the more desirable, less corrupt world of fellow Muslim nations.

From a micro level status planning perspective, the use of Arabic as a medium of instruction scores positively in terms of providing access to science and technology but negatively in terms of the other variables. It scores positively with respect to the first factor because it is not necessary to use English to 'do' science and technology adequately at the undergraduate level. Consequently, rather than impeding science education, the use of the mother tongue facilitates the learners' access to science at this level of discoursal complexity. Indeed, it is probably associated with A HIGHER PROBABILITY OF ACADEMIC SUCCESS IN THE SHORT TERM. As in the case of English, the economic benefits and the possibility of attending graduate school in an English speaking country are deferred benefits which are not important in the short term. And finally, the use of Arabic does not open any windows on the world at this level of planning either. However, we must again note the ideological nature of this statement and acknowledge that if a higher value is placed on promoting students' regional, national, and cultural identity as Arabs, then we would have to change the [-] value assigned to this variable to a [+] value also.

On the basis of this analysis, it would seem from a macro level status planning perspective that English represents a clearly better choice than Arabic as a medium of instruction. However, from a micro level perspective, it might be argued that Arabic is a marginally better choice than English. Since the primary justification for selecting one language rather than the other is instrumental, within the micro LP paradigm, Arabic is preferable because it enables students to understand the content of their lessons more easily and efficiently, at least in the beginning stages of instruction. Clearly, if we seek to develop an integrated perspective that will help us to resolve language-related problems at both macro and micro levels of decision-making, these conflicting conclusions must be reconciled. The question, therefore, is how this goal might be achieved.

If for macro level status planning reasons, English is chosen as the medium of instruction, it is inevitable that students will have great difficulty in doing their course work. As one learner at Khartoum Polytechnic wrote:

> Any one in his live must go to the infront, and comes
> from stage to the other one ... I came to the polytechnic in
> this year and I am afired from the study in the
> polytechnic is pure English Langutish and in the high
> secondry school the study with Arabic and the English
> Langutish is neglgable ... I came to the polytechnic and
> immediately study with English, we nearly about a month
> do not know any thing, after that you know what
> teachers said.   (Markee 1986b)

This sample of student writing is not offered in a spirit of ridicule but to show that the learners themselves were to some extent aware of the language-related problems they faced.   However, as the last sentence demonstrates, they did not fully understand the true magnitude of their problems.   Thus, it is clear that learners must be helped with their linguistic difficulties in a way that takes into account the limitations imposed by local constraints and clients' perceptions of their problems.

The conflicting conclusions reached by different planners can only be resolved by recasting the original status planning problem in acquisition planning terms.   Thus, macro level acquisition planning can provide part of the answer by making provision for appropriate resources to be allocated for this purpose; at the micro level of acquisition planning, curriculum designers and teachers must plan an effective language teaching program.   This objective can be realized most efficiently by providing English for Specific Purposes (ESP) instruction.   The advantages of adopting such a solution are two-fold. First, the relevance and the immediate advantages of an ESP approach are immediately apparent to the students.   Second, the inherent flexibility of ESP, which is not committed in principle to the exclusive use of English as a medium of instruction, provides for the implementation of a dual medium of instruction policy that explicitly acknowledges the important role of local constraints such as the low entry level competence of students.   More specifically, as discussed in Markee (1986a), this approach allows for the partial use of Arabic for classroom activities involving student-student interaction and English for instructor-student interaction.   This solution has the advantage of reflecting actual patterns of communication in different domains of language use within the institution.   But, in addition, it has the advantage of allowing micro level planners to concentrate on improving students' study skills in reading English, the area of communicative competence with which learners get least help from their subject teachers.   Thus, by focusing on reading rather than listening, a skill that learners perceive themselves to be able to cope with quite rapidly, ESP instructors can teach to real short and long term needs.

Of course, ESP solutions to problems of communicative incompetence are hardly new. But what is new is that the micro level acquisition planning solutions outlined above are not developed in complete isolation from macro level status planning input. Normatively speaking, in a completely integrated approach to LP, tensions between different types of planning need to be resolved more efficiently through a better understanding of the interplay between different areas of planning. Nonetheless, the use of cost-benefit analysis influenced by the notion of relative advantage represents the beginnings of an attempt to rationalize contradictions between different levels and foci of planning which will lead to a truly integrated perspective on LP. Thus, to develop further a claim initially made in Markee (1986a) and further articulated in Markee (1989), it is in this sense that ESP may be seen as a language planning solution to language planning problems.

6. Summary and conclusions

This paper has outlined some of the levels of planning that may be involved in the diffusion of communicative innovations and concluded that the most important difference between macro and micro LP is quantitative, not qualitative. That is, macro LP decision-making affects large aggregates, while micro LP targets individuals who potentially have the opportunity to interact with each other. Furthermore, it has defined three related concepts, namely the diffusion of innovations, cost-benefit analysis, and relative advantage. And finally, it has shown how these notions can be used to integrate decision-making at different levels of planning. Ultimately, this integrated perspective on LP must also be capable of resolving tensions between the different foci of LP in a principled fashion.

We should also expect a diffusionist framework to provide interesting insights in other areas of applied linguistics, particularly into what we may call (in contradistinction to traditional Second Language Acquisition research) the Sociology of Second Language Learning and Teaching (SSLLT); see Spolsky 1989 for similar arguments. For example, it would be interesting to establish whether the S-shaped curve that describes the diffusion of other innovations also describes the rate of learning (in the non-technical sense of this word) of morphosyntax and other communicative innovations by second language learners. The next step would be to investigate whether the five qualities that promote or inhibit diffusion mentioned in this paper are sufficiently powerful to explain language acquisition in diffusionist terms. In this regard, these five qualities would subsume many of the conditions for second language learning identified by Spolsky. Translated into empirically-testable hypotheses, these conditions for learning would provide applied

linguists interested in the macro and micro level diffusion of communicative innovations with a ready-made research program. This program would draw on two complementary research traditions, and would potentially contribute valuable insights to both fields. Confirmation of these and other related hypotheses would lend strong support to Rogers's claim that the same processes of diffusion obtain irrespective of the type of innovation that is diffusing, since none of the studies he mentions focus on language. The program of research is an exciting one, therefore, but is still very much in its infancy. The basic facts must still be established. And this can only be accomplished by launching a program of empirical research on these questions.

NOTES

* This is an expanded version of a paper presented at the 24th Annual Mid America Linguistics Conference, October 7 1989, University of Northern Iowa, Cedar Falls, IA. My thanks to Peter Strevens, Eyamba Bokamba and Steve Gaies for commenting on previous drafts of the paper. Of course, final responsibility for its contents remain my own.

1 However, see also Neustupny 1983 and Prator's views on this issue cited in Cooper (1987, 1989) .

2 The stated aim of the Council of Europe is to facilitate movement for both work and leisure in order to improve the quality of life of citizens and to promote the growth of intercultural contacts through tourism.

3 This example is based on the author's experience at Khartoum Polytechnic, Sudan. See Jernudd (1979) and Mahmud (1983) for information on the language situation in Sudan, Yokwe (1984) for a discussion of recent Arabicization policies at the macro level of LP, and Markee (1986a) for more detailed discussion of the solutions reported in this paper. The analytical technique used is similar to the one utilized in Kennedy (1986a).

4 Given its continuing internationalization, English is a resource for appreciating a broad range of cultures, not just those societies where it is the native language of the great majority of the population (Kachru 1985).

5 Steve Gaies (personal communication) points out that, from a macro level perspective, an LWC will always score positively in terms of providing access to technology, promoting economic benefits, and giving access to graduate education in countries where that LWC is spoken as a native language. Conversely, an indigenous language will always score negatively on these variables. Conse-

quently, he argues that these three variables should be collapsed into one because in reality it is impossible to tease them apart. This is ultimately an empirical issue. Meanwhile, we may concede that Gaies is probably correct when the choice consists of selecting between an LWC and an indigenous language. However, the values need not automatically all be either [+] or [-] for these variables when the choice consists of selecting between two LWCs (such as English and French). In the face of competition from English, the importance of French as a language of science is receding worldwide, particularly in Francophone Africa (see Hamouda 1984). But it is receding even inside France. For example, the Institut Pasteur, a leading inter-national institution in AIDS research, has recently switched to using English instead of French as its language of publication. Thus, it is possible to envision that an AIDS researcher from Francophone Africa wishing to study at the Institut Pasteur would find that French-medium education in his/her country did not provide the best access to understanding the latest research findings about AIDS. Similarly, French might not be the best linguistic resource for doing basic research on AIDS at this institution. But given the close economic and linguistic ties that still obtain between France and Francophone Africa, a knowledge of French might provide the surest route to personal economic advancement, in that newly independent countries still tend to look primarily to the former colonial power for economic and other assistance. In this hypothetical situation, there-fore, French would score negatively with respect to access to science and technology and positively with respect to opportunities for per-sonal economic advantage. Conversely, English would score positive-ly with respect to access to science and technology and negatively with respect to opportunities for personal economic advantage.

   [6] Of course, the justification for mandating English as the medium of instruction for non-scientific subjects is much weaker. As Eyamba Bokamba (personal communication) suggests, while English is the language associated with upward mobility in the outer world, the indigenous language (be this Arabic or Swahili in Tanzania, for example) is obligatory for internal upward mobility in almost all practical spheres of life: education, employment, politics etc.

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ON AUTOSEGMENTAL FEATURE-SPREADING IN PHONOLOGY: EVIDENCE FROM CHIYAO*

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In recent autosegmental studies abundant empirical evidence has been given to justify the claim that assimilation processes are best expressed through feature-spreading rather than feature-copying operations. A further claim involving autosegmental spreading has been made by Clements (1985) to the effect that in multi-tiered tree structures, only the feature(s) characterizing a single node can spread in assimilation processes.

The present study provides evidence from Chiyao to support Clements' view. It shows that in this language, an assimilation rule which involves the features {-continuant} and {+voiced} and appears to require those features to spread from two different autosegmental nodes does not provide a genuine argument against the single-node spreading hypothesis.

The claim that spreading affects single nodes is then shown to be more restrictive and compatible with a more constrained theory of assimilation.

1:0   Introduction

It has become increasingly clear from many recent auto-segmental studies on the nature of phonological representations that there is a need to develop a phonological model (or models) of multi-tiered feature representation in which some kind of hierarchical organization of features is recognized. In such a model, some tiers would be allowed to dominate other tiers. This line of argumentation is well illustrated in recent work by Clements (1985), Hayes (1986b), Mascarò (1983), McCarthy (1986), Mohanan (1983), and Sagey (1986), among others.

Another area of recent research concentration has been the characterization of assimilation within a phonological model involving a hierarchy of feature representation such as that referred to above. The claim that has gained overwhelming support is that rules of assimilation involve feature-spreading rather than feature-

copying, (cf. Clements 1985, Hayes 1986b, Schein & Steriade 1986, and others).   There is, however, a further question that arises from this conception of assimilation, namely, given a phonological model with hierarchically organized tiers, how is spreading in assimilation constrained?   Does feature-spreading occur on several autosegmental nodes or is it constrained in such a way that it only affects single nodes in tree structure?   Clements (1985) has proposed and defended the strong and more restrictive position that spreading only affects single nodes.

The present study makes two points.   Firstly, it argues that at a time like the present when many substantial issues of feature geometry remain unclear and unresolved (and thus await more research) the most profitable strategy to adopt pre-theoretically is to abide by the scientific principle of keeping our assumptions about feature spreading to the minimum.   That is, unless proven otherwise by empirical evidence, the tendency to multiply the number of nodes and tiers from where feature-spreading occurs should be avoided.

Secondly, and more importantly, the paper provides evidence from Chiyao (an East-Central African Bantu language spoken in Malawi and other neighbouring countries) in support of the view that feature-spreading affects single nodes in tree structure.

The paper is organized as follows: Section 2.0 presents a brief sketch of Clements' (1985) model of phonological feature geometry and how it relates to recent views on assimilation.   Section 3.0 presents the relevant rules from Chiyao and shows their compatibility with Clements' hypothesis on feature-spreading in assimilation.

2.0   On feature organization

Recently, it has been shown in several studies (cf. Clements (1985), Hayes (1986b), Sagey (1986) etc.) that some sets of phonological features consistently function as a unit with respect to certain phonological features (e.g. assimilation) while other imaginable sets do not function in such a unitary fashion.   This observation has been taken as evidence for the need to group such features simultaneously as a unit at some level of phonological organization.

Building on this functional unity of some phonological features and the multi-tiered representational approach independently made available by autosegmental theory, Clements (1985) proposed a model of feature representation in which the interesting relationship between simultaneous feature grouping and phonological processes like assimilation is said to be more naturally expressed.

Within this model, individual features are organized under hierarchically superordinate autosegmental nodes which Clements refers to as CLASS NODES. The class nodes are themselves dominated by yet a higher-level class node which is referred to as the ROOT NODE which is in turn linked to the CV tier.

The range of class tiers is then defined as including the root, laryngeal, supralaryngeal, place, and manner tiers. The class nodes dominate one another in the following order: The root tier immediately dominates the laryngeal and supralaryngeal nodes. The former immediately dominates such features as {voiced}, {spread}, and {constricted}, while the latter immediately dominates manner and place features. Under the manner features are included those concerned with the degree and manner of constriction in the oral tract which include {consonantal}, {sonorant}, {continuant}, {lateral}, and {strident}. On phonological criteria, the feature {nasal} is also assigned to the manner tier. The place features are those features which distinguish place of articulation in consonants and vowels, and they include {coronal}, {anterior}, {distributed}, {high}, {back}, and {rounded}.

The hierarchical organization of these tiers is thus as shown in (1).

(1)
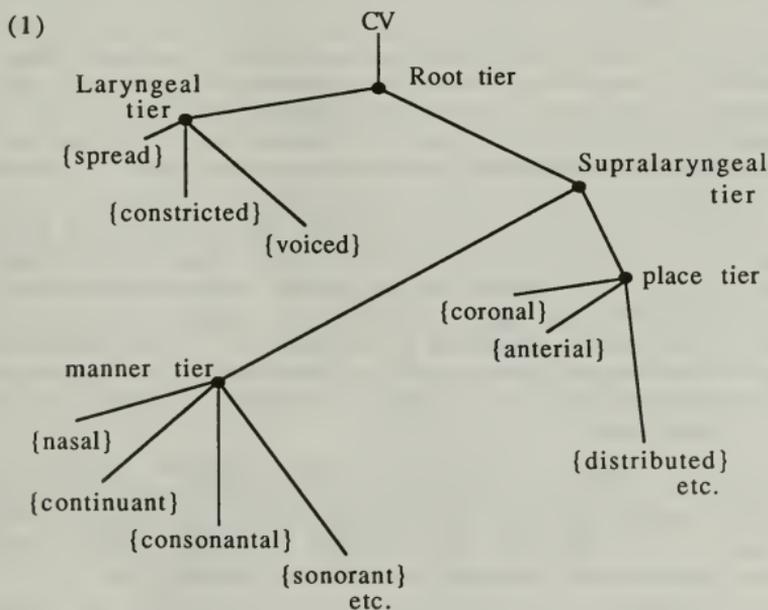
According to Clements, each feature in the diagram above characterizes every node that dominates it (with the root and CV nodes being characterized by virtually all the features of the representation).   For example, the manner node is characterized by the features {nasal}, {continuant}, {consonantal}, and {sonorant}.   A phonetic segment in this model is thus defined as any element of the CV tier together with all the features characterizing it (i.e. all the features dominated by the C or V slot).[1]

3.0   Assimilation and spreading in Clements' model

As noted above, one of the major motivating factors for the simultaneous grouping of phonological features into separate hierarchical levels of representation as proposed by Clements is the fact that certain common types of phonological and phonetic processes exhibit some kind of phonological (functional) independence in that such processes may affect only one set of features to the exclusion of other logically possible sets.   For instance, it has been commonly observed that phonological processes can affect laryngeal features without affecting supralaryngeal features. Rules of voice assimilation and (de)aspiration are typical examples. Conversely, phonological processes can affect supralaryngeal features without affecting laryngeal features.   This is common in cases of partial assimilation where only place or manner features of a segment may be involved.   One interesting implication of the observations made above is that assimilation processes may be expressed (in some way) within the phonological model proposed by Clements.   Before we examine Clements' suggestions on how assimilation ought to be expressed in his model, a brief discussion on recent views on assimilation in autosegmental theory is in order.

The linear model of phonology presented in Chomsky & Halle 1968 views assimilation (both partial and total) as a process whereby one segment is altered in its feature values so as to become more similar to a neighbouring segment.   This view essentially considers assimilation as a feature-copying process.   In other versions of phonology, assimilation by copying can be achieved by either feature-specifying or feature-changing mechanisms or both, depending on certain assumptions about the underlying specification nature of the target segment.

Recent research in CV phonology, however, suggests that assimilation is better expressed by feature-spreading than feature-copying mechanisms (cf. for instance Halle & Vergnaud 1980, Goldsmith 1981, Steriade 1982, Steriade & Schein 1986, McCarthy 1986, Clements 1985, Hayes 1986a,b among others).

Assimilation as spreading involves expanding the temporal domain of autosegments by adding association lines and often

deleting those autosegments which have been displaced. Representations showing differences between spreading-cum-delinking and simple spreading within this model are given below in (2) where the double-crossed line represents delinking and the broken line shows relinking of the second segment to the first segment.

(2)

(a)

	CV tier	M	N		M	N

Melody tier   P   Q   P   Q

(b)

CV tier   M   N   M   N

Melody tier   P   Q   P   Q
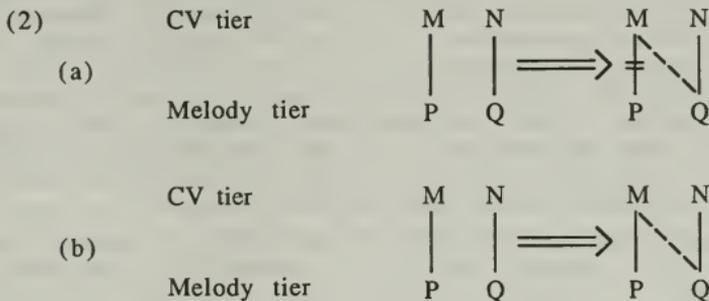
Here, figure (2a) shows that all the features of P are severed and the remaining timing slot M is then reassociated with Q yielding a geminate while (2b) simply shows the spreading of the features of Q to the timing slot M without any delinking involved.

There are several arguments in favour of assimilation as a spreading process. Since these arguments are readily available in the literature, only a brief summary will be presented here. Firstly, while the view treating assimilation as feature-copying in principle allows for any feature or set of features to undergo assimilation, a spreading account of assimilation constrains assimilation rules more sensibly by predicting that only certain (sets of) features can undergo assimilation. This view thus makes it possible to articulate a more constrained and predictive theory of phonology.

Secondly, the view that assimilation involves spreading accounts for certain behavioral properties of long segments derived by assimilation rules. This cluster of properties can be conveniently described under what Hayes (1986a) terms 'Ambiguity', 'Integrity', and 'Inalterability'. Ambiguity refers to the well-known case where long segments behave like a single segment with respect to quality-sensitive rules and like two segments with respect to quantity-sensitive rules. This property has been observed to extend to segments derived by total assimilation rules (for examples, see Hayes 1986a, Clements 1986, and the references cited there).

By assuming that geminates are single segments linked to two timing slots on the CV tier the property of ambiguity is easily accounted for. That is, total assimilation rules involving spreading

yield multiply linked geminates. Rules affecting the melody tier will treat the segment as a single unit, while those affecting quantity and applying on the CV tier will have to affect the two slots to which the segmental material is linked.

Integrity is a case where long segments including tautomorphemic geminates derived by assimilation rules cannot be broken up by epenthesis rules (cf. Abu-Salim 1980, Guerssel 1978, Hayes 1986a for examples). As pointed out by Schein (1981), Kenstowicz (1982), Steriade (1982), and McCarthy (1986), this property can be explained within CV phonology by the assumption that geminates derived by assimilation involving spreading affect multiply linked structures on the CV tier. Inserting a segment (e.g. a vowel) between them would result in the crossing of association lines which is forbidden by the well-formedness condition.

Finally, Inalterability refers to the failure of segments forming halves of a geminate (including tautomorphemic geminates from assimilation) to undergo a rule they would otherwise be expected to undergo (for examples see Schein 1981, Kenstowicz 1982, Hayes 1986a, and others). Hayes (1986a,b) and Schein and Steriade (1986) have proposed general principles that predict cases of Inalterability automatically for those rules that display it. Hayes's 'Linking Constraint' for example proposes that association lines be treated exhaustively for purposes of rule application. That is, a rule whose structural description refers to multiply linked structures cannot apply to segments which are singly linked and, conversely, a rule whose structural description refers to structures with single linkage cannot affect multiply linked segments. Now, this constraint provides a diagnostic for the mechanisms of assimilation as involving spreading.

The logic is simple. If a rule of total assimilation is due to spreading, then it must create doubly-linked structures and according to Hayes's constraint, such structures, like all true geminates, will be inalterable by any rule that crucially refers to singly linked structures in its structural description; and this is precisely what happens. Thus we see that Ambiguity, Integrity, and Inalterability support the claim that (total) assimilation involves spreading.

Interestingly enough, cases of partial assimilation involving spreading are also supported by principles like the Linking Constraint. Hayes (1986b), for instance, presents cases of rules of partial assimilation in Toba Batak, an Austronesian language, which obey Inalterability as predicted by the Linking Constraint. He shows that a number of structures resulting from rules of partial assimilation fail to undergo a rule of glottal formation which is

formulated as affecting only singly-linked consonants.   Hayes thus concludes that rules involving partial assimilation must be considered as yielding multiply-linked structures, explaining why they fail to undergo glottal formation.

Having briefly reviewed the arguments for treating assimilation as spreading, let us now consider Clements's claims about the characterization of such spreading in the multi-tiered hierarchical representations proposed in his model.   Clements has argued that assimilation processes only involve single nodes in tree structure. That is, only those phonological features dominated by a single node can spread to neighbouring nodes to effect the relevant assimilation changes.   Clements's hypothesis on spreading predicts that in structures like (3) where spreading occurs from more than one node, (the letters stand for an arbitrary set of features dominated by the relevant nodes) the processes are independent and ought not be represented in a single rule.

(3)   Laryngeal tier

Root tier

Supralaryngeal tier
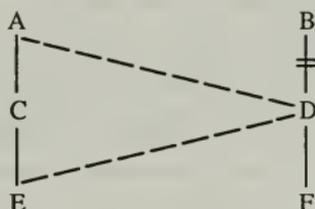
Clements (1985) discusses apparent counterexamples to this otherwise interesting constraint on the nature of spreading in assimilation and shows how they are accounted for by other general factors in the languages concerned.   Here, we will only review the examples Clements cites from Kikuyu, a Bantu language of Kenya.   In this language, there is a general process which assigns the features {-continuant} and {+voiced} to post-nasal obstruents.   The relevant data are presented below (from Clements 1985:244).

(4)	Imperative			1st singular Imperfect	Stem (gloss)
	βur	-	a	m-bur-eetε	'lop off'
	tem	-	a	n-dεm-εetε	'cut'
	reh	-	a	n-deh-eetε	'pay'
	Cin	-	a	ñ-jin-eetε	'burn'
	Kom	-	a	ŋ-gɔm-εetε	'sleep'
	ɣor	-	a	ŋ-gor-eetε	'buy'

Here, it can be noted that the obstruents following the nasal consonants become voiced non-continuants.   Within the framework proposed by Clements, this assimilation process can be accounted for

by assuming that the feature {-continuant} and {+voiced} of the preceding nasal spread on to the following obstruent as illustrated below.[2]   (Here, as well as in subsequent discussions, we follow Clements in assuming that the feature {nasal} is a manner feature dominated by the supralaryngeal node).

(5)   Laryngeal tier   {+voiced}   {•}

       Root tier   •   •

       Supralaryngeal tier   {+nasal} {-cont}   {+obst}

But, as Clements remarks, spreading in (5) involves two independent nodes, the feature {-continuant} belonging to the supralaryngeal tier and the feature {+voiced} belonging to the laryngeal tier.   Thus, there appears to be no way within the framework under consideration in which this assimilation process could be expressed in terms of the spreading of a single node.   This set of data, therefore, appears to constitute a counterexample to the single-node spreading hypothesis.

Clements, however, proceeds to show that the Kikuyu data cease to be recalcitrant once other factors of Kikuyu phonology are considered.   Particularly, he argues that the feature {voiced} is redundant in Kikuyu and therefore need not be specified underlyingly. This therefore implies that in a tree structure such as (5) the feature {voiced} need not be included, which means that it cannot spread. The argument that voicing is redundant in Kikuyu is based on the following factors: Firstly, all sonorants in Kikuyu are voiced, secondly voicing is also predictable in obstruents: Stops are voiced after nasals, otherwise they are voiceless; fricatives are also always voiced.   This would then seem to suggest that the assimilation rule in (5) only involves the feature {-continuant} and a redundancy rule assigns the feature {+voiced} later to the segments to yield the correct output.   The Kikuyu assimilation process therefore does not provide a genuine counterexample to the claim that only single nodes assimilate in tree structure.

Clements goes on to suggest that this interesting intersection between phonological redundancy on the one hand and assimilation and feature representation on the other may turn out to be a vital clue in explaining some cases of apparent exceptions to his views on feature-spreading in assimilation in the sense that one or more of the features involved may not yet be present in representations, such features being added later by redundancy rules.

It is my conviction here that Clements's hypothesis defines a more constrained theory of assimilation and, unless challenged by empirical evidence, it should be considered a viable hypothesis.

In this paper, I use evidence from Chiyao to support the single-node spreading hypothesis. I argue that a series of assimilation rules in Chiyao involving the same features as in Kikuyu (i.e. {-continuant} and {+voiced}) which appear to require spreading to affect more than one node present further supporting evidence for the view that most of the apparent exceptions to the single-node spreading hypothesis can be explained in terms of one of the features being redundant. That is, the notion of redundancy provides considerable insight into the nature of feature spreading in multi-tiered representations and assists in our efforts to preserve a more constrained theory of phonology.

4.0   Assimilation in Chiyao: Apparent counterevidence

Chiyao has a class of assimilation processes which are, in many respects, similar to the Kikuyu case.[3]   There are several assimilation rules in this language (a full discussion of such rules is available in Mtenje In Preparation) but the rules that will concern us in this paper are the following: post-nasal stop formation I, consonant-voicing, and post-nasal stop formation II.   We will first formulate these rules individually before collapsing them into one general assimilation rule.

4.1   Post-nasal stop formation I

This rule changes /l/ to /d/ when it occurs after a nasal consonant in the perfective tense.   Consider the following forms where /ku/ is the infinitive marker and the /a/ at the end of the verb is the final vowel characteristic of Bantu languages.   (I omit tone details here and in all subsequent data because they are irrelevant to the present study).

(6) a) ku-lapit-a   'to lick'
     b) ku-liŋg-a   'to try'
     c) ku-lokot-a   'to pick up'
     d) ku-lila   'to cry'

Now, the perfective tense in Chiyao triggers interesting phonological processes (see Mtenje In Preparation for more examples).   One such process is the change of /l/ to /d/ in post-nasal environments.   A characteristic way of expressing this tense is by prefixing a subject marker (SM) to the root and then suffixing either -e or -ile to the root as the tense marker (TM).   The phonological alternations triggered through this process are illustrated in (7) below (syllabic nasals are noted by subscript dots).

(7)	SM	-	Root	-	TM		
a)	n	-	lapit	-	e →	ndapite	'I have licked'
	m̩	-	lapit	-	e →	m̩lapite	'You (singular) have licked'
	a	-	lapit	-	e →	alapite	'He/she/they have licked'
	t u	-	lapit	-	e →	tulapite	'We have licked'
b)	n	-	liŋg	-	ile→	ndiñǰile	'I have tried'
	m̩	-	liŋg	-	ile→	m̩liñjile	'You (singular) have tried'
	a	-	liŋg	-	ile→	aliñǰile	'He/she/they have tried'
	t u	-	liŋg	-	ile→	tuliñǰile	'We have tried'
c)	n	-	lokot	-	e →	ndokwete	'I have picked'
	m̩	-	lokot	-	e →	mlokwete	'You (singular) have picked'
	t u	-	lokot	-	e →	tulokwete	'We have picked'
d)	n	-	lil	-	ile→	ndisile	'I have cried'
	m̩	-	lil	-	ile→	m̩lisile	'You (singular) have cried'
	a	-	lil	-	ile→	alisile	'He/she/they have cried'

Here, I am mainly interested in the alternation between /l/ and /d/ shown root-initially in the forms *ndapite*, *ndiñǰile* and *ndokwete*. (For changes which are irrelevant to the present study such as the palatalization of /g/ to /ǰ/ before /i/ in (7b), the change of *ko* to *kwe* in (7c) and the /l/~/s/ alternation in (7d), see Mtenje In Preparation for details. Note that /l/ changes to /d/ only when the preceeding nasal is tautosyllabic with it. When that nasal belongs to a different syllable as in the forms *mlapite*, *mlokwete*, *mliñǰile* and *mlisile*, the change fails to occur.

Within the framework assumed above, where assimilation involves spreading, this process can be accounted for by a rule such as that given in (8) where the feature {-continuant} characterizing the nasal consonant spreads on to the following lateral. (Rule (8) shows the relevant tiers only).[4]

(8)   Post-nasal stop formation I

| Manner tier | {+nasal} {-cont} | {+lateral} |
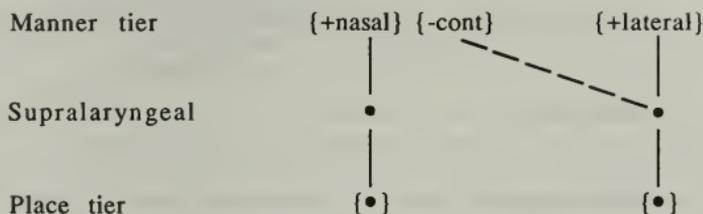
4.2   Consonant voicing

This rule voices a consonant which follows a nasal consonant. Consider the following data:

(9) a) ku - pel - a   'to be tired'
    b) ku - kat - a   'to cut'
    c) ku - timb - a   'to beat'

Now consider what happens when the verb occurs in the perfective tense as shown in (10).

(10) SM   ROOT   TM

    a) n   -   pel   -   ile → mbesile   'I am tired'
    b) n   -   kat   -   ile → ŋgatile   'I have cut'
    c) n   -   timb -   ile → ndimbile   'I have beaten'[5]

Here, the post-nasal stops are voiced.[6] It may be worth pointing out that like post-nasal stop formation I in (8), consonant voicing applies only to consonants which are tautosyllabic with the nasal. Note that the syllabic bilabial nasal /m̩/ does not trigger this rule as shown in (11).

(11) m̩   -   pel   -   ile → mpesile   'You are tired'
      m̩   -   kat   -   ile → mkatile   'You have cut'
      m̩   -   timb -   ile → m̩timbile   'You have beaten'

This voicing process can be accounted for within the spreading framework by assuming that the feature {voiced} from the nasal spreads on to the following consonant as shown below. (I assume the tautosyllabicity condition on the relevant segments.)

(12) Consonant Voicing

Laryngeal tier	{+voiced}	{-voiced}
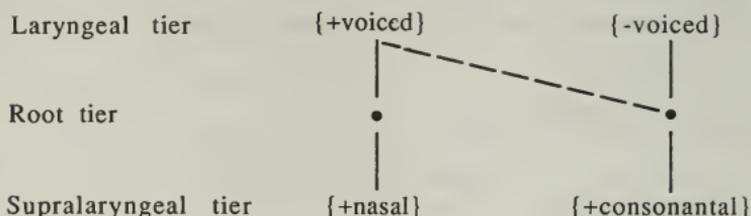
Let us now consider post-nasal stop formation II.

4.3 Post-nasal stop formation II

This rule changes the labial glide /w/ into the voiced bilabial stop /b/ in post-nasal environments. This change is shown in (14) where the initial glides in (13) occur in the appropriate post-nasal environments.

```
(13) a. wugul - a        'open'
     b. walaŋg - a       'read'
     c. wug - a          'cook'
     d. wik - a          'arrive'
     e. wečet - a        'talk'
```

```
(14) a. a    - n - wugul - ile → ambugulile - 'You open for me'
        you - me - open - for
     b. n    - walaŋg - ile  → mbalasile[7]    'I have read'
        I    - read - perfective.
     c. n    - wug - ile     → mbusile[8]    'I have cooked'
        I    - cook - perfective
     d. n    - wik - e       → mbiče[9]      'I have arrived'
        I    - arrive - perfective
     e. n    - wečet - e     → mbečete       'I have talked'
        I    - talk - perfective
```

Again, like Post-nasal Stop Formation I and Consonant Voicing, this rule also applies to tautosyllabic segments only. This can be observed in the following forms involving the syllabic bilabial nasal where the rule fails to apply.

```
(15) a. a    - m̩ - wugul - ile → amwugulile
        He/she - you - open - for
        'He/she should open for you (singular)'
     b. m̩   - walaŋg - ile   → m̩walasile
        you - read - perfective
        'You (singular) have read'
```

    c. m̥   - wug - ile   → m̥wusile
       you - cook - perfective
       'You (singular) have cooked'
    d. m̥   - wečet - e   → m̥wečete
       'You (singular) have talked'

From the point of view of spreading, we can account for this process by assuming that the manner features of the glide are severed and the feature {-continuant} characterizing the nasal spreads to the supralaryngeal node of the glide, thus appropriately changing it into a corresponding non-continuant with the same place of articulation as /w/, namely /b/. The rule achieving this result can be formulated as follows (assuming, again, the tautosyllabicity condition).

   (16)   Post-nasal stop formation II

4.4   Formulating a General Rule

Now, although rules (8), (12), and (16) are formulated as separate and independent rules, it can easily be noted that they share several elements in common. Firstly, in virtually all cases the segments affected occur in post-nasal environments. Secondly, in two of the rules ((12) and (16)), the spreading feature is {-continuant}. Finally, in all cases the process involves changing a consonant into a voiced non-continuant obstruent. It is thus obvious that stating these properties in three separate rules misses the crucial generalization that all the rules involve the feature {+voiced} and {-continuant}. One general rule is therefore needed to capture all these generalizations. The general rule, given below in (17), specifies that a post-nasal consonant becomes a voiced non-continuant through the spreading of the features {+voiced} and {-continuant}.

(17)   Voiced non-continuant formation

Laryngeal tier   {+voiced}   {•}

Root tier   •   •

Supralaryngeal tier   {+nasal} {-cont}   {-syllabic}[11]

At this point, let us review Clements's hypothesis on feature-spreading in assimilation processes and assess the extent to which it is compatible with rule (17) above. It may be recalled that Clements argues that spreading in assimilation involves only single nodes, i.e. only a feature or features dominated by a single node can spread. Rule (17) above which is in many respects similar to the Kikuyu assimilation rule presented in (5) requires the spreading of at least two features {-continuant} and {+voiced} from two different nodes, namely, the laryngeal and the supralaryngeal nodes.

Now, the crucial question that can be asked in relation to spreading in rule (17) is whether the rule is really incompatible with Clements's hypothesis and ipso facto indicates that the hypothesis is too strong and ought to be relaxed to allow spreading to affect more than one node in tree structure. The main claim of this paper is to demonstrate that, on the contrary, the Chiyao data do support Clements's single-node spreading in assimilation. I turn to this issue immediately.

4.5   Redundancy in Chiyao

It may be recalled that Clements accounts for the apparent contradiction to his hypothesis by arguing that in the Kikuyu data one of the features is redundant. I wish to argue here that a closer look at the phonology of Chiyao also shows that some of the features involved in rule (17) above are predictable and redundant and therefore need not be included in the formulation of that rule.

4.5.1 Voicing in Chiyao

The distribution of the feature {±voice} in Chiyao is interesting in a number of respects. To start with, note that the feature is underlyingly distinctive for non-continuant obstruents in V__V and #__V positions as shown in the data below.[12]

(18) / p /   / b /

    ku-pela   'to get tired'   ku-baŋgula   'to roar'
    ku-panda   'to plant'   ku-bindičila 'to stay indoors'
    ku-ponda   'to tread'   ku-bendula   'to break'

    / t /   / d /

    ku-tama   'to sit'   ku-dandaula   'to worry'
    ku-timba   'to beat'   ku-delela   'to despise'
    ku-tota   'to sew'

    / k /   / g /

    ku-kata   'to cut'   ku-ganda   'to be thin'
    ku-kulukutala 'to feel   ku-gomba   'to play music'
                    rough'   ku-gumba   'to mould'

    /č /   /ǰ/

    ku-čačuka   'to rush'   ku-ǰaliwa   'to be blessed'
    ku-čoma   'to burn'   ku-ǰembečela 'to wait'

This would appear to suggest that the feature {±voice} is nonredundant in crucial respects and needs to be underlyingly specified for all obstruents. However, notice that there are other environments (apart from derived post-nasal positions where rule (16) predicts the voicing) in which voicing redundancy is observed. There are underived (underlying) contexts in which the sequence Nasal+Voiced Stop (e.g. nd, mb, ng) is attested.[13] In these environments, the sequence Nasal + Voiceless Stop (e.g. $*nt$, $*mp$, and $*nk$) does not occur. This therefore shows that the {±voice} contrast is non-distinctive in that context. The implication is that in this position, the voicing value of the post-nasal stop need not be specified underlyingly. A redundancy rule, which would essentially be a feature-specifying rule, would fill in the missing value at a later stage.

On the other hand, in derived environments we do get a neutralizing/feature-changing effect where an originally voiceless obstruent becomes voiced after being attached to a nasal consonant. These are the cases which are handled by rule (17) above. We thus get into a dilemma where on the one hand, (in underived contexts) voicing is considered to be redundant, and where on the other hand, (in derived environments) the same feature is regarded as non-redundant. Obviously, positing two separate rules for the two contexts (one a redundancy and the other a feature-changing rule) is unattractive and unnecessary.

While a satisfactory solution to this problem still needs to be found, the case, nevertheless, forces one to speculate that before a feature becomes completely redundant it goes through a stage of

partial redundancy where its occurrence is predictable in some context(s). As the contexts of redundancy become wider, the feature's degree of redundancy also increases until it becomes predictable in all contexts and thus rendered completely redundant. I believe that this change from (feature) distinctiveness or total contrast to complete redundancy is already affecting the feature {voice} in Chiyao. It would thus not be surprising if at a later stage in the development of the language, this feature were to become entirely redundant and not be required in rules like (17) above.

The implication of this observation for the spreading of voicing in rule (17) is that although the feature is contrastive in cases like (18), there is still a nonnegligible element of redundancy in that feature and given a thorough and more refined theory of feature representation (such as that proposed by Sagey (1986) and Clements (1987)) redundancy of this type can be appropriately characterized in ways which may probably not require voicing to be underlyingly specified and needed in assimilation rules like (17).

There is another theoretical issue which needs to be addressed in relation to voicing in clusters of the type N+C. In most Bantu languages, clusters like these are represented as in (19b) rather than (19a).

(19a)   O   (19b)   O
              / \ |
             X   X   X
             | | / \
             •   •   •   •
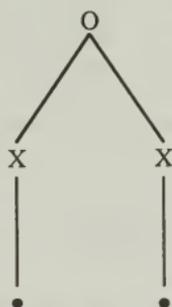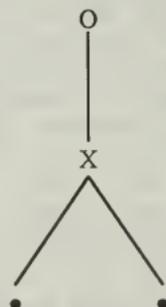
That is, the combination of a nasal and consonant constitutes a complex (contour) segment. Now, the question which arises is whether we want our theory of feature representation and geometry to allow for all kinds of contour segments including those which start out as {+voice} and end up {-voice}. The crucial fact worth noting is that such complex segments, (as far as I know) have never been attested in any natural language, although the theory does not exclude such cases (cf. for instance Lieber 1987:20 for a similar case).

The point being made here then is that an adequate theory of phonological feature representation should predict that cases like post-nasal consonant voicing in Chiyao which result in voicing

agreement within a complex segment are not surprising since they follow naturally from a general and universal effect characterizing feature composition and relations within such types of segments. That is, the theory ought to predict, in some way, the universal effect that no complex segment starts out as {+voice} and ends up as {-voice} and that the application of voice agreement (rules) simply avoids that unnatural situation. But notice now that if it is indeed true that such voice agreement phenomena are a result of a universal effect governing feature co-existence in complex segments, as it appears to be the case, then it is possible that formal rules like post-nasal consonant voicing which were needed to achieve this effect could very well turn out to be redundant and unnecessary, since those universal effects could be stated through some formal devices such as default rules, redundancy statements, filters, or formally equivalent mechanisms. Such a view of post-nasal voicing processes would thus render the inclusion of the feature {±voice} and its eventual spreading in the assimilation rule (17) unnecessary and ipso facto get rid of the two-node spreading problem.

4.5.2   The feature {continuant}

One issue which also undermines the two-node spreading problem and supports Clements' proposal is the status of the feature {±continuant} in obstruents. In the preceding discussion on assimilation in Chiyao, we assumed that this feature is underlyingly distinctive and therefore it had to be represented on a separate tier in rule (17) from where it spreads. However, close examination of the phonology of the language shows that this feature is redundant and need not be included in rule (17). The facts leading to this conclusion are as follows: In its inventory of obstruents, Chiyao has only one fricative sound, namely /s/. (Notice, as a matter of interest, that voicing in fricatives is therefore redundant since there is only one fricative sound in the language whose {-voice} value could be supplied by default.) Now, and this is the crux of the argument, the entire range of obstruents can be adequately distinguished by using the feature {±strident}. The (only) fricative /s/ can be specified as {+strident} and the remaining set of obstruents, i.e. stops and affricates, will automatically be characterized as {-strident}. The feature {-continuant} which also characterizes the nonstrident obstruents, is then effectively rendered redundant and can be filled in by a default rule later, after the main assimilation process which marks all {-strident} obstruents as {-continuant}.

The observation made above about the feature {±continuant} being redundant now effectively gets rid of the two-node spreading problem presented by rule (17). That is, the fact that this feature is redundant means that it need not be included in rule (17) and

therefore it cannot spread in the manner indicated in that rule. Thus even if we were to assume (for the sake of argument) that the feature {±voice} is not sufficiently redundant to be excluded from rule (17), the Chiyao assimilation process does not offer counter-evidence against the hypothesis that spreading in assimilation only affects single nodes in tree structure, since only the feature {±voice} would spread from the laryngeal tier (with the feature {-continuant} being supplied by default later in the derivation). Thus Chiyao provides interesting supporting evidence for the strong and more restrictive position that only single nodes can spread during assimilation. Furthermore, it supports Clements's claim that the intersection between phonological redundancy and assimilation on the one hand and feature representation on the other provides one of the most reliable clues in explaining cases where, contrary to the single-node spreading hypothesis, spreading appears to affect two different autosegmental nodes. A thorough investigation of the phonology of the language(s) concerned may very likely show one or more of the features involved to be redundant and thus not available for spreading at the time when one of the features assimilates.

5.0. Conclusion

This paper has argued that the notion of phonological redundancy provides considerable insight into problems related to feature spreading in assimilation. It has been shown that when thoroughly investigated, feature spreading which appears to contradict Clements's single-node spreading hypothesis could be easily explained in terms of one of the features being redundant and thus not being available in tree structures at the time when assimilation occurs.

It has been demonstrated that the spreading of the feature {-continuant} and {+voice} in Chiyao, for instance, which appears to affect two different autosegmental nodes does not constitute counter-evidence against the hypothesis that only single nodes spread, because one of the features {-continuant} is redundant and thus does not feature in the main assimilation rule. Besides, there is some indication that even the feature {±voice} is redundant to some degree (although not completely) and, given an elaborate theory of redundancy and feature representation, may turn out to be unnecessary too in the assimilation rule.

Finally, the discussion has also helped to show that it is a priori desirable to maintain the strongest possible hypothesis consistent with the scientific requirement of the simplicity hypothesis such as the single-node spreading, rather than to start with a weak hypothesis which fails to impose the strongest possible constraint on the phenomena being studied. In terms of spreading, the weak

position is the one that would allow spreading to affect virtually any number of nodes.   The need for strong constraints is particularly pertinent when the area being investigated — such as that involving tier structure and composition — still requires much research work to be done.

NOTES

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[1] Other versions of phonological feature representation have also been proposed.   Hayes (1986b) for instance accepts the general geometric view proposed by Clements but differs from his theory in terms of tier composition and representation details.

[2] The voicing quality of the obstruent does not appear to be crucial in the formulation of the rule since there is no evidence that the obstruent must be initially voiceless.   In fact, /r/ in /reha/ would normally be considered voiced and would still undergo the rule, albeit vacuously.   On these grounds, then, the voicing value of the obstruent can be left unspecified.   (This is symbolized as {.} in the diagram).   In subsequent discussion, the symbol {.} will be used to represent features which need not be specified or stated in a rule because they are not crucial.

[3] These phonological processes are commonly attested in many Bantu languages, suggesting a common source, probably in Proto-Bantu or one of its branches.

[4] I also assume the following conditions: (i) The two segments are tautosyllabic, (ii) the change occurs in the perfective tense (cf. Mtenje In Preparation for discussion).

[5] There is a general rule in Chiyao (and in Bantu in general) of nasal assimilation which assimilates nasals to their following consonants in place of articulation.

[6] The rule is general and is not restricted to any particular tense. Note that even forms from the progressive tense undergo the rule as shown below:

n - ku - kata   →   ŋgukata   'I am cutting'
I-prog-cut

n - ku - timba   →   ŋgutimba 'I am beating'
I-prog-beat

⁷ There is an independent rule which changes stops into fricatives in the context {+nasal}___{i} in the perfective tense. This rule is responsible for the change of /g/ to /s/ in this form (cf. Mtenje In Preparation for details).

⁸ An alternative form used in other dialects is {mbujile}. This is obtained through the application of a general rule of palatalization which changes velar stops into their corresponding palatal affricates before front vowels, hence the alternation between /g/ and /ǰ/ in this form. For these dialects, palatalization is ordered before the /g → s/ rule, while the dialects using {mbusile} use the reverse order.

⁹ The same palatalization referred to in footnote (8) above is responsible for the {k}~{č} alternation here.

¹⁰ It may be argued that the feature {syllabic} is phonetically not a manner feature but just a class feature referring to the function of segments. Here the feature {syllabic} is being considered as a major class feature like the features {consonantal}, {sonorant}, etc.

¹¹ The feature {-vocalic} can also be used in place of {-syllabic} to cover the class of obstruents, laterals, and the glide /w/.

¹² All the voiced stops are implosives.

¹³ One finds forms like *mboga* 'type of food', *ndawi* 'time', *ŋguku* 'chicken', *ligaŋga* 'stone', *likambale* 'type of fish', *lindanda* 'egg' etc.

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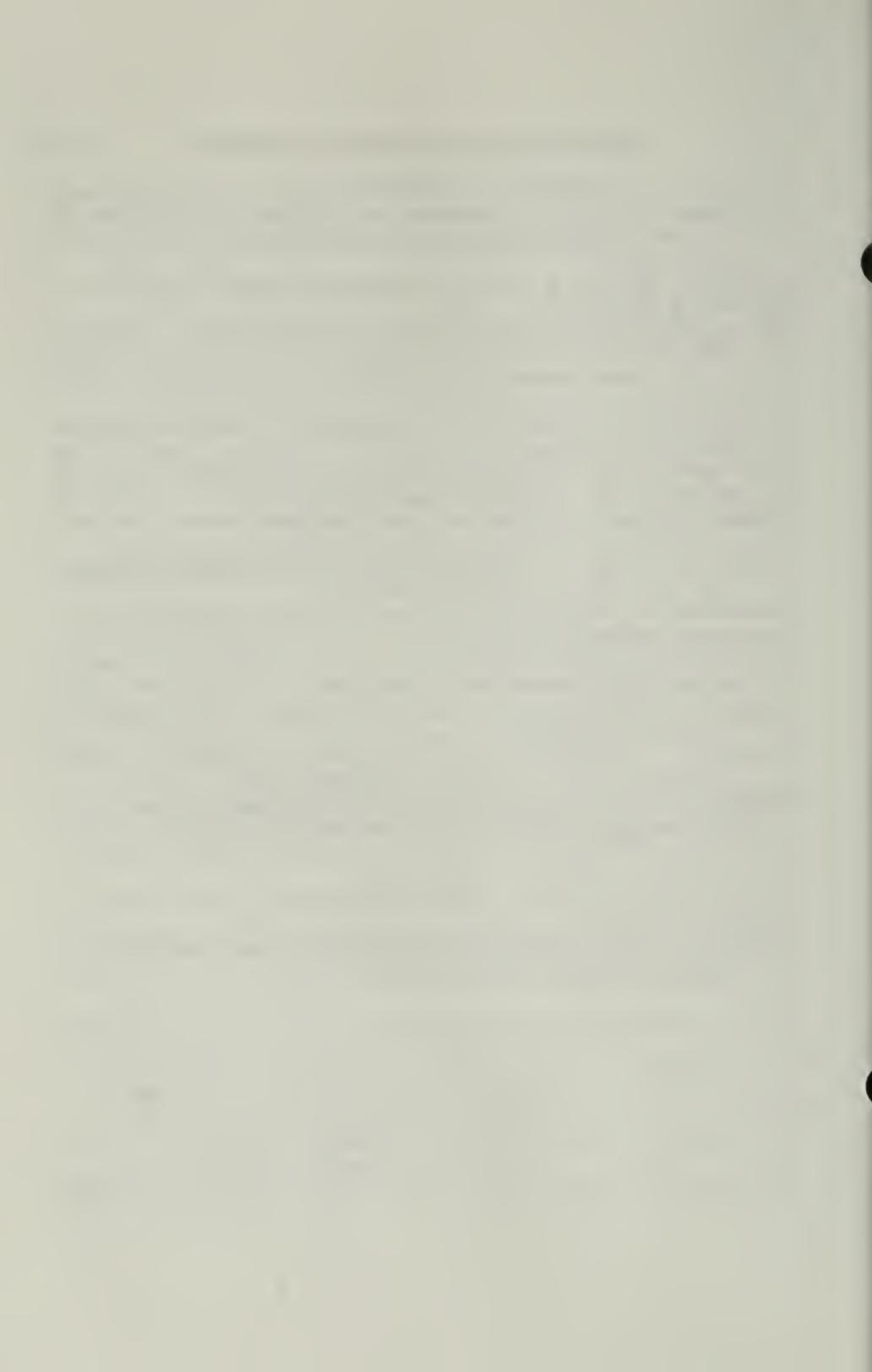
SCHWA FRONTING IN HINDI*

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This paper presents an analysis of Schwa Fronting (SF) in standard Hindi. I show that SF is an ongoing change in the language, especially in its eastern varieties. Moreover, it is subject to lexical restrictions. In lexical phonology terms, then, it is a process of the lexical component. Two synchronic analyses are possible, one in terms of an assimilatory process, the other in terms of underspecification. After discussing the relative advantages — and problems — of the two approaches, I examine the question of motivation of SF. I argue that a motivation can be found in a dynamic approach to linguistic description which conceives of evolution as inherent to linguistic creativity.

0.   Introduction

In this paper, I present an account of Schwa Fronting in standard Hindi with a two-fold purpose: to describe an ongoing change in standard Hindi, and to show the relevance of this change to the issue of naturalness in phonological theory. With regard to the latter, I argue that innovative processes such as Schwa Fronting in Hindi, which do not show a universal regularity of alternation, are difficult to explain within the prevailing static approach of the universalist theory of generative phonology. The latter defines 'naturalness' of phonological rules on the basis of finding a correlation between alternating segments and their distribution. I shall try to show that within a dynamic approach to linguistic description, which conceives of evolution as inherent to linguistic creativity, the 'naturalness' of such processes can be better appreciated.

1.   Analysis

1.1. The data for the present description were elicited from speakers coming from different speech areas of standard Hindi. In all, fifteen speakers were interviewed. Six of them represented the western variety, as spoken in Delhi, Mathura, and Etah. Another group of six represented the eastern variety, as spoken in Varanasi, Jaunpur, and Rewa. The remaining three represented the variety spoken in the central region, Kanpur.[1]

The first six speakers, representing the two varieties, eastern and western (three each), were asked to read in normal tempo a minimal list of 91 words containing 39 words having /ə/ in different environments. The other nine speakers (three for each region) were given an additional list of 29 words to test the hypotheses formed following the elicitations from the first six speakers. Instances of Fronting were recorded by two persons, including myself. In case of differences between the two recordings (which were rather limited), the speakers were asked to pronounce the forms again, until an agreement between the two records was reached.

1.2. Schwa in standard western Hindi is fronted before /h/, which may be followed by a consonant or a schwa, as shown in the examples below.[2]

(1) a. [kə<hna:]   'say' (Inf.)   b. [šə<hər]   'city'
       [pə<hna:]   'wear' (Past)   [Thə<hər]   'stop' (Imp.)
       [gə<hna:]   'jewelry'   [nə<hər]   'canal'
       [mə<hka:]   'smell+past' (Intr.)   [bə<hən]   'sister'
       [pə<hla:]   'first'   [pə<hər]   (part of day)
       [də<hla:]   'No. 10 card'   [ə<həŋka:r]   'pride'
       [lə<hga:]   'skirt' (N)   [[cə<həl][pə<həl]] 'cheerful
       [prə<hla:d] (a name)   movement'
       [əsə<hy]   'intolerable'
       [[gə<hma:] [gə<hmi:]] 'commotion'

     c. [kə<h]   'say' (Imp.)
        [sə<h]   'bear' (Imp.)
        [subə<h]   'morning'
        [tərə<h]   'like' (Adj.)

Exceptions to the above generalization are to be found in numerals, cf. e.g. the examples in (2).

(2) a. [bəhəttər]   'seventy-two'   b.[3] [gya:rəh]   'eleven'
       [sətəhəttər]   'seventy-seven'   [ba:rəh]   'twelve'
       ~ [sətəttər]   [te:rəh]   'thirteen'
       [əThəhəttər]   'seventy-eight'   [cɔ:dəh]   'fourteen'
       ~ [əThəttər]   etc.

Schwa systematically does not front before a consonant other than /h/, or if /h/ is followed by a vowel other than schwa:

(3) a.   b.
    (i) [kəmra:]   'room'   [rəho:]   'stay' (Imp.)
        [ləRka:]   'boy'   [məhila:]   'lady'
        [pətli:]   'thin' (Fem.)   [bəha:dur]   'brave'
        [gəmla:]   'flower pot'   [pəhũca:]   'reached'
        [nəmki:n]   'salty'   [səhu:liyət] 'facility'
        [həm]   'we'   [səhe:li:]   'female friend
        [həl]   'plough'

        (ii) [brəmmha:][4]   'Lord Brahma'
             [brəmmha:ND]   'universe'
             [əllhəR]   'innocent'
             [nənnha:]   'small' (Masc.)
             [kəT(ə)həl]   'tapioca'
             [ərhər]   (a type of pulse)

1.3. We must rule out possible but untenable explanations for the process. Note that the change is not affected by the prosodic structure of words, as the process of Hindi Schwa Deletion is (cf. Pandey To Appear). Although the fronted /ə/ in (1) is stressed ((a) and (c)) or stressable (i.e., tending to be stressed), as in (b), there are clear cases of unstressed [ə<], as for example in (4).

        (4) [pə<hcá:n]   'acquantance, identity'
             [mə<hə́ttw]   'importance'
             [mə<hə́tta:]   'importance'
             [Tə<hə́lna:]   'to stroll'

Moreover, even when /ə/ is stressed, it is not fronted before /h/ if the latter is followed by a vowel other than /ə/; cf. e.g. /məhila:/ 'lady' in (3b) above.

1.4. Clearly, then, one of the factors influencing /ə/-fronting is its melodic sequential occurrence. The rule of /ə/-fronting can be informally stated as follows.

        (5) Schwa Fronting (informal version):
             /ə/ is fronted before /h/ if the latter is not followed
             by a vowel other than /ə/.

(5) may be formally stated as (6), ignoring segmental feature specifications.

        (6) Schwa Fronting
             /ə/ → [-back] / __ /h/
             Condition: /h/ is not followed by a vowel other than /ə/.

It is not immediately apparent as to why Schwa Fronting (SF) should include the condition regarding the following vowel being other than /ə/. But I shall not go further into a formal investigation of the process at this stage. I shall return to it in the next section to show that phonological theory must treat processes such as SF as expectedly idiosyncratic, rather than 'unnatural', on account of their relatedness with the diachronic dimension.

2. Descriptive relevance

2.1. Spread in eastern standard Hindi

The fronting of schwa is a characteristic feature of western Standard Hindi. This fact has not found mention in the literature on

Hindi phonology. Kelkar (1968) notes it as characterizing the 'micro-lects' Urdu and Hindi-Urdu, in contrast to Hindi which has non-front /ə/. Kelkar specifies the environment for SF in the former microlects as a following /h/ which is followed by any vowel (i.e., not only by /ə/). While Urdu certainly has a predominance of fronted schwa, Hindi-Urdu and Hindi are found, in the present investigation, to have dialectal differences within them, which are being gradually lost.

Two main varieties of Standard Hindi(-Urdu) are recognized — eastern and western.[5] I find Schwa Fronting to be a hall-mark of the western standard.[6] Speakers of the eastern variety show a range of manifestations, depending upon many factors.

Within the Eastern Standard, two main types of speakers are found. One are diglossic speakers, who use the standard variety in formal situations, while for informal interaction they use a regional variety. The other type speak only the standard variety. Speakers of both types show a range from total absence of Fronting to its systematic presence. The latter type of speakers tend to have Fronting more frequently in their speech. The productivity of the rule seems to involve many factors, including age, mobililty, exposure to the western standard, etc.[7] which need to be more closely investigated.

In short, SF in eastern Standard Hindi is a case of sound change in progress.

In the present investigation, with its limited scope, two of the six eastern Hindi speakers were found to show no trace of a fronted schwa in a total of 39 forms, and one has it in only four forms: [təˤhkha:na:], [təˤhki:ka:t], [məˤhfil], [dəšəˤhra:]. The other three have it in 14, 23, and 34 forms, respectively. The results are presented in Table 1 below.

	Nil	1-10	11-20	21-30	31-39
No. of speakers:	2	1	1	1	1
No. of FS forms:	0	4	14	23	34
Perc. of FS forms:	0%	10%	36%	60%	87%

Table 1: Fronted schwa in eastern Standard Hindi:
          Sound change in progress.

As compared to eastern Hindi, the western Hindi data show a high percentage of the stable occurrence of fronted schwa. Five of the six western Hindi speakers were found to have common fronted schwas in 35 forms (90%) — the individual differences among them involve only 4 of the forms (10%). I guess the differences in non-occurrence of fronted schwas in these instances are attributable to the fact that the forms are in infrequent use in colloquial speech, e.g. [prəˤhər] (part of the day). The three speakers from the central region (Kanpur) testify to the presence of fronted schwas in this area;

but the number of common fronted schwas in their speech is smaller — 27 (69%), with individual scores of 28, 30, and 35.

The preceding brief discussion of SF spread in eastern Standard Hindi makes it clear that we are dealing with a change in progress and that the change is taking place slowly and irregularly, by lexical diffusion.

This fact is consonant with the predictions of lexical phonology (Kiparsky 1988): The theory of lexical phonology (Kiparsky 1982, 1985; Mohanan 1986) distinguishes between two modular applications of rules — lexical and postlexical. Broadly speaking, lexical rules apply within words, can be cyclic, have exceptions, and involve lexically distinctive features. Postlexical rules have the opposite characteristics: They apply across the board, are non-cyclic and exceptionless, and can introduce novel features. This modular distinction has been found to have interesting implications for resolving the neogrammarian controversy (for which see Labov 1981, Hock 1986). It is now well-known that sound change can take place both by lexical diffusion (cf. e.g. Wang 1977) and exceptionless change, as claimed by the neogrammarians and attested by recent sociolinguistic investigations of sound change in progress (cf. e.g. Labov 1981). According to Kiparsky (1988), the difference in the two mechanisms of sound change spread is predicted by the existence of two types of rule applications. Since lexical rules involve distinctive features and can have exceptions, it follows that 'lexical diffusion must be a redistribution of phonemes among lexical items and cannot create any new phonological contrasts.' Postlexical rules which do not admit of exceptions are expected to undergo exceptionless or 'neogrammarian' change.[8]

Now, returning to Schwa Fronting in Hindi, the evidence from the exceptions in (3) suggests that it must have lexical application. Moreover, it involves lexically distinctive features. The lexical diffusion of the process in eastern Hindi thus is consonant with Kiparsky's claims. The underspecification account of Schwa Fronting in the following section provides another reason, as we shall see, for treating it as a lexical rule.

2.2. Rule formalism

2.2.1. Schwa Fronting, as stated in (6) (and (5)), must contain a stipulated condition. Even otherwise, there is no natural correlation apparent between the change and the environment in the rule. For an explanation of the rule, therefore, it must be shown either that there is a correlation between the fronting of schwa and /h/, or (keeping the conditioning in mind) that schwa has an exceptional property, not shared by the other vowels in the language. The former is the standard strategy in phonological analyses of explaining a rule as

plausible and natural on the basis of relating the alternating seg-ments with their distribution. The latter approach is currently fol-lowed in the underspecification theory (cf. e.g. Archangeli 1984, Pulleyblank 1988), which explains the exceptional behavior of a seg-ment to rules of alternation in terms of its being underspecified for a feature in the underlying representation.

Let us briefly turn to the first alternative of finding a distribu-tion-driven explanation for (6). Note that Chomsky & Halle (1968) assign the feature [+low] to [h] and to pharyngeal consonants. Indian phoneticians (e.g. Allen 1951) consider [h] and [ə] to be homorganic. If, then, Hindi /ə/ can be treated as a low vowel, we have a way of relating /ə/ to /h/ by revising (6) as (7):

(7) $\begin{bmatrix} +\text{low} \\ -\text{long} \end{bmatrix} \rightarrow$ [-back] / ___ $\begin{bmatrix} C \\ +\text{low} \end{bmatrix}$

Condition: /h/ is not followed by a vowel other than $\begin{bmatrix} +\text{low} \\ -\text{long} \end{bmatrix}$

The formulation in (7) is the only form by which SF can be shown to have a natural relation between the alternating segments and the environment. (7), however, still does not provide much by way of an explanation of the condition by which it is restricted. Without that condition, we might perhaps be able to consider SF to be an assimilatory process, which assimilates the vowel /ə/ to the [-back] feature of the homorganic following /h/ — provided that /h/ can indeed be classified as [- back].[9] (See also 2.2.2 below.) But the condition on (7) does not provide any support for an assimilatory account.

An explanation for the exceptional behavior of /ə/ in Hindi is possible within the underspecification approach: /ə/ can be shown to be the only underlying Hindi vowel whose features are totally un-specified, whereas all the other vowels are specified for at least one feature. The distinctive feature specifications for Hindi vowels are given in Table 2. Table 3 provides a tentative underspecified repre-sentation of the vowels underlyingly.

	i	iː	eː	ɛː	ə	aː	oː	ɔː	u	uː
[high]	+	+	-	-	-	-	-	-	+	+
[low]	-	-	-	+	+	+	-	+	-	-
[back]	-	-	-	-	+	+	+	+	+	+
[long]	-	+	+	+	-	+	+	+	-	+

Table 2: Distinctive features for Hindi vowels

	i	i:	e:	ɛ:	ə	a:	o:	ɔ:	u	u:
[high]	+	+							+	+
[low]	-	-	-			-	-	-	-	
[back]	-	-	-	-						
[long]		+	+	+		+	+	+		+

Table 3:   Underspecified representation of Hindi vowels

Following Archangeli (1984), I assume that the features for the underspecified segments are filled by Readjustment rules of the following type:

(8) a. [+low] → [-high]
     b. [   ] → [+low]
     c. [   ] → [-high]
     d. [   ] → [+back]
     e. [+low] → [+back]
     f. [   ] → [-long]

Notice that Table 3 shows only /ə/ to be fully unspecified. All other vowels are underspecified for at least one feature. There is some independent evidence to support the above observation regarding /ə/: Only unstressed /ə/ undergoes deletion, subject to certain conditions (cf. Ohala 1983, Pandey To Appear). Secondly, vowel epenthesis between consonant clusters is a wide-spread process in the regional dialects of Hindi. The epenthesized vowel normally is [ə], as in (9) below.[10]

(9) [prədi:p]   → [pərdi:p]   (a name)
     [kle:š]   → [kəle:š]   'sorrow'
     [mle:kš]   → [məle:kš]   'a foreigner' (obsolete)
     [jəyədrəth]   → [jəy(ə)dərəth]   (a name)

Considering the special underspecified property of /ə/ in Hindi, the condition in (5) appears quite reasonable. (5) may thus be alternatively rewritten as (10):

(10) Schwa Fronting (informal version 2):
     /ə/ is fronted before /h/, if the latter is not followed by a vowel specified for some feature.

The formal version of (10) is as follows:

(11) Schwa Fronting (formal version 2):
     /ə/ → [-back] / __ /h/
     Condition: /h/ is not followed by a vowel specified for some feature.

In fact, given the nature of underspecification theory, it is possible to reformulate the process even more insightfully, as in the informal version of (12).

(12) Schwa Fronting (informal version 3):
/ə/ is fronted before /h/, which may optionally be followed
by a consonant on the SEGMENTAL tier.

Since schwa is completely unspecified on the segmental tier, it is invisible with respect to SF, and a consonant following it does not block fronting. A more formal version of (12), then, is as follows:

(13) Schwa Fronting (formal version 3):
/ə/ → [-back] / __ /h/ (C)

The environments in which SF applies are the following:[11]

(14)   a.   :   b.   : :   c.   :   :
               :   : :   :   :
Root: •   • •   •   •
               | | | | |
Skeleton: X X   X X X   X X X X
            ə h   ə h C   ə h ə C

Note that rules (11)/(13) and (7) contradict each other. Whereas the assimilation rule (7) has /ə/ specified for the feature Low, (11) and (13) must assume it to be underlyingly unspecified. The question that the alternative formulations of Schwa Fronting raise is, which of them is preferable? I am not aware of any grammar-internal considerations that would lead to a choice between the alternative formulations. The underspecification account has the advantage of elegance; but to carry conviction, it would require a more thorough analysis of the phonological structure of the language. The account in (7) is attractive in that it may provide a motivation for fronting — if an analysis of /h/ as [- back] can be justified (cf. also below). If the problems with either account can be solved, it might even be possible to combine the two accounts.

2.2.2. A dynamic approach to explanation

It is my contention that within a dynamic approach to linguistic analysis, a rule such as SF is expected to have idiosyncratic properties as regards comparative phonological considerations. From the dynamic point of view, we must focus not on the alternating segment, i.e. /ə/, but on the TRIGGER that induces the alternation, i.e. the following /h/, for reasons that will be apparent in a moment.

/h/ is known to play a significant role in inducing phonological change in Indian languages (cf. e.g. Chatterji 1960, Vajpeyi 1981). Note that it is the only sound which is stated in two 'pratyāhāras' by Pāṇini — in one of them, the last, it occurs alone.[12] The loss of medial [h] and of 'aspiration' in voiced sounds in Punjabi has given rise to substantial change in Punjabi phonology (cf. Chatterji 1960:113-14 and Hock 1986 with references). In East Bengali, /h/ has become a glottal stop, among other related changes (Chatterji 1960:112-13).

Gujarati has acquired murmured vowels under the influence of medial [h] (which is lost) and of voiced aspirates (cf. Pandit 1957). Besides, [h] has led to other types of alternations, accompanied by its loss, in other languages. Thus in Chaddho, an American Indian language described in Chafe 1968, [h] is lost if followed by a sequence of two consonants, and a preceding vowel gets stressed. Similarly, in the Gitskan dialect of Tsimshian (Anderson 1974:175-178), [h] is deleted intervocalically, leading to the lengthening of short vowels.

The cloudiness concerning the motivation and condition for (7) might clear up if we look at (7) as a prelude to a possible sound change in the language. Is the language preparing itself for a loss of /h/? If so, then /h/ is about to be lost after /ə/ word-finally, before consonant, and before /ə/, but not before other vowels. Fronting of a preceding schwa may then be a way of leaving a trace of its loss in the language, just like murmur in Gujarati, tone in Punjabi, stress in Chaddho, and vowel lengthening in Gitskan Tsimshian.

Considering the comparative evidence of other languages, this is not an implausible hypothesis. In this regard, it is interesting to note that the loss of /h/ after a fronted schwa, or rather after [ɛ] < /ə/, is a common feature in some varieties of western Hindi, and of Rajasthani, giving rise to forms such as [pɛ:la:] for /pəhla:/ 'first', [kɛ:na:] for /kəhna:/ 'to say', etc.

What is more, the loss of /h/ is already taking place in standard Hindi in stray cases, as in [che:], [chɛ:] < /chəh/ 'six'. And as observed in note 1, the optional loss of word-final /h/ in the numeral forms of (2b) leads to the lowering of /ə/ to [a].

The loss of /h/, combined with Schwa Fronting, can be expected to lead to a fully front vowel /ɛ:/ or /e:/. Notice that this is a tense and long vowel. The loss of /h/ thus may be a case of compensatory lengthening.

3. Conclusion

The alternation between [ə] and its fronted variant [ə<] or [ɛ:]/ [e:], which appears to be governed by unnatural conditions in a static conception of linguistic structure, is accepted as being naturally indeterminate within a dynamic conception of linguistic structure, in which a rule integrates not only with the rest of the synchronic structure (cf. Chomsky 1964:22), but also with its evolving structure (cf. Humboldt 1933 (also Robins 1987), Harris 1966:18-19, Vachek 1967, Stockwell & Macaulay (eds) 1973).[13] In tying up Schwa Fronting with a possible future loss of its trigger /h/, on the basis of its indeterminate role in inducing alternations and change in various languages, and of some evidence of its loss in the language and its dialects, we observe a complex dynamic picture of a change already

effected in western Hindi, taking place in the eastern Standard, and leading to a further change in the language.

A conclusion that seems to emerge from this investigation is that we need to distinguish between segments that alternate, and segments that induce alternation. The latter, such as /h/, may lead to indeterminate alternations, which are not subject to 'naturalness' explanations based on distributional facts. The only plausible explanation of their naturalness may lie in a dynamic conception of the organization of linguistic structure.

A dynamic model of linguistic structures is expected to distinguish, for the Evaluation Metric, phonological processes that integrate with the synchronic structure of a language from those that integrate with its evolution. Let us call them Type I and Type II processes, as the terms 'synchronic' and 'diachronic' do not adequately distinguish them. Note that Type II processes may be productive and synchronic, such as SF in Hindi, but still be involved in phonological change. They are either a result of a phonological change, or an instrument to it, and, unlike Type I processes, add to the cost of the grammar. Type II processes are thus not subject to the Simplicity Metric. As some of them are not easily distinguishable from Type I processes on grounds of productivity and distribution, they constitute an important area for further investigation within the research program of Universal Grammar (cf. Chomsky 1986). The Simplicity Metric, which takes into account only those phenomena that belong to the Core and excludes others as being a part of the Periphery, will find it difficult to provide a principled account of some of the Type II processes, unless the latter are properly investigated and defined. The investigation of such processes is expected to show the need to internalize the temporal dimension in linguistic theory, to whatever degree of idealization.

NOTES

*I wish to thank D. M. Joshi for comments on the paper.

[1] The reason why the same number of speakers were not chosen for the central region as for the western and eastern regions is that the focus of the present investigation is the eastern variety, where the process of change is beginning to take shape. Speakers from the western and eastern regions were consulted for comparative data in the first phase. Speakers from the central region were included in the second phase of data elicitation for the purpose of attesting the wide-spread presence of the process in Standard Hindi.

[2] Here as elsewhere, [ə<] indicates a fronted [ə].

3 In Colloquial Standard these forms have the variants [gya:ra:], [ba:ra:], [te:ra:], [cɔ:da:]. In all of these, the final /h/ is deleted, and the schwa is lowered and lengthened.

4 The [CCh] forms of these examples are underlyingly /Ch/, cf. Kelkar 1968.

5 For a little more on this, cf. Pandey 1989:78.

6 A bilingual speaker of Kashmiri and Hindi, Vijay Koul, has interesting data on this. In his speech, forms which belong to the common vocabulary of Kashmiri and Hindi have different pronunciations of schwa in the environments affecting Fronting. Schwa Fronting applies in his Hindi, but not in his Kashmiri. Some examples of his Hindi and Kashmiri pronunciations of the related forms are:

Hindi	GLOSS	Kashmiri
[kə<hər]	calamity	[kəhər]
[lə<hər]	wave	[ləhər]
[tə<hki:ka:t]	inquiry	[təhki:ka:t]
[mə<hfil]	a party	[məhfil]

7 Notice that education is invariably associated with Standard Hindi in the eastern region. The uneducated or not so well-educated normally speak the local dialect, or a non-standard form of KhaRi Boli.

8 For a revision of Kiparsky's claim, cf. Pandey 1990.

9 The question as to whether /h/ can be classified as [- back] is an interesting one, especially for the theory of feature geometry and the distinction between C and V features. It certainly deserves fuller investigation. For the time being, see Allen 1951 on diachronic evidence from Indo-Aryan that might provide further support for the view that /h/ may have properties affiliating it with front vowels. This evidence involves the change of final -as to -ē (as in *daiwas > Pali deve 'god'), presumably via -ah > -ai. Similarly Latin final -s has changed into -i in Italian (as in post > poi 'after(wards), then'), presumably via *-h (Hock 1986 with references). On the other hand, affiliation of /h/ with [+ back] is suggested by the normal Sanskrit development of -as to -o [-ō] in voiced contexts (as in *daiwas > devo 'god'), presumably via *-ah > *au; cf. again Allen 1951 with references to similar developments in Iranian.

10 Non-standard eastern Hindi has also an epenthetic [i] preceding word-initial /sC/ clusters, e.g.

Non-standard Forms	Standard Forms	Gloss
[iste:sən]	[ste:šən]	station
[isku:l]	[sku:l]	school
[isthəl]	[sthəl]	place

However, i-epenthesis before word-initial /sC/ clusters is a natural process, in the sense of Stampe 1973, and perhaps not peculiar to Hindi. Notice that in case of vowel epenthesis into initial /sC/ clusters, in certain dialects of Hindi, especially western ones, the epenthetic vowel is [ə], e.g. [səte:šən] 'station'.

[11] This refinement of the underspecification analysis has been suggested by Jennifer Cole.

[12] To the best of my knowledge, there is no generally agreed upon explanation for the occurrence of /h/ in the two pratyāhāras in Pāṇini.

[13] Post-Chomskian linguistics has seen an upsurge of dynamic approaches to linguistic analysis. Chief among these are the works of sociolinguists (e.g. Labov 1972), developmentalists (e.g. Bailey & Harris 1985), and those following the general systems approach (e.g. Mohanan 1989).

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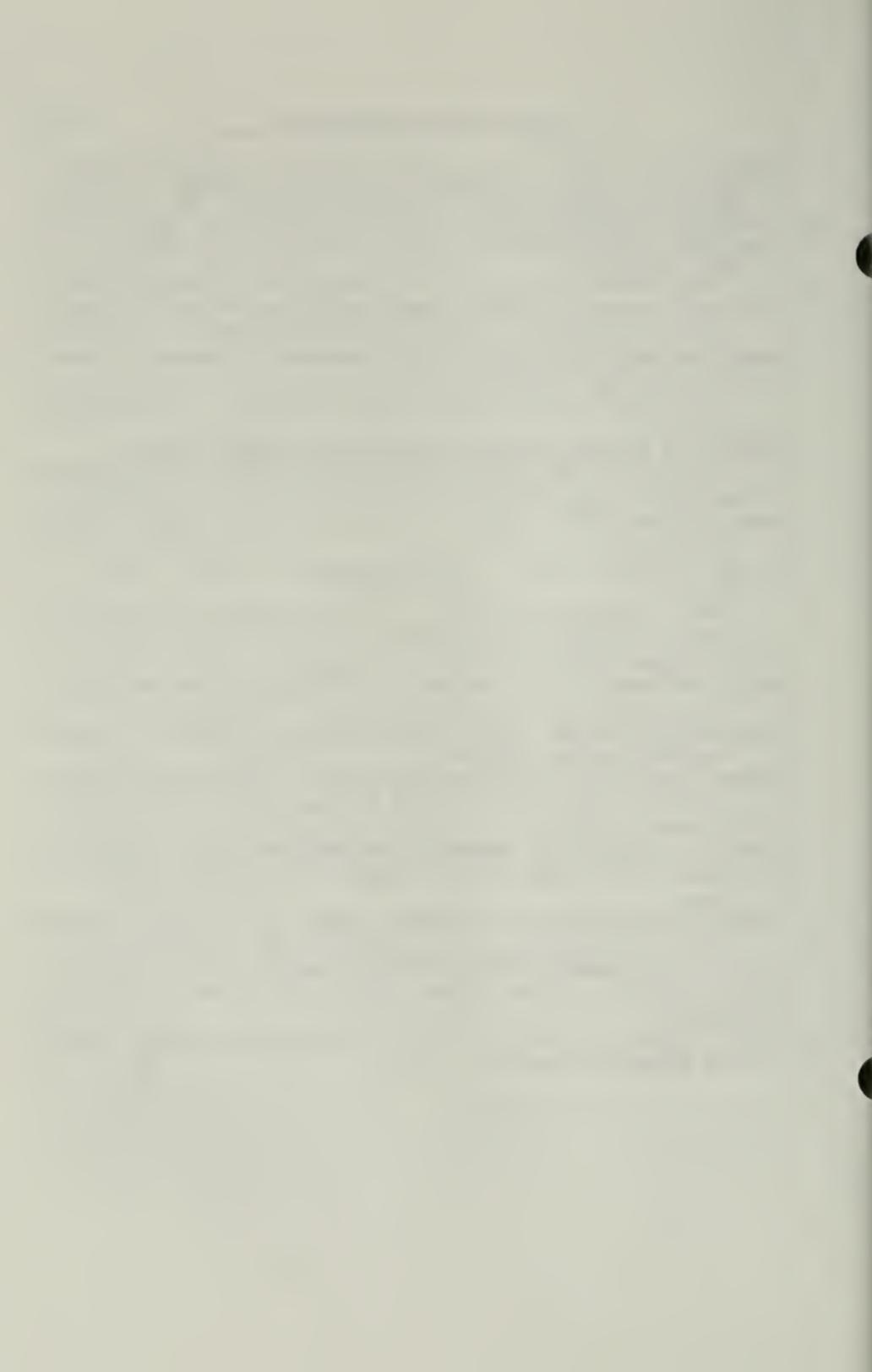
REVIEW

R. N. Aralikatti: **Spoken Sanskrit in India: A study of sentence patterns**. (Kendriya Sanskrit Vidyapeetha, Tirupati Series No. 53.) Tirupati (India): Kendriya Sanskrit Vidyapeetha, 1989. Pp. (xii +) xxiv, 278, + appendix of transcripts (pp. 1-172), indices, bibliography, and errata (i-xxviii).

Hans Henrich Hock

While there is a vast and ever-increasing literature on Vedic and Classical Sanskrit,[1] the use of Sanskrit in modern India has received little attention. In fact, the common assumption is that, like Latin, Sanskrit now is a dead language. The author of the monograph under review is one of the few linguists who has demonstrated that this assumption is erroneous: Sanskrit not only survives as a written language in which every year thousands of publications are produced, but also as a spoken language; cf. in addition to the book under review, Aralikatti 1976, 1980, 1981, 1982, 1991. In this respect, his work converges with my own (cf. Hock 1981, 1983, 1988); but my publications paint a bleaker picture of spoken Sanskrit, viz. as a dying language.

In addition, however, to establishing that Sanskrit is still alive, Aralikatti (A) has made it his life's goal to describe the nature of the modern spoken form of Sanskrit and to foster its continuous use, by developing materials for the teaching of spoken Sanskrit.

The present monograph, a slightly revised version of the author's 1983 Ph.D. dissertation at Sri Venkateswara University in Tirupati, is the most significant step in this direction and represents the results of years of research. It is based on transcriptions of taped telephone conversations, lectures, and conversations of speakers from all areas of India, as well as one foreigner, namely me. As the title suggests, the major emphasis of the volume is on sentence structure. Two chapters, however, are devoted to the question of how to preserve Sanskrit as a spoken language and what pedagogical approaches to direct toward that goal.

A brief introduction (1-13) is followed by Chapter II (14-42) which provides a preliminary view of Sanskrit sentence structure. Topics covered include a classification of sentences, null subjects, verb agreement, interrogative sentences, participial structures, and argument structure. Chapters III (43-60) and IV (61-83) cover the

structure of subject and object NPs.   Chapter V (84-95) is devoted to 'Complement structures'.   Chapters VI (96-103), VII (104-121), and VIII (122-165) take up the use of adjectives, adverbs (including sen-tential particles), and verbs, respectively.   'Minor and simple sen-tences' are dealt with in Chapter IX (166-186), and 'Complex and compound sentences' in Chapter X (188-211).   Chapter XI (212-232) briefly deals with other issues, such as pronunciation and loanwords, as well as regional variations in spoken Sanskrit. Chapter XII (236-252), 'Guidelines for a programme of spoken Sanskrit', outlines pedagogical applications of A's research.   The concluding chapter, XIII (253-264), advocates and attempts to justify the continued cultivation of Sanskrit as a spoken language.   An extensive set of notes, transcriptions, indices, references, and errata round out the volume.

The book is useful especially for its wealth of data on the syn-tactic structure of modern spoken Sanskrit.   Its information on pro-nunciation and lexicon is understandably less complete.

In addition, the attentive reader can find in the volume a large amount of information on regional differences in modern Sanskrit. Some of these are expressly mentioned by A.   These are mainly peculiarities of northern Indian usage.   Interestingly, a number of other differences go unmentioned, viz. those characteristic of southern usage and found prominently in A's personal speech.   (A is a native speaker of Kannada, a southern, Dravidian language.)

Among the peculiarities of northern speech cited by A (196) is the common practice of marking cited discourse by a preposed part-icle *yad*, as in (1).   (Formally, this is the nominative/accusative neuter of the relative pronoun.)   A is no doubt correct in attributing this usage to the influence of Hindi, where direct discourse similarly is introduced by a particle, viz. *ki*; cf. (1').   This contrasts with the normal traditional pattern of using a quotative marker *iti*, placed AFTER the direct discourse; cf. (2).   And again, A is correct in noting that this traditional pattern is fully preserved in the south; cf. (2'). What he fails to mention is that the usage finds strong support in the corresponding structures of the southern languages, which regularly exhibit a postposed quotative particle; cf. the Tamil example in (2"). Regional influence, therefore, may be going in both directions.

(1)   bhāratavidyāsamupāsakāḥ jānanty eva
      yat [asyāṁ vidyāyāṁ sa vidhih vartate ...]
            Direct Discourse
      'Devotees of Indian science know "In this science there
      is the rule ..." ' (Northern speaker; p. 40 of A's monograph)

(1') bhārat vidyā ke samupāsak jānte haiṁ
      ki [us vidyā meṁ yah vidhi hai ...]   (Hindi version of (1))
            Direct Discourse

(2) kathitam avalokitayā [madanodyānaṁ gato mādhava] iti
                                  Direct Discourse
    'Avalokitā said: "Mādhava has gone to the garden of the
    God of Love." ' (Mālat. 1:11)

(2') [samyag eva āsĩt] iti te kathayanti
    Direct Discourse
    'They say, "It was good indeed." ' (Southern speaker; p. 4-5)

(2") [nāṉ varuvēṉ] eṉṟu avaṉ soṉṉāṉ
    Direct Discourse Quotative Marker
    'He said "I will come." '

That this interpretation is on the right track is suggested by the structure of yes/no-questions. Classical Sanskrit used a variety of (optional) particles, but the most common one was *kim* (nominative/ accusative singular of the interrogative pronoun). In his discussion of yes/no-questions (179-182), A duly takes note of these structures in modern Sanskrit, but adds (182), without comment, the structure in (3) below, in which a particle *vā* follows the clause-final verb of the question. This usage is without direct precedent in traditional Sanskrit, where *vā* is a coordinating conjunction, normally meaning 'or'.[2] My observations show this structure to be the exclusive property of southern Sanskrit. And in the south, the usage can be accounted for as a calque of the normal Dravidian pattern of yes/no questions, in which a phonetically quite similar particle, -*ā*, follows the clause-final verb; cf. the Tamil example in (3'). Here, then, it is the southerners who have innovated, while the northerners preserve the older pattern (which, again, is supported by the structure of Hindi).

(3) kevalam ajñātvā pūrvatanāḥ evaṁ upāsanam akurvan vā
                                            Fin. Verb
    'Did (our) ancestors worship (the moon) ignorantly?'
    (Southern speaker)

(3') avaṉ pustakattai koṭuttāṉ-ā
                 Fin. Verb
    'Did he give the book?'

The fact that A does not consider this use of *vā* worthy of further discussion shows the extent to which it has become part and parcel of 'southern Sanskrit'. At the same time, however, his inability to take note of such southern regionalisms diminishes the value of his book to some extent.

Additional problems arise from the fact that his transcriptions are not always accurate. Now, transcribing taped conversations is a formidably difficult undertaking, and some minor mistakes are

bound to occur.   However, the transcription of a conversation involv-
ing me (pp. 140-147) differs extensively, and in many places pro-
foundly, from the taped original, a copy of which is in my possession.
I became alerted to this problem when I found A in his transcript
attributing to me the use of *vā* as question particle, a usage I was
sure is not part of my spoken Sanskrit.   While I do not have access to
the taped originals of A's other texts and thus cannot judge the
accuracy of their transcription, the evidence available to me suggests
that A's primary data must be used with some caution.   Fortunately,
the overall picture is not affected; the structures that A considers are
all very common in modern spoken Sanskrit.   The only aspect of
modern Sanskrit that IS affected is the issue of regional, or personal,
variation and peculiarities.[3]

A further difficulty arises from the fact that the book is marred
by a large number of misprints, as well as errors in the translitera-
tion of Sanskrit examples, only a small part of which is corrected in
the Errata.   One especially egregious example consists in the fact that
in the excerpt cited on p. 214 as an example of 'stress accent' in my
spoken Sanskrit, the promised accent marks are consistently absent.
(Most of these errors, of course, are attributable to the printers and
publishers.)

In spite of such difficulties, however, A's book presents a valu-
able contribution to the study of modern spoken Sanskrit, the only
ancient Indo-European prestige language that has remained in spok-
en use to the present day.

NOTES

[1] For syntax, note for instance the bibliography of Hock & Desh-
pande 1991.

[2] There is, to be sure, a special use of *vā* as emphatic particle in
Classical Sanskrit questions, as in *mānuṣiṣu katham vā syād asya
rūpasya sambhavaḥ* (Śak. 1) 'How indeed might there be such a
beauty among human females?'   However, this use is quite different
from that of *vā* as question marker in 'southern Sanskrit'.

[3] Thus, A's transcriptions in his appendix (114-115) contain a
few examples of *vā* in yes/no-questions of native Marathi speakers.
Rajeshwari Pandharipande (p.c., fall 1990) informs me that such use
is not found in the Sanskrit of Marathi speakers.   Are A's trans-
criptions here inaccurate?   Or are there some Marathi-speaking in-
dividuals who have picked up the southern pattern of *vā* in their
spoken Sanskrit (perhaps because they learned to speak Sanskrit in
the south)?

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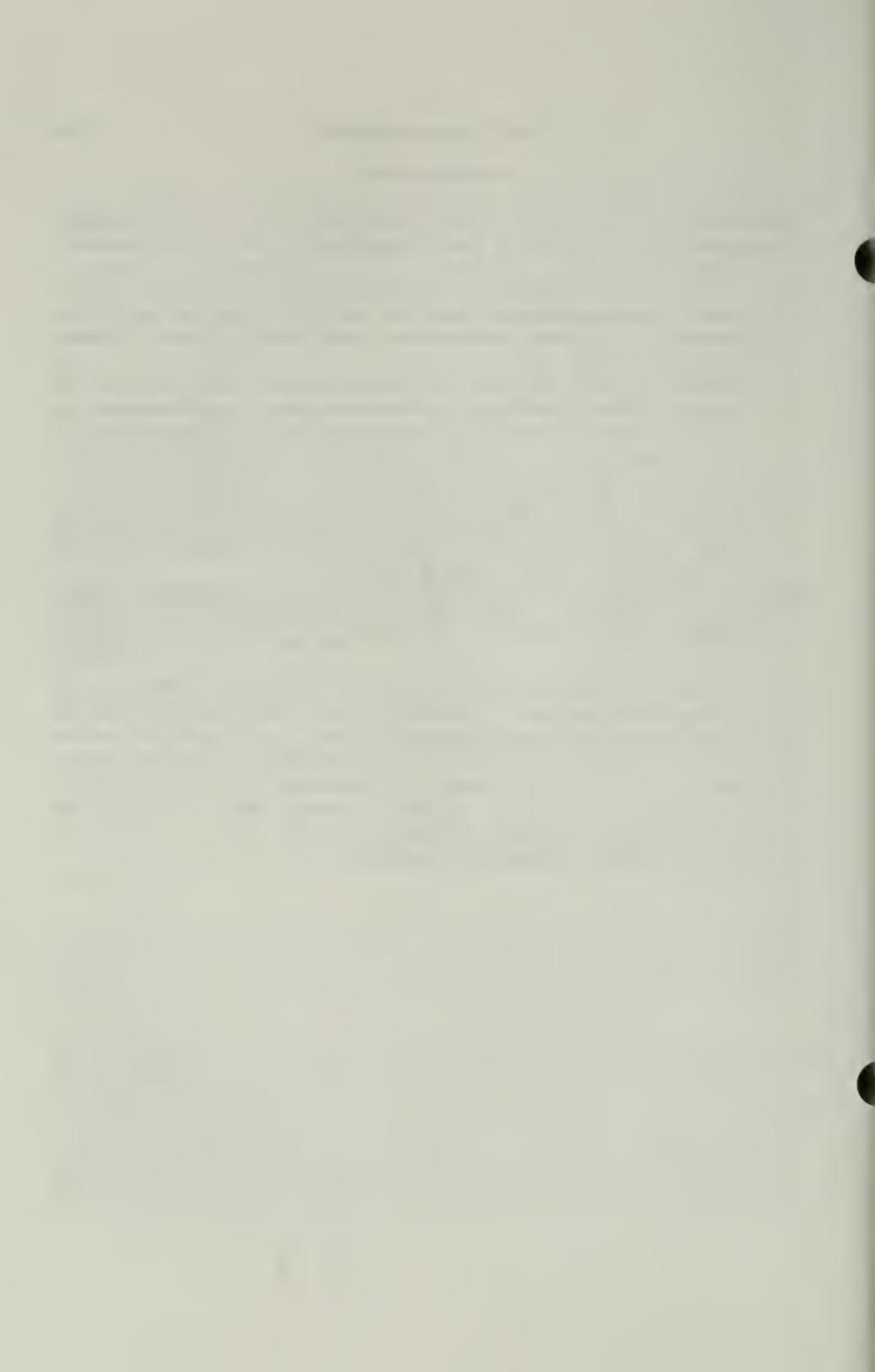
REVIEW

Alternative conceptions of phrase structure, edited by Mark
R. Baltin and Anthony S. Kroch. Chicago & London: The
University of Chicago Press, 1989; pp. xi, 315. $19.95 pa-
per/ $60.00 cloth.

James H. Yoon

0. The volume 'Alternative conceptions of phrase structure'
(ACPS hereafter) is a collection of papers from a conference held
under the same name during the 1986 Linguistic Institute at New
York University. Some of the papers presented at the conference are
not included since they have been published elsewhere (e.g.
Grimshaw 1988, Kuroda 1988). In addition, the volume contains one
paper (Steedman's) that was not presented at the conference. In all,
there are twelve papers with an introduction by the editors
containing a helpful summary of current issues concerning phrase
structure, as well as the contents of individual contributions.

1. A fundamental fact about natural language syntax is that it
is structured. This raises the following questions about syntactic
structure: What motivates structure? What is structure like? What
is the best way to represent structure?

The motivation for structure comes both from our intuition and
linguistic tradition, and is felt most palpably in the existence of
structural ambiguities. The answer to the second question provided
by Chomsky (1955/75, 1957) is that structure involves the sub-
grouping of linguistic elements (TERMINAL elements) into
'constituents' (the DOMINANCE relation) and 'syntactic categories' (the
LABELING relation), with 'order' (the PRECEDENCE relation) defined
among constituents. The formal means Chomsky employed to
represent structure was context-free rewriting rules. Adopting
rewrite rules commits one to a view of syntactic structure as
determinate, continuous, single-rooted graphs where dominance and
precedence relations are complementary (Wall 1972). Thus, there
are no 'virtual' categories, multiply dominated, discontinuous, or
dismembered constituents. In addition, from early on, Chomsky was
committed to the belief that functional information (such as 'subject-
of', 'object-of', etc.) could be reduced to structural information
available in trees.

However, it was recognized immediately that these restrictions on an unadorned Phrase Structure Grammar (PSG) made it a clumsy tool for representing the full range of dependencies found in natural language syntax. Chomsky's answer to this problem was not to give up PSG as the tool of syntactic representation but to think of syntactic representations instead as consisting of sets of trees given by a PSG which are related via a different rule type — transformations.

Subsequent developments in generative grammar largely assumed the correctness of Chomsky's answer. In fact, the proponents of an influential modern syntactic theory, Government & Binding (GB) theory, still operate on the same assumption. Thus, the GB papers in the volume do not really deal with ALTERNATIVE conceptions of phrase structure, if 'alternative' is taken to imply 'other than PSG'. However, one must grant that the potential benefit of not probing into the mathematical foundation of PSG is that the innovations in GB are driven more by a desire to describe new and emerging empirical generalizations, elevating them, where possible, into explanations.

In contrast, several of the non-GB papers seek to provide proof that a new formalism is adequate and capable of describing the standard constructions in every syntactician's stock. This is true especially of theories embracing newer formalisms. However, quite often, the adoption of newer formalisms leads to interesting and elegant solutions to older problems that received cumbersome treatments within standard transformational grammar.

Five of the papers in the collection represent various aspects of work in GB theory on phrase structure and will be discussed in section 2. Section 3 is devoted to papers written in other frameworks. Section 4 concludes the review.

2. BALTIN's paper is an exercise in taking to the limit the generalization captured by X-bar theory (Chomsky 1970, Jackendoff 1977) that natural language structures are endocentric, or LEXICALLY AN-CHORED, an idea that is also expressed in the PROJECTION PRINCIPLE of Chomsky 1981. B argues that subcategorization (or selection) is always for a lexical (zero-level) category and not for a maximal projection. Thus, there are no instances where a head that occurs alone is exhaustively dominated by a maximal projection. One-bar and two-bar (maximal) projections are licensed by X-bar theory only when there are complements and specifiers respectively, a proposal which is somewhat reminiscent of categorial grammar which also does not distinguish lexical and phrasal categories. Thus, B proposes to replace the usual X-bar schema in (1a) with that in (1b).

(1) a.   X"   →   Spec(Z^{max}) X'
           X'   →   X Y^{max}

     b.   X"   →   Spec X'
           X'   →   X   Y

In addition, B proposes a principle which is similar to the Projection Principle that says a maximal projection of X can occur where the head X can occur.

He shows that this proposal solves a number of problems. For example, the fact that verbs select an embedded complementizer is no longer problematic if Comp is the head of S'. Idioms like *make headway* are no different from verb phrases like *make a cake* since both involve selection of N by V. The only difference is that in the former, the verb 'make' selects a specific N, viz 'headway'. The disjunctions in certain principles of grammar which refer to a maximal projection or a head (government, ECP) can also be eliminated.

MARANTZ's paper comes closest among the GB-oriented papers to proposing an alternative (or a supplement) to PS rules as the representational tool of syntactic structure. M's paper deals specifically with the problem that clitics pose for the standard X-bar theoretic view of phrase structure and draws some interesting conclusions about the role of phrase structure constraints in grammar. The problem that M addresses is this: The surface structure of clitic constructions defies adequate characterization in terms of X-bar schema. For example, a principled labelling of the French surface constituent *du* below is impossible in orthodox X-bar theory since it is a merger of a preposition and an article.

(2) [$_{PP}$ [$^?$du] [garcon]]
           of-the boy

The dominant analysis of such constructions is to derive them via a cliticization rule from a structure where precedence, dominance, and labelling consistent with X-bar schema hold, such as the one in (3).

(3) [$_{PP}$ de [$_{NP}$ le   garcon]]
           of   the boy

Basing himself on earlier work (Marantz 1984), M proposes to derive clitic constructions DIRECTLY from S-structures in which linear order is undefined. In M's work, S (and D) structures are unordered lists of constituents and the relations holding between them. Although the relations and constituents may be represented in trees, the relations are not determined FROM them. A principle called the MAPPING PRINCIPLE in Marantz 1984, 1988 and which is termed the EXTENDED PROJECTION PRINCIPLE in this work, ensures that relations between constituents at one level must map onto a well-defined set of relations

between the corresponding constituents at another level. Thus, while Chomsky's Projection Principle requires constancy of lexical properties as reflected in tree structure from level to level, M's version requires that relations at D-structure be preserved at all other syntactic levels.

The trees representing the relations at D and S structure, for example, conform to X-bar theory. But M argues that X-bar theory has no independent status as a well-formedness condition on syntactic representations, since X-bar theoretic constraints are completely determined by the combinatorial potential of categories as in categorial grammar.

M's analysis of clitics crucially utilizes the possibility inherent in his theory of grammar of an S-structure relation being able to be mapped onto several distinct surface structure (or PF) relations, together with the ASSOCIATIVITY of the S-structure relation of ADJACENCY (notated as '*'), as argued for in Marantz 1984 and Sproat 1985. By the associativity of adjacency, the effects of 'rebracketing' necessary in clitic constructions and other instances of bracketing paradoxes follows simply as one of the allowable mappings from S-structure relations to surface structure relations. There is no need to invoke actual rebracketing of constituent-structure trees.

(5) a. $[X * [_{YP} Y * Z]]$
          de   le garcon

     b. $[[X * Y] * Z]$
          de le   garcon = du garcon

The requirement that *de* be left-adjacent to *le* is satisfied in both structures. The surface bracketing in (5b) differs from that in (5a) solely because a clitic, unlike other syntactic primitives, has a morphological requirement that it is a prefix.

WILLIAMS's paper is also on morphosyntax, but the ideas in the paper are at best tangential to the stated theme of alternative conceptions of phrase structures. W addresses a potentially interesting issue that has been clouded by a lot of controversy and misunderstanding: Are word structure and phrase structure the 'same' simply because (i) both can be described with a PSG, and (ii) principles which are purportedly 'syntactic' apply both in and outside of words? (Cf. Yoon 1989) While this is doubtless an interesting question, it does not bear on the limits of PSG or whether alternatives to PSG should be sought in this particular domain. W comes up with the conclusion that even though PSG can be used to characterize both word and phrase structure (and many other things, in fact), the two types of structure are not the same, because the notion of 'maximal projection' (XPs) is absent from word structure. W's strategy in the

paper is to attribute things like theta roles, predication, Case, and others as exclusive properties of XPs. If so, then their 'absence' at the word (internal) level can be explained if XPs are lacking at that level.

In a sense, this conclusion is almost trivially true. The system of 'bar' levels, which yields the notion of 'maximal' projection (XP), is (phrasal) syntactic. With it, we characterize 'constituents' and constituent structure, which are irretrievably (phrasal) syntactic notions. Words are the lowest levels (X^o) in this hierarchy, simply because under standard conceptions they are the atoms/primitives of the phrasal rule system, not because they are inherently incapable of being 'maximal' in any epistemologically prior sense of the term. The hypothesized difference between 'words' and 'phrases' is encoded in this distinction. To claim then that the lack of XPs is the source of difference between words and phrases is simply a restatement of the hypothesis that words are not phrases. What is needed is independent support, outside the domain of the assignment of bar-levels in X-bar theory, for the proposed distinction.

SAITO deals with a problem that arises from his earlier (1985) analysis of Scrambling in Japanese as A'-movement. The case for the A'-movement analysis of Scrambling proposed in that work received considerable support from Hoji 1985. However, if Scrambling is A'-movement, it should behave in all respects like A'-movement. S shows in this paper that there are instances where it does not. More such differences between Scrambling and Wh-movement have been discovered recently by Mahajan (1990) and Webelhuth (1989), among others. As an example, while Wh-movement shows Weak Crossover (WCO) effects, Scrambling does not, as seen below, even though the requisite WCO configuration is present in both.

(5) WH-MOVEMENT:
    *?Who$_i$ does his$_i$ mother love t$_i$?

    SCRAMBLING (Korean):
    John$_i$-ul ku$_j$-uy emeni-ka t$_i$ salanghanta
    John-ACC he-GEN mother-NOM loves
    'John, his mother loves.'

S's proposal in this paper is that while Scrambling is an A'-movement, it can be freely 'undone' at LF, since it does not form an operator-variable chain relevant for interpretation. He then suggests that the reason an A'-position (adjoined position) in a language like Japanese doesn't behave like a typical operator position is that in Japanese there are constructions where at D-structure nominals are base-generated in these adjoined positions. S calls these 'D-positions' (on the analogy to A-positions) and speculates that the difference between Wh-movement in English and Scrambling in Japanese might

be attributed to whether or not movement is to a D or a D'-position. Comp is a D'-position and movement to it cannot be 'undone', while adjoined positions in Japanese are D-positions and as such allow A'-movement to be 'undone'.

STOWELL deals with the question of the correspondence between syntactic categories and semantic categories on the basis of an investigation into the syntax (and semantics) of noun phrases. In particular, he finds that there is evidence that referential noun phrases should be analyzed as the category 'DP' (cf. Abney 1987[1]), although certain predicative uses of noun phrase should be analyzed as 'NP's. S examines data on extraction from predicative vs. referential noun phrases and the governability of the subject position of each type and concludes that there is evidence for maintaining a (restricted) version of the DP hypothesis.

An apparent problem for this is that certain instances of DPs (NPs headed by determiners in languages like English) appear in clearly predicative contexts.

(6) Bob called Stan *(a) fool

This would appear to challenge the conclusion that there is a correspondence between the semantic type of noun phrases and their syntactic instantiations. S argues, however, that the nonreferential uses of DPs are tied to the expression of 'membership in a kind' (Carlson 1977). If this is feasible, then, once again, there is a nontrivial correspondence between syntactic categories and semantic categories.

The question of whether there is a strict 'correspondence' between syntactic and semantic categories is an interesting one, and is certainly one of the better uses to which the 'extended' clause/noun phrase structure proposals (Chomsky 1989, Pollock 1989, Abney 1987) can be put, since most proposals on 'articulated' clausal structure have been based either on distributional generalizations, conceptual 'arguments", or the need to account for certain word order variations. Regardless of the ultimate correctness of S's conclusion, practitioners of GB would do well to turn their sights to the question that S dealt with in his paper — the relation between syntactic and semantic categories.

TRAVIS, in the tradition of 'eliminating' PS rules, proposes that word order generalizations that are expressible by the head-peripherality parameter (i.e., head-first vs. head-last) of standard X-bar theory are inadequate and proposes to supplement the parameter with two additional parameters — directionality of theta-role assignment and directionality of Case-assignment. These two, in addition to a default setting for the head parameter, provide far greater free-

dom in expressing certain sub-generalizations about word orders not expressible in the old system.

T's primary data comes from Mandarin Chinese, and is augmented with some data from Kpelle. In Mandarin VPs, only those elements (NPs or PPs) that are direct arguments of the V can appear postverbally, subject to other conditions on their co-occurrence. PP adjuncts appear preverbally, and objects of V's may do so as well, if they are flanked by the preposition *ba*. T accounts for this state of affairs with the following parametric settings: Chinese is (i) default head-final, and (ii) Left-to-Right theta-marking.

Mandarin word order is a bit more complex than what T describes and is open to several alternative analyses (Li 1985, Huang 1988, Yoon 1989, Tang 1990, inter alia). Yet the idea that the basic ingredients of word order typology concern three primitives, instead of one, is interesting in that while flexible, it still makes predictions about the types of partial word order generalizations that should not exist. An extensive typological investigation of a large number of languages seems to be the logical next step for this program.

3. Beginning perhaps with Relational Grammar in the seventies, several linguists began to realize that Chomsky's answer to the 'inadequacy' of a simple PSG is not the only, or the most plausible, way of remedying its defects. Both Relational Grammar and Lexical-Functional Grammar seek the direct expression of FUNCTIONAL/ RELATIONAL information in the syntactic representation. The absence of any offering from RG in this collection appears to be a major omission. LFG is represented by a paper of KAPLAN and ZAENEN (KZ) which proposes a new analysis of long-distance dependencies in functional, rather than constituent-structural terms.

The paper begins by showing that there are instances of argument-adjunct asymmetries with respect to extraction which cannot be adequately characterized in structural terms. Ever since Huang 1982, there has been intensive research on the differing locality conditions on adjunct vs. argument extraction (and extraction from adjuncts vs. arguments). Even within a structure-based theory like GB, the current concensus is that the argument-adjunct asymmetry cannot be adequately described with structure alone but must make reference to functional/relational notions such as 'L/Theta-marking' (Chomsky 1986). The same conclusion is supported in KZ. However, the similarity between the two ends here.

Employing the concept of 'functional uncertainty', the new analysis of LD dependencies in KZ takes on the following rough form:

(7)   S'   →   X   Y
                    (↑ DF) = ↓
                    (↑ DF) = (↑ body   bottom)

DF stands for discourse functions such as TOP(ic). The 'body' constrains the function of constituents that can occur 'between' the filler and the gap (bottom). The 'bottom' constrains the grammatical function of elements that correspond to the 'gap'. (8) is the Topicalization rule for English given in this format.

(8)   S'   →   XP or S'   S
                        (↑ TOP) = ↓
                        (↑ TOP) = (↑ {COMP, XCOMP}* (GF-COMP))

(8) says that topics in English can bear any GF except COMP (finite clause complements) and that the body of the dependency can cross a potentially infinite number of COMPs and XCOMPs (nonfinite complements).

One thing to note is the treatment of locality constraints. In this revision of LFG, the theory of 'islands' is built directly into the LD dependency rules for each individual language — in the form of specification of possible functional paths in the body of the rule introducing the dependency. This stands in contrast to recent attempts within GB circles that attempt to define possible islands in universal terms. This is where the two part ways.

Stipulating locality into the rules is no doubt more 'economical' as KZ claim, but this move appears to be a step back into construction-specificity which is being avoided as much as possible these days. The paper also includes interesting discussion on whether categorial (and by hypothesis, c-structural) information is ever relevant in the syntax of LD dependencies and demonstrates the usefulness of multi-domination in f-structures introduced by different types of functional dependencies.

KARTTUNEN's contribution is a categorial-unification grammar (CUG) fragment of Finnish. CUG adapts a classical Categorial Grammar with (directional) Functional Application to the unification formalism currently used in several other theories. With the novel assumption that nouns are functor categories and verbs are basic categories in free word order languages like Finnish, K demonstrates that the facts of free word order, including 'long-distance' (non-clause bounded) Scrambling which either requires more powerful combinatorial operations such as Type Raising and Functional Application (cf. Steedman's contribution) or unbridled use of transformational adjunction (Saito 1985 and Saito's contribution to the volume) can be handled with only Functional Application.

KROCH's paper represents Tree Adjoining Grammar (TAG) in the volume. TAG does not offer a new formalism for PS trees. The innovation in TAG is in the treatment of embedding. Instead of stating possibilities of embedding directly in PS-rules, TAG defines an operation of Adjunction which maps elementary trees onto elementary trees to derive complex structures, somewhat in the manner of embedding transformations of early Transformational Grammar (Chomsky 1955/75, 1957). The subject matter of the paper is the apparent exception to island constraints (Subjacency) that have been noted in the literature and how TAG can deal with them.

This question is of importance to TAG because in TAG GLOBAL conditions on complex structures like Subjacency can be made to fall out as a theorem when reasonable assumptions are made about constraints on its elementary structures. Thus, the fact that WH extraction out of a 'WH-island' is impossible can be made to follow from the simple fact that multiple WH fronting is impossible in simple clauses in English. This is because when a tree is adjoined to an already ill-formed tree, the resulting tree is also ungrammatical.

The problem with this approach is two-fold: First, there are certain instances of Subjacency-like violations that cannot be accounted for straightforwardly under this derivation of Subjacency; cf. (9). Second, there are selective violations of WH-islands which must be allowed, in particular, the fact that arguments violate WH-islands much more freely than adjuncts when extracted; cf. (10).

(9)   *Who$_i$ does he think that e$_i$ left?
         When$_i$ does he think that we left e$_i$?

(10)   ?What$_i$ were you wondering how$_j$ to say e$_i$ e$_j$?
         *How$_j$ were you wondering what$_i$ to say e$_i$ e$_j$?

K solves these problems by importing GB conditions such as proper government into TAG, formulating them with the notion of auxiliary tree sets. K concludes that the flexibility of the TAG formalism in accounting for a range of cross-linguistic variations with regard to island-related phenomena makes it a serious candidate as a formalism for describing natural language syntax.

MCCAWLEY's contribution does not propose an 'alternative' to phrase structural accounts of syntax. Nor does it contain a specific proposal concerning formal aspects of PSG. It is noncommittal and yet it probes into areas of natural language syntax where the standard mathematical strictures (i.e., P-marker axioms) appear to run into problems.

Dubbing them 'individuation' problems, M draws on the wealth of his knowledge and astute intuitions and investigates various constructions that have direct bearing on the standard P-marker

axioms.   He questions the validity of Single-Rootedness on the basis of sentences with parentheticals and *S, therefore S* sequences.   He raises the question of whether or not succeeding strata in a derivational model of syntax constitute a single or multiple representation(s).   The validity of the ban on Multiple Domination in P-markers is questioned on the basis of the study of the syntax of 'restructuring' in Japanese.   Issues arising from morpho-syntactic individuation (French *du* and other hybrids) and categorial/selectional uncertainty round out the paper.

SAG and POLLARD's paper is one among several co-authored papers the duo have presented over the years in which the theory of Head Driven Phrase Structure Grammar (HPSG) is expounded.   By now familiar to a wider circle of syntacticians, HPSG differs from its predecessor GPSG in not adopting P-markers as the formalism for syntactic (and semantic) description, opting instead for feature structures (attribute value matrices) and employing the operation of unification as the fundamental tool for expressing various kinds of syntactic dependencies, as opposed to the PS relations of precedence, dominance, and labeling.   The virtue of adopting unification is that it allows a more DIRECT encoding of linguistic information than in a PS-based approach, and that it is declarative and monotonic.   These are properties that are taken to be virtues from a computational perspective.   The approach is also akin to LFG in directly encoding certain types of grammatical functions.   The coverage of a fragment of English syntax in the paper is quite extensive.   Questions of subcategorization, constituent order, grammatical function, and semantic role selection are dealt with, among other topics.

HPSG has going in its favor a winning combination of (i) a level of rigor needed to make claims precise and to test their predictions, and (ii) a flexibility that enables the formalism to serve potentially as a 'lingua franca' within which various syntactic traditions can be formalized and tested.

STEEDMAN's contribution is the second Categorial-Grammar (CG) paper in the volume.   In contrast to the stated aim of Karttunen's paper, S employs the full gamut of operations available in 'extended' CG — (directional) Application and Composition and Type Raising.   S deals with a range of 'problematic' constructions — nonconstituent coordination, right node raising, gapping, and unbounded dependencies.   The attractiveness of S's analysis is that it allows one to simply do a left-to-right parse of the syntactic string for these constructions and still get their syntax and semantics to come out right.   However, the theoretical 'cost' in the process is the extended use of Type Raising and the formation of some unorthodox 'constituents'.

While the simplicity and elegance of this extended CG treatment of 'problematic' constructions are impressive, there is a certain sense in which the rather pervasive derivational ambiguity allowed by the system, even if harmless from a mathematical point of view (as S notes), seems unnatural. For example, in S's account, a string like (11) can be parsed in two ways (at least).

(11)   Apples are good

In one derivaton, the predicate *are good* (S\NP) combines by Application with *apples* (type NP) to yield an S. Another possible derivation is one where the subject has been Type Raised (S/(S\NP)) and combines via Composition with the predicate to yield S. Both derivations, however, yield equivalent semantic interpretations.

4. Given the theoretical fragmentation of the field of syntax, it might be impossible to come up with a less diversified collection of papers than this one. A minor objection must be raised against the title. The title of the volume engenders false hopes that there is more coherence in the selection and theme of individual papers than actually exists. However, the individual papers are in general informative and stand up on their own, even when not addressing the topic of 'alternative conceptions' of phrase structure.

NOTES

[1] Abney (1987) popularized the idea that the structure of noun phrases is like the structure of clauses currently assumed in GB theory; i.e., there is an internal lexical projection (NP or N') whose outer layer is a functional projection, headed by the category D(et). As S notes, Abney's proposal for articulated noun phrase structure is based mainly on distributional considerations. S, on the other hand, seeks to 'ground' the DP hypothesis in a theory of semantic types of nominals.

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REVIEW

**Deborah Tannen: You just don't understand. New York:
William Morrow and Company, Inc., 1990; pp. 330.**

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Deborah Tannen's latest book is an attempt to explain mis-
communication between the sexes. In her 1986 book, *That's not what
I meant*, she devoted the eighth chapter to gender differences in
conversational style. This chapter was the one that apparently re-
ceived most interest from her readers and the one which forms the
basis of her most recent book. The basic tenet of that chapter and the
present book is that sons and daughters are treated differently from
birth onwards. Although they may grow up in the same family, so
different are the lessons they learn that their upbringing is the
equivalent to an upbringing in two different cultures. Language is
used differently about them and by them and they learn to assign
different meanings to the same interaction. When men and women
interpret each other's conversation in terms of their own systems and
are not aware that another interpretation exists, inexplicable and
painful misunderstandings can arise. It is toward raising awareness
and reducing miscommunication that this book is dedicated.

As indicated above, inculcation in a conversational style begins at
an early age. Tannen draws on the work of Malz & Borker (1982),
Dorval (1990), and others to highlight the different worlds that boys
and girls inhabit. Whereas little girls play in cooperative, egalitarian
groups, evidence suggests that little boys play in groups where there
is continuous competition and jostling for status. Girls spend more
time talking and exchanging personal information, while boys are
more physically active and use talk to try and prove that they are
superior, rather than equal, to their peers. Although conflicting
desires for independence and involvement are present in all child-
ren's interactions, the focus of girls' talk is on involvement while the
focus of boys' talk is on independence. It is not surprising that
problems arise in later life, because the stage has already been set at
an early age for different uses and expectations of verbal communi-
cation.

Men and women carry into adulthood the same conflicting
desires for involvement and independence in interactions, as well as
the mistaken belief that their's is the one and only way to speak and

to listen. This means that they can interpret the same conversation differently even if there is no apparent misunderstanding. Whereas a woman might offer a man advice as a way of showing concern, he may interpret this as a threat to his right to make his own decisions. Similarly, while a man might intend to make his wife feel better by telling her that his problems are worse than hers, she might interpret his behavior as invalidating her experiences and trying to distance himself from her worries. Thus, as well as having to balance dual needs for involvement and independence, men and women have to cope with different ways of expressing those needs. Tannen claims that the differences between male and female communication styles are significant enough to view male-female communication as cross-cultural communication. If we accept this claim, that is, that the differences between men's and women's ways of speaking and using speech are as great as those between speakers of different ethnic backgrounds, we can more readily accept that differences between men's and women's talk are indeed considerable.

A commonly held belief is that women are the more loquacious of the sexes. This myth seems counter-intuitive when we consider study after study that shows that men talk more than women in the classroom, in conferences, at work and at social gatherings. However if we consider Tannen's discussion of the purposes of women's and men's talk, there are some possible explanations. Offices and schools are public places. The participants in the interactions are 'on show'. For men talk is a way of preserving independence and maintaining status in a hierarchical order. The more they talk and display knowledge the more attention and esteem they receive. In the public sphere, therefore, there is great incentive to talk and occupy the floor. Turns taken and utterance length of women's speech are over-estimated and women are perceived as talking much more than they actually do because, according to Spender (1980), they are not expected to be talking at all. Talk in the home, however, is a very different matter. In the private sphere men feel they can relax; they do not have to compete so they do not have the same incentive to impress through verbal skill. Women frequently complain that they have trouble getting men to talk at all. Women talk a dispropor-tionate amount of the time in order to draw men into conversation because talk is a means of establishing intimacy. By way of illus-trating the effort involved, Tannen comments on the many jokes about the insurmountable morning newspaper at the breakfast table. In the private sphere men think women talk a lot because they talk in situations where men would not.

Dividing speaking arenas into 'public' and 'private' also throws light on the mystery of the woman who rarely opens her mouth at a meeting yet talks freely in the house, and the husband who is 'the life

and soul of the party', but has practically nothing to say to his wife in the home.   The husband interprets the wife's attempts to 'make conversation', to establish a connection between them, as attempts to overwhelm him with inconsequential talk and restrict his freedom to spend his leisure time as he wants.   The woman for her part interprets the man's behavior as unfriendly and inconsiderate.   Tannen introduces the paired terms 'report-talk and rapport-talk', 'contest and community', and 'lecturing and listening' to characterize these differences in men's and women's conversational styles.

Since it is not just academics but also laypersons who are faced with having to interact with the opposite sex, it is appropriate that this book is aimed at the general reader.   For this reason the text is on the one hand lively and entertaining, but on the other hand overly dramatic and simplified.   Although Tannen suggests that both men and women should be aware of differences in each others' style and should both seek to accommodate one another, she notes that male-female conversations are more like men's conversations than they are women's.   There is much less incentive for men to become familiar with women's genderlect than there is for women to become fluent in men's.   Tannen implies, however, that the different styles of men and women are equally valid.   As long as men use talk primarily to nego-tiate and maintain status in a hierarchical society, they will continue to dominate women.   As long as women use talk primarily to nego-tiate intimacy and focus on relationships rather than status, they will continue to be dominated by men.   Though Tannen's book goes far in explaining how and why miscommunication arises, it unfortunately does not come up with viable ways of improving women's experiences of cross-sex communications.   Nonetheless there is much of interest for men and women scholars and laypersons alike, and the path is cleared for further in-depth study in this hitherto neglected field.

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TANNEN, Deborah.   1986   That's not what I meant!   How conver-sational style makes or breaks your relations with others.   New York: William Morrow.

RECENT BOOKS

Studies in the Linguistic Sciences gratefully accepts review copies of recent publications and tries to find reviewers for them. In this endeavor, however, it does not always succeed. Volumes for which no reviewers have been found so far are publicized in this section, with brief indications of contents or interest. Prices are indicated where known.

C. Anthony Anderson & Joseph Owens, eds. **Propositional attitudes: The role of content in logic, language, and mind.** (Lecture Notes, 20.) Stanford, CA: Center for the Study of Language and Information, 1990, pp. xvi, 342. $16.95 (Paper), $37.50 ('Library cloth').

'The papers in this volume treat issues involved in formulating a logic of propositional attitudes and consider the relevance of attitudes to the continuing study of both the philosophy of language and the philosophy of mind.' (Cited from the jacket.) Contributors are: K. Fine, H. Kamp, E. Lepore & B. Loewer, T. Burge, R. Stalnaker, J. Owens, H. Wallace & H. E. Mason, K. S. Donnellan, N. Salmon, S. Schiffer, J. R. Searle, and K. Gunderson.

Edna Andrews. **Markedness theory: The union of asymmetry and semiosis in language.** (Sound and Meaning: The Roman Jakobson Series in Linguistics and Poetics.) Durham, NC: Duke University Press, 1990, pp. ix, 220.

The notion 'markedness' was introduced to linguistics by Jakobson. The present book attempts to relate the notion to Peircean semiotics. Chapter One outlines 'The principles of Jakosonian markedness theory' and considers, among other topics, deixis and 'shifters' in the Russian verb. Chapter Two deals with 'Peirce and Jakobson revisited: a reconciliation.' Chapter Three discusses 'Markedness theory as mathematical principle.' Chapter Four addresses 'Myths about markedness' and considers issues such as statistical frequency, neutralization, and substitutability. Chapter Five applies markedness theory to 'The category of grammatical gender in Russian, Serbo-Croatian, and Modern Greek.'

John Baldwin & Peter French. **Forensic phonetics.** London & New York: Pinter Publishers, 1990, pp. (viii,) 141. $47.50.

Phonetic evidence is increasingly being used in legal proceedings. This book is intended to make relevant information available to persons in the legal profession and the police who have no prior knowledge of phonetics, as well as to provide information on issues of English criminal law relevant to forensic phoneticians.

Susan Bassnett & André Lefevre, eds. **Translation, history, and culture.** London & New York: Pinter Publishers, 1990, pp. viii, 133. $49.00.

This book offers twelve essays concerned with translation studies, with emphasis on cultural and social factors relevant in and for translation. Contributors are: S. Bassnett, D. Delabatista, B. Godard, M. Hjort, P. Kuhiwczak, A. Lefevre, V. Macura, M. Sengupta, S. Simon, M. Snell-Hornby, A. Tabakowska, M. Tymoczko, and P. Zlateva.

Philipe E. Bennett & Graham A. Runnalls, eds. **The editor and the text.** Edinburgh: Edinburgh University Press, 1991, pp. xiv, 175. $15.00.

This volume addresses the issue of editing medieval French text, which involves drawing on a large number of different disciplines, including paleography, historical linguistics, lexicography, and most important, philology. Contributors are: E. Baumgartner, P. E. Bennett, C. Corley, T. Hunt, A. Kennedy, J. C. Laidlaw, A. Lodge, J. H. Marshall, P. Ménard, G. Roques, G. A. Runnalls, W. van Emden, and K. Varty.

Christine Cheepen & James Monaghan. **Spoken English: A practical guide.** New York & London: Pinter Publishers, 1990, pp. (viii,) 215. $47.50.

The book is intended as a textbook for students of language and linguistics, with focus on spoken, conversational English and the encoding of topic, speaker status, and speaker orientation. The book concludes with exercises, a bibliography, an appendix of transcribed conversations, and an index.

D. S. Clarke, Jr. [ed.]. **Sources of semiotic: Readings with commentary from antiquity to the present.** Carbondale & Edwardsville: Southern Illinois University Press, 1990, pp. xvi, 208.

As suggested by the title, this book is a reader of writings on the nature of the sign, from antiquity (Aristotle, Quintilian etc.), through the Middle Ages (e.g. St. Augustine, Ockham, Hobbes), via early modern philosophers (e.g. Locke, Arnauld, Kant), to more recent approaches (including Carnap, Chomsky, Hjelmslev, Ogden & Richards, Osgood, Quine, Russell, de Saussure, Skinner, and such clearly semiotically oriented authors as Peirce, Barthes, and Sebeok). The book concludes with readings on 'recent philosophical developments' concerned with 'Criticisms', 'Communicative intent', 'Convention', 'Reference', and 'Iconic representation'.

Susan D. Fischer & Patricia Siple, eds. **Theoretical issues in sign language research.** Chicago: The University of Chicago Press, 1991, pp. ix, 338. $29.95 (Paper), $55.00 ('Library cloth').

The book offers articles on sign language in the 'four traditional core areas of phonology, morphology, syntax, and semantics.' (p. 1) Most contributions deal with American Sign Language (ASL), but four cover other sign languages (of Brazil, New Zealand, Sweden, and Taiwan) and one provides a contrastive analysis of ASL, Chinese Sign Language, and three sign languages created by 'isolated deaf adult signers in the absence of all internal linguistic input models' (363). Contributors are: I. Ahlgren, L. F. Brito, M. Collins-Ahlgren, G. R. Coulter,

S. K. Liddell, D. Lillo-Martin & E. S. Klima, C. Lucas & C. Valli, R. P. Meier, D. M. Perlmutter, W. Sandler, W. H. Smith, T. Supalla, R. B. Wilbur, and S. Yau.

Jean Mark Gawron & Stanley Peters. **Anaphora and quantification in situation semantics.** (Lecture Notes, 19.) Stanford, CA: Center for the Study of Language and Information, 1990, pp. xi, 187. $15.95 (Paper), $37.50 ('Library cloth').

'This book is an investigation into the semantics of quantification and anaphora with third person singular pronouns.' (p. 1) Chapter 2 sketches the general theory of meaning and semantic interpretation adopted; Chapter 3 provides a fragment of a semantics for NPs; Chapters 4 and 5 specifically deal with anaphora; Chapter 6 turns to the 'theory of circumstances' and a circumstance-based account of scope, concluding with a brief presentation of Binding Theory; Chapter 7 compares the present approach to those of Montague and Kamp & Heim, and accounts of binding conditions such as Reinhart's.

Patrick de Gramont. **Language and the distortion of meaning.** (Psychoanalytic Crosscurrents.) New York & London: New York University Press, 1990, pp. xi, 292. $45.00.

Drawing on evidence from infant observations and linguistics, as well as information theory, de Gramont attempts to show how language 'distorts meaning' and our perception of reality. The focus of the book is psychoanalytical.

Claude Hagège. **The dialogic species.** (European Perspectives.) New York: Columbia University Press, 1990, pp. xii, 288. $35.00.

A translation of *L'homme du paroles: contribution linguistique aux sciences humaines* (1985, Librairie Arthème Fayard), this volume offers an opportunity to become familiar with the thoughts on human language by Hagège, one of the most productive and influential French structuralists, but relatively unknown outside France. The book draws on H's extensive work with a large variety of European and non-European languages. (The latter include Tikar and Mbum of the Cameroon, Palau of Micronesia, and Comox Laamen of British Columbia.) H's goal is to present a synthesis on the issues of linguistic structure and development, typology, the social function of language, innateness, and the relation of language to human nature in general.

William F. Hanks. **Referential practice: Language and lived space among the Maya.** Chicago & London: The University of Chicago Press, 1991, pp. xxiv, 580. $27.50 (paper), $65.00 (cloth).

Referential practice is an anthropological study of language use, based on extensive fieldwork with Maya speakers in Yucatán. The central concern of the book is deixis, defined as a 'cultural construct' that links language with the physical space of speakers' bodies, their immediate surroundings, and their ritual and conceptual world. Part I addresses the 'Social foundations of reference', Part II, 'Person, participation, and perception', Part III, 'Space and spatial reference', and Part IV, 'Structure in referential practice'.

Hans Henrich Hock, ed. **Studies in Sanskrit syntax: A volume in honor of the centennial of Speijer's Sanskrit syntax.** Delhi: Motilal Banarsidass, 1991, pp. xi, 244. Rs. 180/– (cloth), 95/– (paper).

The volume contains papers originally read at Sanskrit Syntax Symposia of the 1986 and 1987 South Asian Languages Analysis Roundtables (University of Illinois, and Cornell University & University of Syracuse). Topics include word order, the interaction between phonology and syntax, and the use and function of grammatical categories. A wide variety of different approaches are presented, ranging from historical-comparative to synchronic-theoretical. Many papers deal with Vedic, but the classical language is presented as well, and one contribution focuses on modern spoken Sanskrit. Contributors are: A. Aklujkar, R. N. Aralikatti, V. Bubenik, M. M. Deshpande, H. H. Hock, S. W. Jamison, B. D. Joseph, J. S. Klein, K. Meenakshi, S. Schäufele, and B. Tikkanen. The volume concludes with a bibliography on Sanskrit syntax compiled by H. H. Hock and M. M. Deshpande.

Sharon Inkelas & Draga Zec, eds. **The phonology-syntax connection.** Chicago & London: The University of Chicago Press, 1990, pp. xv, 428.

This volume grew out of a workshop on the phonology-syntax connection, held in May 1988 at Stanford University. The purpose of the workshop was to bring together linguists concerned with the interaction between phonology and syntax and the role of prosodic hierarchy in this interaction. Contributors are: L. Bickmore, M. Y. Chen, Y.-M. Y. Cho, C. Condoravdi, B. Hayes, L. Hyman, S. Inkelas, E. M. Kaisse, J. M. Kanerva, I. Kenesei, M. Kenstowicz, L. Kidima, C. W. Kisseberth, B. McHugh, M. Nespor, D. Odden, W. Poser, K. Rice, E. Selkirk, T. Shen, I. Vogel, D. Zec, and A. Zwicky.

Thomas Amis Lyman. **Grammar of Mong Njua (Green Miao): A descriptive linguistic study.** Sattley, CA: The Blue Oak Press, 1979, pp. ix, 100.

Mong Njua (or Green Miao) is a language of northern Thailand. This volume provides information on the ethnography, phonology, and morphology of the language, plus thirty-two pages of texts and a bibliography of earlier work on the language.

P. A. Messelaar. **La confection du dictionnaire général bilingue.** Leuven: Peeters, 1990, pp. 109.

According to the preface, this book can be considered an aide-mémoire for the head of a bilingual dictionary project or a manual for beginning bilingual lexicographers. The areas covered include elements of lexicography, semantics, stylistics, communication theory, and translation techniques. Illustrations are drawn from a variety of Romance and Germanic languages.

Yves Charles Morin & Etienne Tiffou. **Dictionnaire complementaire du bourouchaski du Yasin.** Paris: Peeters/Selaf, 1989, pp. (vi), 58.
Etienne Tiffou & Jurgen Pesot. **Contes du Yasin.** Paris: Peeters/Selaf, 1989, pp. (vi), 163.

Burushaski, a language isolate in the extreme north of South Asia, is of considerable interest to linguists concerned with linguistic convergence in South Asia, as well as to typologists. Of special interest to typologists are the ergative construction, considerable restrictions on finiteness, and a complex morphological system of both prefixal and suffixal verb agreement. Until recently, the

only major sources on the language were D. L. R. Lorimer's *The Burushaski language*, 3 vols. (Oslo: Institutet for Sammenlignende Kulturforskning, 1935-1938) and H. Berger's *Das Yasin-Burushaski* (Wiesbaden: Harrassowitz, 1974). The two volumes under consideration are welcome additional sources. The volume by Tiffou & Pesot offers far more than its title (*Contes du Yasin* 'Tales of Yasin') might suggest: Pages 7-80 contain an extensive outline of Yasin-Burushaski grammar, including two sections (pp. 53-71 and 73-75) concerning syntactic issues, a topic that has received short shrift in earlier publications. The volume by Morin and Tiffou provides a fuller account of the lexicon than available in earlier publications.

Geoffrey Nunberg. **The linguistics of punctuation.** (Lecture Notes, 18.) Stanford, CA: Center for the Study of Language and Information, 1990, pp. ix, 141. $14.95 (Paper), $35.00 ('Library cloth').

In contrast to widely held views on the relation between written and spoken language, Nunberg claims that written language is equivalent to and, in large measure, independent from spoken language, and therefore worthy of serious linguistic study in its own right. Specifically, he attempts to demonstrate that punctuation is 'a linguistic subsystem and hence to be considered as part of the wider system of the written language ...' (6) This system has arisen entirely within the written medium, 'as a response to the particular communicative requirements of written language texts, and as an exploitation of the particular expressive resources that graphical presentation makes available.' (7)

Paul Postal & Brian D. Joseph, eds. **Studies in Relational Grammar, 3.** Chicago & London: The University of Chicago Press, 1990, pp. xii, 390.

This is the third and final volume in a series of *Studies in Relational Grammar* published by the University of Chicago Press. (The earlier two volumes, edited by D. M. Perlmutter and D. M. Perlmutter & C. G. Rosen, appeared in 1983 and 1984, respectively.) The present volume contains 'a selection of papers which not only draw on and support the insights, analyses, and theoretical devices developed in the earlier collections but also provide various refinements and modifications.' (viii) Among these are 'the recognition of a broader class of primitive relations', 'specification of universal restrictions' on verb agreement, and new proposals regarding clause union. (ibid.) Some of the papers are formulated in the framework of Arc Pair Grammar. Contributors are J. L. Aissen, B. J. Allen, A. Berinstein, S. Dubinsky, D. G. Frantz, D. B. Gardiner, D. B. Gerdts, J. D. Gibson, N. Gonzalez, B. D. Joseph, D. M. Perlmutter, and P. M. Postal.

Chris Sinha. **Language and representation: A socio-naturalistic approach to human development.** New York: Columbia University Press, 1988, pp. xix, 235. $35.00.

This book attempts to provide a synthesis between linguistics, philosophy, semiotics, and biology as regards linguistic and cognitive development. 'The book offers a psycho-semiotic analysis of "context"; relating this discussion to controversial issues in the acquisition of word meaning, and providing experimental evidence for its account.' (Cited from the jacket.)

William A. Smalley, Chia Koua Vang, & Gmoa Yee Yang. **Mother of writing: The origin and development of a Hmong messianic script.** Chicago & London: The University of Chicago Press, 1990, pp. xii, 221.

In 1959, Shong Lue Yang, called 'Mother [= Source] of Writing' by his followers, began developing an alphabet for two quite unrelated languages, one of which is Hmong. The alphabet he produced efficiently conveyed all phonological contrasts (including tones), but its structure was notably different from any other writing system the authors of this book were able to locate. The authors trace the development of this writing system through the historical record created by Shong Lue Yang's disciple, Chia Koua Vang, one of the co-authors of the book.

H. L. Somers. **Valency and case in computational linguistics.** (Edits, 3.) Edinburgh: Edinburgh University Press, 1987, pp. x, 328.

The aim of this book is to provide an application of linguistic case and valency theories to 'computational language-processing tasks'. Part One deals with the theories (Chapter 1: Valency; Chapter 2: Fillmore; Chapter 3: Anderson: Localist case; Chapter 4: Chafe, Cook, Longacre: Verb features; Chapter 5: Starosta's Lexicase). Part Two is concerned with 'Some classical problems for case' (Chapter 7: Defining the cases: Specificity and multiplicity; Chapter 8: One-case-per-argument: Dual roles; Chapter 9: One-case-per-clause: 'Inner' versus 'outer' roles). Part Three addresses the issue of 'Case and valency in language processing' (Chapter Eleven: Case in computational linguistics and artificial intelligence; Chapter Twelve: Case and valency in machine translation).

Loreto Todd & Ian Hancock, eds. **International English usage.** New York: Columbia University Press, 1990, pp. vii, 520. $20.00 (paper).

International English usage is a compendium in dictionary-form, covering not only, as its title suggests, issues of English usage. It also has entries of the type **acquisition of language**, a summary of psycholinguistic views on language acquisition, or **Anglo-Romani**, a brief account of Romani, the language of the Gypsies, as well as its offshoot, a variety of English heavily code-mixed with Romani. The focus of the volume is INTERNATIONAL English, i.e., not only the language used by native speakers of English, but also established regional varieties (e.g. Indian English) which are used by native speakers of other languages.

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STUDIES IN THE LINGUISTIC SCIENCES

Illinois Studies in Korean Linguistics, II

Preface

Korean linguistics at The University of Illinois at Urbana-Champaign has grown considerably since the publication of the first volume of *Illinois Studies in Korean Linguistics* in Fall 1986 as a special issue of *Studies in Linguistic Sciences*, vol. 16, no. 2. The number of graduate students in Korean linguistics has steadily increased reaching a peak of twenty in 1991, a full one-fifth of the student body of the Department, eliciting a facetious proposal that the Department change its name to the Department of *Korean and* Linguistics. It may have been facetious but not entirely fallacious. In the six years since 1986, the Department has produced twelve doctoral dissertations on Korean, again one-fifth of 59 total dissertations written during that period, and added James H-S. Yoon to the faculty (the list of dissertations is found on the next page). More often than not, Illinois had the largest representation in meetings and conferences devoted to Korean linguistics in the U. S. (e.g., biennial meetings of the International Circle of *Korean* Linguistics, Harvard Workshops on Korean Linguistics.) In Korea, The University of Illinois at Urbana-Champaign is known as the institution that has produced the largest number of Korean Ph.D.'s in linguistics. The three editors of this volume can now adequately cover nearly all aspects of the Korean language from phonetics and phonology to syntax and pragmatics. Few linguistic programs outside Korea can so boast.

Contributors to this volume were limited to those who graduated with Ph.D.'s since 1986 and to graduate students who were ABD's, i.e., post-Prelim students, in Spring 1991 when this volume was planned. Not everyone who was eligible contributed, however. Hectic academic life in Korea and miscommunications of one kind or another prevented a few from sending their papers.

We regret that the publication of the volume was delayed one year, primarily due to the editors' indolence. We apologize for it. Before closing, we would like to thank Ms. Amy Cheatham for her immense help in editing the volume. She was more than a proofreader and a typesetter. Her remarkable editorial skills improved not only the texts in uncountably numerous places but also the design of the layout immeasurably.

February 1992

Chin W. Kim
Jerry L. Morgan
James H-S. Yoon
(Editors)

List of dissertations on Korean between 1987-92 at The University of Illinois at Urbana-Champaign

1987
Hyang-Sook Sohn: *Underspecification in Korean phonology*

1988
Euiyon Cho: *Some interactions of grammar and pragmatics in Korean*

Yeon Hee Choi: *Textual coherence in English and Korean: An analysis of argumentative writing*

1989
Hye Suk Yoon: *A restrictive theory of morphosyntactic interaction and its consequences*

1990
Hyoung Youb Kim: *Voicing and tensification in Korean*

1991
Seok Ran Shim: *Word structure in Korean*

Virginia K. McClanahan: *Some interactions of grammar and pragmatics in negation in Korean*

1992
Seikyung Cho: *Universal Grammar and the Subset Principle in second language acquisition: The acquisition of the Governing Category Parameter by adult Korean learners of English*

Seok Keun Kang: *A moraic study of some phonolgoical phenomena in English and Korean*

Han-Gyu Lee: *The pragmatics and syntax of pragmatic morphemes in Korean*

Yongsoon Kang: *Phonology of consonant-vowel interaction: With special reference to Korean and Dependency Phonology*

Jang Song Lee: *Semantics of Korean noun phrases in Discourse Representation Theory*

VOWEL DELETION AND EPENTHESIS: THE VOWEL ï*

Sang-Cheol Ahn

The main purpose of this paper is to deal with a two-fold
issue: The deletion and epenthesis of the high back
unrounded vowel ï. For this purpose I first discuss the
deletion process and the representation of ï. Relating to this
issue, I also reexamine the so-called conjugational *h*-
deletion. In proposing a more explanatory rule formulation
and representation of deleting segments, I employ the
theories of underspecification and feature geometry. For the
epenthesis processes, on the other hand, I discuss the
analogical epentheses as well as loanword epentheses. Then
I specify phonological as well as morphological
environments in rule formulation.

1. Introduction

According to the theories of underspecification and feature
geometry, it is assumed that representation of segments (and
autosegments) should be underspecified to capture better
phonological generalization (Archangeli 1984, Archangeli &
Pulleyblank 1986, etc.) and that feature representation should be
organized geometrically (Clements 1985, 1989, Sagey 1986,
McCarthy 1988, etc.).

Employing these frameworks, this paper discusses two opposing
issues. For the first part, it will be shown how the high back
unrounded vowel ï (known as the least marked vowel) is
represented in Korean and why the so-called controversy of ï-
deletion and ï-epenthesis is solved in favor of deletion.[1] Moreover,
within the frameworks of underspecification and feature geometry, I
will show that the representation of the vowel ï is not specified
below the root node, while the representation of any other vowel
lacks this node. Then I will briefly reexamine an alternative proposal
by pointing out its problems and attempt to reformulate the
controversial ï-deletion process. Relating to this issue of ï-deletion, I
will also discuss how the so-called conjugational *h*-deletion can be
treated.

In addition to the discussion of ï-deletion, the second part will
show in what context an epenthetic vowel is allowed and in what

shape it appears. For this purpose, I will deal with analogical epenthesis and loanword epenthesis. For analogical epenthesis, I will show how this process is constrained by morphological as well as phonological environments. For loanword epenthesis, I will show various data triggering vowel epentheses. Then it will be shown how epenthetic vowel variation can be handled in terms of assimilation.

2. ï-deletion

2.1. Deletion versus epenthesis

In Korean, many case markers and affixes following a noun or a predicate have the high back unrounded vowel ï initially in their underlying representation. The underlying ï also occurs stem-finally in many predicates. The affix-initial ï is retained when it is preceded by a consonant-final predicate, e.g. *mak-ïlä* → [magïrä] 'in order to block'. A stem-final ï of a predicate also remains intact when it is followed by a consonant-initial suffix e.g. *camkï-ta* → [camgïda] 'to lock'. However, the underlying ï is often deleted when in contact with another vowel or when between certain sonorant consonants.

    (1)   a. po   + ïlä [porä]   'in order to see'
           b. camkï + i   [camgi]   'to be locked'

This ï-deletion is considered to be a vowel-hiatus breaking phenomenon (B.-G. Lee 1976, Kim-Renaud 1982). As in several studies, it could be argued that ï is not a part of the underlying representation but is inserted by ï-epenthesis between obstruents (H.-P. Choi 1937, C.-W. Kim 1971, Y.-S. Kim 1989). This assumption seems plausible, particularly when ï is an affix-initial segment. If we follow this assumption, however, then we cannot explain the following situation with the ï-epenthesis rule. First, there are consonant-initial affixes which do not insert ï when following a consonant-final stem, as illustrated in (2). Thus, if we assume that ï-epenthesis applies, we have to mark these as exceptions.

    (2) ip-hi-ta   [iphida].   *[ibïhida]   'to make someone dress'
        mäk-ci   [mäkc'i],   *[mägïji]   'eat (Aspectual)'
        sal-ki   [salgi],   *[sarïgi]   'living'
        k'ak'-ni [k'aŋni],   *[k'ak'ïni] 'Do you cut?'

Second, in the following example (3), there is no way to differentiate the aspect affix from the interrogative ending affix if we assume the application of the ï-epenthesis rule.

    (3) Aspect   Ending (Interrogative)
        po-ni   'As we see'   po-ni   'Do you see?'
        tat-ïni 'As we shut'   tat-ni 'Do you shut?

Even if we consider the boundary distinction between the two affixes, both are expressed as '+' morpheme boundaries. Thus, unless we assume *ï* as a part of the underlying representation of the aspect affix, it is impossible to distinguish between the two affixes unless the interrogative affix is marked [-*ï*-epenthesis].

Third, *ï* can be the stem-final segment of a predicate and it does not disappear unless it is followed by a vowel initial affix. By claiming that *ï* is an epenthetic vowel between consonants, it follows that an underlying representation of a predicate stem can be formed by a single consonant in the following examples. As we know, however, this is not possible because the underlying representation of a stem cannot consist of a single consonant.

(4)　/s'ï + ä/　　[s'ä]　　'Write (Imperative)'
　　　/kʰï + äto/　[kʰädo]　'Although it is big'

Thus, any mono-syllabic *ï*-final predicate stem can be a counter-example to *ï*-epenthesis because the stem-final *ï* cannot be inserted by *ï*-epenthesis.

Finally, as was argued by B.-G. Lee (1976:139), the so-called *lï*-irregular predicates are strong evidence against the assumption of *ï*-epenthesis. In *lï*-irregular predicates, *ï* is deleted but another *l* is added before a vowel, e.g. [[pulï] ä] → [pullä] 'call!'. (Kim-Renaud 1973, 1982 posits two *l*'s in the underlying representation such as /pullï/, but this different underlying representation does not affect the current discussion.) As we can see in (5), it is impossible to derive the correct result in the second example.

(5)　Adv-forming　　　Purpose

　　　[[pulï] lä]　　　[[pulï] lä]
　　　-------　　　　-------　　　　*ï*-epenthesis
　　　[pullä]　　　　[pullä]　　　Intersonorant *ï*-deletion
　　　[pullä]　　　　*[pullä]　　　Phonetic representation
　　　([purïrä])

As will be discussed later, an intersonorant *ï*-deletion rule is needed as a separate rule which is unrelated to *ï*-epenthesis and *ï*-deletion. Unless the second example is marked as an exception to intersonorant *ï*-deletion, the correct result [purïrä] cannot be derived.

Nevertheless, Y.-S. Kim (1989) recently revived the earlier argument for epenthesis. In order to support this claim, he compares those inflectional suffixes which take his epenthesized *ï* with those that do not.

    (6) a. cap-ïni
            cap-ïna
            cap-ïmyän
            cap-ïlä
            cap-ïl
            cap-ïn
            cap-ïma

        b. cap-ta
            cap-ko
            cap-se
            cap-ca
            cap-ci
            cap-ni   (Interrogative)
            cap-na   (Interrogative)
            cap-ne   (Indicative)

In this categorization, he observes that those suffixes taking ï begin with sonorants, while those not taking ï begin with obstruents, except two interrogative and one indicative suffixes. Thus he proposes the following rule of ï-epenthesis.

    (7) ï-Epenthesis (Obligatory)

$$\emptyset \quad \rightarrow \quad \underset{\textstyle ï}{V/C} \quad + \quad \_\_C]_{\text{-Int,-Ind}}$$
$$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad [+\text{son}]$$

This rule implies that, save three exceptional affixes (i.e., two interrogatives and one indicative), an ï is epenthesized between a consonant-final verb stem and a sonorant-initial suffix. And this sort of interpretation seems quite convincing at a glance.

    There are, however, several problems encountered besides those mentioned above. First, it should be explained why a vowel is inserted before a sonorant, rather than before an obstruent. If the function of the vowel ï is to euphonize the consonantal sequence, it should be inserted between two obstruents, rather than a consonant and a sonornant consonant which is closer to vowels in nature. Second, it is not a desirable rule if we have to allow an additional description for exceptions such as '-Int' or '-Ind'. Third, besides the exceptions shown in (6b), there are other exceptional cases such as -nya and -nïn.

    (8) *cap-nya*   'Do you hold?'
          cap-nïn   'holding'

Especially, the latter, -nïn is not an interrogative or an indicative suffix. Rather, it is an aspectual one and it does not take ï, unlike the other aspectual suffixes shown in (6a). Finally, there are also many

obstruent-initial suffixes which should take *ï*, such as the honorific suffix *-si* and the style suffix *-p*.

(9) cap-ïsi-ta   'hold'   (cf. po-si-ta 'see')
     cap-ïp-ni-ta   (cf. po-p-ni-ta)

All the evidence shown here does not indicate that *ï* is epenthesized between a consonant and a sonorant. Rather, it indicates that *ï* exists in the underlying representation and it is deleted when adjacent to a vowel. Therefore, we assume *ï*-deletion, rather than epenthesis, since it is hard to retain the proposal for epenthesis without encountering numerous problems.

2.3. Rule formulation of *ï*-deletion

The issue of *ï*-deletion was first formulated within the framework of generative phonology by B.-G. Lee (1976, 1979). He introduced a generalized *ï*-deletion rule (10), by employing the mirror image convention.

$$(10)\ \text{ï} \rightarrow \text{ø} \ \% \ [\text{+voc}]\ \big]\text{b<N>VA} + \begin{bmatrix} a<n> \\ s_0 \end{bmatrix} \_\_\_ a<b<[\text{+seg}] \begin{bmatrix} \text{+seg} \\ a<\text{+cor>} \end{bmatrix} > [\text{+low}] >$$

When we remove the complicated symbols from this rule, (10) is regarded as the combination of the two rules in (11).

(11) a. $\text{ï} \rightarrow \text{ø} / [\text{+voc}] \big]_{VA} + s_0 \_\_$

        (When preceded by zero or an indefinite number of
        segment 's', *ï* is deleted after the stem of a verb or an
        adjective.)

     b. $\text{ï} \rightarrow \text{ø} / \_\_ _{VA} + [\text{+voc}]$

        (A verb or an adjective's initial *ï* is deleted before an affix
        initial vowel or an *l*.)

This complex generalized *ï*-deletion rule (10) is later revised and simplified as another mirror image rule by Lee to account for the deletion of affix-initial or stem-final *ï* 's (B.-G. Lee 1979:4).

(12) $\text{ï} \rightarrow \text{ø} \ \% \ [\text{+voc}] + \_\_\_$

This generalization looks very plausible and attractive in its simplicity. It is, however, subject to substantial revision due to many instances in which it does not apply, e.g. [[kï]$_N$ eke] $\rightarrow$ [kïege] 'to him', [iïkko]$_{Adv}$ $\rightarrow$ [iïkk'o] 'at last', [hïlk] $\rightarrow$ [hïk] 'soil'. In other words, (12) does not apply to a noun or an underlying representation. Because of this, Kim-Renaud (1982) claims that *ï*-deletion should be regarded as consisting of four separate rules.

(13) a. Affixal ï-Deletion

    ï → ø / V + ____

(The initial ï of an affix is deleted when following a stem
which ends in a vowel.)
    e.g. ki + ïmyän [kimyän] 'if one crawls'

b. Verbal Stem Final ï-Deletion

    ï → ø / ____ & V

(The final ï of a verb stem is deleted when followed by
an affix beginning with a vowel.)
    e.g. k'ï & äto [k'ädo] 'though (we) extinguish (it)'

c. Casual ï-Deletion (optional)

X	V	ï	Y
1	2	3	4
→ 1	2	ø	4
	[+long]		

(ï is truncated when meeting another vowel and the
remaining vowel is lengthened.)
    e.g. /maïl/ → [ma:l] 'village'

d. Interconsonantal ï-Deletion (optional)

    ï → ø / l & ____ $\left[\begin{array}{c} m \\ l \end{array} \right]$

    e.g. ul-ïmyän [ulmyän] 'if one cries'

These rules in (13) can explain those counter-examples unexplained
by B.-G. Lee's rule. In Ahn (1985a), however, it is argued that we
need only three rules, instead of four as posited by Kim-Renaud. In
this paper, however, as the modification made by Ahn (1985a, 1986,
1991) for Casual and Interconsoantal ï-deletion is not so crucial for
discussing the nature of ï, the discussion of this paper will be limited
to the so-called general ï-deletion process.[2]

    Now, as Kim-Renaud (1982:474-5) stated, in addition to Affixal
ï-Deletion, the Verbal Stem Final ï-Deletion rule is used to prevent a
noun stem ending in ï from undergoing ï-deletion as in [[kï]eke] →
[kïege] 'to him'. In other words, two separate rules were used to
explain a single phenomenon, ï-deletion in 'stem + affix'. Therefore,
Kim-Renaud's Affixal ï-Deletion and Verbal Stem Final ï-Deletion can
be combined into one rule by using a curly bracket as follows.

(14) ï → ø / $\left[\begin{array}{c} V \;] \\ \_\_\_\_ \;] \end{array} \right]_{-N}$ $\left[\begin{array}{c} \_\_\_ \\ \overline{V} \end{array} \right.$ (-N = all grammatical
                         categories except Noun)

As a noun-final *ï* does not undergo *ï*-deletion, we need to specify this grammatical information. Moreover, Kim-Renaud's grammatical boundaries can be replaced by a single bracket. This rule can now be simplified further by employing a mirror image convention as follows:

(15) ï → ø % ___]₋N [V

Because *ï* is deleted except when it is a noun-final segment, we do not need additional grammatical information in formulating this mirror image rule. Thus the following examples illustrate the application of (15) whether *ï* is preceded or followed by a vowel.

(16) a. [[s'ï]_V äto]   → [s'ädo]   'although (we) write'
       [[kʰï]_A äto]   → [kʰädo]   'although (it is) big'
       (cf.[[kï]_N eke] → [kïege]   (*[kege]'to him'))

    b. [[ka]_V ïni]   → [kani]   'because (we) go'
       [[hïli]_A ïni]   → [hïlini]   'because (it is) fuzzy'
       (cf.[[ka]_N ïlo] → [karo]   'to the edge')

Although the new rule (15) replaces the earlier two rules by Kim-Renaud, there remains a crucial factor to be considered in relation to the so-called *h*-irregular conjugation.

Predicate final *h* is deleted in the so-called *h*-irregular conjugation if followed by a vowel-initial suffix, regardless of the grammatical category of the stem.

(17) [[noh] ato]   → [noado]   'although (we) locate (it)'
     [[nolah] ato] → [norado] 'although (it is) yellow'

If the suffix-initial vowel is *ï*, however, *ï* is deleted obligatorily only after the adjective-final *h*, e.g. [[noh]_Vïmyän] → [noïmyän] 'if (we) locate (it)' vs. [[nolah]_Aïmyän] → [noramyän] (*[noraïmyän]) 'if (it is) yellow'. In order to solve this problem, Ahn (1985a, 1986) appeals to the methods of CV Phonology. In other words, because this difference is related to the grammatical category, Ahn claims that the verb-final *h* is associated to the C slot of the CV tier, while the adjective-final *h* does not have its own C slot underlyingly.

(18) a. verb   C V C   b. adjective C V C V
                 | | | | | | |
                 n a h   n o l a h

In other words, the final segment *h* in a verb is associated to the timing C slot, while the final *h* in an adjective does not have its own timing slot underlyingly. Therefore, as there are two different underlying forms for the stem-final *h* deleting before a sonorant, the rule of *h*-deletion was formulated as (19).

(19) Affixational h-deletion: (Ahn 1985a,b, 1986)

$$<\!C\!> \rightarrow \emptyset \; / \; V \underline{\quad}]_{<V>/A} \; \underset{\substack{| \\ [+son]}}{[\!X} \qquad (X = \text{any timing slot})$$

with the h under $<\!C\!>$.

Now, related to the affixational h-deletion, the non-linear rule formulation for $ï$-deletion was also proposed by Ahn (1985a), as shown in (20).

(20) $ï$-deletion: mirror image

$$V \rightarrow \emptyset \; \% \; X \perp_{-N \; <p/c>} V$$

with the $ï$ under V and the σ above.

(Note: X = either C or V, p/c = passive/causative affix,
       -N = all grammatical categories except noun)

As specified in the rule formulation, if an $ï$-final predicate stem is followed by a vowel-initial passive/causative affix, the stem should be multi-syllabic.

(21) a. /ka-ïni/   →   [kani]   'since (it) goes'
        /camkï-i/ →   [camgi] 'to be locked'
        (passive)

     b. /s'ï-i/   →   [s'ii]   'to be used'
        /thï-i/   →   [thïi]   'to be opened'

In other words, the nonlinear rule of $ï$-deletion applies to (18b) by scanning the CV tier, not the segmental tier. As shown below, we can obtain the correct results with these two nonlinear deletion rules.

(22)
$$\begin{bmatrix} \begin{bmatrix} C\,V\,C \\ |\ \ |\ \ | \\ n\ a\ h \end{bmatrix}_V & \begin{matrix} V\,C\,V \\ |\ \ |\ \ | \\ ï\ n\ i \end{matrix} \end{bmatrix} \quad \begin{bmatrix} \begin{bmatrix} C\,V\,C\,V \\ |\ \ |\ \ |\ \ | \\ n\ o\ l\ a\ h \end{bmatrix}_A & \begin{matrix} V\,C\,V \\ |\ \ |\ \ | \\ ï\ n\ i \end{matrix} \end{bmatrix} \quad \text{inflection}$$

		C V C V | | | | n o l a h	C V | | n i	$ï$-deletion
C V | | n a	V C V | | | ï n i	C V C V | | | | n o l a	C V | | n i	h-deletion
[naïni]		[norani]		$l \rightarrow r \; / \; V \underline{\quad} V$

Here, however, there are some problems in the formulation of two deletion rules. First, as for the affixational h-deletion, the V slot preceding h is redundant at the timing tier for two reasons: i) Due to the boundary bracket in the rule formulation, it is possible to predict that the h is stem-final, so we can eliminate the morphological

condition '<V>/A' from the rule description. ii) As syllable-final consonant clusters are not allowed in Korean, the stem-final *h* is truncated even after an underlying consonant.

```
(23) /manh-a/    [mana]     'much'
     /k'ïnh-ïni/  [k'ïnïni]   'since (we) cut'
     /talh-ato/   [tarado]    'though (it is) worn out'
```

Moreover, at the melody tier, the representation of the segment *h* is specified along with the feature representation [+son] and this is apparently not a desirable rule description.

In order to solve these problems in a consistent way without causing any redundancy, we can employ the theories of underspecification and feature geometry. Thus two kinds of underlying representation for /h/ are proposed as follows.[3]

```
(24) a. verb:              b. adjective:
            X
            |
         R-[+cont]              R-[+cont]
            |                      |
            L                      L
            |                      |
         [+s.g]                 [+s.g]
```

   (Note: X = timing slot, R = root node,
           L = laryngeal node, [s.g] = [spread glottis])

(24) shows that the stem-final *h* is specified only for the root feature [+cont] and the laryngeal feature [+spread glottis], while other predictable features are filled in by redundancy rules: e.g. [ ] → [-voice], [ ] → [-son], [ ] → [-constricted glottis], [ ] → [-labial], etc. Here the question arises as to whether a simpler underlying representation for /h/ can be postulated by eliminating the root feature [+cont]. This possibility, however, should be discarded since, without the root feature, the representation of /h/ may not be distinguishable from the representation of /tʰ/ shown in (25). (See Iverson (1989) for the representation of Korean obstruents.)

```
(25) /tʰ/:     X
               |
            R-[+cont]
               |
               L
               |
            [+s.g]
```

Based on the arguments above and (24), the earlier version of affixational *h*-deletion is now reformulated as in (26).[4]

(26) Affixational *h*-deletion (revised)

$$
\begin{array}{ccc}
\text{(X)} & \rightarrow & \emptyset \;/ \;\underline{\quad}\;] \; \text{X} \\
| & & | \\
\text{R-[+cont]} & & \text{R-[+son]} \\
| & & \\
\text{L} & & \\
| & & \\
\text{[+sg]} & &
\end{array}
$$
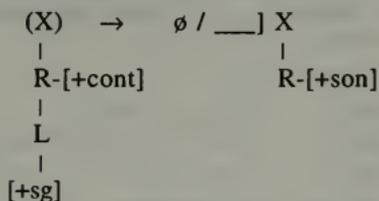
Turning to the earlier rule formulation of *ï*-deletion, however, there also remain a couple of things to be reconsidered. First, the rule formulation in (20) is overly complex due to the condition on syllable counting of causative/passive forms. This problem can be avoided if we treat those several cases of monosyllabic stems of causative/passive forms as true exceptions being listed in the lexicon (Sohn 1987). Second, being neutral to vowel harmony and being the epenthetic vowel between consonants (Ahn 1985a; Sohn 1987), *ï* should be regarded as the least marked vowel in Korean. Thus, within the framework of underspecification, the least marked vowel *ï* is represented only as a nucleus root without any features. Based on this, the rule formulation for *ï*-deletion is revised as the simple figure in (27).

(27) (Revised) *ï*-deletion: mirror image

$$
\begin{array}{ccc}
\text{N} & & \text{N} \\
| & & | \\
\text{X} \rightarrow \emptyset \;/ \;\underline{\quad}\;]_{\text{-noun}} \;[\; \text{X} & & \quad(\text{Note: N = nucleus} \\
| & & \qquad\qquad\quad \text{R = root node}) \\
\text{R} & &
\end{array}
$$
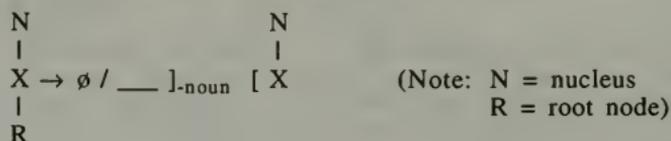
With the rule formulation (27), I refer to the least marked vowel *ï* with the nucleus node, the timing X-slot, and the root node, but without any features, while I underspecify the root node as well as the class node, only to simply represent a vowel, regardless of its quality.

Sohn (1987) also proposed a similar rule of *ï*-deletion called 'empty nucleus deletion' where she deleted the condition '-noun' as well, saying that /kï/ 'he' is the only non-verbal stem for which *ï*-deletion needs the morphological constraint.

$$
\begin{array}{ccc}
\text{(28)} & \text{N} & \text{N} \\
& | & | \\
& \text{X} \rightarrow \emptyset \;/ \; \text{X}]\underline{\quad} \\
& | & \\
& [\;] &
\end{array}
$$

Here she claims that the epenthetic *ï* of a loanword noun should be treated separately since this process is a matter of Korean syllable structure not allowing CC clusters. However, it should be noted that *ï*-epenthesis in loanwords is very productive and the epenthetic vowel never undergoes the obligatory *ï*-deletion rule, as shown in (29a). Moreover, *ï*-epenthesis can apply not only to loanwords but also to native words in children's speech as well as in some dialects, a process which is called '*ï*-analogy' (Ahn 1985a), as shown in (29b).

(29)   a. /milkʰï-e/   → [milkʰïe]   'to milk'
       /cʰïlisïmasï-ini/ → [cʰrisïmasï(i)ni] 'since (it is) Christmas'
       b. /mäk-ta/   → [mägïda]   'eat'

Another problem in Sohn's proposal is that she sets up two underlying representations for *ï*, i.e., deleting *ï* and epenthetic *ï*.

(30)   a. deleting *ï*   N   b. epenthetic *ï*   N
                         | |
                         X   X
                         |
                        [ ]

However, as both of them surface very freely without any difference in their usages, there is no reason to distinguish these two forms.

3.   *ï*-epenthesis

The obligatory *ï*-deletion (27) applies in derivation or in inflection. Thus, a suffix initial *ï* is deleted after a vowel. There is, however, an opposite phenomenon which inserts an *ï* before a consonant initial suffix, in a consonant final predicate stem. And there are two cases which allow *ï*-epenthesis.

3.1.   Analogy

First, *ï*-epenthesis often occurs in children's speech or in the imitation of children's speech: Children insert *ï*'s in the environment mentioned above, their way of breaking a consonantal hiatus, in the process of language acquisition (P.-G. Lee 1979, Ahn 1985a). Thus, considering the morphological information, *ï*-analogy is formalized as follows (Ahn 1985a).

(31)   *ï*-Analogy

$$\emptyset \rightarrow ï \;/\; C]_{V/A} \_\_ C$$

ï-analogy is morphologically conditioned as it applies to predicate conjugations only, not to case-markings.

(32) a. Predicate inflection
          mäk-   'eat'   →   mäk-[ï]ta, mäk-[ï]ci
          noph-   'high'   →   noph-[ï]ta, noph-[ï]ci
          an-   'hug'   →   an-[ï]ta, an-[ï]ci

      b. Case marking
          mäk   'ink-stick' →   *mäk-[ï]to 'ink-stick too',
                                  *mäk-[ï]man 'ink-stick only'
          pap   'rice'   →   *pap-[ï]to, *pap-[ï]man

In (32), the second morpheme in each example has no alternation in different phonological environments. In other words, the underlying representation does not include ï in every case. By the morphological condition specified in (31), ï is inserted only after a predicate stem, not after a noun or a case marking.

Moreover, as inflection is the domain of application, ï-analogy does not apply to derivation either. Therefore, ï-analogy is considered to be applied to inflection as in (33a), not to derivation in (33b), or to compounding in (33c).

(33) a. Inflection
          [[kam] ki] →   [kamïgi]   'winding'

      b. Derivation (passive)
          [[kam] ki] →   *[kamïgi]   'to be wound' ([kamgi])

      c. Compounding
          [puth][cap] → *[puthïjap]   'to catch' ([putc'ap])
          [kam][s'a]   → *[kamïs'a]   'to protect' ([kams'a])
                                          'to wind' 'to wrap'

Finally, in relation to irregular conjugations, which will be discussed in the next chapter, ï-analogy precedes an irregular conjugation process as follows. (*p*-irregular conjugation refers to stem-final 'p → w' change before a long-vowel initial suffix. *s*-irregular conjugation refers to deletion of *s* before a vowel initial suffix.) As we can see here, ï-analogy feeds the application of an irregular conjugation process which changes a stem-final consonant before a vowel-initial suffix. As ï-analogy precedes an irregular conjugation, the stem-final consonants never appear in phonetic representations which are derived after ï-analogy. Therefore, in (34), *[kobïda] 'be pretty' or *[cisïda] 'make' never appear in Standard Korean. (But note that some southern dialects do not follow the irregular conjugational process and hence they would pronounce the stem-final consonants in their phonetic representations.)

(34) a. *p*-irregular
                 /ko:p-ta/   'to be pretty'
                 ko:p ï ta   *ï*-analogy
                 ko:w ï ta $p \rightarrow w$
                 ko w ï ta   V shortening
                 [kowïda]   Voicing
             (or [kowuda])   Rounding of *ï* (*[kobïda])

      b. *s*-irregular
                 /ci:s-ta/   'to make'
                 ci:s ï ta   *ï*-analogy
                 ci: ï ta $s \rightarrow \emptyset$
                 ci   ï ta   V shortening
                 [ciïda]   Voicing
                (*[cisïda])

      c. *h*-irregular
                 /noh-ta/   'to locate'
                 noh ï ta   *ï*-analogy
                 no   ï ta $h \rightarrow \emptyset$
                 [noïda]   Voicing

3.2. Loanwords.

Besides the analogical *ï*-epenthesis process, there is another type of *ï*-epenthesis which occurs when a foreign word is borrowed from an Indo-European language such as English. When a loanword has a complex consonant cluster which is not allowed in Korean syllable structure, *ï* is epenthesized between consonants in order to be compatible to Korean syllable structure which does not allow a consonant cluster in a syllable on the surface. In order to examine the characteristics of this process, we can observe the following facts. First, *ï* (bold) is inserted to break up a word-initial consonant cluster. For the analogical epenthesis, I discussed the morphological environment for rule application

(35)   Christmas $\rightarrow$ [kʰ**ï**risïmasï]
        trump $\rightarrow$ [tʰ**ï**rämpʰï]
        play $\rightarrow$ [pʰ**ï**rei]

Second, *ï* is inserted after a word-final consonant if it is a fricative or a stop which can be exploded.

(36)   bus $\rightarrow$ [p'äsï]   light $\rightarrow$ [laitʰï]
        news $\rightarrow$ [nyusï]   seat $\rightarrow$ [s'itʰï]
        serve $\rightarrow$ [s'äbï]   card $\rightarrow$ [kʰadï]
        Gulf $\rightarrow$ [kälpʰï]   mike $\rightarrow$ [maikʰï]
        pump $\rightarrow$ [pʰämpʰï]   smog $\rightarrow$ [sïmogï]
        bunt $\rightarrow$ [p'äntʰï]

However, if the final consonant is an unexploded stop, ï will not be inserted. Thus, in the following example, we do not get any epenthesized ï word-finally as the final consonants are unexploded ones.

(37)	jeep	→	[c'ip], ??[c'ibï]
	Contac	→	[kʰontʰæk], *[kʰonïtʰæk],
	team	→	[tʰim], *[tʰimï]
	can	→	[kʰæn], *[kʰænï]
	wool	→	[ul], *[urï]
	pool	→	[pʰul], *[pʰurï]

For the same reason, ï is epenthesized between consonants word-internally only if the first consonant is exploded. Thus we have epenthesized (i.e., bold) ï's between consonants only in (38a), not in (38b).

(38)	a. disk	→	[disïkʰï]
	list	→	[lisïtʰï]
	whisky	→	[wisïkʰi]
	b. bond	→	[p'ondï], *[p'onïdï]
	mint	→	[mintʰï], *[minïtʰï]
	tent	→	[tʰentʰï], *[tʰenïtʰï]
	trunk	→	[tʰïräŋkʰï], *[tʰïräŋïkʰï]
	milk	→	[milkʰï], *[mirïkʰï]

As we saw in the last two examples of (37), ï is not epenthesized after the final l which is not released. If the final segment is an r which is realized on the surface, however, ï is usually inserted as shown in (39a) since [r] cannot occur syllable-finally in Korean. But if [r] is not realized, ï-epenthesis does not apply as in (39b). Thus the application of ï-epenthesis depends on the realization of [r] on the surface. And the realization of [r] is a matter of conventional representaion, rather than a morphological or phonological issue.

(39)	a. tar	→	[tʰarï]
	cork	→	[kʰorïkʰï]
	b. car	→	[kʰa]
	par	→	[pʰa]

Based on the observation made so far, we can formulate a rule of ï-epenthesis applying to loanwords as follows.

(40) ï-Epenthesis in Loanwords

$$\text{ï} \rightarrow \text{ø} / \begin{bmatrix} +\text{release} \\ +\text{cont} \end{bmatrix} \underline{\quad}] \sigma$$

By this rule, ï epenthesizes to form a new syllable if the preceding consonant is a released stop (such as [tʰ] or [d], not [tʰ]) or a fricative (such as s).

Before we close this section, there remains a fact to be considered: When a syllable-final segment of a loanword is palatal, the epenthetic segment surfaces as [i], rather than [ï].

(41)   orange   →   [orenji]
       George Bush   →   [cojibuši]
       French   →   [pʰïrenchʰi]
       Apache   →   [apʰacʰi]

This sort of variation could also be handled by establishing a separate rule of *i*-epenthesis, where ï is deleted after a palatal segment syllable-finally.[5] Note, however, that we have already made the rule of epenthesis (40) and that there is a rule of assimilation which is required anyway in Korean phonology. (The non-existant /f/ is usually realized as [pʰ] in Korean.)

(42)   /pʰlencʰ/   'French'
       pʰïlencʰï   Rule (40)
       pʰïlencʰi   Place Assimilation
       pʰïrencʰi   l → r

Thus, by making use of the already existing rule (40) and the rule of place assimilation, we can obtain not only the correct results but also simplicity of linguistic description.

4. Concluding summary

So far I have discussed two opposite phenomena: ï-deletion and ï-epenthesis. In the first part of the discussion, I showed how the controversy over the status of ï can be resolved. Moreover, relating to the discussion over the issue of ï-deletion, I reexaminined the so-called *h*-irregular conjugation as well. Furthermore, in order to provide more explanatory feature representation and rule formulation, I employed the theories of underspecification and feature geometry. Here I adopted generally accepted concepts, rather than any specific stipulations. Finally, I briefly reexamined an alternative proposal and its problems with respect to these issues.

In the second part of this paper, I discussed the ï-epenthesis processes for two separate environments: Epenthesis by analogy and epenthesis for loanwords. In discussing the analogical epenthesis, I examined the constraining factors from morphological as well as phonological points of view. For the discussion of loanword epenthesis, I specified the phonological environment of the epenthesis rule. Then I discussed how the two rules epenthesizing ï and *i* can be merged as one.

NOTES

[1] Through this paper, the symbols [ä] and [ï] refer to the mid back unrounded vowel [ə] and the high back unrounded vowel [ɨ], respectively.

[2] The other two ï-deletion processes are formulated as follows.

Casual ï-deletion: mirror image

$$
\begin{array}{cc}
V & V \\
| \nearrow & \dagger \\
V & \ddot{\imath}
\end{array}
$$

ï is truncated when meeting another vowel and the remaining vowel is lengthened.

Intersonorant ï-deletion

$$\ddot{\imath} \rightarrow \emptyset \, / \, l \, _{V/A} \underline{\quad} \begin{bmatrix} m \\ l \end{bmatrix}$$

[3] When we adopt more recent proposals by McCarthy (1988) or Clements (1989), these representations may appear differently. However, I will adopt a more general way of representation since taking any specific model is not our major concern here.

[4] The underspecified representation for the adjectival *h* is not the only one which lacks a timing slot. For example, there are nouns which have a final 'floating' *h* in their underlying representations (Ahn 1986). This *h* does not appear as an individual form or before a vowel, but it appears on the surface before an obstruent by aspirating the following consonant.

an pak	/anh + pak/	[anpʰak]	'in and out'
su päl	/suh + päl/	[supʰäl]	'a drone'
mälikalak	/mäli + kalak/	[märikʰarak]	'hair'

Here I also assume that the final *h* lacks the timing slot since the rule of *ï*-deletion applies to these examples as it does to *h*-final adjectives: e.g. /mäli + ïlo/ [märiro] 'with hair'. Moreover, if any of these nouns has a vowel immediately before *h*, it takes -*ka*, rather than -*i*, as its subject marker, just as other vowel final nouns do.

[5] We may formulate a rule roughly as follows.

i-epenthesis: $i \rightarrow \emptyset \, / \, C \underline{\quad}] \, \sigma$
$\qquad\qquad\qquad\quad$ [+palatal]

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NOTES ON SOME TESTS FOR SUBJECTHOOD IN KOREAN

Euiyon Cho

In this paper, I examine some syntactic phenomena of Korean which make reference to subjecthood: honorific *si*, reflexive *casin*, and plural copying. It will be shown that what controls these linguistic phenomena is not just the grammatical function 'subject'; semantic and pragmatic factors such as animateness, in addition to the grammatical function of subject, govern them. Arguments for this conclusion will be presented with discussions about the subjecthood of nominals in the so-called "double/multiple subject constructions".

1. Introduction

Korean has some grammatical phenomena which are seemingly sensitive to the function 'subject'. Rules governing the distribution of honorific *si*, reflexive *casin*, and plural copying are representative. Such grammatical phenomena have been, therefore, cited in Korean linguistics to justify one's claim for the subjecthood of a nominal in certain constructions when inquiries concerning which nominal in a sentence bears the grammatical relation subject arise.[1] Especially queries concerning which nominal is a subject in the so-called "double/multiple subject constructions", exemplified below, have forced Korean linguists to utilize the above-mentioned subject-referring grammatical phenomena.[2]

(1) Inho-ka kho-ka   khu-ta.
      NOM   nose-NOM   big-Dec
  'It is Inho whose nose is big.'

(2) Inho-ka apeci-ka   khu-si-ta.
         father-NOM   big-HON-Dec
  'It is Inho whose father is big.'

For instance, in his study of Korean multiple nominative constructions within the framework of Relational Grammar, Youn (1990) uses such subject-referring phenomena in order to support his arguments for the subjecthood (final *1*-hood) of the first nominative nominal in sentences like (1) and for the subjecthood of the second nominative nominal in sentences like (2).

In this study, I shall show the following regarding the subjecthood of a nominal in sentences like (1): a non-term R-sign such as 'Focus' as well as a subject is able to serve as a target of honorific *si* and antecedent of reflexive *casin* if the grammatical subject fails to refer to an animate entity; what controls plural copying is not the plural marker *tul* on a subject nominal but the semantic plurality of the subject nominal. At the same time, contrary to Youn's claim for the subjecthood of the first nominative nominal in sentences like (1), it will be argued that in sentences like (1), which will be called "inalienable double subject constructions" (IDSC), the second nominative nominal is the (final) subject. This will pave the way of giving a unified account of the two types of double subject constructions.

In section 2, Youn's work on IDSCs will be presented with discussions about honorific *si*, reflexive *casin*, and plural copying. This will be followed by my arguments for the subjecthood of the second nominative nominal in IDSCs. Section 3 concludes the paper discussing some consequences of this study.

2. Searching for Subject in IDSCs

2.1. Honorific *si*

It is commonly accepted in Korean linguistics that the appearance of honorific affix *si* in the predicate of a sentence implies that the speaker shows respect to the subject referent. The following sentences show that the grammatical property of honorific *si* is linked to a subject nominal: the property of honorific *si* anchors to the subject nominals *apeci* 'father' and *halapeci* 'grandfather' in (3) and (4), respectively.

   (3) apeci-ka Kim sensayngnim-ul mana-si-ess-ta.
       father-NOM   teacher-ACC   meet-HON-Past-Dec
       'Father (Hon) met teacher Kim.'

   (4) halapeci-ka   cap-hi-si-ess-ta.
       grandfather-NOM catch-Pass-HON-Past-Dec
       'Grandfather (Hon) was arrested.'

Thus honorific *si* has been called "subject referent honorific."

On the basis of the examples such as (3) and (4), Youn (1990) proposes the following rule governing honorific *si*.

   (5) A final *l* controls S(ubject) H(onorification).

With the above rule of honorific *si*, Youn attempts to show that the first nominative nominal is a (final) subject in IDSCs. In general, as he shows, the first nominative nominal in IDSCs appears to be a target for honorification by means of honorific *si*. For example, what is honorified by the linguistic element *si* in the following sentences

are the referents of the first nominative nominals *enemin* 'mother' and *apenim* 'father'.

(6) emenim-i   nwun-i   khu-si-ta.
    mother-NOM eyes-NOM big-HON-Dec
    'It is mother whose eyes are big.'

(7) apenim-i   phal-i   pwuleci-si-ess-ta.
    father-NOM arm-NOM become broken-HON-Past-Dec
    'It is father whose arm was broken.'

Therefore, he concludes that the first nominative-marked nominal is the subject of IDSCs.

In the following, we shall first see that it is not the case that only subject nominals control honorific *si*. After that it will be shown that sentences like (6) and (7) belong to a case where a non-term R-sign — nominal in terms of Relational Grammar — controls honorific *si*. That is, it will be argued that in the above sentences, the second nominative nominals are subjects although the referents of the nominals are not interpreted as being honorified by the honorific *si*.[3]

That a non-term R-sign controls honorific *si* is shown in the data (8) and (9) below, taken from Cho (1988) and Kim (1990), respectively. What is honorified by the presence of *si* in (8) and (9) are the referents of the nominals *kyocang sensayngnim* 'principal' and *halmeni* 'grandmother', which are not the subjects of the sentences; the nominal 'grandmother' is a part of the topic phrase *halmeni-uy   sangsi-eyse-nun* 'in Grandmother's life' while the nominal 'principal' is part of the postpositional phrase *cang sensayng-nim-ulopwute* 'from the Principal'.

(8) kyocang sensayngnim-ulopwute cisisahang-i iss-usi-
    Principal teacher-from   message-NOM exist-HON-
    kkeyss-upni-ta.
    Future-HON-Dec
    'There will be a message from the Principal.'

(9) halmeny-uy   sayngsi-eyse-nun samsiptay-ka kacang
    grandmother-Poss life-Loc-Top   thirties-NOM   most
    hayngpokha-si-ess-ta.
    happy-HON-Past-Dec
    'In Grandmother's life, (her) thirties was the happiest.'

That is, in (8) and (9), the nominative case-marked subject nominals *cisisahang* 'message' and *samsiptay* 'thirties' do not serve as targets of honorific *si*. As the above examples show, nominals bearing a non-term R-sign can be the target for honorification by honorific *si*. What we need to note in the above examples is the semantic relation between the target of honorification and the subject nominal:

kyocangsensayngnim 'Principal' *cisisahang* 'message'; *halmeni* 'grandmother' and *samsiptay* 'thirties'. It is a possessor-and-possessee relation (in the interpretation of the above sentences.) This relationship is the same as that between the first and second nominative nominals in IDSCs. I conjecture that the reason why grammatical subjects fail to serve as the target of honorification in the above sentences is that the subject referents are not human.

My analysis of honorific *si* honorification is as follows: *si* is grammatically linked only to a subject (final *1*).[4] But if the subject nominal denotes non-personage and the denotation of the subject nominal turns out to be a possessee of the person(s) referred to by a non-term bearing nominal, then in order for a speaker to show his deferential attitude to the possessor, the honorific si is used in order to honorify the possessor by linking the possessee nominal (subject) with the honorific *si*. Seen from the perspective of language change, it would be said that by showing his deferential attitude to the referent of subject nominal which is grammatically linked to honorific *si*, the speaker shows respect indirectly to the person who possesses it. However, what the speaker eventually wants to achieve by means of the linguistic element *si* is such a communicative context is to show respect to the possessor (a person), not to the possessee (a non-person). This kind of use of honorific *si* has been conventionalized. Thus, the appearance of honorific *si* in constructions like (8) and (9) as well as in IDSCs is quickly interpreted as being connected with a possessor denoted by a non-term R-sign bearing nominal.

This explanation of honorific *si* phenomena applies equally to the interpretation of the honorific *si* in IDSCs. Let us consider the IDS sentence (6) repeated below:

(6) emenim-i   nwun-i   khu-si-ta.
    mother-NOM eyes-NOM big-HON-Dec
    'It is mother whose eyes are big.'

I claim that the second nominative nominal *nwun* 'eyes' is the subject of the sentence (6), which is predicated by the predicate *khu* 'big'. Since the speaker knows that the honorific *si* is grammatically linked to the subject nominal *nwun* 'eyes' denoting a possession of a person, by using the honorific *si*, the speaker intends to show his deferential attitude to the possessor of eyes, Mother. Thus, the appearance of the honorific *si* in IDSCs like (6) conveys the implication that the speaker shows a deferential attitude to the possessor. That is, in IDSCs like (6), the referent of the first nominative nominal can be honorified by the speaker's use of honorific *si* not because it is the subject of IDSC but because its denotation is a human possessor of the subject referent (= the second

nominative nominal) which is grammatically linked to honorific *si*. In short, in Modern Korean, it is no longer true that what is honorified by honorific *si* is a subject. But a non-term R-sign as well as subject can be connected to the effect of honorific *si* only if what they denote is interpreted as a possessor of the referent (non-personage) of the subject nominal.

Finally to further support my claim that the second nominative in IDSCs is a subject, let me cite a situation in which only the referent of second nominative nominal in IDSCs can be honorified by honorific *si*. Suppose that in a science fiction story computers are personified so that they think, speak, operate machines, and control the relationships between computers. In such a context, the use of honorific *si* as shown in the following utterance, has a communicative effect that the speaker of (10) shows deferential attitude to the RAM.

> (10) i   kompwute-ka raym-i khu-si-ta.
>   this computer-NOM ram-NOM big-HON-Dec
>   'It is this computer whose ram is big.'

To conclude, honorific *si* is grammatically linked to a subject nominal but the speaker's use of honorific *si* for the purpose of honorifying the person(s) referred to by a nominal does not always cover the cases in which the person is the subject referent: The referent(s) referred to by a non-term R-sign can be honorified by the speaker's use of honorific *si* if the nominal bearing the non-term R-sign is interpreted as a possessor of an inanimate subject referent.

2.2. The Reflexive *casin*[5]

According to Youn (1990), the interpretation of reflexive *casin* 'self' is dependent on the nominal bearing the subject relation as the following examples show:

> (11) Chelswu-ka Swuni-lul casin-uy chayk-ul cwu-ess-ta.
>   Chelswu-NOM Swuni-ACC self-Poss office-Loc meet-Past-Dec
>   'Chelswu$_i$ met Suni$_j$ self's$_{i/*j}$ office.'

> (12) Chelswu-ka Swuni-eykey casin-uy chayk-ul cwu-ess-ta.
>   Chelswu-NOM Swuni-DAT   self-Poss book-ACC give-Past-Dec
>   'Chelswu$_i$ gave Suni$_j$ self's$_{i/*j}$ book.'

Since Youn argues that the first nominative nominal in IDSCs is the subject (final *1*), it is predicted under his analysis that only the first nominative nominal can antecede the reflexive *casin*. The following IDSCs show that this prediction is borne out:

> (13) Chelswu-ka elkwul-i casin-uy kotnong-ulo ilkuleci-
>   Chelswu-NOM face-NOM self-Poss pain-with   become twisted-
>   ess-ta.
>   Past-Dec
>   'It was Chelswu$_i$ whose face was twisted with self's$_i$ pain.'

However, for a subject nominal to serve as antecedent of reflexive *casin*, it should have the semantic or pragmatic property of 'being animate'. For example, if an IDSC has two inanimate nominals as in (14), no matter whether the first or second nominative nominal is the subject of (14), neither of them is eligible as antecedent of the reflexive *casin*.

(14) i   pang$_i$-i   pyek$_j$-i   casin$_{*i/*j}$-uy nolyek-ulo
     this room-NOM   wall-NOM   self-Poss   effort-with
     twukkeyp-ta.
     thick-Dec
     'It is this room whose walls are thick with self's effort.'

However, if we personify the referent of the second nominative nominal, then the reflexive *casin* can be coreferential with it. This example serves as evidence for the subjecthood of the second nominative nominal in IDSCs. Suppose that in a fairy tale, walls have ears to hear and mouths to speak. In addition, they have a magical power to make themselves thick or thin whereas rooms do not have such abilities although they are possessors of the walls. In this speech context, the second nominative nominal of the sentence (14) serves as the antecedent of *casin* while the first one fails to. This clearly shows that the second nominative nominal is the subject of IDSCs, and that for a subject nominal to be coreferential with the reflexive *casin*, it needs to be interpreted as animate.

The question which naturally arises at this point is thus: in most IDSCs, what makes the first nominative nominal a possible antecedent of reflexive *casin*? Is it because the first nominative nominal in IDSCs bears the grammatical relation of subject like the second one? The answer to this question is no. This is what I shall show in what follows.

We shall see an example showing that a nominal within a topic phrase in a non-gap topic construction, i.e., a non-subject nominal bearing a non-term R-sign serves as antecedent of reflexive *casin*. Let us look at the following sentence (15):

(15) [[Inho-uy Seoul saynghwal-un] [ton-i   casin-uy
     Inho-Poss   living-Top   money-NOM self-Poss
     checi-eyse kacang kun eleywem-i-ess-ta]]
     situation-Loc most   big difficulty-be-Past-Dec
     'In Inho$_i$'s life in Seoul, money was the greatest difficulty in
     self's$_i$ situation.'

In (15), the nominal *ton* 'money' is undoubtedly the subject of the sentence. But it cannot serve as antecedent of the reflexive *casin* because it is inanimate. What is eligible as a possible antecedent of *casin* in (15) turns out to be the nominal *Inho*, a person, in a topic

phrase. What this phenomenon tells us is that reflexive *casin* finds its antecedent in an extra-sentential constituent if it fails to have the subject as antecedent because the subject is inanimate. But the nominal in an extra-sentential constituent needs to be interpreted as a possessor of the inanimate subject referent. What is happening in IDSCs like (13), repeated below, is the same as that of (15) as far as the phenomenon of reflexive *casin* is concerned.

> (13) Chelswu-ka elkwul-i casin-uy kotnong-ulo ilkuleci-
> Chelswu-NOM face-NOM self-Poss pain-with   become twisted-
> ess-ta.
> Past-Dec
> 'It was Chelswu₁ whose face was twisted with self's₁ pain.'

In (13), the second nominative nominal *elkwul* 'face' fails to serve as antecedent of reflexive *casin* because the nominal lacks the property 'being animate' although it is the subject of the sentence (13). Thus, the first nominative nominal naturally becomes available as a possible antecedent of the reflexive *casin* because it does not only bear a non-term R-sign 'Focus' but also is interpreted as a human possessor of the subject referent 'face'.

If we assume the structure of sentences like (13)-(15) as [[focus/topic] [s]] and treat the initial element as an extra-sentential constituent, then the above reflexive phenomena shown in (13)-(15) lead us to the conclusion that a nominal in a topic/focus constituent can serve as antecedent of reflexive *casin* if it is interpreted as an animate possessor of the subject referent when the subject nominal in [s] fails to serve as antecedent of it because it lacks the property of 'being animate'. Thus, not every nominal which serves as antecedent of reflexive *casin* can be taken as a subject.

2.3. Plural copying

Korean has a plural marker *tul*. One of the interesting facts concerning the distribution of the plural marker is that it appears with categories other than the noun it pluralizes. The following examples show this:

> (16) haksayng-tul-i nuckey(tul) o-ess-ta.
> students-PL-NOM late (PL)   come-Past-Dec
> 'Students have come late.'

> (17) chayk-tul-i kapang sok-ey-tul iss-ess-ta.
> book-PL-NOM bag   inside-LOC-PL exist-Past-Dec
> 'Books are in the bag.'

Based on the above data as well as other ones, Youn proposes a condition on plural copying as in the following:

> (18) A final *l* can control Plural Copying.

Since he assumes that the first nominative nominal is the subject (final *1*) of the IDSCs, he predicts that plural marker tul attaches to categories other than the first nominative nominal when it pluralizes. The following examples are cited in support of the first nominative nominal is the subject of the IDSCs:

> (19) a. Chelswu-ka elkwu-i manhi-(*tul) yewi-ess-ta.
>   Chelswu-NOM face-NOM much-(PL)   become thin-Past-Dec
>   'Chelswu's face became very thin.'
>
>   (Youn's 51 in Ch. 2)
>
>   b. ai-tul-i   elkwul-i manhi-(tul) yewi-ess-ta.
>   child-PL-NOM face-NOM much-(PL) become thin-Past-Dec
>   'The children's faces became very thin.'
>
> (20) a. ku uyca-ka tungpati-ka manhi-(*tul) hyeeci-ess-ta.
>   the chair-NOM back-NOM   much-(PL)   wear-Past-Dec
>   'The back of the upholstered chair was very worn.'
>
>   (Youn's 53)
>
>   b. ku uyca-tul-i   tungpati-ka manhi-(tul) hyeeci-
>   the chair-PL-NOM back-NOM   much-(PL) wear-
>   ess-ta.
>   Past-Dec
>   'The backs of the upholstered chairs were very worn.'

With the data like (19)-(20), Youn uses the plural copying phenomenon as a test for the subjecthood of a nominal in IDSCs.

In the ensuing discussion, first of all, I would like to show that what really controls plural copying is not the plural marker *tul* attached to a subject nominal but the concept of plurality of a subject in the semantic interpretation of a sentence. Let us consider the following sentences (21) and (22), which have two nominative case-marked nominals and the first nominative nominal is undoubtedly interpreted as a possessor of the referent of the second one.

> (21) Inho-ka (yangccok) nwun-i manhi-tul pwu-ess-ta.
>   Inho-NOM (both)   eyes-NOM much-PL swell-Past-Dec
>   'It is Inho whose eyes were very swollen.'
>
> (22) i   ai-ka   sin-i   manhi-tul tahl-ess-ta.
>   this child-NOM shoe-NOM much-PL wear-Past-Dec
>   'This child's shoes were very worn down.'

As the above sentences show, there is no plural marker attached to the two nominals: only the adverb *manhi* 'much' has the plural marker. But the sentences are grammatical, though. What is it that grammatically licenses the plural marker *tul* attached to the adverb *manhi* in (21) and (22)? The appearance of the plural marker in the above sentences cannot be attributed to the first nominative

nominals *Inho* 'Inho' and *i ai* 'this child' since they are singular in number. The appearance of *tul* on an adverbial constituent in the above sentences is attributed to the plurality of the second nominative nominal derived from their denotation *nwun* '(both) eyes' and *sin* 'shoe(s)', even though no plural marker *tul* is attached to them.

Thus, viewed from this perspective, the appearance of the plural marker *tul* on the adverb *manhi* 'much' in the IDSC (19b), repeated below, is attributed to the plurality of the things referred to by the second nominative nominal *elkwul* 'face', which is possessed by the referents of *ai-tul* 'children'.

(19) b. ai-tul-i   elkwul-i manhi-(tul) yewi-ess-ta.
　　　　 child-PL-NOM face-NOM much-(PL)   become thin-Past-Dec
　　　　 'The children's faces became very thin.'

In other words, even though there is no plural marker attached to the second nominative nominal *elkwul* 'face', since in the linguistic context of (19b) it denotes the faces (of the children), the second nominative nominal *elkwul* 'face' is interpreted as plural. Thus, the plural marker *tul* attached to the adverb *manhi* 'much' owes its existence to the plurality of the things referred to by the second nominative nominal *elkwul* 'face'.

Thus we are led to draw the conclusion that what controls the appearance of plural marker *tul* on non-nominal syntactic categories in a sentence is the semantic plurality of a subject nominal.

3. Conclusion

I have attempted to show that what controls the phenomena of honorific *si*, reflexive *casin*, and plural copying is not just the grammatical relation 'subject'. It was shown that reflexive *casin* and honorific *si* are vulnerable to semantic or pragmatic factors such as animateness. On the other hand, it was argued that what controls plural copying is not the plural marker *tul* but the semantic plurality of a subject nominal.

On the basis of these findings, I have argued that the second nominative nominal in IDSCs is a subject. This will make the structure of IDSCs no different from that of ADSCs since the second nominative nominal in ADSCs has been claimed to be a subject (see Youn 1990: §2.2). This is certainly a welcome consequence for the future study of double/multiple nominative constructions if we aim to provide a unified account of their syntactic structure.

NOTES

[1] In this paper, I use the term 'subject' neither in the sense of Relational Grammar in which the notion is taken as primitive of syntactic theory, nor in the sense of other syntactic theories such as Government and Binding in which it is taken as a derivative one. But, irrespective of one's syntactic theory, what is found as a subject by heuristic tests in a language can be incorporated in the grammar of the language a linguist aims to design.

[2] These constructions have been given various names such as "double/multiple nominative constructions". Although I use the term "double subject constructions" I do not assume that there are two (final) subjects in a sentence like (1) and (2) in the main text. Those readers who are interested in the works on these constructions are referred to the works quoted in Youn (1990).

[3] This argument has been already made in works like Yoon (1987) and Cho (1988: Ch. 2).

[4] There is evidence for the claim that the honorific *si* is grammatically linked to only a subject nominal even though there are data which show that the target of honorific *si* can be a non-term R-sign nominal. In Cho (1991), I presented data whose syntactic structure is the same as that of (9) as shown below:

(i) halmeni-uy   sangcon-si-nun halapeci-ka   kacang
    grandmother-Poss life-time-Top   grandfather-NOM most
    hayngpokha-si-ess-ta.
    happy-HON-Past-Dec
    'When Grandmother was alive, Grandfather was the happiest.'

If the topic phrase or focus phrase as well as the subject nominal in a non-gap topic construction can be grammatically linked to the honorific *si*, then it is predicted that the interpretation of the honorification of the referents of the two nominals *halmeni* 'grandmother' in a topic phrase and *halapeci* 'grandfather'. However, in (i), only the subject nominal 'grandfather' is interpreted to be connected to the pragmatic effect of honorific *si*.

[5] Korean has another reflexive element *caki* whose usage is different from the reflexive *casin*. For the grammatical and pragmatic aspects of *caki*, the reader is referred to O'Grady (1987).

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THE ACQUISITION OF ENGLISH REFLEXIVES BY KOREAN ESL LEARNERS

Seikyung Cho

This study investigates the acquisition of English reflexives by adult Korean learners of English. Wexler and Manzini (1987) propose the Governing Category Parameter for which five different values have been posited to account for the differences in languages with respect to the binding pattern of reflexives. According to this proposal, English represents the narrowest (unmarked) value and Korean represents the widest (marked) one. Thus, by inspecting how Korean learners acquire English reflexives, we can address the issue of the availability of the Subset Principle in second language acquisition. This investigation also answers the question of what type of value of the parameter second language learners choose: The transfer of the L1 value, the acquisition of the correct L2 value, or the choice of an intermediate value which is distinct from both L1 and L2. Two different types of tests were administered to Korean learners of English: A reading comprehension test, and a sentence-picture matching test. Results from these tests indicate that the Subset Principle is not available to adult second language learners. However, the successful acquisition of English reflexives by advanced subjects suggests that the resetting of a parameter is possible in second language acquisition even in the absence of relevant positive evidence. To account for this, I suggest that the application of the subtle solutions like 'indirect negative evidence' and 'indirect positive evidence' is available to second language learners.

1. Universal Grammar and the Subset Principle

During the past three decades, we have seen that such approaches as Contrastive Analysis and Creative Construction fail to address the traditional issues of second language acquisition research. Consequently, second language research focuses on developing a single theory which can integrate what was found in the Contrastive Analysis model and the Creative Construction model. Recently, one of most promising developments in this direction has

been the theory of Universal Grammar. This is the approach developed primarily in works by Chomsky as realized in the syntactic theory of Government and Binding (1981). According to this theory, children are born with a very specific set of cognitive structures, called Universal Grammar, which controls and guides the way children handle all the aspects of their language. Universal Grammar defines possible human languages and consists of a set of 'principles' which constrain the types of hypotheses that children can entertain about their language. Along with these principles, Universal Grammar also makes available to children a set of 'parameters' which cover the variations among languages. Children set the parameters differently for different languages, thus creating the characteristic grammar for that language.

Within this model, the children's task is straightforward. They only have to discover where Universal Grammar differs from the target language. In areas where Universal Grammar and the target language match, children simply apply UG principles to the language. Since such principles are innately built-in to children's minds, nothing has to be learned. When children are faced with a structure which varies from one language to another, they set the parameter to the appropriate value of the target language.

This theory of language acquisition naturally leads us to the question of whether or not such a theory would account for second language acquisition. Despite the fact that Universal Grammar itself was not intended to account for second language acquisition, recently a lot of empirical evidence has been accumulated in support of the UG hypothesis in second language acquisition. For example, Flynn (1987) investigated the acquisition of the Head Parameter by adult second language learners and claimed that she found evidence indicating that second language learners actually have access to UG principles, and that parameter-resetting is possible in second language acquisition. In similar studies with adults learning a second language, White (1985a, 1987) investigated the accessability of UG principles in second language acquisition and reported similar results.

Another important aspect of UG theory is related to the type of relevant evidence that language learners need to fix the parameter. UG theory rejects the use of negative evidence (correction, for example) as a reliable source of evidence to disconfirm inappropriate hypotheses.[1] Therefore, in this model, children must be able to learn their language solely on the basis of positive evidence. If this is true, how do language learners reject incorrect hypotheses which require direct negative evidence? From the UG point of view, language learners can reject inappropriate hypotheses by virtue of UG principles that constrain how and where the learners may apply

their hypotheses. However, even with the operation of UG principles, there still remains a possibility that children arrive at incorrect hypotheses which must be disconfirmed by negative evidence.

To overcome this problem, a proposal known as the Subset Principle (Wexler & Manzini 1987) has been proposed as a learning principle. The idea is that the order of hypotheses that children can entertain is constrained by a certain markedness hierarchy. According to this proposal, children start out with the unmarked value of a parameter. They never arrive at the marked value of a parameter unless positive evidence from the target language warrants it. In this way, this principle guarantees that children can proceed from the unmarked value of a parameter to the marked one without benefit of negative evidence.

In order for the Subset Principle to apply, we need a parameter whose two values generate sentences in a subset/superset relation, a requirement referred to as the 'Subset Condition' (Wexler & Manzini 1987). This is a situation where sentences generated by one value of a parameter (superset) are not only compatible with sentences generated by the other value of the parameter (subset), but with additional sentences as shown in the following figure.

Figure 1. Subset/superset relation

Here, the wider grammar that yields the Y sentences includes the X sentences generated by the narrower grammar. Then, Y sentences are compatible with two grammars; the grammar that yields X sentences and the grammar that yields Y sentences. In this case, X is a proper subset of Y and Y is a superset, and thus they meet the Subset Condition.

2. The Governing Category Parameter

One example of a parameter of this type is the Governing Category Parameter proposed by Wexler and Manzini (1987), which has five different values, each representing one type of language. Wexler and Manzini argue that languages can be divided into five types depending on how far away the reflexive can be from its antecedent and that these differences among languages can be described by a subset relationship as presented in the following figure.
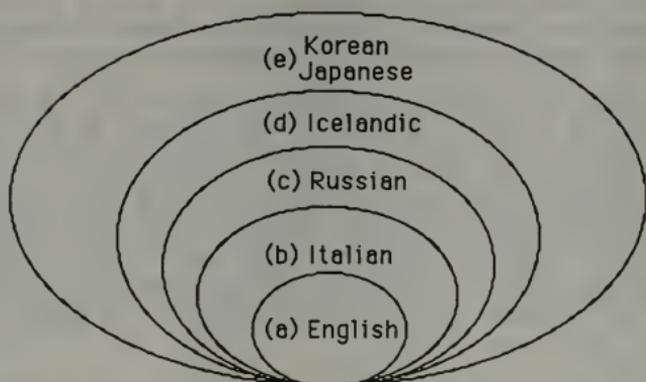
Figure 2. Governing Category parameter

English is a type (a) language, which is the most restrictive language in that it allows only the closest NP to the reflexive to be its antecedent regardless of whether the sentence is finite or non-finite. Therefore, in the following example, only 'Fred' can serve as antecedent for the reflexive 'himself' in a type (a) language.

(1) Mike recalled that John wanted Fred to paint himself.

By contrast, in a type (e) language like Japanese or Korean, the governing category is a root clause sentence (meaning the whole sentence).

(2) Chulsoo-nun Kinam-ika caki-lul kkociputtako malhatta.
　　　Nom　　　Nom self-Acc pinch Comp say-Past
　　'Chulsoo said that Kinam pinched himself.'
　　'Chulsoo said that Kinam pinched him.'

In (2), both NPs can serve as an antecedent for the reflexive. Thus, we can see that English and Korean occupy opposite ends of the hierarchy of the GCP values in figure 2 which Wexler and Manzini postulate. That is, English is a type (a) language, which is the most restrictive in that it allows only the closest NP to the reflexive to be its antecedent. On the other hand, Korean is a type (e) language, which is the least restrictive language in that any NP in the sentence can serve as an antecedent for the reflexive.

Thus, we are in a situation where English and Korean grammars happen to yield sentences which are in a superset/subset relation; English grammar which generates the same subset sentences, and Korean grammar which generates not only subset sentences of English type, but also additional ones by allowing non-local NPs to be antecedent for the reflexive. In other words, Korean grammar allows

other non-local NPs as well as every NP that is allowed in English. Thus, the parametric value of the English reflexive and that of the Korean reflexive in this kind of relationship meet the Subset Condition.

3. Analyses of previous L2 studies on the GCP

3.1. Hirakawa's study (1990)

Hirakawa investigated the effects of the GCP (Wexler & Manzini, 1987) in the acquisition of English by four groups of Japanese high school students: Grade 10, grade 11, grade 12, and grade 13.[2] Japanese is like Korean in that the reflexive can be bound either locally or non-locally. Therefore, it is another widest-type of language with respect to the GCP. The test sentences included five types as can be seen in (3).

(3) Type A: Two-clause sentence (finite)
     John said that Bill hit himself.
  Type B: Three-clause sentence (finite)
     Mary remembers that Jane said that Ellis blamed herself
  Type C: Two-clause sentence (infinite)
     Mary asked Ann to introduce herself.
  Type D: Three-clause sentence (infinite)
     Ann knows that Mary told Jane not to hate herself.
  Type E: One-clause sentence
     Bob talks to Paul about himself.

A total of 25 sentences (5 each type) were presented. A multiple-choice grammaticality judgment task was conducted in which subjects were given a sentence with five alternatives. Subjects were asked to indicate who 'himself' or 'herself' referred to in each sentence by circling one of five choices as in the following example in (4).

(4) John said that Bill hit **himself**
  a. John
  b. Bill
  c. either John or Bill
  d. someone else _____
  e. don't know

If they could not find an antecedent in the alternatives, they were to circle 'someone' and to write down to whom it referred in the blank space as in (4d). When they did not understand the sentence, they were to circle 'don't know'.

Hirakawa's results show a high incidence of non-local response for the finite clause. The subjects were transferring their L1 value of

the GCP. Hirakawa's interpretation of these results is that since the subjects were relatively less advanced than those of Broselow and Finer (1991), it may be that learners move from the widest value to a narrower value as they become more proficient in English. In other words, at a less advanced stage, L2 learners transfer their L1 value, but as learning progresses, they gradually reset the GCP to the value of their target language. However, Hirakawa did not give any answer to the question of exactly how learners accomplish the resetting of the parameter.

A total of 65 subjects were tested, and 5 types of sentences with an equal number of test items each were employed. Hirakawa conducted a screening test to investigate the subjects' metalinguistic knowledge to perform this kind of task. Background information of subjects was provided as to number of years of English study, amount of exposure to English, age when English study began, and method of English instruction they were given. She provided five choices for each test item to avoid the possibility of response bias of subjects. She compared the results of the study with Japanese and English native speakers' judgments. This is useful since this study is to observe the pattern of learners' judgments as they approach those of native speakers'.

However, this study is methodologically not desirable in several aspects. First, the inclusion of 'someone else' option creates some confusion. She said that she included this option because in Japanese the reflexive 'zibun' can be interpreted as having the speaker as its antecedent. So she wanted to see if subjects might made this interpretation in English. However, as far as this grammaticality judgment task is concerned, only one sentence was given to subjects rather than a paragraph or conversation of some length where some context is given. Therefore, it is doubtful of whether subjects will really choose this option. Actually, Hirakawa's results show that almost none of her subjects chose this option.

The second problem with this study is that it does not contain distractor items. One disadvantage of the inclusion of dummy items is that it often results in lengthy tasks which would tax the patience of subjects. On the other hand, however, the non-inclusion of dummy items often results in perturbation due to learning effect and fatigue. In addition, this kind of test is vulnerable to the recognition of grammatical focus by subjects. Therefore, as Birdsong (1989) points out, it may be desirable to prevent subjects from recognizing the grammatical focus of the test. The focus can be disguised by the inclusion of distractor items on the test.

The third problem of this study is that only one type of test was provided, a multiple-choice grammaticality judgment task. The

purpose of this study is to indicate the L2 learners' stage of development. However, as many researchers note, a grammaticality judgment task alone may not be a very sensitive indicator of learners' competence in their L2. Therefore, it may be that grammaticality judgment tasks serve as a valid measure of L2 knowledge only when they are compared with data derived from other subtle and varied methods of empirical data-gathering. Judgment should be validated by the comparison with data from other measures on the same test items and subjects.

3.2. Broselow and Finer's study (1991)

Broselow and Finer conducted a study to investigate the acquisition of English reflexives by non-native speakers of English.[3] They tested 97 subjects: 30 native speakers of Korean, 37 native speakers of Japanese, and 30 native speakers of Hindi. The subjects were students at the State University of Stony Brook, or their friends and spouses. Their reported level was high intermediate. A picture identification method was employed. The subjects simultaneously heard and read 24 English sentences containing reflexives as can be seen in the following.

(5) a. Mr. Fat ⟨expects / tells⟩ Mr. Thin to paint himself.

b. Mr. Fat ⟨believes / thinks⟩ that Mr. Thin will paint himself.

c. Mr. Fat ⟨threatens / promises⟩ Mr. Thin to paint himself.

Subjects were asked to choose one picture out of four which was the most appropriate for the sentence according to their judgment. Here are Broselow and Finer's results.

Table 1   Mean percentages of responses

	Finite					Non-finite				
	L	NL	L&NL	NL*	L*	L	NL	L&NL	NL*	L*
Korean	97%	2%			1%	88%	7%	1%	2%	3%
Japanese	88%	8%	2%		2%	70%	20%	2%	4%	5%
Hindi	100%					96%	2%		1%	

L: Local   NL: Non-local

These results show that the Japanese and Korean subjects chose local antecedents a great deal more frequently than non-local antecedents in sentences like (5b). On the other hand, they took local antecedents comparatively more frequently in sentences like (5a) than they did in sentences like (5b). Therefore, it seems that the Korean and Japanese subjects chose the English setting of the GCP value in sentences like (5a), and their native language's setting in sentences like (5b). Browselow and Finer interpreted these results as showing that the subjects treated the English reflexive as if it occupied position (c) or (d) on the hierarchy of the GCP values in figure 2. To put it another way, Broselow and Finer argue that L2 learners start out with the parameter settings of their native languages and then move in stages through the intermediate settings in the direction of target language settings.

However, an alternative interpretation for these results is possible. First, although Broselow and Finer claim that their Korean and Japanese subjects prefer non-local antecedents in non-finite sentences like (5a), as table 2 shows, the majority of the subjects chose local antecedents: Koreans 88%, Japanese 70%. Only 7% of Koreans and 20% of Japanese chose non-local antecedents in non-finite sentences. Thus, it is too powerful a claim to say that Korean and Japanese subjects chose non-local antecedents in non-finite clauses.

Secondly, Broselow and Finer argue that the more frequent choice of non-local antecedents in non-finite sentences is not traceable to their L1, since the subjects made such a distinction even though their L1 does not have a grammatical distinction between finite and infinite sentences. However, if we assume that the subjects have not mastered the distinction between finite and non-finite sentences in English, they would treat a non-finite clause as a simple sentence rather than a complex one. And in fact, in Korean, there is a strong tendency to prefer a non-local antecedent over a local one (Lee, 1984). Then, the choice of non-local antecedents in non-finite sentences made by Korean and Japanese subjects can be attributed to the effect of transfer from their native language.

Methodologically, this study is not desirable in several ways. First, only one type of test (picture identification task) was used in this study. This type of study is suitable for illiterate or semi-illiterate subjects who do not have the metalinguistic skills necessary to perform other types of tests. However, Finer and Browselow's subjects seem to have enough metalinguistic knowledge to perform tests designed in other ways. Therefore, this study should have been done along with other measures on the same items and with the same subjects to increase the validity and informativeness of the L2

study by providing comparisons with data derived from other measures.

Secondly, in this study, no comparison with native judgments was given. Therefore, the judgment as to which picture represents the test sentence is the experimenter's alone. Comparison with native speakers' judgments is essential in this kind of study in which one's L2 acquisition theory makes explicit predictions about learners' intuitions for grammaticality relative to those of native speakers.

4. Hypotheses and predictions

In this section, I will present the hypotheses which derive from the analyses discussed previously and their predictions with respect to the acquisition of the GCP in English by adult Korean learners of English. Here is the first hypothesis.

A. The Subset Principle operates in L2 acquisition exactly as it does in L1 acquisition. That is, learners initially pick up the unmarked value of the GCP which generates the subset sentences. When learners encounter positive evidence that requires the GCP to be set the other way, they simply switch the setting to the value of the L2.

This position is compatible with the 'pure UG hypothesis' (White 1989) which assumes that UG operates identically in L1 and L2 acquisition, and that there is an acquisition sequence of unmarked before marked. Learners' L1 does not play any role in L2 acquisition because UG reverts to its preset options regardless of the actual situation in target language. Thus, there is no transfer of marked parameter settings of L1 to L2.

Thus, this hypothesis predicts that the Subset Principle enables Korean learners of English to assume that the unmarked value of the GCP applies to English. Since there is no positive evidence requiring the marked setting in English, subjects make no misinterpretation about the binding pattern of English reflexives. Korean learners simply start out with the correct English value of the GCP and do not accept any non-local antecedents for the reflexive. Everything goes automatically and the subjects' native language does not play any role in this case.

The second hypothesis is as follows:

B. The subset Principle is not available to adult second language learners and transfer is the dominant factor in L2 acquisition. Thus, if the learners' native language has a different setting for the GCP from the target language, they simply transfer their L1 value to the target language.

This position is equivalent to the 'transfer hypothesis' of Contrastive Analysis (Fries 1945, Lado 1957) which claims that in areas where the structures of two languages differ, learners should encounter difficulties due to interference and negative transfer from the native language. Thus, where the L1 has adopted a superset value, learners will assume that this superset value is also appropriate for the L2 data. UG principles are assumed not to be involved in L2 acquisition in this hypothesis.

Then, this hypothesis predicts that speakers of Korean whose native language employs the most marked setting of the GCP would start off with their superset L1 setting and fail to choose the correct English value. They would make mistakes of choosing non-local NPs as the antecedent for the English reflexives.

The third hypothesis is similar to the second hypothesis with one important difference.

C. The Subset Principle is not available to adult L2 learners. Learners initially transfer their L1 value of the GCP to the target language. However, as their learning proceeds, they eventually achieve the resetting of the parameter to the correct value of the target language even though no positive evidence is provided in the target language.

This position claims that where the L1 has adopted a parametric value generating superset sentences, learners transfer their L1 value to the L2 under the assumption that this superset value also applies to the L2 data. Thus, they initially produce incorrect sentences, but as their learning proceeds, they gradually reset the parameter to the value of the L2. This position assumes that the resetting of a parameter is not necessarily done in a once-and-for-all fashion. As in L1 acquisition, L2 learners move along a development continuum, starting off with simple structures and moving to more complex structures. Therefore, it seems to be that it takes a considerable length of time for L2 learners to reset some parameters to the values of the target language.

This hypothesis is compatible with Zobl's (1988) study in which his advanced Japanese learners of English did not allow sentences violating the adjacency condition which is required by a configurational language like English between the verb and its complements, while less advanced learners transfer their L1 superset value. Hirakawa (1990) has also reported similar results, that advanced Japanese learners of English eventually achieve the resetting of the GCP to the subset value of English from their own superset L1 value.

Then, this hypothesis predicts that Korean L2 learners first transfer their superset L1 value to English, making mistakes such as picking up non-local NPs as the antecedent for the reflexive, which are not allowed by English grammar, but, as their learning proceeds, they eventually achieve the switching from their L1 superset value to the correct English subset value.

As we discussed before, some UG parameters are multi-valued, rather than binary. The following two hypotheses are relevant to multi-valued parameters. Here is the fourth hypothesis.

D. The Subset Principle is not available to L2 learners, and the transfer of L1 value is not in operation in L2 acquisition either. L2 learners pick up an intermediate value which is not predicted either by the Subset Principle or the transfer hypothesis.

This position is possible with multi-valued parameters, especially with the GCP which has five different values. With the GCP, L2 learners have three other possibilities than those of the native and target language. However, these three possibilities are consistent with the UG hypothesis because they are on the hierarchy of the GCP values (Wexler & Manzini 1987) all representing natural languages. In other words, these possibilities represent values permitted by UG, and therefore, possible in natural languages.

This hypothesis is compatible with the results of the study by Browselow and Finer (1991), in which they report that their subjects converge on a parameter setting somewhere between the native and target language. Their subjects start with the parameter setting of the native language and then arrive at a setting that is midway between the L1 and the L2.

Then, this hypothesis predicts that Korean learners of English have three possibilities other than values from their L1 and L2: (b) type (Italian), (c) type (Russian), and (d) type (Icelandic) value on the hierarchy of the GCP proposed by Wexler and Manzini (1987). For example, if Korean learners of English choose the Russian type of binding pattern of reflexives, they would pick up either local or non-local NPs as the antecedent for English reflexives in nonfinite clauses. On the other hand, in finite clauses, they would choose only local antecedents for English reflexives.

The fifth hypothesis is similar to the fourth one with one important difference.

E. None of the following is available to L2 learners: The Subset Principle, transfer from the L1, and the UG principles. L2 learners would pick up an intermediate grammar not permitted in natural languages.

Although no one has ever reported the existence of this type of grammar in L2 learners' interlanguage, this is a logically possible alternative. For example, if L2 learners choose only non-local antecedents in finite clauses and only local antecedents in nonfinite clauses, this would be an unnatural grammar. Another example is a situation where L2 learners choose non-local antecedents regardless of whether the clause is finite or non-finite.

If Korean learners of English assume that this possibility is appropriate for English data, this hypothesis predicts that they would pick up only non-local antecedents in finite English sentences and only local antecedents in non-finite English sentences. Or, they would choose only non-local antecedents regardless of the finite or non-finite status of the clause.

5. The experiment

5.1. Subjects

In order to test the above hypotheses, an experimental study on the acquisition of English reflexives was conducted. Seven groups of subjects were involved in this experiment. Five experimental groups were composed of native speakers of Korean learning English as a foreign language. There were two control groups: A Korean control group composed of native Korean speakers and an American control group composed of native speakers of English.

5.1.1. Motivation for selection of subjects

The experimental groups were composed of a total of 104 subjects and they were from five different levels: 23 grade 11 subjects (age 16-17), 22 grade 12 subjects (age 17-18), 20 college freshmen subjects (age 18-19), 21 college senior students (age 21-22) and 18 graduate students (age 23 and over). The choice of these four groups of subjects was based upon two considerations. First, as many researchers (Ellis 1990, Sorace 1985) point out, grammaticality judgments may not be very sensitive indicators of a learner's stage of development, in particular for beginning learners. Beginning learners often perform very poorly in judgment tests. Therefore, researchers conclude that if tests are to be valid measures of L2 knowledge, subjects must pass a certain threshold. Based upon this consideration, I chose three intermediate-level groups and two advanced-level groups.

The other reason for such a choice of subjects is that one of purposes of this study is to investigate whether or not Korean L2 learners show a significant difference between an early stage of their L2 development and that of a later stage. In other words, we want to see if Korean learners fail to reset the GCP to the value of the L2 at the early stage. And if that is the case, we also wanted to see

whether or not they eventually accomplish the resetting of the parameter at a later stage. To satisfy such needs, we need both intermediate and advanced subjects.

5.1.2. Control for background variables

When we choose subjects for L2 experiments, there are some other things we must take into consideration. First, we need to control for the background variables. Things like the number of years of language study, length of residence in target-language environment, age when language study began, methods of language instruction, and scores of standardized language tests are important. Such data are essential to homogenize groups of subjects. By constraining the variables, we can limit the possible sources of variability of response data, thus enhancing the reliability of a test.

In this respect, we were fortunate to choose Korean subjects. In Korea, students start learning English from grade 7 with almost no knowledge of English. Furthermore, they have almost no access to English outside the classroom. Therefore, Korean subjects seem to share a similar background in terms of the starting age of learning English, the number of years of language study, and the amount of exposure to English.

The grade 11 and grade 12 subjects were students at a senior high school located in Seoul, Korea. In a Korean high school, students receive four hours of English lessons per week. None of the high school teachers were native speakers of English. They were all Koreans who had studied English language and literature at the university. The teaching methods used in Korean high schools are by and large traditional. Rules of grammar are intensively taught and practiced in classes, and usually instruction focuses on reading and writing rather than hearing and speaking. All explanations are given in Korean regardless of the level of students. However, teachers reported that no form-focused instruction or error-correction was given in class with respect to the behavior of English reflexives.

The grade 13 subjects were first-year students of a college located in Seoul, Korea. They receive three hours of English lessons per week. Their instructions focus on reading with a belief that college students should be prepared to read materials of their own field written in English. Another group of college students was composed of juniors and seniors who took courses like English literature and English composition. Many of them had some experience with native instructors.

Unlike high school students, among college students, the amount of exposure to English outside classroom varies slightly from person to person; some reported that they were taking private English

conversation lessons given by native speakers; some subjects subscribed to English newspapers or magazines; others had attended special lectures given by the US Cultural Center in Seoul, Korea, etc.

The graduate students were the most advanced among the five groups of subjects. All of them were students of the Graduate Institute of Peace Studies in Kyung-Hee University, Seoul, Korea. This institute was founded years ago with the support of the United Nations with the special aim of developing specialists in international peace studies. Therefore, in this school, they placed a heavy emphasis upon proficiency in English. Most of the lectures are given in English and many international exchange programs are provided in this institute. Students reported that they utilized English in their normal interactions with teachers. English magazines like *Time* and *Newsweek* were widely read among the students.

From all five groups of subjects, those who had early exposure to English or any experience in an English-speaking country for more than three months were eliminated. Therefore, each subject seemed to share a common background with other subjects in the same group with respect to the starting age of learning English, the number of years of English education, and the amount of the exposure to English. The following table presents the subjects' background information such as their age range, mean age, and average number of years of English education.

Table 2 Subjects background information

Group	N	Age range	Ave. age	Ave. length of Eng. learning
Grade 11	23	16-18	16.2	4.3
Grade 12	22	17-19	17.4	5.3
Freshman	20	18-23	19.8	6.7
Jr. & Sr.	21	20-26	22.6	9.8
Graduate	18	23-33	27.9	11.4

The two control groups were composed of fifteen subjects each. A Korean control group consisted of college students who attended the same school as the experimental groups. Fifteen American students at the University of Illinois at Urbana-Champaign served as the English control group. The purpose of testing control groups was to compare L2 learners' judgements with those of native speakers. This is really important if the purpose of the study is to observe learners' judgements as they approach those of native speakers, or if a linguistic theory makes explicit predictions about learners' intuitions for grammaticality relative to those of native speakers.

5.1.3. Screening test

In order to secure comparability among subjects within a group, a screening test was administered. When we investigate the acquisition of L2 syntactic properties, we need to test the subjects' basic grammatical skills. We conducted a preliminary test which examined the subjects' ability to distinguish between a pronoun and a reflexive and their proficiency in vocabulary items which were on the test. Six high school students who failed to meet the criteria of the test were eliminated.

5.2. Materials

The actual test was composed of two types of tests of different methods: A reading comprehension test and a sentence-picture matching test. Four types of sentences were employed for both of these tests. They are two-clause finite sentences, two-clause non-finite sentences, three-clause finite sentences, and three-clause non-finite sentences. Example (6) illustrates each type.

(6) a. Mary said that Sue pinched herself.
    b. John asked Fred to paint himself.
    c. Jean said that Mary remembered that the waitress deceived
    d. Tom remembers that Mike asked Al to dress himself.

5.2.1. Sentence-picture matching test

The first test of the experiment involved a sentence-picture matching task, where subjects heard an English sentence containing a reflexive which was read two times in a row by a native speaker at normal speed. Then they were asked to look at three pictures and make a choice as to which picture they believe best correctly describes the sentence. An example is given in (7).

(7) (Subjects will hear)
John said that Tom shot himself.
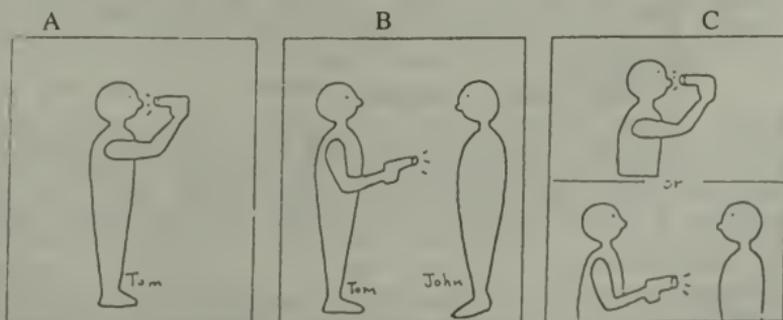
A total of 12 sets of pictures were presented, of which 8 items were relevant to the effect of the English value of the GCP. Since basically the same predictions are made for this test as in the above-mentioned three types of grammaticality judgment tests, I will not spell them out here.

5.2.2. Reading comprehension test

The reasoning behind the presentation of a reading comprehension test is a methodological one. Chomsky's grammar aims at describing and explaining the learner's 'competence'. However, L2 researchers within the UG framework, more often than not, gather data from an empirical examination of language learners' 'performance'. This, as Ellis (1985) claims, poses a serious problem of what type of performance provides the best window for looking at competence. Most of L2 acquisition research is based upon results from standard grammaticality judgment tests. Therefore, in an effort to enhance the reliability and validity of grammaticality judgment tasks, it is important to examine whether or not there is a significant difference between grammaticality judgment tasks and different measures. If similar results could be obtained by different methods, the conclusions would be strengthened.

In this test, subjects were asked to read an English passage which contains reflexives and answer the questions by selecting one option among three choices. A small sample from one of the reading passages is given in (8).

> (8) Last year, Chinese students staged a massive demonstration against the Communist government. They called on government leaders to make a series of political and economic reforms to save ailing China. The Chinese police immediately suppressed the students in a brutal way. However, the students believed that the police disgraced themselves.

> Q: Who did the police disgrace in last year's Chinese uprising?
> A. police
> B. students
> C. either police or students

Subjects were given two passages with four questions, of which two are relevant to the interpretation of the English reflexive. The other two items are distractor items even though they are perfect questions in their own right. Each passage runs around 100 words.

5.3. Procedures

Before taking the tests, the subjects were given written instructions for the experiment in their native language. They were

informed that the purpose of this study was to examine their intuitions about English sentences rather than their knowledge of the grammatical rules of English. Thus, we instructed subjects to focus on how they felt about English sentences in the test in an effort to insure that they would not regard the tasks as a grammar test which is determined by prescriptive rules.

This was followed by an explicit description of the tasks which subjects were to perform, written in plain 'everyday' language to avoid the possibility of idiosyncratic interpretation of the judgement criterion. Attempts were made to use 'everyday' vocabulary in actual test items, too. Otherwise, there is a possibility that subjects would judge the correctness of a sentence upon the lexical interpretation rather than grammatical judgement. Extra efforts were also made to devise sentences that are semantically plausible to avoid the possibility that students would make judgments based on a semantic interpretation rather than a grammatical one.

The subjects were tested group by group in the classroom of their schools by a native Korean who also had a good knowledge of English and experience in carrying out this kind of experiment. Ten minutes were given for the sentence-picture matching test, and fifteen minutes for the reading comprehension test. A Samsung cassette recorder was used for the sentence-picture matching task in which subjects were to choose a picture after hearing an English sentence read by a native speaker of English.

6. Results and discussion

6.1. Results

6.1.1. Results from the sentence-picture matching task

In this task, subjects heard an English sentence read by a native speaker of English twice, and then they were asked to choose which of the three pictures they believed most correctly described the sentence. Results from this task are given in Table 3 in the form of percentages of responses by sentence types and levels of subjects, and in Table 4 which presents percentages of correct choice of local NPs and their means by sentence types and levels of subjects.

The overall results show that approximately 69.6% of the subjects' responses were correct choices of a local antecedent for the reflexive. However, there were a lot of subjects who failed to choose the correct English value of the GCP. Therefore, these results seem to suggest that the Subset Principle does not operate in Korean learners' acquisition of English. If the subjects had the Subset Principle, they would have initially chosen the English subset value, independently of their L1, and not made the mistake of taking non-local NPs as antecedents for English reflexives.

Table 3 The percentage of responses by type and grade in the
sentence-picture matching task

	G11	G12	Fr	Jr.&Sr.	Grad.	Korean controls	English controls
2 clause finite							
L	69.4	84.2	85.0	88.1	97.2	33.3	100
NL	22.2	10.5	7.5	4.8	2.8	56.7	0
Either	8.4	5.3	7.5	7.1	0	10.0	0
2 clause non-finite							
L	44.4	50.0	57.5	83.3	88.9	26.7	96.7
NL	44.4	50.0	35.0	14.3	11.1	63.3	3.3
Either	11.2	0	7.5	2.4	0	10.0	0
3 clause finite							
L	61.1	68.4	65.0	76.2	86.1	33.3	93.4
NL	25.0	26.3	27.5	23.8	13.9	53.3	3.3
Either	13.9	5.3	7.5	0	0	13.4	3.3
3 clause non-finite							
L	47.2	47.4	55.0	64.3	72.2	36.7	100
NL	41.7	44.7	37.5	31.0	2.8	46.7	0
Either	11.1	7.9	7.5	4.7	0	16.6	0

Table 4 The percentage of correct responses by type and group

	G11	G12	Fr.	Jr.&Sr.	Grad.	mean
2 clause finite	69.4	84.2	85.0	88.1	97.2	84.8
2 clause non-fin.	44.4	50.5	57.5	83.3	88.9	64.9
3 clause finite	61.1	68.4	65.0	76.2	86.1	71.4
3 clause non-fin.	47.2	47.4	55.0	64.3	72.2	57.2
mean	55.5	62.6	65.6	78.0	86.1	

However, results from the advanced-level subjects do not
support the transfer hypothesis either. In particular, graduate
subjects made 86.7% of correct choices, a performance close to that of
the native English control group, indicating that they were almost
unaffected by transfer from their L1 value.

These results do not support the hypothesis advanced by Broselow and Finer either. While their hypothesis predicted that Korean subjects would choose an intermediate value which is distinct from either the L1 or L2 (middle non-local NP in three-clause sentences, as discussed previously), they chose more left-most NPs than middle ones for English reflexives, suggesting that they chose them not as an intermediate value, but as a value of their L1.

In general, Korean learners showed clear effects of UG in two ways. First, they showed an overall performance which is significantly better than chance even though less-advanced subjects showed some signs of transfer. Secondly, the choice of values they made were within the constraints of UG. That is, none of the values they chose represents an unnatural language. All of them represent natural languages definable by UG.

The next question is whether or not there is a significant correlation between the subjects' performance and factors like age and length of learning. We can observe a clear developmental progress from grade 11 subjects to graduate subjects; while grade 11 subjects made an average of 55.5% of correct choices, graduate subjects showed an average of 86.1% of accurate choices for the English value. Such a poor performance of less-advanced subjects is probably attributable to the fact that their knowledge of English was still insufficient, so that there was no appropriate structural basis for UG principles to operate on. On the other hand, the graduate subjects' near native-like performance, even in the absence of the Subset Principle, can be interpreted as indicating that they have had enough access to UG principles and have achieved the resetting of the GCP to the value of English.

Now, let us look at whether or not there are differences between different sentence types. Subjects showed better performance in two-clause sentences (mean 74.9%) than in three-clause sentences (mean 64.3%). This result is consistent with our expectation that the more complex a structure is, the more difficulty subjects would have, because in Korean, there are more choices of NPs permissible as antecedents. The same pattern of response is found in finite vs. non-finite sentences. Subjects showed better performance in finite sentences (mean 78.1%) than in non-finite sentences (mean 61.1%). Thus, it seems that Korean subjects were affected by both complexity and non-finiteness of sentences, but slightly more affected by complexity than non-finiteness.

As we expected, the English control group showed an overwhelming choice of local antecedents at a level ranging from 93.4% to 100% over non-local ones regardless of finite or non-finite and two-clause or three-clause. On the other hand, Korean control

group chose non-local antecedents more often than local ones. In two-clause sentences, where not only local antecedents but non-local ones are permissible in Korean, subjects chose non-local options (60.0%) more often than local options (30.0%). In three-clause sentences, where subjects have three possible choices permitted in Korean, the same pattern of response is found. These results, as a whole, lend support for the view that in Korean, there is a preference for the non-local antecedent over the local one even though both are grammatically legitimate.

In summary, the overall performance of the experimental Korean subjects is clearly distinct from that of the English control group, suggesting that the Subset Principle is not in action in their acquisition of English. Less-advanced subjects failed to choose the correct English value suggesting that they transferred their L1 value to English. However, they did not behave exactly as Korean controls did. And, we found that subjects, as their age increases, showed a developmental progress which became gradually close to the binding pattern of the English control group. In particular, the most-advanced graduate subjects behaved almost like the English control group, indicating that they already had achieved the resetting of the parameter to the value of English.

6.1.2. Results from the reading comprehension task

This task involved a reading comprehension test, where subjects were asked to read an English passage which contains reflexives and to answer questions by selecting one of three or four choices. The focus of the test was to see whether subjects make a correct choice in questions which are relevant to the interpretation of English reflexives. The results are given in Table 5 in the form of percentages of responses in relation to sentence types and levels of subjects, and in Table 6 which presents percentages of correct choice of local NPs and their means by each group and sentence type.

The overall results from this task are similar to those of the previous test in that more-advanced learners performed better than less-advanced learners confirming the developmental progress we found in previous tests. Graduate subjects showed the highest performance of 81.9% of correct choices. Grade 11 and grade 12 subjects showed worse performance than those of the previous test, 27.8% and 44.8% of correct choices respectively. No significant difference was found between freshmen subjects (55.0%) and junior and senior subjects (57.2%).

Table 5 The percentage of responses by level and type in the reading comprehension task

	G11	G12	Fr.	Jr.&Sr.	Grad.	Korean controls	English controls
2 clause finite							
N	16.7	36.8	35.0	52.4	83.3	80.0	86.6
NL	72.2	57.9	65.0	47.6	16.7	13.3	6.7
Either	11.1	5.3	0	0	0	6.7	6.7
2 clause non-finite							
L	33.3	57.9	65.0	42.9	55.6	73.3	93.3
NL	38.9	36.6	35.0	47.6	44.4	20.0	6.7
Either	27.8	10.5	0	9.5	0	6.7	0
3 clause finite							
L	22.2	63.2	60.0	76.2	100	80.0	86.6
NL 1	44.4	15.8	25.0	9.5	0	13.4	13.4
NL 2	27.8	10.5	15.0	14.3	0	6.7	0
Either	5.6	10.5	0	0	0	0	0
3 clause non-finite							
L	38.9	21.4	60.0	57.1	88.9	73.3	93.3
NL 1	16.7	26.3	20.0	19.0	5.5	20.0	0
NL 2	16.7	21.1	10.0	19.0	5.5	6.7	6.7
Either	27.8	36.5	10.0	4.8	0	0	0

Table 6 The percentage of correct choice by group and type

	G11	G12	Fr.	Jr.&Sr.	Grad.	mean
2 clause finite	16.7	36.8	35.0	52.4	83.3	44.8
2 clause non-fin.	33.3	57.9	65.0	42.9	55.6	50.9
3 clause finite	22.2	63.2	60.0	76.2	100	64.3
3 clause non-fin.	38.9	21.1	60.0	57.0	88.9	53.2
mean	27.8	44.8	55.0	57.2	81.9	

However, if we look at the results closely, it is difficult to discern the consistent response pattern we found in the sentence-picture matching test. Subjects did well on some items, but poorly on others. For example, grade 12 subjects showed 63.2% accuracy in three-clause finite sentences, but 21.1% accuracy in three-clause non-finite sentences. Such an unexpected inconsistency is also found even in

the performance of the most advanced graduate subjects; while they showed 100% accuracy in three-clause finite sentences, in two-clause non-finite sentences, they showed a surprisingly low 55.6% accuracy. However, in general, more-advanced learners showed the response pattern in relation to sentence types which we found in the sentence-picture matching test. Such a pattern is not found among less-advanced subjects. The subjects' performance in this test in relation to age share the same problem. That is, among more-advanced learners, the tendency toward more accurate interpretation of English reflexives with increasing age is found; graduate subjects outdid the junior and senior subjects in all categories of sentence types. However, among less-advanced subjects, it appears to be a disaster. For example, grade 12 subjects outdid freshmen subjects in two types of sentences; 36.8% vs. 35.0% in two-clause finite sentences, and 63.2% vs. 60.0% in three-clause non-finite sentences. However, at the same time, they showed 21.1% accuracy in three-clause non-finite sentences which is much worse than the grade 11 subjects' 38.9% accuracy.

Such an inconsistent response pattern among less-advanced subjects is probably attributable to several factors. First, the level of the reading comprehension test is appropriate for advanced learners, not less-advanced learners. Even though we expected in advance that they could handle this kind of test, it turned out that their knowledge of English is not sufficient to carry out the task yet. They seem to be more affected by the misinterpretation of context of the passage than by the binding pattern of English reflexives. The other possibility is that the number of test items is too small to draw reliable results. Due to the constraint of time and length of the passage, one test item was assigned to each sentence type.

As in the sentence-picture test, English controls showed an overwhelming choice of correct interpretation of English reflexives. However, Korean subjects showed a very different response pattern from that of the previous test. Rather they showed a performance which is close to that of English controls in that they chose local NPs for English reflexives. This is not too surprising given the fact that the Korean version was presented to them. They seemed to be more affected by context of the passage than the ambiguous binding pattern of Korean reflexives. Therefore, as far as this kind of particular test is concerned, it is not too meaningful to compare the results of the Korean control group with those of the experimental groups.

6.2. Discussion

6.2.1. Results in relation to hypotheses

In considering whether or not the Subset Principle is available to L2 learners, two hypotheses were proposed. One is the subset hypothesis, which suggests that the Subset Principle operates in L2 acquisition exactly as it does in L1 acquisition. That is, Korean learners of English initially pick up the unmarked subset value of the GCP, and therefore, they make no misinterpretations of the binding pattern of English reflexives. The other possibility is the transfer hypothesis, which says that the Subset Principle is not available to L2 learners, but instead transfer is the dominating factor in L2 acquisition. That is, Korean learners of English initially choose the unmarked superset value of the GCP and transfer this value to the target language making mistakes such as taking non-local NPs as the antecedents for English reflexives.

The results from the two tests indicate that the Subset Principle does not operate in Korean learners' acquisition of English. This result is consistent with findings by other researchers (Zobl 1988, White 1989a, Hirakawa 1990). Contrary to what the Subset Principle predicts, Korean subjects, especially less-advanced subjects, made lots of mistakes in choosing non-local NPs as antecedents for English reflexives. If the Subset Principle had been available to L2 learners, they should have chosen only local NPs for English reflexives.

If the Subset principle is no longer available to L2 learners, are they influenced by their native language? The results from less-advanced learners, especially grade 11 subjects, seem to be compatible with the transfer hypothesis in that they set the value of the GCP wider than required by English. They may have assumed that the L1 superset value is also appropriate for English, thereby allowing non-local NPs as antecedents for English reflexives. However, the results from more-advanced learners are not consistent with the transfer hypothesis. Even though some of them still chose the wrong value of the GCP, the majority of them showed a performance more like that of the native English control group than that of the native Korean control group. Especially, the performance of the graduate subjects is close to that of the English control group in not allowing non-local NPs for the reflexive. This suggests that transfer is no longer a factor in their L2 acquisition in spite of the fact that they cannot directly apply the Subset Principle to L2 data any more.

In this context, it may worth noting that the inaccessibility of the Subset Principle to adult L2 learners does not necessarily mean that UG principles are not available to L2 learners. As we discussed earlier, the Subset Principle is a learning principle, which is

independent of UG principles, to enable language learners to initially choose the unmarked subset value for a given parameter. The fact that Korean learners switch their L1 value to some other values of the GCP suggests that UG is still available to them because parameters are part of UG. If UG is not available to adult L2 learners, they are not expected to choose a value which is one of GCP values. However, even if UG is available to adult L2 learners, there still remains a question as to exactly how more advanced Korean learners of English achieved the resetting of the GCP from the marked superset value to the unmarked subset value without the benefit of positive and negative evidence from their target language, a problem we will return to below.

About the hypothesis of acquiring an intermediate value which is distinct from either L1 or L2 (Broselow & Finer 1991), a possibility was raised that Korean learners of English would have three other possibilities than their L1 value and L2 value: That is, (c) or (d) type value on the hierarchy of the GCP proposed by Wexler and Manzini (1987). Browselow and Finer base such a claim upon the observation that their Japanese and Korean subjects took 'Mr. Fat' as the antecedent in a non-finite sentence like (a), but 'Mr. Thin' in a finite sentence like (b).

(9) a. Mr. Fat expects Mr. Thin to paint himself.
    b. Mr. Fat thinks that Mr. Thin will paint himself.

It seems to be that the subjects followed an English type binding pattern in a sentence like (9a), but a Korean or Japanese type binding pattern in a sentence like (9b). They interpreted this result as indicating that the subjects were treating the English reflexive as though it occupied position (c) or (d) on the hierarchy of the GCP.

However, as I mentioned before, this study raises some issues which require explanation. First, if the subjects had picked up an intermediate value on the basis of whether the sentence is finite or non-finite, the same pattern should be found in more complex sentences such as the following in example (10).

(10) Tom says that Mr. Fat asked Mr. Thin paint himself.

In a non-finite sentence like (10), subjects should choose 'Mr. Fat', not 'Tom', as the antecedent for the reflexive 'himself'. However, the results from the tasks of our study show that many Korean subjects chose the first NP like 'Tom' as the antecedent for the reflexive in three-clause sentences like (10). It follows, then, that they were not choosing the intermediate value, but their own L1 value of the GCP.

Secondly, Korean exhibits no distinction between finite sentences and non-finite ones. Therefore, Korean subjects generally have more difficulty in choosing the correct English value of the GCP

in non-finite sentences than in finite ones. Furthermore, as the results from the Korean control group indicates, in Korean there is a strong preference for a non-local antecedent over a local one even though both are permissible in the language. Thus, the Korean subjects' choice of non-local antecedents in non-finite sentences is probably attributable to the combined possibility of treating non-finite sentences as simple ones and being led by the preference for non-local antecedents over local ones. If this is the case, we can conclude that they were not choosing the intermediate value, but their own relatively wide Korean value.

Now, let us move to the logical possibility of choosing an intermediate value which is not permitted in natural languages. Two possibilities were predicted by this hypothesis; either that Korean subjects would have picked up only non-local antecedents in finite sentences, and only local antecedents in non-finite sentences; or that they would have picked up only non-local antecedents regardless of finite or non-finite. These possibilities are totally disconfirmed by the results from the tasks in which not a single Korean subject showed such a binding pattern of reflexives. This lends additional support for the operation of UG in L2 acquisition. If L2 learners have no access to UG, and they rely upon general problem-solving hypotheses for the construction of a grammar of the target language; there is no reason that they should not adopt logical possibilities which do not represent UG parameters. In other words, parameters are part of UG, and therefore, they all represent natural human languages. Unless UG operates in L2 acquisition, language learners may adopt logically possible alternatives other than only the possibilities represented by UG parameters.

6.2.2. Correlation between performance and factors

The next question is whether or not there is a significant correlation between the subjects' performance and factors like their ages and length of English education. With the exception of the less-advanced subjects in the reading comprehension task, our results clearly show that there is such a correlation. Korean subjects showed a developmental progress from the transfer stage of grade 11 to the parameter-resetting stage of graduate level.

This result is not compatible with Hirakawa's (1990) outcomes where she found no tendency towards more accurate interpretations of English reflexives with increasing grade. This is probably attributable to the fact that Hirakawa's choice of subjects was not desirable: Most of Hirakawa's subjects were low-intermediate or intermediate learners. If one of the purposes of the study is to investigate whether or not there is a significant difference between earlier stages and later stages of L2 development, we need to

investigate subject groups which are more widely separated from each other by factors like age and length of English education.

6.3. Possible solutions

6.3.1. Possible L2 learning stages

Generally speaking, less-advanced Korean subjects seem to fail to choose the correct English value for the GCP. They set a wider value than is required by English reflexives, and as a result, they take non-local NPs as the antecedents for English reflexives. This suggests that the Subset Principle is not available to adult L2 learners, and that transfer still plays a considerable role in their acquisition of English reflexives. They appear to have more difficulty in choosing the correct English value in sentences of complex embedding. And the inability to make a distinction between finite and non-finite sentences often results in making more mistakes of choosing non-local NPs for English reflexives in non-finite sentences than in finite sentences. However, even though they fail to choose the correct English value, they do not seem to choose an intermediate value of the GCP, either. They appear to be affected by both UG principles and transfer at this stage.

However, as their learning progresses, there is an increase in the number of learners who make more choices of correct English value for the GCP than wrong ones. They show a developmental progress as they approach later stages of development. This suggests that intermediate-level learners are less affected by transfer from their native language, and that they are in the process of resetting the GCP from a wider L1 value to a narrower L2 value. However, they appear not to have made a clear distinction between finite and non-finite sentences yet.

Advanced-level learners like graduate students seem to set the correct English value for English reflexives. They correctly choose local NPs as the antecedents whether the sentence is finite or non-finite, indicating that they make a distinction between finite and non-finite sentences, and that they already achieved the resetting of the GCP from the L1 value to the L2 value. In principle, as White (1989b) points out, resetting may never take place at all, presumably either because of the absence of the relevant kind of input, or because L2 learners are unable to use it even if it occurs. However, some other previously cited studies as well as ours have reported that resetting does happen. In these studies, more-advanced learners do not inappropriately apply the incorrect L1 superset value to the target language.

However, there still remains a question of exactly how they achieve the resetting of a parameter. We have already seen that in

L2 acquisition of the GCP, learners have no access to the Subset Principle and positive evidence from the L2 which is necessary to disconfirm the inappropriate L1 superset value. This means that direct negative evidence is the only available alternative for the learners to achieve the resetting of the GCP. This is especially true for the Korean L2 learning situation where most of English learning takes place solely in a classroom setting.

6.3.2. Indirect negative evidence

Then, how can Korean learners of English proceed from the wider grammar of their own language to the narrower grammar of English without the benefit of direct negative evidence? One possibility is what is known as 'indirect negative evidence'. This idea, proposed by Chomsky (1981), is that when language learners fail to hear certain sentences, this will be taken as (indirect) evidence that such sentences are ungrammatical. Therefore, this kind of evidence can be obtained even without correction or adverse reactions, etc.[4]

Chomsky has suggested the Prodrop Parameter can be set by virtue of such indirect negative evidence. If children's target language is English, sentence like (11) is not allowed in English, while allowed in prodrop languages like Italian and Spanish.

(11) *Left at night.

Then, if children mistakenly hypothesize that the unmarked value is appropriate for the target language, the hypothesized grammar will generate a grammar properly containing English.[5] To solve this problematic situation, Chomsky's argument proceeds as follows: Since every language would prefer a null subject to an overt one, children expect null subjects to occur. Thus, when children notice the non-occurrence of null subjects, their absence can serve as relevant evidence that such sentences are ungrammatical in English.

Although many researchers (e.g. White 1989b) call into question the validity of this idea, if we apply this insight from L1 acquisition research to Korean learners' acquisition of English GCP value, Korean learners fail to hear English sentences with reflexives referring to non-local antecedents, and take this as evidence that such sentences are ungrammatical in English. In other words, Korean L2 learners start with an incorrect initial guess for English, but the absence of English sentences with reflexives bound to non-local NPs will indirectly indicate that the initial guess is wrong. Then, the incorrect superset setting will be replaced by the correct subset setting even in the absence of direct negative evidence.

However, a question still remains as to under what circumstances the absence of a sentence will be taken by Korean learners as evidence for ungrammaticality. In the case of the Prodrop

Parameter, the preference of null subjects among languages to overt ones leads language learners to expect the occurrence of such sentences, and therefore, the absence of such sentences is taken as relevant evidence. However, in the case of Korean reflexives, which are not preferred to an unmarked English value, it is not clear what aspect of Korean reflexives eventually lead Korean learners to expect the occurrence of superset sentences in English.

6.3.3. Indirect positive evidence

Zobl (1988) presents another possibility, which one might call 'indirect positive evidence', in his study of Japanese adult learners' acquisition of English VP construction. His idea is that language learners who initially hypothesized an incorrect wider grammar may find evidence to disconfirm the hypothesis from another area of the grammar. That is, a certain grammatical knowledge obtained from one area of the grammar may serve as a trigger for disconfirming the incorrect hypothesis of another area of the grammar. Zobl showed how this kind of evidence is used as the basis for rejection of an incorrect hypothesis by using the example of passive construction in English.

The passive construction in English involves movement of the NP in direct object position to an empty subject position, leaving behind an empty category. Then, how can Japanese learners of English notice that there must be adjacency between the verb and the empty object left behind? Zobl's answer to this question is given by virtue of the notion of 'deterministic parsing'. Van Buren (1988) has presented a good explanation of this rather technical notion. According to his explanation, one of the basic tenets of parsing theory is 'deterministic', meaning that probability is not involved in the parsing process, but the process is totally governed by a corresponding grammar on a yes/no basis.

Given the assumption of a determinacy of parsing process, NP movement in English passive construction entails that the empty category must be adjacent to the verb. Then, the Japanese learners of English only have to learn the rule of NP movement in English, which is a relatively easy task to do because enough positive evidence for the NP movement is provided in English. Then, there automatically follows the adjacency between the verb and its empty direct object. Once Japanese learners obtain the rule of English passive, they realize that their initial hypothesis is not appropriate for English VP structure, thus replacing the incorrect assumption with the correct one.

Zobl argues that some properties from one area of a certain grammar, which only become available to advanced L2 learners from positive evidence, triggers reanalysis of the incorrect wider

hypothesis, and eventually lead the language learners to reset the parameter to the correct narrower grammar.

In principle, there is no reason to rule out the possibility that language learners may use 'indirect negative evidence' and 'indirect positive evidence' as the source for the rejection of an incorrect initial hypothesis when input from the target language provides no clear disconfirming evidence for the hypothesis. In practice, however, these proposals may sound implausible.[6] Still, they deserve consideration. For our present purpose, it is sufficient to outline the class of available solutions. The choice of a correct solution requires much more extensive research.

NOTES

[1] This does not imply that UG theory denies the existence of negative evidence. Since negative evidence available to language learners is usually accidental, namely not uniformly available to all language learners, UG theory rejects this kind of evidence as a reliable source for disconfirming purposes.

[2] Hirakawa also examined the effects of the Proper Antecedent Parameter (Wexler & Manzini 1987). However, here I just concentrate on results for the GCP.

[3] Broselow and Finer also investigate the acquisition of phonology: The mastery of particular syllable onset clusters. However, I will not discuss the acquisition of phonology here.

[4] White (1989b) argues that the non-occurrence of certain sentences does not guarantee ungrammaticality of those sentences; there are many other sentences that language learners will not hear which are nevertheless grammatical. Furthermore, she points out, this presupposes that learners are able to notice non-occurrence, which is doubtful.

[5] This argument proceeds under the assumption that the prodrop value forms the unmarked value, and the non-prodrop, the marked.

[6] For example, van Buren (1988) argues that Zobl's proposal is unwarranted in the theoretical context in which it is drawn.

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APPENDICES

Appendix A: General Background Questions

Age: ___years ___months

Sex: M___ F___

1. How old were you when you started learning English? _____

2. How many years have you studied English? _____

3. How many hours do you study English in class in a week? ___

4. Do you study English outside of classroom? If yes, how? (examples: watching TV programs in English, reading English newspapers or magazines, attending lectures given in English, receiving English conversation lessons, etc.)

_____

5. Have you lived in an English-speaking country?
   If yes, how long? ____ years ____months.

Appendix B: Screening Test Questions

   I. Translate the following English words into Korean.

       1. to humiliate   _____
       2. to deceive   _____
       3. a candidate   _____
       4. a surgeon   _____
       5. behavior   _____
       6. a demonstration   _____
       7. to stir   _____
       8. intervention   _____
       9. a critic   _____
      10. generosity   _____

   II. Translate the following English sentences into Korean.

      11. Mary wanted her mother to give a present to her.

      _____

      12. Mike think that Tom hates himself.

      _____

      13. I think that president Roh considers Kim to be the best candidate.

      _____

      14. They shot the arrows at each other.

      _____

      15. The doctor told the patient not to go out by himself.

      _____

   III. Look at the following English sentences. If you think that the sentence is correct, mark 'C', or incorrect, mark 'I'.

      16. I like Tom's picture of his father.   ____
      17. Mr. Lee wants Al to assist him.   ____
      18. Ann hopes that her father will help herself. ____
      19. They think that both will win the game.   ____
      20. John thinks that Mary will kill himself.   ____

Appendix C: Test items of the experiment

I. Listen carefully to the reading of the English sentence. Each sentence will be read twice at normal speed. And then look at pictures on the exam and choose one of them which you think best describes what you hear.

12.

13.
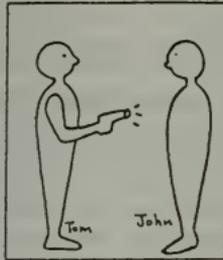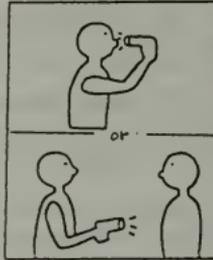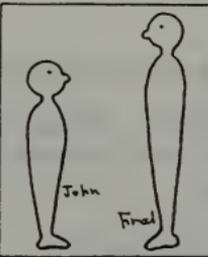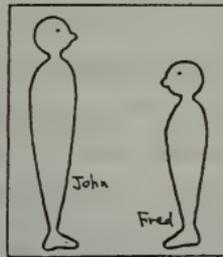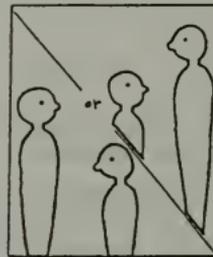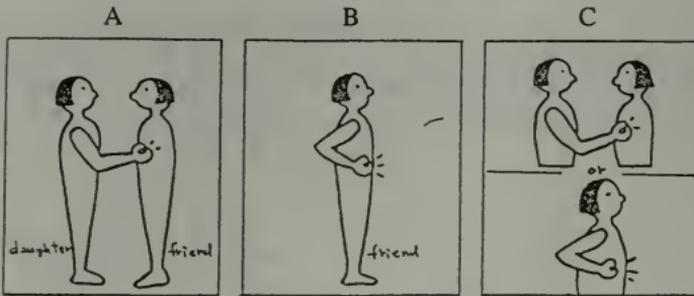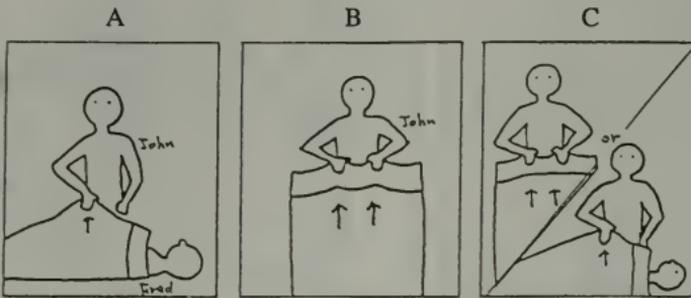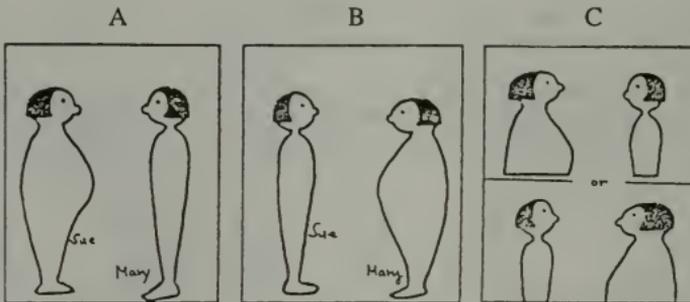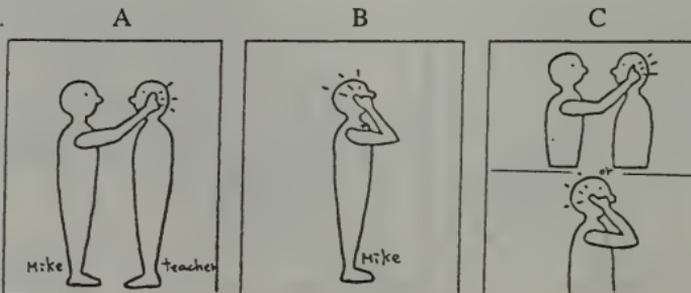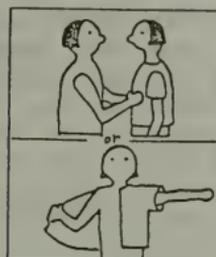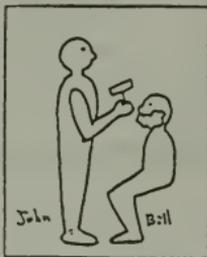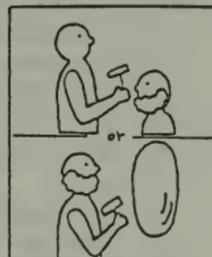
Test Sentences

1. He answered the phone himself, not the secretary.
2. John said that Tom shot himself.
3. John considers himself to be taller than Fred.
4. Mr. Kim says that Tom thinks that John might kill himself.
5. I heard that the doctor asked the patient to talk to himself about the dream.
6. The soldiers shot the arrows at each other.
7. They say that the president is not sure that the minister will vote for himself.
8. My daughter said that her friend pinched herself.
9. Fred said that John pulled the blanket around him.
10. The fact that she is fatter than Mary annoys Sue.
11. My brother recalled that the teacher wanted Mike to hit himself.
12. Mary asked her mother to dress herself.
13. I remember that Bill asked John to shave himself.

II. Read the following English passages and answer the English questions by circling one item which you think is the most appropriate to the questions.

Passage A

Last year, Chinese students staged a massive demonstration against the communist government. They called on the government leaders to make a series of political and economic reforms to save ailing China. The Chinese police immediately suppressed the students in a brutal way. However, the students believed that the police disgraced themselves by refusing people's sincere desire for democracy and a free-market economy. The Chinese leaders claimed that evil-minded Chinese dissidents stirred the innocent students to destroy themselves. The one month-long struggle of the students was finally ended by the military intervention of the Chinese army.

14. Which of the following did the students not ask for in last year's demonstration?
    (A) Democracy
    (B) Free market economy
    (C) Free travel to foreign countries

15. Who did the police disgrace in last year's Chinese uprising?
    (A) police
    (B) the students
    (C) Either police or the students

16. By whom was the demonstration finally ended?
    (A) By the students
    (B) By the police
    (C) By the army

17. Who did the Chinese authorities say would be destroyed by the demonstration?
    (A) Chinese leaders
    (B) The students
    (C) The dissidents
    (D) Either the students, Chinese leaders or the dissidents

Passage B

The Italian tenor Enrico Caruso was probably the most famous singer of all time. He was born in Italy in 1873. After he came to the U.S. in 1904, he made a great success at the Metropolitan Opera. He had a voice of exceptional beauty with a superb technique. But, above all, people loved the soul of his singing. When he sang, the music and words were in his breath and in his blood. This is something God-given. Actually, he was so perfect that every critic considered Caruso to set the standard for himself. As a person, he left lots of wonderful stories about his generosity and his love for people of all kinds. To poor people, he liked to give money and even his coat. In Caruso's

biography, his friend recalled that his manager once asked Caruso to save some money for himself. He suddenly died in 1921 of lung illness at the age of 48.

18. How old was Caruso when he came to the U.S.?
    (A) 2 7
    (B) 3 1
    (C) 4 4

19. For whom did Caruso set the standard of singing?
    (A) Critics
    (B) Caruso
    (C) Either Caruso or critics

20. Which of the following was not mentioned about Caruso's singing?
    (A) beautiful voice
    (B) superb technique
    (C) good stage presence

21. For whom did the manager ask Caruso to save some money?
    (A) For the friend
    (B) For the manager
    (C) For Caruso
    (D) For Either the manager, the friend or Caruso

DISCOURSE REFERENCE IN WRITTEN KOREAN FOLK TALES

Yeon Hee Choi

This study investigates referential chains in written Korean narrative, exploring the notion of discourse structure. It examines three referential forms (zero anaphora, pronouns, and full NPs) in written Korean folk tales by analyzing text structure, using a simplified version of Fox's rhetorical structural analysis (1987b). The findings of the study reveal a dichotomy between zero anaphora and noun forms, on the one hand, and pronouns as referential devices in Korean, on the other. The distribution patterns in terms of referent-types and grammatical coding forms reflect the type of the texts analyzed: narrative writing. Futhermore, the results of the study show that referential choices were not affected by such factors as linear referential distance and ambiguity as much as in the distance-based approach. Rather, accessibility in terms of structural distance and continuity of the semantic role are crucial in determining referential devices. The study thus concludes that in order to better understand referential choices, they should be explored in the hierarchical structure of the text, not simply in linear distance.

1. Introduction

Reference to characters plays a crucial role in developing a narrative text and it also helps to comprehend the text. A clear referent and effective referential devices are thus major factors determining the textuality of narrative discourse. For these reasons, referential expressions have been one of the key issues in studies on narrative texts in various languages including Korean (Clancy 1980, Givón 1983, Hwang 1983, Lee 1989). Futhermore, contrastive studies of written texts have investigated the use of referential devices in different languages, because differences in their use are easily noticeable across languages (Y. Kachru, 1982; Pandharipande, 1982; Tsao, 1982). However, most of these studies have simply counted the frequency of different referential devices in order to investigate their distribution in or between languages, and their functions.

Discourse anaphora has also been a main concern in the research on Korean text. Some Korean linguists have analyzed discourse anaphora in Korean narrative writing, following Givón's (1983)

theory of topic continuity (Hwang, 1983). These studies have overemphasized, however, the linear nature of texts and have not incorporated a hierachically structural view of text. On the other hand, Lee (1989) has explored referential choice in Korean discourse by analyzing discourse structure. His data include casual conversation and personal letters which are different from the type of data analyzed in the previously mentioned studies (i.e., narrative texts) so that the findings from the two groups of studies, using linear and structural approachs respectively, are not really comparable. In this research, thus, referential forms in written Korean narrative discourse are examined, following Fox's (1987b) structure-based approach; it aims at testing the adequacy of the linear and structural analysis of discourse anaphora in written Korean narrative.

By investigating referential chains, more specifically identity chains,[1] the present study examines factors affecting Korean writers' strategies of referential choices in narrative text which have antecedents in the preceding discourse. In the study, referential forms are categorized as zero-anaphora, pronouns, and full NPs including subtypes. The data analyzed consist of written Korean folk tales taken from a Korean textbook. In these texts, the three types of anaphora are examined in hierarchical text structure, using a simplified version of Fox's rhetorical structural analysis model (Aston 1977, Tirkkonen-Condit 1985, Choi 1988).

2. Distance-based and structure-based analysis of discourse reference

In terms of the way of looking at text, there are two types of analysis of reference in narrative discourse. First, a text is viewed as a linear sequence of sentences; thus, referential devices are examined in terms of linear referential distance and decay, and referential ambiguity,[2] in order to understand the linguistic coding of the concept *topic* (Givón, 1983). In the second approach, on the other hand, a text is seen as hierarchical relationships of sentences. Referential choices are, therefore, analyzed in text structure (Clancy 1980, Fox 1987a,b).

In exploring the concept *topic*, Givón has proposed the iconicity principle (the Continuity Hypothesis), which says "The more disruptive, surprising, discontinuous or hard to process a topic is, the more *coding material* must be assigned to it." (p. 18) The factors which influence disruptive or discontinuous topics include the distance to the referent's last mention, ambiguity from other referents, availability of semantic information, and availability of thematic information. The first two factors are the major concerns of the studies in Givón (1983). These studies present the anaphoric patterns

that pronouns are used when the distance to the last mention of the referent is small, without interfering referents, while full NPs are used when that distance is somewhat great and/or if there are interfering referents.

Referential expressions have also been analyzed in Korean narratives, following Givón's approach. Hwang (1983) has investigated topic continuity of participant arguments in a written Korean narrative text (a short story) to explore Givón's continuum of topic continuity in connection with human discourse processing. She has found that zero-anaphora is used for the most continuous topic, the pronoun for the second most continuous, and finally, full NPs for the least continuous. Her findings of the correlation between the degree of grammatical encoding and topic continuity in Korean support Givón's hypothesis. In addition, her study suggests the important roles of other factors affecting referential choice: Humanness of antecedents, grammatical functions of referential expressions, socio-cultural constraints (e.g., politeness), and discourse-pragmatic factors (e.g., the speaker's intentions).

The studies following Givón's cognitive approach overemphasize the linear nature of text and do not incorporate a hierarchically structural view of text. On the contrary, Clancy (1980), whose study was followed by Givón, had examined discourse anaphora in short spoken English and Japanese narratives, exploring the notion of discourse structure. The original purpose of her study was to analyze referential choice in terms of ambiguity and distance; however, besides these factors, she noted the impact of discourse units on the use of full noun phrases. She found that the main discourse structures influencing referential choice are episode boundaries, the beginning of a new line of action, and world shifts, in other words, "the speaker moves from one mode of talking to another (e.g., from digression to the plot line, or from film-viewer mode to story-teller mode). Both of these structure-types tend to be associated with use of full noun phrases" (Fox 1987a:159).

Likewise, Fox (1987a) has explored the anaphoric patterning in written English narratives by analyzing them in hierarchical structure. Her study has suggested that the patterns based on the structuring functions in narrative, such event-line, plans and actions, describe a very large proportion of the anaphors in the narrative texts she examined, including in the environment of interfering referents (p. 172). Criticizing Givón's linear approach to reference, she claims that to understand the use of various referential devices in discourse, they must be examined in the structure of the text.

The structural approach has also been adopted in the research of Korean reference. Lee (1989) has analyzed referential choice in

Korean casual conversation and personal letters from a cognitive and social perspective, using both the linear and structural analysis. His study brings out the differing distributions of referential forms between the two types of discourse, as found between English conversation and expository text in Fox (1987b). The study also points out the important roles of not only cognitive factors (iconicity principle and plannedness)[3] but also social factors (text structure and collaborative interaction,[4] and stance representation[5]). Based on his findings, Lee suggests the need of cognitive and social approaches to discourse reference including their analysis in discourse structure.

Referential forms in languages including Korean have been analyzed from both distance-based and structure-based approach. However, the results of these studies are not really comparable in order to determine which approach provides a more accurate picture of referential choice since the data are of different types. Nevertheless, the structure-based research seems to suggest that the writer's choice of one referential device over others can be better understood when it is examined in the structure of the text, not only in terms of linear distance.

3. Research design

3.1 Data

Five written Korean folk tales were analyzed in quantitative terms. Taken from a Korean textbook for foreign students, the folk tales were chosen for the study because they are one of the main types of narrative discourse analyzed across languages. Although they are shorter than other types of narrative texts such as short stories and novels, they still clearly have discourse units (e.g., climax) within the text; thus, it was expected to see the effect of discourse structure and units on referential choice, as found in Clancy (1980) and Fox (1987a).

The five folk tales contained 23 paragraphs, 115 sentences, and 164 finite clauses excluding nominal and relative clauses. Since folk tales are usually told in the third person (the observer), there was no first person reference in the data. On the other hand, the texts contained four types of reference: human, animal, inanimate, and text reference. The title of each text is as follows:

Senpi-wa toduk ('Scholar and Thief')
Han Sek-pong-kwa emeni ('Han Sek-bong and His Mother')
Sicip sali ('Married Life in the Parents-in-law's House')
Horangi kkori ('The Tail of a Tiger')
Cheng kaykuli ('The Green Frogs')

3.2 Data analysis

The five Korean folk tales were analyzed to identify three types of referential forms: Zero anaphora, pronoun, and full NP. The pronoun form included personal and demonstrative pronouns. The noun forms were classified into several subtypes: repeated or partially repeated noun forms including names and kinship terms (*kanan-ha-n senpi* 'a poor scholar' — *senpi* 'the scholar'); lexical replacement ('*cheng kaykuli hyengcey-tul* 'the green frog brothers' — *ahi-tul* 'the children'); possessive-plus-NP (*ku cung* 'that monk'); demonstrative adjective-plus-NP (*iren myenuli* 'such a daughter-in-law'); and NP-plus-relative clause (*i mal-ul tul-un si-apeci* 'the father-in-law who heard this').

The three types of referential forms were examined in the hierarchical structure of the text. The structure was analyzed by the simplified form of Fox's rhetorical structure analysis (1987b) which was modified by adapting the interactive text analysis model (Aston, 1977; Tirkkonen-Condit, 1985; Choi, 1988). The basic unit of the analysis is finite clauses, excluding relative clauses and nominal clauses such as complementary clauses of the verb in which anaphors are syntactically controlled.

In the analysis, each text was broken down into finite clauses. Any quoted material was not analyzed, although each quote was counted as one clause if they appeared as an independent unit, but not as part of the main text, such as a quote within a sentence (see (1)). After breaking down each text into clauses, the hierarchical relationships of clauses were determined by their functional roles and generality in topic. No label was given to relationships between clauses (e.g., elaboration).

A sample of the analysis is found in example (1). The text in the example is the first paragraph of the folk tale *Cheng Kaykuli* (Green Frogs). It has three rhetorical units narrating temporally situated actions; eight clauses (Clauses 1-5 and 9-11) are in the same hierarchical level. Clauses 6-8 provide background information for the action described in clause 9. In the diagram following the English translation, the equivalent English expressions of the tokens of the referential forms are provided under each clause.

(1) *Cheng kaykuli* ('Green Frogs')

    1) Yeysnal   enu cheng kaykuli kacok -i sal -ko iss-
       once upon a time a   green frog   family SM live PROG

    ess -upnita. 2) Kurentey cheng kaykuli hyengcey- tul -un
    PAST DEC   but   green frog   brother   PL TOP

emma -uy mal -ul cal tut -ci anh-ass -upnita.
mother POS speech ACC well listen not PAST   DEC

3) Haru   -nun emma cheng kaykuli -ka ahi -tul -eykey
   one day TOP mother green frog   SM child PL   DAT

'onul -un param-i pul -ko nalssi -ka nappu-nikka, cip
today TOP wind SM blow and weather SM bad   since house

an   -eyse nol -aya ha-n -ta.' -ko malha -ass -upnita.
inside LOC play must PRES DEC IDS say   PAST DEC

4) Kurena cheng kaykuli hyengcey-tul-un 'yay, uri pakk
   but   green frog   brother PL TOP hey we outside

-ey naka -se nol -ca.' ha -ko -nun 5) motu pakk -uro
LOC go out and play PRO say and TOP   all outside LOC

naka- ss -upnita. 6) Ttoharu   -nun pi -ka manhi
go out PAST DEC   Another day TOP rain SM a lot

wa -ss- upnita. 7) Cangma -ka ci -ese. 8) yeki
come PAST DEC   rainy season SM set in because here

ceki -se yatan- i na   -ss -upnita. 9) Emma
there LOC trouble SM break out PAST DEC   mother

cheng kaykuli -nun ahi -tul- eykey 'mul -i manh-un
green frog   TOP child PL   DAT   water SM plenty

kot -ey -nun tomapaym-i iss-unikka, ka-myen khu-n
place LOC TOP lizard   SM be since go if big

il   -i -ta.' ha-ko malha-ass -upnita. 10) I   mal-uh
event be DEC IDS say   PAST DEC   this speech

tul -un cheng kaykuli hyengcey-tul-un ipen- ey-to
hear PAST green frog   brother PL TOP this time again

'yay, uri tomapaym kukyeng-ka-ca.' ha -ko -nun
hey we lizard   see   go PRO say and TOP

11) motu pakk -uro naka -ss -upnita.
    all outside LOC go out PAST DEC

1) Once upon a time, there was a green frog family. 2) The
frog brothers did not listen to their mother. 3) One day the
mother green frog said to her children, 'Since it is very windy
today and the weather is not so good, don't go out to play but

stay at home.' 4) But, the green frog brothers said, 'Let's go outside to play.' and 5) all of them went out. 6) Another day, it poured rain. 7) Because the rainy season set in, 8) people were in trouble here and there. 9) The mother green frog said to her children, 'Since there are lizards at the wet place, don't go there. It is very dangerous.' 10) The green frog brothers, who heard this, said this time again, 'Let's go to see the lizards' and 11) then they all ran out.

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                              /\                          /   \
            /\               /    \                      /      \
          /    \            /   /    \                  /        /\
        /        \         /   /       \               /       /    \
      1)    2)            3)  4)    5)     _ _ _ _ _|  9) 10)  11)
      the green frog   the mother   the      ø (the    |     the mother   this/ ø (the
      brothers/        green frog/  green  green frog |_     green        the   green
      their mother     her children frog   brothers) 6) \    frog/her     green frog
                                    brothers          |_ children  frog  brothers
                                                      7) \          brothers
                                                      |
                                                      8)
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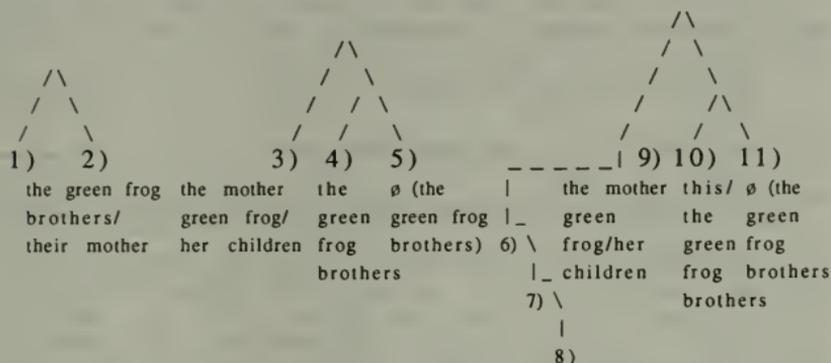
After identifying the text structure and referential forms, tokens of the forms which were classified into four categories in terms of the types of their referents (human, animal, inanimate, and text)[6] were quantitatively analyzed in terms of the following aspects: 1) frequency distribution with respect to the grammatical functions (e.g., topic or subject)[7] and the type of clause (initial and non-initial);[8] 2) the number of intervening clauses and sentences separating the two mentions; 3) the presence of intervening referents of same and different genders; and 4) text-structural factors (e.g., starting a new unit).

4. Results and discussion

4.1 Frequency of referential forms and types of referent

Tokens of the three types of referential forms were counted in terms of the type of referent. As presented in Table 1, the most common referential form was noun forms (66%); the frequency of zero anaphora (31%) was relatively high. On the other hand, pronouns were least frequently used (3%). This distribution pattern has also been noted in another type of written Korean narrative (Hwang's analysis of a Korean short story (1983)), while it does not hold true in Lee's (1989) study of Korean conversation and personal letters where zero anaphora occurred most frequently.

Table 1
Frequency of Referential Forms and Types of Reference

	Human	Animal	Inanimate	Text	Total
Zero Anaphora	56 (38%)	3 (27%)	2 (8%)	0 (0%)	61 (31%)
Pronoun	0 (0%)	0 (0%)	3 (13%)	3 (27%)	6 (3%)
Full NP	93 (62%)	8 (73%)	19 (79%)	8 (73%)	128 (66%)
Total	149	11	24	11	195

The high occurrence of full NPs and the rare occurrrence of pronouns contrasts with the dominance of pronominal reference in various types of English discourse (Brown, 1983; Fox, 1987b; Choi, 1992). Such a skewed distribution pattern can be accounted for by the formal features of pronouns and zero anaphora, and the socio-cultural constraints on their use in Korean. Korean is a pro-drop language in which not all constituent elements of a sentence (e.g., subject or object) have to be on the surface, in other words, their presence is not obligatory. Zero anaphora thus can be used where pronouns would be most acceptable in English, without jeopardizing the grammaticality of the sentence. In addition, Korean pronouns are coded in diverse forms, some of which cannot be easily distinguished from nouns (e.g., *ku saram* 'the person'); the third-person singular personal pronoun *ku* is used for both male and female referent so that it can cause referential ambiguity. Korean pronouns are, moreover, similar to English stressed pronouns, which are expected to carry some contrastive meaning or emphasis. As a result, pronouns tend to be avoided as much as possible in Korean. Zero anaphora or full NPs are instead chosen over them, depending on the explicitness of the referent and the writer's strategy of presenting his/her message.

The overall distribution pattern of referential devices exhibits some common points and variations across the four types of reference. A huge difference was found between the total tokens of human and non-human reference, which may be due to the feature fo the narrative texts analyzed that humans were the topics of narration. On the other hand, the distribution of the three referential devices was similar across the four types of referent, except for the

high occurrence of pronouns for inanimate and text referents. The high frequency of full NPs in all types of referent does not support Lee's statement that "human referents are very topic continuous and, therefore, are encoded by zero-anaphora without regard to the specific type of speech activity." (Lee 1989:103)

Another variation was noted between animate (human and animal) and inanimate (inanimate and text). Pronouns were never employed for animate referents in the texts analyzed for this study, while they were relatively frequent for inanimate referents. This seems to suggest a contrast between the role of zero anaphora and nominal forms, and of pronouns as referential devices in Korean.

For text reference, zero anaphora was never used, while the frequency of pronouns was relatively high. The distinctive referential pattern for text reference suggests the need of more specified classification of reference than just a dichotomy such as human/non-human or animate/inanimate in investigating the writer's referential strategies.

4.2 Clause types and case roles

The frequency of the three types of referential devices were counted in terms of the type of clause and their grammatical coding forms. The frequency distribution varied with these two factors. Nominal forms were most frequent at the initial clause across the four types of referent, while zero anaphora occurred most frequently in the non-initial clause (NI), except for inanimate and text reference. The latter finding is not very surprising because in Korean ellipsis is common when the antecedent is mentioned in the previous clause, especially within a sentence.

Another dichotomy was present between topic and non-topic. Most of the tokens of human and animal reference were in topic positions, whereas inanimate and text reference were more frequent in non-topic positions, specifically in object positions. This indicates that animate referents, humans and animals, tend to be agents and thus appear in the topic position; on the other hand, inanimate referents including text are typically the recipient rather than the actor, appearing in the object position. the differences between animate and inanimate reference have also been noted in Hwang (1983), which found the high occurrence of human reference in subject positions contrasted with that of non-human reference in accusative and oblique positions.

Table 2   Frequency of Referential Forms, Clause
          Types, and Case Roles

	Topic Init. NI		Subject Init. NI		Accusative Init. NI		Dative Init. NI		Genitive Init. NI		Oblique Init. NI	
Human												
Zero Anaphora	9	36	2	1	0	4	2	2	0	0	0	0
Pronoun	0	0	0	0	0	0	0	0	0	0	0	0
Full NP	50	5	9	1	8	1	6	1	9	1	2	0
Animal												
Zero Anaphora	0	2	1	0	0	0	0	0	0	0	0	0
Pronoun	0	0	0	0	0	0	0	0	0	0	0	0
Full NP	3	0	0	1	1	0	0	0	3	0	0	0
Inanimate												
Zero Anaphora	0	1	0	0	0	0	0	0	0	0	1	0
Pronoun	2	0	0	0	0	1	0	0	0	0	0	0
Full NP	1	1	1	0	11	0	0	0	1	0	4	0
Text												
Zero Anaphora	0	0	0	0	0	0	0	0	0	0	0	0
Pronoun	0	0	0	0	2	0	0	0	0	0	0	1
Full NP	0	0	0	0	6	0	0	0	1	0	1	0

Init.: Initial   NI: Non-initial

4.3   Referential distance and text structure

The distance to the most recent mention of a given referent for each referential form was measured by counting the number of clauses from a token to the nearest clause where the referent appeared. The average distance for pronouns was shortest, and that for noun forms longest, as shown in Table 3. All referents of pronominal forms (inanimate and text) were present in the immediately preceding clause. This finding was surprising because the shorter referential distance had been expected for zero anaphora, as found in other studies on Korean discourse (Hwang 1983, Lee 1989). This may be due to the absence of pronouns for animate referents in the data.

The average distance for noun forms was greater than for the two other forms. However, it was much shorter than that found in Hwang (1983:71) in which the average distance for relative clause + NP was 16.98 for non-human referents; that for names, 5.6 for human. Such a discrepancy can be explained by the differences in

the type of data: The present study analyzed short folk tales, while Hwang's data was a short story containing about 4100 clauses where many characters and inanimate objects are introduced and then reintroduced through the changes of scenes.

A variation across the referent types was also noted in terms of referential distance. The referential distance was the longest in the case of zero anaphora and full NPs for inanimate referents. On the other hand, that of nominal forms was shortest for human referents. These results seem to support Givón's claim about the higher topicality of human/animate/agents. It cannot explain, however, the short distance for text referents (1.00 for pronouns and 2.25 for full NPs), which are also inanimate. The findings of the present study thus point out that referential distance itself cannot account for topic continuity as accurately as expected in distance-based studies.

Table 3   Referential Distance of Referential Forms

	Human	Animal	Inanimate	Text	Average
Zero Anaphora	1.16	1.00	2.50	0.00	1.55
Pronoun	0.00	0.00	1.00	1.00	1.00
Full NP	2.08	4.00	5.18	2.25	3.38
Average	1.62	2.50	2.89	1.63	1.98

In contrast to Givón's iconicity principle and Lee's (1989) findings that zero anaphora is most frequently used to encode referents in the previous clause in Korean personal letters and conversation, the present study also found, as shown in Table 4, that full NPs were frequent when the referent was mentioned in the immediately preceding clause. For human and animal reference with the antecedent in the preceding clause, zero anaphora and noun forms were used in the exactly same frequency (50% both); for inanimate and text reference, the use of full NPs was much greater (60% and 67%, respectively) than that of other referential forms.

Table 4   Referential Forms and the Scope of Referents

	Referent in Preceding Clause	Referent not in Preceding Clause	Referent in Preceding Sentence	Referent not in preceding sentence
Human				
Zero Anaphora	52 (50%)	4 (9%)	11 (17%)	3 (9%)
Pronoun	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Full NP	51 (50%)	43 (91%)	55 (83%)	33 (92%)
Animal				
Zero Anaphora	3 (50%)	0 (0%)	0 (0%)	0 (0%)
Pronoun	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Full NP	3 (50%)	5 (100%)	3 (100%)	4 (100%)
Inanimate				
Zero Anaphora	1 (10%)	1 (7%)	0 (0%)	1 (8%)
Pronoun	3 (30%)	0 (0%)	2 (22%)	0 (0%)
Full NP	6 (60%)	13 (93%)	7 (78%)	11 (92%)
Text				
Zero Anaphora	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Pronoun	3 (33%)	0 (0%)	2 (25%)	0 (0%)
Full NP	6 (67%)	2 (100%)	6 (75%)	2 (100%)

When the distribution of referential forms was examined in terms of the location of the referent in the sentence level, the frequency of noun forms increased across all types of reference. Such referential forms were chosen, however, more frequently when the referent was in the immediately preceding sentence than when there was more than one intervening sentence. This result indicates that referential devices perform more than just connecting a reference item with its antecedent, as claimed by Fox (1987b:144).

> ... full NPs in the written texts are doing much more than just the standard referent-tracking work attributed to them: that is, if they occur even when their referent is plainly retrievable from the preceding clause, then they are not simply performing an anaphoric duty. Rather, they are helping to block the text into its structure units.

In order to see the impact of text structure on the choice of referential devices, the tokens of reference were counted in five types of text-structure features: referent in the same rhetorical unit, return pop,[9] referent in the same unit that is unaccessible, referent in the closed unit, and starting a new rhetorical unit. When the referent was in the same unit, variations were noted across the four

types of reference. For human reference, zero anaphora was relatively more preferred than noun forms, while such preference was not noted when the referent was animal. On the other hand, noun forms were much more frequently used for inanimate referents. Pronouns were of the most favorable for text reference.

Table 5   Referential Forms and Position in Rhetorical Unit

	Same Unit	Return Pop	Same Unit-Closed	New Unit	Closed Unit
Human					
Zero Anaphora	48 (60%)	5 (19%)	1 (20%)	1 (6%)	1 (5%)
Pronoun	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Full NP	32 (40%)	22 (81%)	4 (80%)	16 (94%)	18 (95%)
Animal					
Zero Anaphora	3 (50%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Pronoun	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Full NP	3 (50%)	1 (100%)	0 (0%)	0 (0%)	4 (100%)
Inanimate					
Zero Anaphora	1 (13%)	0 (0%)	0 (0%)	0 (0%)	1 (11%)
Pronoun	2 (25%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Full NP	5 (63%)	4 (100%)	0 (0%)	2 (100%)	8 (89%)
Text					
Zero Anaphora	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Pronoun	3 (60%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Full NP	2 (40%)	0 (0%)	0 (0%)	2 (100%)	4 (100%)

Except for the first type of text-structural position, however, full NPs were of the most frequent across all types of reference. These results show that in the folk tales analyzed, noun forms were selected over the other types when the referent was not accessible in the same rhetorical unit. In the studies on English discourse (Fox 1987b, Choi 1992), pronouns have been found to be the most favorable referential form for return pops. In this study, human, animal, and inanimate return-popped reference tended to be coded in noun forms. Likewise, full NPs were preferred when the popped-over material was structurally complex, or did not contain mentions of the referent; when the writer tended to create the effect of beginning a new unit; or when it was in other rhetorical units and thus unaccessible. These findings suggest that referential choices are more sensitive to structural distance than to referential distance.

4.4 Referential ambiguity

Since the presence of interfering referents often determine the referential choice, the tokens of reference were counted in terms of the presence of other third-person animate referents of the same or different genders. This quantitative analysis was done for human, animal, and animate reference. When there were no interfering referents between the referential form and the antecedent (NIR), full NPs were the most common across the three types of reference, while for human reference the percentage of zero anaphora was as high as noun forms (45% and 55%, respectively). Noun forms were also chosen when there were interfering different-gender (DG) as well as same-gender (SG) referents. The high frequency of full NPs when containing no intervening referents has not been noted in other studies on Korean discourse (Lee, 1989; Hwang, 1983) as well as on English discourse (Fox, 1987b; Choi, 1992). In such cases, rather, the most frequent type was zero anaphora in the former and pronouns in the latter.

Table 6 Referential Forms in the Environment of
Interfering Referents

	NIR	DG	SG	Role Continuity	Role Change
Human					
Zero Anaphora	40 (45%)	7 (23%)	9 (30%)	47 (70%)	9 (11%)
Pronoun	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Full NP	49 (55%)	23 (77%)	21 (70%)	20 (30%)	73 (89%)
Animal					
Zero Anaphora	3 (30%)	0 (0%)	0 (0%)	3 (75%)	0 (0%)
Pronoun	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Full NP	7 (70%)	0 (0%)	1 (100%)	1 (25%)	7 (100%)
Inanimate					
Zero Anaphora	1 (7%)	0 (0%)	1 (11%)	2 (17%)	0 (0%)
Pronoun	3 (20%)	0 (0%)	0 (0%)	1 (8%)	2 (17%)
Full NP	11 (73%)	0 (0%)	8 (89%)	9 (75%)	10 (83%)

In Choi's (1992) study on written English narrative, grammatical or semantical roles of reference have been noted as the crucial factor affecting anaphora choices in interfering same- and different-gender referents. In this study, thus, the distribution patterns of referential forms were analyzed in terms of role continuity or change, in other words, whether the reference had the same grammatical or

semantical role as its referent. Regardless of the type of reference, zero anaphora was most frequently chosen when the semantic role was constant, whereas noun forms were preferred when the role changed. This suggests that in Korean narrative text the continuity/discontinuity of the semantic role has a significant impact on referential choices.

5. Conclusion

The distribution of three types of referential forms has been explored in written Korean folk tales with respect to reference-type, clause type and case roles, linear referential distance, the position in the rhetorical unit, and the environment of interfering referents. First, zero-anaphora and full NPs were much more frequent referential forms than pronouns. The low frequency of pronouns shows that pronominal forms are not important referential forms in Korean, compared to zero-anaphora and full NPs, which is due to the formal features of pronouns and the socio-cultural constraints on their use in Korean. In addition, another contrast between zero anaphora and full NPs, on the one hand, and pronouns, on the other, was noted in terms of referent-types. The former referred to inanimate. The largest tokens for human reference as well as this difference reveal the strong impact of animacy or the ability of an entity that performs an action on referential choice in Korean narrative writing and also in narrative text in general (Y. Kachru 1982, Choi 1992).

Next, the analysis of the three types of referential devices in terms of clause type and their grammatical coding forms has also revealed a dichotomy between animate and inanimate reference. This dichotomy reveals a characteristic of narrative text: Animate entities are usually actors, the main characters in the story, so that they appear in the topic or subject position.

Third, in contrast to the expectation of the shortest referential distance for zero anaphora, pronouns had the shortest distance, and the distance for noun forms was longest. A variation across the referent types was also noted in terms of referential distance. The distance for inanimate referents was greatest; that for human referents was relatively short. However, text reference also exhibited short distance. Furthermore, full NPs were frequent when the referent was mentioned in the immediately preceding clause. When the anaphoric patterns were analyzed in text structure, it was found that noun forms were selected over the other types when the referent was not accessible in the same rhetorical unit. These findings thus suggest that referential choices are more sensitive to structural distance than to referential distance. Referential distance itself cannot account for topic continuity as accurately as expected in

distance-based studies, because referential devices perform more than an anaphoric duty.

Finally, the presence of more than one referent of same or different gender triggered changes in referential choice; however, not just their presence but the continuity/discontinuity of the grammatical and semantic role of the reference was crucial in determining which reference took zero anaphora.

This study has shown that referential forms were not chosen as simply as Givón states in his Topic Continuity Hypothesis. Unlike Hwang (1983), no significant correlation was found between the degree of grammatical coding and referential distance. Referential choices were affected by various factors including reference-type, structural distance, and continuity of semantic roles. Structure-based analysis can account for the use of referential devices in written Korean folk tales more accurately than distance-based analysis, even though linear referential distance cannot be completely ignored. In order to have an accurate picture of the writer's referential strategies, thus, referential choices should be analyzed not only linearly but also structurally.

The results of the study have exhibited some common points with Hwang's study on a Korean short story, because both studies have analyzed narrative text. However, the similarities are overridden by the differences in their findings. Thus, future studies on various types of narrative prose are needed to have a better generalization of anaphoric patterns exhibitied by all types of Korean narrative writing. Such studies may find variations within one text-type. In addition, if other types of Korean discourse are explored in text structure, insight can be provided into referential forms used in Korean in general. It can also help Korean students, who are not usually taught how to compose in Korean, to write a better text in their native language.

NOTES

1 Identity chains are one of the two types of cohesive chain proposed by Halliday and Hasan (1985). A cohesive chain is "a set of items each of which is related to the others by the semantic relation of co-reference, co-classification, and/or co-extension" (p. 84). The items related to each other by co-reference form an identity chain: "every member of the chain refers to the same thing, event, or whatever" (p. 84).

2 Referential distance is the distance to the most recent mention of a given referent. Referential decay is the measurement of distance forward: the number of following clauses where the given referent is

mentioned. Referential ambiguity refers to the presence of possible referents besides the actual referent (Givón 1983: 13-15).

3 Ochs (1979) defines planned discourse as "the discourse that has been thought out and organized (designed) prior to its expression" (p. 55).

4 The term collaborative interaction in Lee (1989) is based on Grice's Cooperative Principle. In other words, the speaker's referencing process is a collaborative process not to break down communication but to continue it.

5 Stance representation is a concept from Grimes (1975). In Lee (1989) it is defined as "verbal behavior representing the speaker's (or writer's) affective and epistemic attitudes toward a referent, or towards his/her relationship with hearers through the act of referencing in the context of interaction" (p. 271).

6 When animals were the main characters with no human character, their reference was counted as human in the study (e.g., *Cheng kaykuli* 'Green Frogs').

7 The grammatical functions of each referential form were determined by the case marker following it.

8 In the analysis of English data, clauses are classified into main and non-main including subordinate, participial, relative clauses (Givón 1983, Brown 1983); this set of categories has also been used in Hwang's (1983) study of written Korean narratives. In Korean, main clauses always appear at the end of the sentence unless inversion occurs for special effects. Consequently, a great deal of zero anaphora can occur in the clauses including the main clause after the first. In order to obtain better information about referential choices when a sentence consists of more than one clause, the occurrence of reference at the initial clause and in the following clauses was differentiated in the present study.

9 Return pop is a sentence which ties back to an earlier, a superordinate sentence other than the immediately preceding one.

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MORAIC REPRESENTATION OF AMBISYLLABICITY: EVIDENCE FROM KOREAN*

Seok Keun Kang

The purpose of this paper is to consider the formal representation of 'ambisyllabicity' in terms of moraic phonology. Presenting evidence from Korean, first, I claim that ambisyllabicity DOES exist; i.e., the notion of ambisyllabicity capturing the shared feature of a consonant has a real intuitive appeal. Second, I also claim that ambisyllabicity and gemination are not properties which are in complementary distribution among languages, and that they should be given different representations from each other. Finally, I show that the moraic representation of ambisyllabicity is preferred over the CV representation.

1. Introduction

There has been much discussion in the literature on the formal representation of ambisyllabic consonants since a multi-tiered phonological representation was introduced in the field of phonology. Kahn (1976) argues for the representation of ambisyllabicity in (1a), explaining the English flapping which changes, for instance, /t/ into [D]. Claiming that all phonetic properties characteristic of ambisyllabic segments are derived from their coda status as in (1b), Selkirk (1982:355) believes that ambisyllabicity does not exist. Borowsky et al. (1984:34), on the other hand, assert that the formal representation of ambisyllabicity is identical to that of gemination as in (1c). Furthermore, they claim that ambisyllabicity and true gemination are properties which are in complementary distribution and that phonetic rules interpret the representation with reference to the phonology of the particular language.

(1) a. $\begin{array}{cc} \$ & \$ \\ \diagdown & \diagup \\ & t \\ & | \\ & t \end{array}$ b. $\begin{array}{cc} \$ & \$ \\ \diagdown & \cancel{\diagup} \\ & C \end{array}$ c. $\begin{array}{cc} \diagdown & \diagup \\ C & C \\ \diagdown & \diagup \\ & t \end{array}$
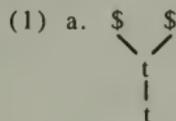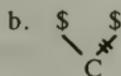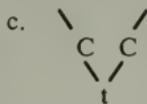
Kahn (1976)   Selkirk (1982)   Borowsky et al. (1984)

In what follows, I will claim that unlike Selkirk's assertion, ambisyllabicity DOES exist. I will present some evidence from Korean which shows that phonetic properties characteristic of ambisyllabic

segments are not derived from their coda status nor from their onset status. In addition, I will also show that unlike Borowsky et al.'s assertion, ambisyllabic and geminate consonants should be represented differently from each other, for both configurations occur in language, e.g. Korean.

2. Ambisyllabicity

Selkirk (1982) argues that all phonetic properties typical of ambisyllabic segments are derived from their coda status. Thus she formulates the English flapping rule as resyllabification in (1b) above. As Borowsky et al. (1984) point out, however, the resyllabified structure in (1b) violates a universally observed preference for onsets. In addition, phonetic properties of ambisyllabic segments are not derived from their coda status, as will be discussed below.

In Korean, there is evidence that certain consonants function as neither the onset of a syllable nor as the coda of the preceding syllable. A syllable-initial lateral /l/, for instance, becomes [n], as shown in (2).

(2) /kamlam/   →   [kamnam]   'olive'
     /kuklip/   →   [kuŋnip]   'government established'
     /lakwən/   →   [nakwən]   'a paradise'
     /loin/   →   [noin]   'an old man'

The /l/-Nasalization rule can be formulated as follows.

(3) /l/-Nasalization

                    μ
                   / \
     /l/ → [n] / ___ V

Rule (3) reads that the lateral /l/ is nasalized into [n] in the syllable-initial position.

But it is interesting to note that an intervocalic lateral /l/ does not undergo /l/-Nasalization but rather changes into [r], which is illustrated in (4).

(4) /malu/   →   [maru]   'a wooden floor'
     /tali/   →   [tari]   'leg'
     /suli/   →   [suri]   'repair'
     /polu/   →   [poru]   'a fort'

Of interest here is that /l/ is not subject to rule (3) even if it appears to satisfy the structural description of the rule. Syllabification of /tali/ 'leg; bridge', for example, will proceed as follows.

(5)

$$
\begin{array}{ccc}
 & & \$\quad\$ \\
 & & |\quad| \\
\mu\quad\mu & \rightarrow & \mu\quad\mu \\
|\quad| & & /\backslash\ /\backslash \\
\text{t a l i (UR)} & & \text{t a l i (Syllabification)}
\end{array}
$$
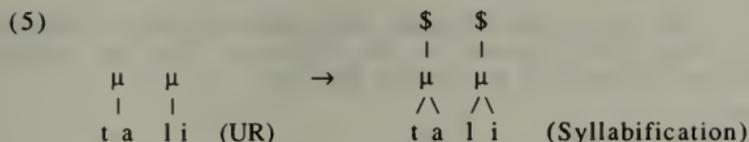
In (5), /l/ is syllabified as the onset of the second syllable, which is predicted by the Onset First Principle.

(6) The Onset First Principle

a. Syllable-initial consonants are maximized to the extent consistent with the syllable structure conditions of the language in question.

b. Subsequently, syllable-final consonants are maximized to the extent consistent with the syllable structure conditions of the language in question.

(Clements & Keyser 1982:37)

Despite the fact that (5) meets the structural description of /l/-Nasalization after syllabification takes place, it does not undergo the rule. The /l/ in the example is phonetically realized as [r], not as [n] or [l]. Selkirk's (1982) resyllabification analysis given in (1b), which would resyllabify /l/ in (5) into the coda of the preceding syllable, cannot hold here, for an allophone [r] of /l/ is not allowed to occur in the coda position. Put differently, the /l/ in (4) is not the onset of the second syllable nor the coda of the first syllable, but rather it should be interpreted as an ambisyllabic segment, which is produced by the ambisyllabification rule given in (7).

(7) Ambisyllabification

$$
\begin{array}{ccc}
\mu & & \mu \\
\upharpoonleft\searrow & & \diagup\!\!\upharpoonleft \\
V & l & V
\end{array}
$$
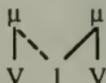
The structural description of the /l/-Nasalization rule is no longer met in (5) after the Ambisyllabification takes place. This is predictable by the so-called Linking Constraint.

(8) Linking Constraint

Association lines in structural descriptions are interpreted as exhaustive.

(Hayes 1986)

As can be seen in (3), the structural description of the /l/-Nasalization rule requires a unique association line between the segment /l/ and the mora 'μ'. But the ambisyllabification associates the segment /l/ with two moras. Thus the ambisyllabified segment

/l/ no longer meets the structural description of the /l/-Nasalization rule. Rather it is subject to the following rule, by which the ambisyllabic segment /l/ is changed into [r].

(9)   μ   μ

     /l/ → [r] /   V ___ V

It is clear from the above that unlike Selkirk's (1982) assertion, the notion of ambisyllabicity capturing the shared feature of a consonant has a real intuitive appeal.

Now, let's turn to how ambisyllabic and geminate consonants are represented. Do they have the same representation or different representations? According to Borowsky et al. (1984), the formal representation of ambisyllabicity is identical to that of gemination. They assert that ambisyllabicity and gemination are properties which are in complementary distribution and that any phonetic differences between them are predicted by phonetic rules, which interpret the representation with reference to the phonology of a particular language. In what follows, I will show that this is not the case. That is, ambisyllabicity and gemination should be represented in different ways, and that they are not in complementary distribution

There is evidence that in Korean, there exist both ambisyllabic and geminate consonants, which are phonetically realized differently from each other. Consider the following examples.

(10) a. /məli/   →   [məri]   'head'
     a'. /məlli/   →   [məlli]   'far'
     b. /ili/   →   [iri]   'here'
     b'. /illi/   →   [illi]   'some reason'
     c. /ilɨta/   →   [irɨda]   'to arrive'
     c'. /illɨta/ →   [illɨda] 'to inform'

(10a-c) are examples that show ambisyllabicity. The syllabification of /məli/ 'head', for instance, proceeds as follows.

(11)   S   S
                                      | |
              μ   μ   μ   μ
              | | /\ /\
          m   ə   l   i (UR)   →   m ə l i   (Syllable Association
                                                 & Onset Rule)

The output in (11) first undergoes the Ambisyllabification rule in (7), and then the rule in (9) which changes /l/ into [r], as shown below.

(12)

```
      S    S              S    S
      |    \              |    |
      μ    μ              μ    μ
      |                   /\   /\
    m ə  l  i      →    m ə  l  i    (Ambisyllabification)

                         S    S
                         |    |
                         μ    μ
                         /\   /\
    →  ... (/l/-Nas.) →  m ə  r  ı   (/l/→[r])
    →  [məri]
```
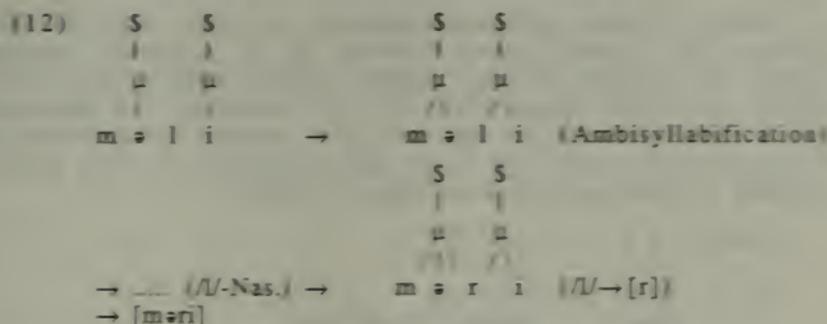
As shown in (12), the ambisyllabic segment /l/ is not assigned any mora underlyingly but is associated with two moras in the process of syllabification. In contrast, the geminate segment /l/ in (10a-c) is assigned a mora in the underlying representation (Hayes 1989, Kang 1991a). In contrast to /məli/, /məlli/ 'afar' is syllabified as shown below.

(13)

```
        μ  μ  μ              μ  μ  μ
        |  |  |              /\ \/
      m ə  l  i   (UR)  →  m ə  l  i   (Syllable Association
                                        & Onset Rule)

        S    S
        /\   |
        μ  μ  μ
        /\ \/
    →  m ə  l  i   (Coda Rule)
```
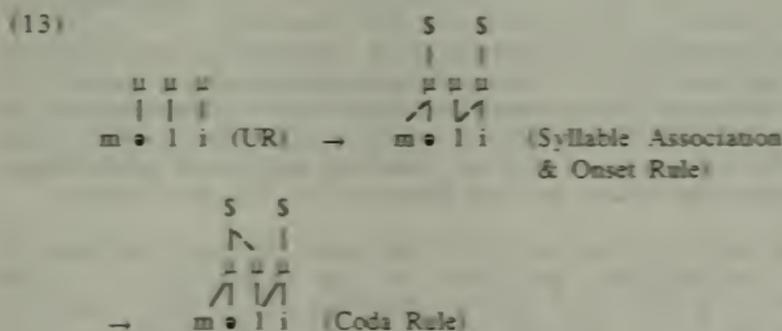
In (13), the geminate consonant /l/ is first syllabified as the onset of the second syllable by the Onset Rule and then its mora is associated with the preceding syllable by the Coda Rule. The final output here does not meet the structural condition of the /l/-Nasalization rule nor that of the /l/ → [r] rule. It is clear from (12) and (13) that ambisyllabicity and gemination should not have the identical representation. This presents evidence against Borowsky et al's (1984) claim that the formal representation of ambisyllabicity is identical to that of gemination. That is, their assertion that ambisyllabicity and true gemination are properties that are in complementary distribution is incorrect in that Korean has both structures.

Some evidence for ambisyllabicity is also found in Middle Korean. The bilabial voiced fricative /β/ of a Humble morpheme /saβ/, for example, occurs neither syllable-initially nor syllable-finally (Lee 1975, Baek 1985). In (14), therefore, the intervocalic /β/ is first syllabified as the onset of a syllable by the Onset First Principle in (6), and then it is also associated with the preceding syllable by Ambisyllabification (Baek 1985:10).

(14) $ $ $
        /I\   /I\ /\
        t ɨ t + s a β + a
        'hear'   HUMBLE COMPLETIVE

In the coda position, on the other hand, /β/ gets devoiced, and its preceding vowel is lengthened, as shown below.

(15) $ $ $ $ $ $
        /I\   /I\   /\   /I\   /I\   /\
        t ɨ t + s a β + k o → t ɨ t + s a p + k o
        'hear'   HUMBLE 'and'

(Baek 1985:10)

In connection with ambisyllabicity, Baek examines the tonal behavior of the morpheme /saβ/. The underlying tonal melody of /saβ/ is LH, of which H is a floating tone. The high tone is associated with the following syllable if the syllable begins with a vowel, as in (16a). Otherwise it is associated with the vowel of /saβ/ itself, which results in a contour tone LH, as in (16b) (Baek 1985).

(16) a. $ $ $ b. $ $ $
        /I\ /\ /\   /I\ /I\ /\
        t ɨ t s a β a   t ɨ t s a:p k o
        | | ⁄| | /ˋ |
        L   L H H   L   L H   H

Baek asserts that phonetic realization of the underlying tonal melody LH in Middle Korean is related with syllable structures. In order to account for the interaction of the tonal behavior with the syllable structures, he posits an underlying empty V slot on the CV tier.

(17)   CVCV
        /saβ/
        LH

(18a) and (18b) show how [tɨt sa βa] and [tɨt sa:p ko] are derived, respectively.

(18) a.
```
     $      $      $                    $      $    $
    /|\    /\    //\                  /|\   /|\/|\
   C V C  C V C V V                  C V C C V C V V
   | | |  | | | |  |                 | | | | | | | \/
   t ɨ t  s a β    a                 t ɨ t s a β   a
   |      |     |                    |      |    /\
   L      L H   H          →         L      L   H H


     $      $       $                  $       $       $
    /|\    /|\     /\                 /|\    / /\ \    /\
   C V C  C V C V  C V               C V C  C V V C   C V
   | | |  | | | |  | |               | | |  | | \/ |  | |
   t ɨ t  s a β    k o               t ɨ t  s a p  k o
   |      |        |                 |       /\       |
   L      L H      L        →        L      L H       L
```

Baek (1985:12) says,

> "...the empty V before a vowel-initial syllable [in (18a)] is associated with the neighboring vowel, and that the floating tone H is associated with the same vowel, resulting in two contiguous high tones....the two tones are collapsed into each other. On the other hand, the empty V before a consonant-initial syllable [in (18b)] is associated with the vowel of the preceding syllable, producing a long vowel. In this case, the floating tone H is associated with the same vowel, forming a contour tone LH."

His analysis, however, has several shortcomings. To begin with, the empty V slot posited in the underlying representation of the morpheme /saβ/ is not independently motivated. And it is not clear how his syllabification works. In the first half of the derivation in (18a), the empty V slot is already syllabified with both the preceding consonant and the following vowel, whereas in the case of (18b), it is not syllabified yet. This kind of syllabification is ad hoc in that in some cases the empty V slot is syllabified and in other cases it is not. Finally and more crucially, his derivation in (18b) encounters a serious problem; i.e., how can the empty V element be syllabified into the preceding syllable? He gives no account for this problem. Suppose that his analysis is correct. Then there seems to be two possible ways of syllabifying the empty V slot into the preceding syllable in (18b). One possibility is given in (19).

(19)

```
        $    $    $                        $    $    $
       /I\  /I\   /\                      /I\  /I\   /\
       CVC CVCV  C V                      CVC CVCV  C V
       |||  |||   | |                     ||| ||L+  | |
       t ɨ t s a β  k o                   t ɨ t s a β  k o
       |    |    |                        |    |    |
       L    L H  L  (Syll.)     →         L    L H  L
                                          (Vowel Lengthening)
```

```
              $    $    $
             /I\  /I\   /\
             CVC CV CV C V
             |||  | |↙ | |
             t ɨ t s a p  k o
             |    /\    |          (Association of the
       →     L   L H    L          floating H tone)
```
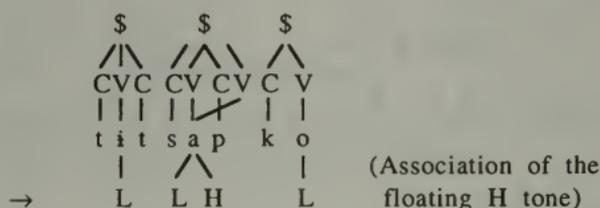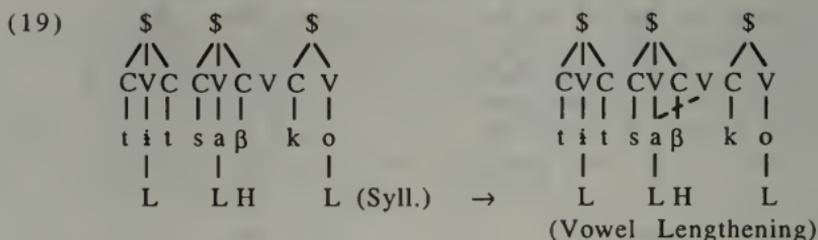
Vowel lengthening in (19) would raise eyebrows, since we end up with crossing association lines. An alternative mechanism is some kind of metathesis, which will exchange the empty V slot with the preceding C slot, as shown below.

(20)

```
        $    $    $                        $    $    $
       /I\  /I\   /\                      /I\  // \  /\
       CVC CVCV  C V                      CVC CVVC C V
       |||  |||   | |                     |||  ||  | |
       t ɨ t s a β  k o                   t ɨ t s a  β k o
       |    |    |                        |    |   |
       L    L H  L  (Syll.)     →         L    L H  L
                                          (Metathesis
                                          )
```

```
              $    $    $
             /I\  /I\\   /\
             CVC CV VC C V
             |||  |↙ | |
             t ɨ t s a  p k o
             |    /\    |        (Vowel lengthening,
       →     L   L H    L        Association of H & /β/→[p])
```
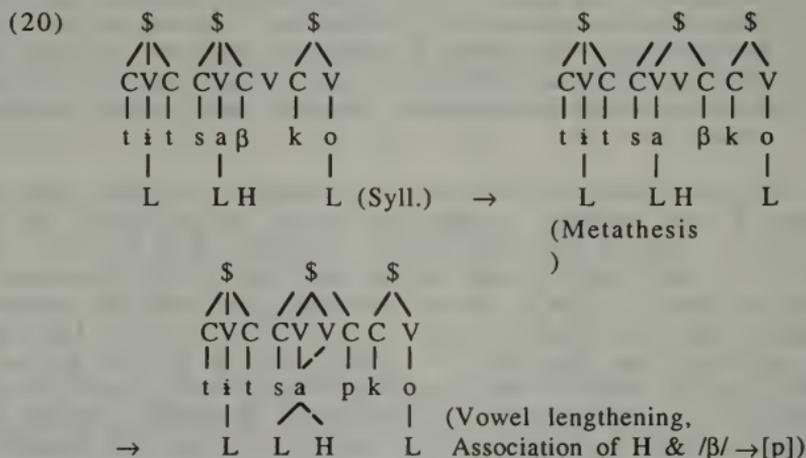
But the metathesis is not supported by any empirical evidence.

Now let's turn to an account in terms of moraic phonology. As discussed above, when /β/ occurs syllable-finally, it becomes a voiceless bilabial stop [p] and the preceding vowel is lengthened. Assuming that /β/ is moraic but /p/ is not, we can give a natural account for the devoicing of /β/ with compensatory lengthening of

the preceding vowel. In the process of syllabification, that is, /β/ in
the coda position is assigned a mora by the Weight by Position in
(21), which is the revised version of Hayes (1989), as shown in (22).

(21) Weight by Position
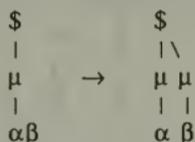
```
      $                $
      |                |\
      μ      →        μ μ        Where $ dominates the only μ and
      |                | |       β is moraic.
      αβ               α β
```

```
(22)  $    $    $              $     $    $
      |    |    |              |     |\   |
      μ    μ    μ              μ    μ μ   μ
     /|\  /|   /\             /|\  /| |  /\
     t ɨ t  s a β  k o        t ɨ t  s a β  k o
      |    |    |  (Onset      |     |   |   (Coda
      L    L H  H   Rule)  →   L     L H  H   Rule)
```
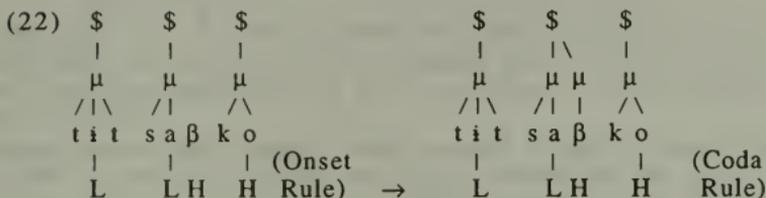
Then the devoicing rule which changes /β/ into [p] delinks /β/ from
its mora. As a result, the mora is stranded so that it can be
reassociated with the preceding vowel. Example (23) shows how this
takes place.

```
(23)  $    $    $              $     $    $
      |    |\   |              |     |\   |
      μ   μ μ   μ              μ    μ μ   μ
     /|\ /| |  /\             /|\  /|    /\
     t ɨ t s a β k o          t ɨ t s a p k o
      |   |    |               |    |    |
      L   L H  H        →      L    L H  H
                              (Devoicing)
```

```
      $    $    $
      |    |\   |
      μ   μ μ   μ
     /|\  /|ʋ  /\
     t ɨ t s a p k o
      |   |ʋ    |
  →   L    L H  H        (CL & Linking of H)
```

```
      $    $    $
      |    |\   |
      μ   μ μ   μ
     /|\  /|ʌ  /\
     t ɨ t s a p k o
      |   |ʌ    |
  →   L    L H  H        (Reassociation of /p/)
```
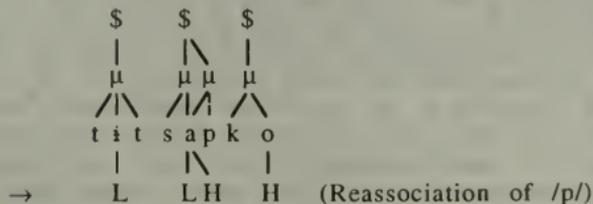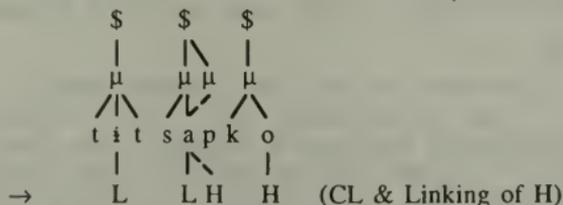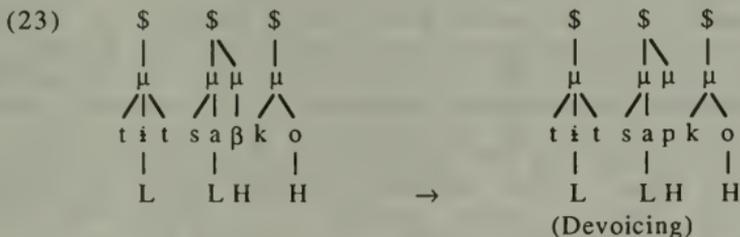
The floating high tone in (23) is associated with the long vowel /a:/, producing a contour tone LH. On the other hand, no contour tone is derived when the bilabial voiced fricative /β/ occurs as the onset of a syllable, which is shown below.

(24)

```
     $  $  $                              $  $  $
     |  |  |                              |  |  |
     μ  μ  μ                              μ  μ  μ
    /|\ /| /|                            /|\ /|√|
    t ɨ t s a β a                        t ɨ t s a β a
    |    |  |                            |    |  |
    L    L H H (Syll.)      →            L    L  H
                                         (Ambi. & SEC)
```
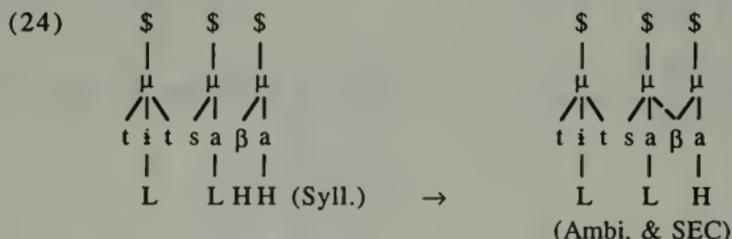
Suppose that in Middle Korean, short vowels cannot bear a contour tone. Then, the unassociated high tone above is deleted by the Stray Erasure Convention given in (25).

(25) Stray Erasure Convention

   Erase segments and skeleton slots unless attached to higher level of structure. (Steriade 1982)

It is shown above that unlike Baek's (1985) assertion, the devoicing of /β/, vowel lengthening and the association of the floating high tone are phenomena related with one another. That is, the devoicing of /β/ triggers compensatory lengthening of the preceding vowel, which in turn feeds the association of the floating high tone, producing a contour tone LH. Here, we do not need to posit with Baek (1985) an empty V slot underlyingly which has no independent motivation. Once a moraic structure is assumed, then those phenomena discussed above can be given a natural account.

3. Conclusion

I have discussed so far how ambisyllabicity should be represented. It has been shown that unlike Selkirk's (1982) assertion, ambisyllabicity DOES exist. Arguing against Borowsky et al. (1984), I have also shown that ambisyllabicity and gemination have different structures from each other. A geminate consonant is assigned a mora in the underlying representation, and in the process of syllabification, it is syllabified both as the onset of a syllable and as the coda of the preceding syllable. In contrast, an ambisyllabic consonant does not bear any mora underlyingly. It is syllabified as the onset of a syllable in the process of syllabification, and then it is also linked with the preceding mora by the Ambisyllabification. Ambisyllabicity and gemination are not in complementary distribution as Borowsky et al. (1984) assert. Rather they can exist in

a single language, and the distinction between them even contributes to differences in the meanings of words, as discussed above.

Finally, the moraic representation of ambisyllabicity in (26a) is preferred over Clements and Keyser's (1983) in (26b).

```
(26) a.   μ μ            b.  $ $
          /\/\               \/
          V t V              C
                             |
                             t
```
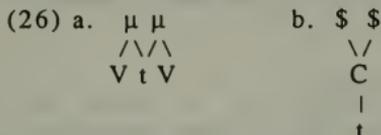
As Borowsky et al. (1984:35) point out, first, questions with respect to descriptive power may arise. Observe (27). Can the V-slot be shared by different syllables in a way analogous to the ambisyllabic C-slot in (26b)?

```
(27)   $ $
       \/
       V
       |
       a
```
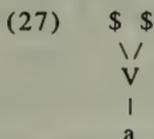
Unlike CV theory, however, moraic theory correctly predicts that no ambisyllabic vowel occurs. Under moraic theory, that is, ambisyllabic segments are distinguished from vowels underlyingly in that the former do not bear any mora, while the latter bear one or two moras. Only unmorified segments can become ambisyllabic segments. This leads to the correct prediction that vowels can never be ambisyllabic.

Second, the loss of an ambisyllabic segment does not induce compensatory lengthening (CL). Consider a case of this sort from English given below.

```
(28)   $ $                    $ $
       | |                    | |
       μ μ         →          μ μ        (/h/ → Ø)
       |\/|                   | |
       ni h i lism            n i ilism
```

The fact that in (28), no CL is triggered by the deletion of the ambisyllabic segment /h/ comes from the moraic representation of ambisyllabicity. That is, the deletion of /h/ has no mora stranded, so that no CL occurs. Under CV theory, however, this prediction cannot be made. CV theory would incorrectly predict that the loss of the ambisyllabic segment /h/ triggers CL, as exemplified in (29).

```
(29)   $ $                  $ $                    $ $
       |\/|                 |\/|                   |\/|
       VCV        →         VC V  (/h/ → Ø)  →     VCV    (CL)
       || |                 |  |                    |/ |
       nih ilism            n i ilism              n i ilism
```
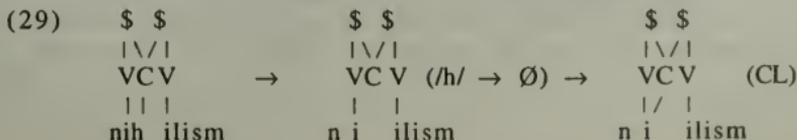
NOTES

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THE LOCALITY CONDITION OF TONAL SYSTEMS: WITH SPECIAL REFERENCE TO NORTH KYUNGSANG DIALECT IN KOREAN

Yongsoon Kang

This paper is an attempt to reduce the power of phonological rules. To be specific, this paper deals with the tonal system of the North Kyungsang dialect in Korean and shows that a couple of suggested tonal rules violate the Locality Condition (LC), which prohibits rule application between nonadjacent elements. This paper proposes that these rules be removed and that following the idea of LC counting, the counting capability of phonological rules be limited to two operations, i.e. trigger itself and trigger the adjacent target.

1. Introduction

It was the tonal system which introduced the concept of non-linearity into phonology. Recently, Korean tonal systems also have been reanalyzed under the non-linear framework and many new rules have been suggested. Since these rules are part of phonological rules, they are expected to obey other phonological conditions and constraints.

The purpose of this paper is to show that a couple of tonal rules suggested in the previous works (Kim, G-R. 1988, Chung, Y-H. 1989, Han, S-H. 1989) on the tonal system of North Kyungsang (Taegu) dialect are too strong in that they violate the Locality Condition (LC) (Hewitt & Prince 1989), and thus should be removed.

In the next section, I will introduce the notion of the LC and discuss its theoretical importance. In section 2, I suggest that several previously formulated tonal rules violate the LC and that, therefore, they can be dispensed with.

2. Locality Condition

In this section, I will introduce the LC suggested by Hewitt & Prince (1989) and discuss its theoretical significance. According to the LC of Hewitt & Prince (1989:3), phonological rules may affect a single element (tier) adjacent to the rule trigger. Under the non-linear framework, they define the notion of structural adjacency as follows.

(1) a. Adjacent

    x   x   x   x
    | | | |
    A B   A B   A B   A B

    b. Nonadjacent

    x   x   x
    | |
    A   B
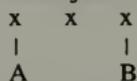
In (1), x signifies the tone bearing unit (TBU) and capital letters (A, B), the tonal tier. Tones which are not linked to the TBU are floating and are assumed to be adjacent to any linked tones as (1a) shows. The two floating tones are also assumed to be adjacent. However, linked tones are adjacent only if their connected TBUs are adjacent. Phonological rules may affect a single tone which is adjacent to the rule trigger. Thus we can say that A and B can affect each other in (1a) but not in (1b).

This kind of constraint is of theoretical importance in that it restricts the power of phonological rules. Assuming that the ultimate objective of studying language is to explain language acquisition of children, we do not want our grammar to be so powerful as to generate everything. On the contrary, we want it to be as simple as possible so that we can explain how a child learns his or her own language with such ease and quickness.

By the LC, we can restrict the power of phonological rules to apply only between the adjacent trigger and target. Moreover, following the idea of the LC, I suggest that the counting capacity of phonological rules be limited to 'two', i.e. the trigger itself and the adjacent target. Thus we can prevent the following kind of powerful phonological rule from taking place.

(2) x_0 x_1 x_2 ... x_n
    | ..../
    | /
    A   (A spreads to the nth segment)
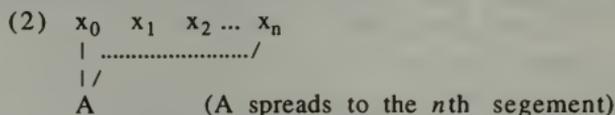
In this paper, following the underspecification theory of Pulleyblank (1986), I assume that only high tones will be represented on the underlying structure and all low tones will be realized on the surface by the following default low tone insertion rule.

(3) Default Low Insertion rule

    x → x
           |
           L

3. Previous analyses

In this section, I will present three tonal rules suggested in previous analyses (Kim, G-R. 1988, Chung, Y-H. 1989, Han, S-H. 1989) which violate the LC, and I will then suggest an alternative solution in §4.

As an adjustment rule, several rhythm rules were introduced in the previous studies. However, the LC was never considered. Example (4) illustrates some of these rules.

(4) a. Pre-linked H-deletion (Kim, G-R. 1988:58)

$$H \rightarrow \emptyset \,/\, \# \,(x)\, x + (x)\, x\, (x)\, \#$$
$$\quad\quad\quad\quad\quad | \quad\quad\quad |$$
$$\quad\quad\quad\quad\; \underline{} \quad\quad\quad H$$

b. Second H-delinking rule (Han, S-H. 1989:141)

$$\begin{array}{lll} x & x_1] & x \\ | & & | \\ | & = & \quad (X_1 \text{ is one or more sequence of} \\ | & & | \quad\; \text{empty x's)} \\ H & & H \end{array}$$

These rules apparently violate the LC because one or more TBUs are between two high tones. In rules of example (4), H-delinking is motivated by the neighboring (but not adjacent) H. The situation is worse, especially in (4b), since the number of TBUs between two H-bearing TBUs is not limited. In the next section, I will show that the same data can be explained without these rules.

Another powerful tonal rule found in all of the above previous works is the Third H-delinking rule.

(5) Third H-delinking rule

$$H \rightarrow \emptyset \,/\, x \quad\; x \quad\quad x^0$$
$$\quad\quad\quad\quad\; | \quad\quad\quad\quad\; |$$
$$\quad\quad\quad\quad\; | \quad\quad\quad\quad\; |$$
$$\quad\quad\quad\quad\; H \quad\quad\quad \underline{}$$

This rule says that all the high tones are delinked except the first two. This rule was motivated to explain the data which show [HHLL...] pattern. First, they assume the universal free tone association which forces the maximal association of a high tone to the right, and then rule (5) applies since high tones are not realized from the third on.

Rule (5), however, is too powerful in the sense that it does not restrict the power of the counting capability of phonological rules. If we allow that it can count three, then we can ask why not four, five, six and so on. In fact, the rule is a by-product of the free tone

association rule, which unnecessarily spreads to the maximum. Thus its sole motivation is to derive the correct surface form. Therefore, the rule makes the grammar too powerful by giving it unlimited counting capability, which is a violation of the LC. The original LC proposed by Hewitt and Prince (1989) limits the power of counting to the adjacent unit.

Given the above reasons to reject this rule, I will adopt the Tone Mapping Rule instead which was suggested by S-H. Han (1989:136) to explain the same data.

    (6)   Tone Mapping Rule (TMR)

        a. Map a floating H tone onto the first TBU.
        b. Mapped H tone spreads only to the next TBU to the right.

4. Alternative analysis

In this section, I will show that the same data discussed in earlier works can be explained only with the rules which do not violate the LC. To begin with, I will introduce the data and some tonal rules which will be adopted in this paper. Then I will present derivations of the data.

4.1. Data

The following are some examples which I will discuss in this paper. First, there are some words in which the location of the tone is not affected by the attachment of postpositions. The underlying forms of these words are given in (7d) (Chung, Y-H. 1989).[1]

    (7) a. myenuli [HLL]   'daughter-in-law'
           myenuli+ka [HLLL]   'daughter-in-law (Subj.)'
           myenuli+chelem [HLLLL]   'like daughter-in-law'
           myenuli+pota [HLLLL]   'than daughter-in-law'

        b. kkamaki [LHL]   'raven'
           kkamaki+ka [LHLL]   'raven (Subj.)'
           kkamaki+chelem [LHLLL]   'like raven'
           kkamaki+pota [LHLLL]   'than raven'

        c. hanul [HL]   'sky'
           hanul+i [HLL]   'sky (Subj.)'
           hanul+chelem [HLLL]   'like sky'
           hanul+pota [HLLL]   'than sky'

        d. myenuli   kkamaki   hanul
              | | |
             H   H   H

Second, in the following, the first two tones are always high, regardless the number of TBUs.

(8) a. mwucikay [HHL]   'rainbow'
        mwucikay+ka [HHLL]   'rainbow (Subj.)
        mwucikay+chelem [HHLLL]   'like rainbow'
        mwucikay+pota [HHLLL]   'than rainbow'

    b. kwulum [HH]   'cloud'
        kwulum+i [HHL]   'cloud (Subj.)'
        kwulum+chelem [HHLL]   'like cloud'
        kwulum+pota [HHLL]   'than cloud'

    c. so [H]   'cow'
        so+ka [HH]   'cow (Subj.)'
        so+chelem [HHL]   'like cow'
        so+pota [HHL]   'than cow'

    d. mwucikay   kwulum   so
        H   H   H

Third, the location of the high tone is shifted with the addition of postpositions.

(9) a. satali [LLH]   'ladder'
        satali+ka [LLHL]   'ladder (Subj.)'
        satali+chelem [LLLHL]~[LLHHL] 'like ladder'
        satali+pota [LLLLH]   'than ladder'

    b. poli [LH]   'barley'
        poli+ka [LHL]   'barley (Subj.)'
        poli+chelem [LLHL]~[LHHL]   'like barley'
        poli+pota [LLLH]   'than barley'

    c. cha [H]   'car'
        cha+ka [HL]   'car (Subj.)'
        cha+chelem [LHL]~[HHL]   'like car'
        cha+pota [LLH]   'than car'

Following Y-H. Chung (1989), I assume that there is no underlying H for words in (9) and that the surface forms are realized by a H-insertion rule as in the following.

(10) H-insertion

        x]   →   x]
                 |
                 H   (Condition: no H in the domain)

4.2. Derivations

In order to explain the above data, I introduce three more rules which are given in the following examples. First, there is a H-shifting rule as in example (11).

(11) H-shifting

```
x     x     (Condition: a. prelinked H doesn't shift.
|    ./                 b. it doesn't shift to the last
=   ./                     TBU of the domain.)
| /
H
```

Second, we need a rule which docks the floating H of a postposition to the last TBU of the lexical item, which is given in (12).

(12) Floating H-docking Rule (Y-H. Chung 1989:122)

```
x  +  x
 \.......
        \
        H
```

This rule precedes the Tone Mapping Rule and we don't have to specify this rule ordering in the grammar, for this is determined naturally by the Elsewhere Condition which makes a rule A apply before a rule B if and only if the structural description of A properly includes that of B.

Third, we need Meeussen's rule in which the application of the rule takes place only between adjacent TBUs.

(13) Meeussen's Rule
     $H \rightarrow \emptyset / H \underline{\quad}$

To summarize, the rules I have proposed are as follows in example (14).

(14) Floating H-Docking Rule (FHDR)
     Tone Mapping Rule (TMR)
     H-insertion
     H-shifting
     Meeussen's rule

Before examining the rule ordering relationship of (14), I would like to say a little more on postpositions in Korean. Given the fact that all postpositions in Korean are bound forms and that they cannot occur alone, I suggest here that tonal variation of postpositions is not realized until they are attached to the independent lexical items in the sense of Lexical Phonology (S-C. Ahn 1985), even though they have the underlying tonal structure as in example (15).

```
(15) -ka (-i)    -chelem      -pota
      H            H
```

With these rules we need to specify the rule ordering relations between the rules. To begin with, Meeussen's rule should precede the FHDR since the former bleeds the latter as shown below.

(16)   a. myenuli+chelem   b. myenuli+chelem
              | |
              H   H   H   H
    Meeussen   ø   x x x + x x
                                        | \....   FHDR
    FHDR   ----   H   H
                                        ----   Meeussen
              [HLLLL]   *[HLHLL]

Second, FHDR precedes the H-shifting rule since the former feeds the latter as in (17).

(17)   a. satali+chelem   b. satali+chelem
                     H   H
    FHDR   x x x + x x   ----   H-shifting
                 \....
                      H   x x x + x x   FHDR
    H-shifting   \..
               x x x + x x   H
                 | ./   *[LLHLL]
                 = /
                 H
               [LLLHL]

The ordering relation between the five rules is summarized in (18).

(18)   Meeussen's rule----
                                |
            ---FHDR--------------
            |
            | TMR---------------
            | |
            ---H-shifting rule-----

            H-insertion rule

With these rules and their ordering relation, we can derive the data as seen in (19).

(19)   a. kkamaki-chelem   meli-chelem
                    | |
                    H   H   H   H

Meeussen   ∅   ∅
FHDR   ----   ----
TMR   ----   ----
H-shifting   ----   ----
H-insertion   ----   ----
              [LHLLL]   [HLLL]

          b. kkamaki-pota   meli-pota
                    | |
                    H   H
all
rules   ----   ----
              [LHLLL]   [HLLL]

H-insertion rule doesn't apply to -*pota* in (19b), since there is another H in the domain. Low tone is realized by the default low-insertion rule (2) after all other rules have applied.

TMR plays a crucial role to explain following data.

(20)   a. mwucikay+ka   kwulum+i   so+ka

                  H   H   H   H   H   H

Meesseun   ∅   ∅   ∅
FHDR   ----   ----
TMR   x x x + x   x x + x   x + x
              | / | / |.../
              H   H   H
H-shifting   ----   ----   ----
H-insertion   ----   ----   ----
              [HHLL]   [HHL]   [HH]

          b. mwucikay+chelem   kwulum+chelem   so+chelem

                  H   H   H   H   H   H

Meeussen   ∅   ∅   ∅
FHDR   ----   ----   ----
TMR   x x x + x x   x x + x x   x + x x
              | / | / |../
              H   H   H
H-shifting   ----   ----   ----
H-insertion   ----   ----   ----
              [HHLLL]   [HHLL]   [HHL]

	c. mwucikay+pota	kwulum+pota	so+pota
	H	H	H
Meeussen	- - - -	- - - -	- - - -
FHDR	- - - -	- - - -	- - - -
TMR	x x x + x x	x x + x x	x + x x
	l /	l /	l ..../
H H H			
H-shifting	- - - -	- - - -	- - - -
H-insertion	- - - -	- - - -	- - - -
	[HHLLL]	[HHLL]	[HHL]

In (20), FHDC does not apply because this rule applies to only the floating H of postpositions.

The H-insertion rule is not affected by rule ordering, and if there is no H in the given word then it applies, making the last TBU high-toned. (21) gives some examples.

(21)	a. satali	poli	cha
Meeussen	- - - -	- - - -	- - - -
FHDR	- - - -	- - - -	- - - -
TMR	- - - -	- - - -	- - - -
H-shifting	- - - -	- - - -	- - - -
H-insertion			
	x x x]	x x]	x]
	l	l	l
	H	H	H
	[LLH]	[LH]	[H]

	b. satali+ka	poli+ka	cha+ka
	H	H	H
Meeussen	- - - -	- - - -	- - - -
FHDR	x x x + x	x x + x	x + x
	\\..	\\..	\\..
	H	H	H
TMR	- - - -	- - - -	- - - -
H-shifting	- - - -	- - - -	- - - -
H-insertion	- - - -	- - - -	- - - -
	[LLHL]	[LHL]	[HL]

```
              c. satali+chelem      poli+chelem      cha+chelem

                        H                 H                H
Meeussen       ----              ----             ----
FHDR           x x x + x x       x x + x x        x + x x
                    \...              \...            \...
                        H                 H                H
TMR            ----              ----             ----
H-             x x x + x x       x x + x x        x + x x
 shifting           | ./              | ./            |./
                    =/                =/              =/
                    H                 H               H
H-insertion    ----              ----             ----
               [LLLHL]           [LLHL]           [LHL]

              d. satali+pota       poli+pota        cha+pota

Meeussen       ----              ----             ----
FHDR           ----              ----             ----
TMR            ----              ----             ----
H-shifting     ----              ----             ----
H-             x x x + x x]      x x + x x]       x + x x]
 insertion          |                 |               |
                    H                 H               H
               [LLLLH]            [LLLH]           [LLH]
```

In (21c), if we change the H-shifting to H-spreading which spreads
the H only to the next TBU without delinking the trigger, then we can
explain the alternative tonal form.

(22)   a. H-spreading

```
              x   x
              | ../
              |/
              H
```

       b.   satali+chelem

```
                              H
Meeussen       ----
FHDR           x x x + x x
                    \..
                        H
TMR            ----
H-             x x x + x x
 spreading          | ./
                    |/
                    H
H-insertion    ----
               [LLHHL]
```

5. Conclusion

The Locality Condition is theoretically significant in that it restricts the power of phonological rules. For instance, the application of Meeussen's rule or H-delinking would be undesirable if we assume that they can apply between the nonadjacent segments. Moreover, if we allow this, there is no way to prevent them from applying to cases such as in (23), which apparently look wrong.

(23)   x x x ... x x x
             | |
             H   H

In this paper, I have suggested the removal of some rules which violate the LC because they make a grammar too powerful. I have proposed that, following the idea of the LC, the counting ability of phonological rules be limited to 'two'. I adopted TMR which was suggested by S-H. Han (1989) and restricted the application of Meeussen's rule to apply strictly to adjacent environments. Finally, I have showed that, with certain modifications, these rules can derive correct surface forms.

NOTES

[1] For the transcription of the Korean data, I use the Yale Romanization system.

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THE *CHARACTER* OF KOREAN GLIDES

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The maximum surface syllable structure of Korean is CGVC. The exact status of G within the syllable hierarchy has been in dispute in recent years: It has been viewed either as (a) a full segment in flat structure, (b) a part of a complex consonant, (c) a part of the onset cluster, or as (d) a part of the nucleus. In the first part of the paper, we present various morpho-phonological phenomena in Korean, i.e., morpheme structure conditions, consonant cluster reduction, initial consonant constraint, reduplication in ideophones, a language game, etc., as evidence for the nuclear nature of glides. In the second part, we show how the proposed view may simplify phonological descriptions of rules involving glides beyond the Korean data, e.g., glide formation, metathesis, compensatory lengthening, etc. In conclusion, we show how correctly and ingeniously, *Han'gul*, the five and a half century old native script, represents the nuclear character of glides in the Korean syllable.

1. Introduction

Our task today is a simple one; we would like to argue that in the syllable structure of Korean, the glides should be regarded as a part of the nucleus, rather than a part of the syllable onset. The paper is divided into two parts. In the first part, we will present evidence for the nuclear position of glides, and in the second part, we will show how this view simplifies a phonological description beyond the Korean case.

Korean phonologists have not been in agreement with the canonical syllable structure. With respect to the position of glides, the syllable structure of Korean may be divided into the following several types:

(1) a. Flat structure
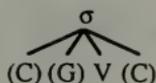
Kim & Shibatani (1976)
Y-S. Kim (1984)

b. Glide as onset
   i. Right-branching Rime
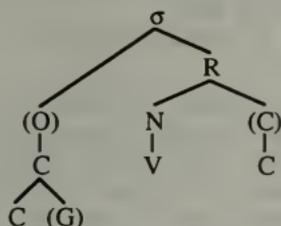
B-G. Lee (1982)
S-C. Ahn (1985)

   ii. Left-branching Core
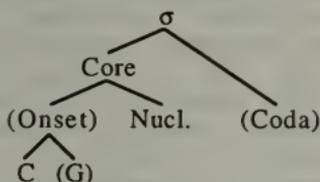
C-G. Gim (1987)
S-C. Ahn (1988)

c. Glide as nucleus
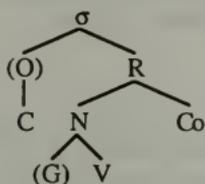
Kim-Renaud (1978)
J-M. Kim (1986)
H-S. Sohn (1987)

Our evidence for a glide as a part of the syllable nucleus in Korean will take the form of presenting and examining several phonological phenomena that involve interaction with glides. Much of such evidence was first given by H-S. Sohn (1987) where she advances excellent arguments for representing complex Korean vowels including diphthongs and glides as a sequence of vowels dominated by syllable nucleus. The exact mechanism by which two vowels coalesce to produce surface complex vowels is admirably worked out by Sohn, I will not go into details here. Below we give a brief summary of her arguments. Let's first begin with what Sohn (1987) calls an *ex silentio* argument for the nuclear nature of glides.

2. Evidence of a nuclear glide

In many languages where there are consonant clusters, two things are very common: One, a severe constraint in the sequencing of the segments, what used to be called "Morpheme Structure Conditions", and two, a mirror-image relation between the onset cluster and the coda cluster. In English, for example, only non-nasal sonorants may follow stops, which in turn can follow only *s*, e.g., *pr-*, *pl-*, *py-*, *tr-*, *tw-*, *kr-*, *kl-*, *kw-*, *ky-*, *spr-*, *spl-*, *str-*, *skr-*, etc. It is also true that for all the initial clusters listed above, there are also final clusters in reverse sequence, i.e., *-rp*, *-lp*, *-lb*, *-rt*, *-rk*, *-lk*, *-rps*, *-lps*, *-rts*, *-rks*, etc. Note that there are no final clusters *-wp*, *-wb*, just as there are no initial clusters *pw-*, *bw-*. Returning to Korean, if we regard the glides *w* and *y* to be parts of the onset cluster, then we might expect that there may exist a certain constraint in the sequencing of glides with respect to other consonants. But the fact is that there is none. Any consonant may precede a glide. A possible exception might be the nonexistence of a sequence of a palato-alveolar consonant and the palatal glide *y*. But it is a case of nondistinction in pronunciation between *cya* and *ca*, rather than a case of nonexistence of the underlying sequence *cya*. Also, if we grant that *Cy-* and *Cw-* sequences are onset clusters, then we might also expect the mirror-image sequences to occur as coda clusters, i.e., *-yC* and *-wC*. But such a cluster is simply nonexistent in Korean.

Curiously enough, on the other hand, there exist co-occurrence constraints both in the permissible coda consonant clusters and in the complex nuclei involving glides. In Korean, there are morphemes and words that have two-consonant clusters at the coda position. However, the composition and the order of these clusters are severely constrained, so that only *-ps*, *-ks*, *-lp*, *-lp^h*, *-lk*, *-lt^h*, *-lk*, *-lh*, *-lm*, *-nh*, and *-nc* are permissible coda clusters. In complex nuclei, there is a negative condition such that **yi*, **yu*, **yi*, **wu*, **wo*, **wo*, **wi*, and **wu* do not occur, and the only off-glide diphthong occurring in Korean is *iy*. This is not a place to explicate a rule and a reason for non-occurrence of the complex nuclei listed above, nor does this phenomenon by itself constitute evidence for assigning glides to the nucleus rather than to the coda, but on typological grounds it makes one bet on the former as a more probable and likely case.

Since we are on the subject of consonant clusters, let us examine the phenomenon of consonant cluster reduction in Korean and its relevance to the position of glides. As was mentioned in the preceding paragraph, some words in Korean may end in one of the small set of two-consonant clusters. When such a word is followed by a vowel, both consonants survive, as the second consonant becomes the onset of the following syllable, thus keeping the canonical syllable shape. But when the next morpheme/word begins with a

consonant, as in example (2), it creates an impermissible three-consonant cluster medially, which prompts deletion of one of the cluster consonants.

(2) kaps   'price',   kaps-i   (Nom), *but* kap-man 'price only'
    nəks   'spirit', nəks-i   (Nom),   nək-to 'soul also'
    ilk-   'to read', ilk- ra (Imp),   ik-ca   'let's read'
    cəlm- 'young',   cəlm-in (Adj),   cəm-ta 'is young'
    anc-ə 'to sit', anc-ətta (Past),   an-kəra 'sit' (Imp)

Suppose now that a glide is a part of the onset. Then a word-initial consonant followed by a glide should be regarded as a cluster. If such a word is preceded by a word ending in a consonant, we would again have a medial three-consonant cluster, and we should expect the cluster reduction rule to apply to delete one consonant. But this does not happen. Examine example (3).

(3) ol-pyə   'this year's crop'
    sil-kwa   'fruit'
    sok-pyəng 'internal illness'
    cəl-myo   'exquisiteness'
    kak-pʰyo   'each vote/ballot'
    sən-nyə   'angel, fairy'

One can of course argue that this is not a genuine case of a three-consonant cluster by appealing to the intervening CV tier independent of the segmental tier, as in example (4).

(4) Syllable tier: σ   σ
                               /| /|
    CV tier: C   V   C   C   V
                        | | | \ / |
    Segment tier: s   i   l   k w   a   'fruit'
                        k   a   k   pʰ y o   'each vote'
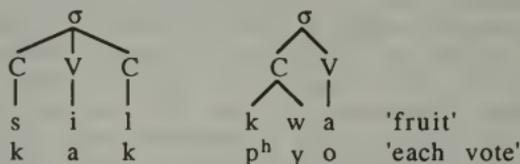
In this representation, there is no violation of the canonical syllable structure, and naturally the cluster reduction rule does not apply. But note that this gain is made only at the expense of postulating a large set of complex consonant phonemes in Korean. While there are complex consonants such as affricates and prenasalized consonants in the phonetic inventory of the world's languages, the set is very limited, and a large number of complex consonants allegedly involving glides in Korean is highly suspect on universal phonetic grounds.

Even if one grants that *Cy* and *Cw* are acceptable complex consonants, one runs into a difficulty when it comes to pre-*y* sonorant deletion in the word-initial position in Korean. In Korean,

word-initial *l* and *n* are deleted although they survive in the medial position, as in example (5).

(5) Base form   Medial   Initial

lyuk 'ground'   tae-lyuk 'continent'   yuk-ci   'land'
nyə 'female'   su-nyə   'nun'   yə-ca   'woman'
nyo 'urine'   pang-nyo 'urination'   yo-to   'urethra'
lyang 'pair'   yəl-lyang 'ten pairs'   yang-ka 'both
                                                    families'

If *ly* and *ny* are regarded as complex consonants linked to a single C in the CV tier, then deleting the initial segment would be like deleting the first half from affricates or prenasalized stops, i.e., the stop component from *ts*, *dz*, *pf*, etc., or the nasal component from *mb*, *nd*, *ng*, etc. It may not be an impossible thing to do or an impossible to rule to write, but certainly such a rule would be a complicatd one reflecting a rather rare phenomenon.

Ideophones in Korean also give evidence that a glide is a part of the nucleus. Ideophones normally take the form of reduplication, as in example (6).

(6) k'opul-k'opul   'zigzagging, winding'
     taekul-taekul   'rolling, rumbling down'
     pintung-pintung   'loafing, idling'
     cʰulləng-cʰulləng   'lapping, slopping'

There is, however, a set of ideophones with partial reduplication in that the initial consonant of the first isotope is missing, e.g.,

(7) aki-caki   'sweet, intriguing'
     osun-tosun   'friendly, chummily'
     ulkit-pulkit   'colorful'
     əmpəng-təmpəng   'sloppily, carelessly'

Now, examine the following examples in this context:

(8) yam-nyam   'tasty'
     yək-lyək   'vivid'
     yong-nyong   'teasing'

These forms suggest that the glide *y* is a part of the nucleus, not a part of the onset, for, if the latter, a partial reduplication without the onset consonant would have given us non-occurring *am-nyam, *k-ly k, *ong-nyong, etc.

Sohn (1987:108) cites a language game to support her argument of glides as parts of nuclei. This game involves copying a CV from every syllable in which C is prelinked to *p* and V copies the vowel of the preceding syllable, as in example (9).

(9) həkong   'empty sky'   hə-pə   ko-po-ng
    pʰato   'waves'   pʰa-pa   to-po
    camsil   'a place name'   ca-pa-m   si-pi-l

What is noteworthy is that where the syllable contains a glide, this glide is also copied as a part of the nucleus. Examine the following:

(10) kwənse   'power'   kwə-pwə-n se-pe
     yaku   'baseball'   ya-pya   ku-pu
     cwasək   'seat'   cwa-pwa   sə-pə-k

If the glide was a part of the onsent consonant, then we would not expect the glide to be copied along with the vowel. As Sohn (1987) notes, the fact that it is, provides substantial evidence that glides constitute a prosodic unit with their following vowel rather than with their preceding onset consonant.

There are two pieces of phonetic evidence showing that a glide is a part of the syllable nucleus. The first is palatalization of /s/ before /wi/ in such words as *swin* 'fifty', *swi-ta* 'rests', *swip-ta* 'is easy', etc., where the initial consonant [s] is palatalized to [š]. If [w] is a part of the onset cluster /sw/, it is difficult to explain this palatalization phenomenon. But if [w] is a part of the vowel complex [wi] such that the complex nucleus is a round front vowel [ü], then it is natural for the preceding consonant to be palatalized.[1]

The most transparent phonetic evidence showing that glides are a part of the syllable nucleus not the onset cluster is found in the pronunciation of the liquid phoneme /l/ before a glide in Korean. One of the most salient phonetic rules in Korean is the change of [l] to [r] in the prevocalic (= syllable-initial) position, as in example (11).

(11) kil 'street', kil-to   'st. also',   cf. kil-e   [kire] (Loc)
     tal 'moon', tal-picʰ   'moonlight', cf. tal-i   [tari] (Nom)
     pul 'fire', pul-k'ocʰ   'flame',   cf. pul-il [puril] (Acc)

Now, when a glide-initial morpheme follows a morpheme ending in l, this l uniformly becomes r, as in example (12).

(12) il-yo-il [iryoil], *[ilyoil], 'Sunday'
     səl-yok   [səryok], *[səlyok], 'vindication'
     kɨl-w l   [kɨrw l], *[kɨlwəl], 'writing'
     mil-w l   [mirw l], *[milwəl], 'honeymoon'

If the glides are onset consonants, then the preceding liquid ought to remain as the coda consonant of the preceding syllable rendering the lateral pronunciation [l]. But the fact that it changes to [r] suggests that glides *y* and *w* are a part of the syllable nucleus, allowing the preceding *l* to fill the empty onset position during resyllabification, as in example (13).

(13)

```
   σ     σ     σ                 σ     σ     σ
   ∧     ∧     ∧    resyll.      |    /\    /\
   i  l-y  o-i  l      →         i - lyo-i  l      [i r y o i l]

   σ           σ                 σ       σ
  /∧          /\    resyll.     /∧      /∧
 m i  l  -  w ə l     →        m i  -  l w ə l     [m i r w ə l]
```

There is in fact a southern dialect (Kyongsang Province) in which the above words are pronounced with the lateral [l], e.g., [ilyoil], [milwəl], etc. This suggests that in this dialect the glides function as the onset consonant forcing the liquid to remain as the coda consonant. Significantly, it is just in this dialect that we find no nucleus involving a glide after another consonant, i.e., there is no such complex nuclei as *wa, wə, yu, yə*, etc. post-consonantally. Compare the following sets of words:

(14) | Standard dialect | Kyongsang dialect | Gloss |
|---|---|---|
| kwaca | kaca | 'cookie' |
| pwara | para | 'see' (Imp) |
| kyəul | keul | 'winter' |
| pyəl | pel | 'star' |

This fact is significant, for it shows that there is a non-accidental relation between the fact that the glides function as onset consonants in the Kyongsang dialect and the fact that glides are not found in the nucleus position in the same dialect, for, obviously, glides cannot function both as onset consonants and as nuclei. The fact that the liquid is pronounced as a lateral [l] in this dialect indicates that it is in the syllable-final position with the following glide acting as the onset consonant for the following syllable. On the other hand, the fact that the pre-glide liquid is pronounced as [r] in the standard dialect indicates that here the glide is a part of the syllable nucleus.

Interestingly, not only do we not find prevocalic glides in the Kyongsang dialect, but also there is no post-vocalic glide. It may be recalled that there is one diphthong in Korean involving an off-glide, namely, *iy*. As a native suffix, it is a genitive marker, and as a Sino-Korean morpheme, it has a few homophonous meanings, e.g., 'justice', 'medical', 'clothing', 'will', etc. In Kyongsang dialect, all these homophonous morphemes are uniformly pronounced as [i].

3. Theoretical implications

We have now come the second part of the paper. We will show in the following that, cast against the current format of non-linear (CV or X-tier) phonology and a theory of underspecification, the

nucleus glide achieves a descriptive simiplicity that the onset glide does not.

Take first the common phenomenon of devocalization in Korean, as in example (15).

(15) no-a [nwa] 'to put down'   ci-e [cye]   'lose (game, war)'
     tu-e [tue] 'leave behind'   phi-e [phye] 'bloom'
     cu-e [cwe] 'give'
     po-a [pwa] 'see'

One can describe this phenomenon as in (16):

(16)
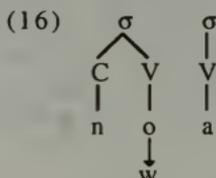
This description entails three problems:

(17) a. V(o) gets linked to node C,
     b. compensatory lengthening obligatorily results, and
     c. it creates a complex consonant.

In order to avoid these problems, one may posit a rule changing the skeletal position V into C as in example (18).

(18)
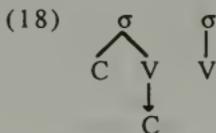
If we do this, all of the above problems will disappear, but we have now created an onset cluster; a solution equally untenable as the previous one.

These descriptive glitches will disappear in a "nuclear fusion", so to speak. In this process, two nucleus vowels coalesce or fuse as shown in example (19).

(19)
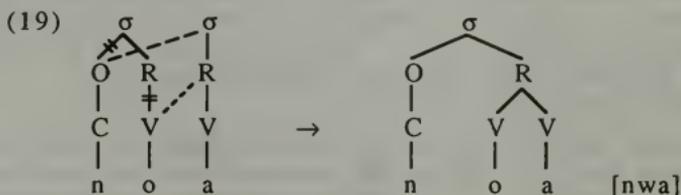
In this configuration, two vowels with identical features will generate a long vowel under the OCP, but when the two vowels have non-identical feature specifications (in underspecified features), the first vowel will be realized as a glide. The exact mechanism of this process has been worked out by Sohn (1987), and we won't go into further details here. What is to be noted is that this "nuclear fusion" gives a "clean" power (We're on an extended metaphorical trip here). We said "clean", because it does not generate any of the undesirable by-products mentioned above in (17).

C-W. Kim (1977) pointed out that devocalization does not take place in Korean when the first of the two vowels is long, as in example (20).

(20) coo(h)-a → *cwaa 'good'   cf. no-a → n wa 'put down'
     too(w)-a → *twaa 'help'   cf. tu-e → twe 'leave behind'

Since a long stem vowel is in general shortened before a vowel-initial affix, as in example (21),

(21) t'wii-e → t'wi-e 'to run'
     k'uu-e → k'w-e   'borrow'

it creates a problem of indeterminacy at the point of application of the devocalization rule, i.e., how to prevent *to-a* (from *too-a*) from becoming *twa*. But a simple condition on the nuclear fusion, i.e., the nuclear fusion cannot involve three or more vowels, can take care of this. It's as if a certain chemical reaction cannot take place when there is an extra chemical element.

Another phonological phenomenon involving glides in Korean is METATHESIS which takes place under certain conditions, as exmplified in (22).

(22) pyel   → peyl   → pel 'star'
     o-si-e-yo   → o-sy-e-yo   → o-sey-yo → o-se-yo 'come!'
                                                    (Hon)
     hyeng-nim → heyng-nim → heng-nim 'elder brother'
     koyang'i → koayng'i → kwayng'i → [kwæŋi]'cat'
     syem   → seym   → se:m 'island'

A description in terms of the glide as a part of an onset cluster, as shown in (23), involves the switching of two segments, one belonging to Onset and the other belonging Rhyme. While this may not be an implausible process (cf. English *brid — bird, hrose — horse*, etc.), it is more complicated and less plausible than a switch of two elements dominated by the same node, as shown in (24).

(23)
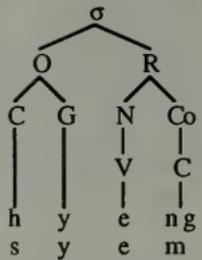
(24)
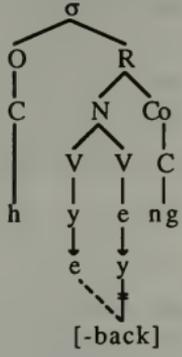
The example in (22) is not that of metathesis but compensatory lengthening.[2] If it is a case of CL and if glide is a part of onset, then we are describing here a cross-linguistically rare case of an onset consonant inducing CL. Ingria (1980) and others have shown that CL normally occurs within the Rhyme consitituent, as in example (25).

(25)
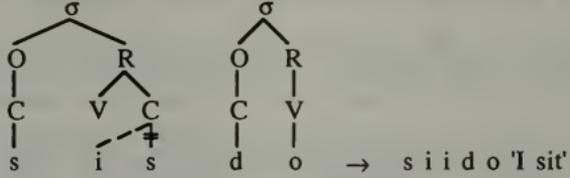
Regarding a glide as a part of the nucleus makes CL of the adjacent V within the rhyme a typologically more plausible and a descriptively simpler phenomenon.

4. Concluding remarks

In conclusion, we have argued that glides in Korean are best regarded as a part of the nucleus rather than as a part of the onset on both internal and external grounds. C-W. Kim (1968) argued earlier in an article on the system of Korean vowels that glides are

distinctive features of vowels to be realized as superimposed (simultaneous) components in some cases (e.g., $wi \rightarrow$ [u]), but to be sequentialized as falling diphthongs in other cases (e.g., wa, we, etc.). Nearly a quarter of a century later, after a reexamination of the behavior of Korean glides, we find ourselves holding a modified but basically unchanged view.

The title of this paper is "The *character* of Korean glides". As you know, the word *character* has two meanings: One meaning 'a distinguising quality,' and the other meaning 'a graphic symbol.' As the final tidbit, we will examine how the glides are represented in the native script *han'gul,* which we think you will find very revealing.

Five centuries earlier, King Sejong described the Korean vowel system as in (26).

(26) a. Simple vowels

- • [ɔ] depicts the (round) heaven; the tongue is retracted, and its voice is deep. (舌縮而聲深)

- — [ɨ] depicts the (flat) earth; the tongue is slightly retracted, and its voice is neither deep nor shallow. (舌小縮而聲不深不淺)

- | [i] depicts a (standing) man; the tongue is not retracted, and its voice is shallow. (舌不縮而聲淺)

- ㅗ [o] is the same as • , but the mouth is contracted/rounded. (ㅗ與 • 同而口蹙)

- ㅏ [a] is the same as • , but the mouth is stretched/spread. (ㅏ與 • 同而口張)

- ㅜ [u] is the same as — , but the mouth is contracted/rounded.

- ㅓ [ə] is the same as — , but the mouth is stretched/spread.

b. Complex vowels

- ㅛ [yo] is the same as ㅗ , but rises from | . (ㅛ與ㅗ同而起於 |)

- ㅑ [ya] is the same as ㅏ , but rises from | .

- ㅠ [yu] is the same as ㅜ , but rises from | .

- ㅕ [yə] is the same as ㅓ , but rises from | .

Note especially the description of the so-called "complex vowels" (26b). The sage monarch knew exactly what he was doing. He could have devised separate characters for [y] and [w], but he knew better.

Chong Lin-ji, one of the courtiers, wrote in the postscript to the royal edict proclaiming the creation of a native script:

"Although there have been thousand kings in the East, none was wiser than his majesty."

With admiration, we can only agree.

NOTES

*An earlier version of the paper was presented at the first Formal Linguistic Society of Midamerica meeting, May 1990, University of Wisconsin, Madison, WI, and at Linguistics Seminar, October 1990, University of Illinois, Urbana, IL. The authors benefited from the discussions that followed the presentation at both places. Any flawed arguments, however, are solely ours.

[1] The reason why /t/ is not palatalized to [č] in the same context in such words as *twi* 'back' is probably because the /t/ - /č/ distinction is phonemic in Korean, while the [s] - [š] distinction is not.

[2] We are not sure how general this historical process was in Korean, so we may be walking on thin ice here.

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PROSODIC PHONOLOGY OF KOREAN

Hyoung Youb Kim

Traditional accounts of Korean phonology have been syntax-insensitive in the sense that they have been done exclusively within a phonological framework without reference to any syntactic information. In recent years, however, evidence has accumulated to suggest that there is an area of phonology-syntax interface which could be fruitfully explored by way of accounting for certain phonological phenomena. Recently, Cho-Yu (1987, 1990) attempted to describe certain phonological phenomena in Korean within this new framework, now known as phrasal phonology. In this paper, I point out three problems in Cho-Yu (1987, 1990) that she does not address, and show how they can be resolved with the model proposed in Nespor & Vogel (1986). I will also argue that such morpho-syntactic phenomena such as compound words, multiple subjects, topicalization, and rightward movement can be more readily explained within a new model of prosodic domains that I postulate for Korean phonology.

1. Introduction

In Korean all phonological phenomena have been regarded as being syntactically insensitive. They have been accounted for exclusively within a phonological framework without reference to any syntactic information. However, Y-M. Cho-Yu (1987, 1990) illustrates some inconsistently applied phonological rules even though they are generally accepted as post-lexical rules which are applied without exceptions. She attempts to account for them by assigning different prosodic domains which are based on different syntactic structures. The prosodic domains are syllable and foot, phonological word, phonological phrase, and intonational phrase (Nespor & Vogel 1982, 1986). Each domain has different phonological rules which are limited to it. Unless they satisfy the conditions of each domain, the rules are not allowed to apply.

Hayes (1984), Nespor & Vogel (1982, 1986), Selkirk (1984), and Kaisse (1985) have suggested several conditions for the domains. Cho-Yu (1987, 1990) suggests three domains: The phonological word, phonological phrase, and intonational phrase. However, the

conditions for each domain have three serious problems. First, the definition of a phonological word does not show how compound words can be incorporated into the domain. Moreover, it cannot distinguish the difference between a subcompound and a co-compound. In the latter, the Post-Obstruent Tensing Rule does not apply even though in the former it does. Second, Cho-Yu (1987, 1990) categorizes relative clauses, with a head and a specifier, into the same domain as the phonological word. The application of the Post-Obstruent Tensing Rule is supporting evidence for putting relative clauses in the domain of the phonological word. In order to account for them within the domain, Cho-Yu puts the clauses into the lexicon. However, the analysis of the clauses shows that she does not understand the structure of the clause. The relative clause is actually generated by a syntactic operation outside of the lexicon. Third, Cho-Yu claims that the phonological phrase formation is cyclically applied from the innermost maximal projection. The established phonological phrase is not sought to be reanalyzed even within the higher maximal projection. However, the cyclic application of the formation can produce an incorrect prosodic domain which blocks certain phonological phenomena even though they are expected at that position.

Below I will elaborate these problems and show how they can be accounted for more appropriately within the framework of Nespor & Vogel (1982, 1986).

2. Phrasal phonology

In this section I will give a summary of Cho-Yu (1987, 1990) where we can see how a theory of phrasal phonology may be at work in Korean. In order to show why a theory of phrasal phonology is required she illustrates two sentences in (1) where the Voicing Rule is applied only in (1a). Although in (1b), /k/ is located between the same vowels /i/ and /a/ as in (1a), it does not become [g]. In order to account for the difference between (1a) and (1b) she claims that the two /k/'s belong to two separate domains. In (1a), /k/ is in the same domain with two flanking vowels, but in (1b), /k/ and the preceding vowel are in different domains. For the same reason, /p/ of /pang/ in (2) is voiceless, while /p/ of /kapang/ in (b) is voiced.

(1) a. apəci-ka pang-e tɨləka-si-n-ta.
         father-nom room-loc enter-honor-pr.-VE
         [abəjiga p a ŋe dɨləgasinda]
         'Father is entering the room.'

     b. apəci kapang-e tɨləka-si-n-ta.
         father bag-loc
         [abəji k a p a ŋe dɨrəgasinda]
         'Father is entering the room.'

In her papers, Cho-Yu (1987, 1990) claims that there should be three domains in Korean within a theory of phrasal phonology: The phonological word (W), phonological phrase (P), and intonational phrase (I).[1] The domains are assumed to have hierarchical structures like that of syntax. Thus, every terminal constituent can be assigned to 'W', and the matrix sentence to 'I'.

The phonological word is defined as a domain which contains lexical items (N, V, A, etc.) and endings like particles and inflectional suffixes. All terminal constituents of a sentence can be phonological words.

(2)   The phonological word consists of a lexical item (noun, verb, adjective, determiner, and adverb) and any particle or any inflectional ending that follows it.

                                                        (Cho-Yu 1987:330)

The main phonological rules working in the domain are Palatalization and Post-Obstruent Tensing. In (3) below are Cho-Yu's examples of the two rules.[2]

(3)   Palatalization

            a. tot-i → toji   'rising'(derivation)
               rise-Nominalizer
            b. pat^h-i → pac^{h}i 'the field'(inflection)

      Post-Obstruent Tensing[3]

            a. hal kil   → hal k'il   'way to do'
            b. titil panga → titil p'anga 'tread mill'

The domain of the phonological phrase is defined on the basis of the concept of X'-theory where a head is the main part of a certain maximal projection: N of NP and V of VP, etc. A domain is constituted with a head and complements.

(4)   Korean P-Phrase Formation

            a. In [...Y^n X] where X is the head of X^n and Y^n is an adjacent complement, the sequence Y^n X forms a P-Phrase.
            b. All P-Words unaffected by (1) form P-Phrase.
                                                        (Cho-Yu 1987:335)

A prime example of a phonological rule working in the P domain is the Voicing Rule. For example, (5) shows how /k/ in (1a) and (1b) are assigned to separate domains.

(5) a.

```
                        S
                  /           \
                NP             VP
                |          /        \
                |        PP           V
                |        |            |
            apəci-ka   pang-e    tɨlə-ka-sin-ta
            [abəjiga]    |            |
                |        P            P
                P
```

b.

```
                        S
                  /           \
                NP             VP
                |          /        \
                |        PP           V
                |        |            |
            apəci     kapang-e   tɨlə-ka-sin-ta
            [abəji]   [kapaŋe]        |
                |        |            P
                P        P
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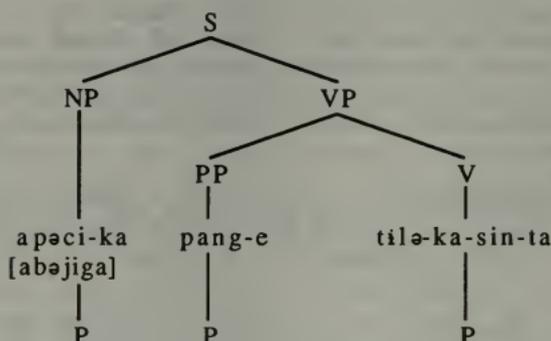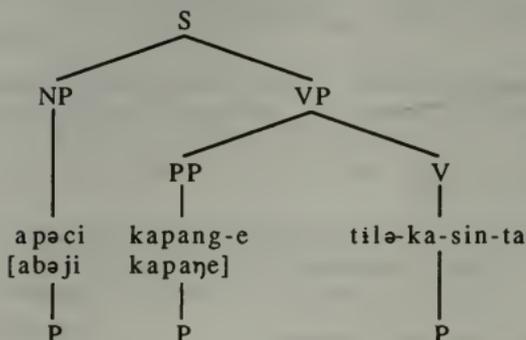
3. Problems

As I have already mentioned in section 1, the conditions which decide each domain are not enough to account for all phonological phenomena related to each domain. In this section, I will examine some of these problems in more detail.

3.1 Compound words

In Cho-Yu (1987:333) a compound is a word, and it is constructed in the lexicon. She refers to the leveling strata organization of the lexicon to show that compounding is a part of the lexicon. Any compound word can be a phonological word, and the Post-Obstruent Tensing Rule is applied in the domain. Indeed, a great deal of compound words in Korean go through the rule in the domain. However, rule (2) is not enough to assign the domain to a compound word. It actually has two problems which make (2) account inadequately for compound words. First, according to (2), a compound word cannot be a phonological word because all compound words are composed of more than two lexical items (Selkirk 1982:13). Second, in the examples in (6) we see that some compound

words are not influenced by the Post-Obstruent Tensing Rule even though they are phonological words and have the same phonological environment as those influenced by the rule. In addition, they have a different morphological structure from those undergoing the rule. For instance, we can insert *kwa* 'and' between the internal elements without changing their semantic contents. On the other hand, the compound words influenced by the Tensing rule have the 'adjunct + head' structure. Thus, different morphological structures appear to determine their prosodic structures. The former are Co-compounds and the latter are Subcompounds (Y-S. Kim 1984:152-157).

(6) a. Co-compounds

kyecip casik	'wife and children'
kusək kusək	'every nook and cranny'
kos kos	'place and place; everywhere'

   b. Subcompounds

pom p'i	'spring rain'
ip p'əlis	'manner of speech'
sol p'angul	'a pine cone'

3.2 Relative clauses

According to Cho-Yu's analysis, the head and the preceding verb of a relative clause should be grouped together into a phonological word because they make a tight phonological unit in which the initial consonant of the head becomes tensed when the preceding verb ends with 'l', which comes from the inflectional suffix of the future tense: '-(i)l'.[4] But, as mentioned in fn.3, 'l' is not an obstruent. In order to account for this case, she argues that relative clauses must be constructed in the lexicon by the compounding process. Namely, a 'C' (an underspecified segment) is inserted between the verb and its head, which satisfies the environment of the Post-Obstruent Tensing Rule.[5] After tensing the initial consonant of the head, 'C' is deleted by the Stray Erasure Convention.[6]

(7) /hal C kil/   'way to do'
     hal C k'il   Post-Obstruent Tensing

     [hal k'il]

However, derivation of [hal k'il] in example (7) has two serious problems. First, the ending /-l/ of /hal/ requires the looping between the subcompound level and the inflection level, since /-l/ is an inflectional suffix and /hal C kil/ is at best a subcompound. This weakens the theory of strata of the lexicon.[7] Second, the derivation in (7) is not a morphological, but a syntactic process. The relative clause formation is a syntactic construction which is generated by syntax. Song (1978) shows how the phrase structure rule (PS rule) produces the relative structure of Korean: NP → S N.

3.3 Cyclicity of P-phrase formation

In the case of the complex sentences with embedding clauses, rule (4) exhaustively assigns phonological phrases to the sentences from the innermost maximal projection of embedding clauses. Once a domain is set, it is not reanalyzed because of the higher maximal projection. Example (8) illustrates how the phonological phrases are assigned to complex sentences. In (8b), the initial consonant of /poassta/ 'saw' is voiced, but in (8a), the same consonant is not voiced even though it appears in the same phonological environment. According to Cho-Yu (1987) the voicing of /p/ depends on whether it is located in the same domain with the preceding and following elements.

(8) a. Syntactic Bracketing
         [[[sənsæ ŋnim-k'esə][cusi-n]] kilim-il]   po-ass-ta]
              teacher-Nom   give-Mod picture-Acc see-Past-VE
         '(I) saw the picture that the teacher gave.'

         Phrasal Bracketing
         [sənsæ ŋnimk'esə]   [cusin   girimil]   [poatt'a]

     b. Syntactic Bracketing
         [[[sənsæ ŋnim-k'esə [[haksæŋ-eke] cusi-n]] kilim-il]
                                  student-Dat
         po-assta]
         '(I) saw the picture that the teacher gave the student.'

         Phrasal Bracketing
         [sən æ ŋnimk'esə] [haksæ ŋege jusin] [kirimil boatt'a]

However, the cyclic application of rule (4) causes two problems. First, it actually cannot produce the two different prosodic structures found in (8a') and (8b'). In (8a'), /cusin/ 'give' is under the VP of the embedding sentence, and the VP can be an independent phonological phrase. When a new domain is established in an upper hierarchy like NP, the verb is excluded from the new domain. According to this analysis, (8a) and (8b) have the same prosodic structures.

(8) a'.
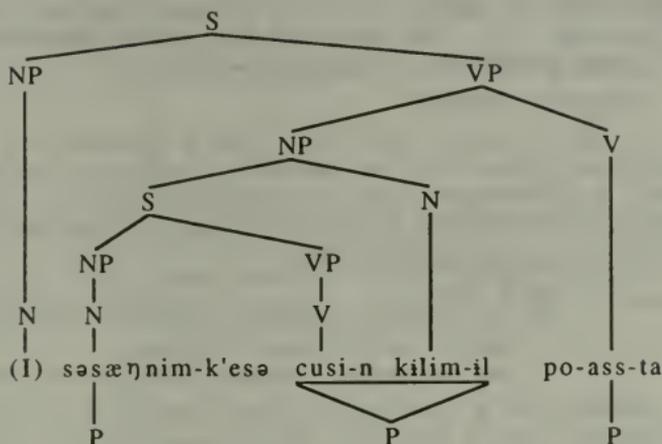
b'.
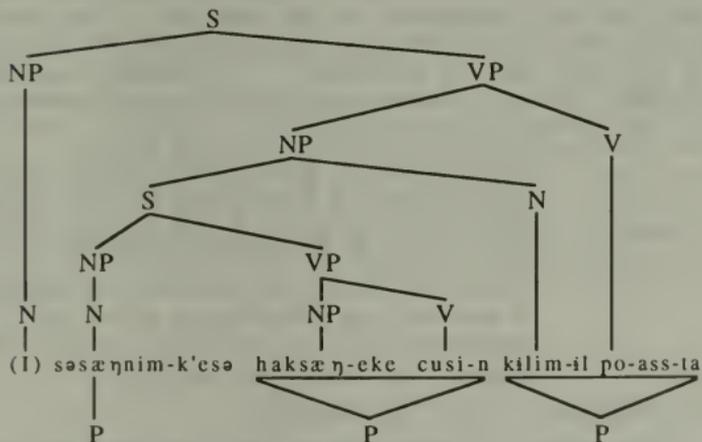
Second, it is not appropriate that the phonological phenomenon is blocked due to an added constituent within the innermost maximal projection. For example, in (8b) the initial consonant of /poassta/ 'saw' is not voiced because of the noun phrase /haksæeke/ 'to a student'. Unlike syntax where a question pronoun (*who, which, what,* etc.) is coindexed with the original position no matter how far the position is from the pronoun in a sentence, phonology is concerned only with specific environments within a limited range.[8]

4. A new framework

As I mentioned in section 1, I will show that the problems in section 3 can be solved by the new domain conditions of Nespor &

Vogel (1986). In section 4.1, I will introduce the conditions in detail, and in section 4.2, I will show how they can account for the problems that I have pointed out in the previous section.

4.1 Prosodic domains

In this section I will show how a phonological word and a phonological phrase may be defined. According to Nespor & Vogel (1986), a phonological word is constructed with a stem, and the preceding and following elements of phonology and morphology.

(9) Phonological Word [W][9]
        a. a stem
        b. any element identified by specific phonological
           and/or morphological criteria
        c. any unattached elements form a W on their own

The definition of a phonological phrase consists of two parts such as Phonological Phrase Formation and Domain Restructuring (optional). The domain of a phonological phrase is constructed with a lexical head (X) and complements on the nonrecursive side. Because Korean is left recursive, the domain must consist of a head and complements on the right side of the head.[10] The domain restructuring is to eliminate as many non-branching phonological phrases as possible.

(10) a. Phonological Phrase Formation (P)
        The domain of phonological phrase consists of a C
        which contains a lexical head (X) and all the C's on its
        nonrecursive side up to the C that contains another
        head outside of the maximal projection of X.

     b. Phonological Phrase Restructuring (optional) (P')
        A nonbranching phonological phrase which is the first
        complement of X on its recursive side is joined into the
        phonological phrase that contains X.

4.2 Solutions to the problems

In section 3, I have pointed out three problems caused by the definitions of domains by Cho-Yu (1987). In this part, I will show how rules (9) and (10) can overcome these problems.

First, it must be mentioned that rule (2) cannot put a compound word into a phonological word. If we observe the morphological structure of compound words, we will find that it can be included into the domain of a phonological phrase instead of a phonological word. In order to be a phonological phrase, a compound word must have a head. Selkirk (1982:20) shows how a compound word has a head in the case of English. Y.-S. Kim (1984:154) says that in Korean (endocentric) compounds, the head is invariably on the right-hand side of the compound. After the head is decided, rule (10b) can join the complement on the left side which is recursive in Korean.

Example (11) shows how (10a) and (10b) assign the phonological phrase to compound words.

```
(11) ip pəlis  →  ip pəlis  →  [ipp'əlit]   'manner of speech'
       H          | |
       |          | P
       P          |/
                  P'
```

The words in (6), which are illustrated as counterexamples of the Post-Obstruent Tensing Rule, can also be accounted for if we consider each of them as having double heads (Y-S. Kim 1984:157). Thus, they have two separate phonological phrases, which will block the rule as shown in (12).

```
(12) kyecip   casik
       H        H
       |        |
       P        P
```

Second, rule (10) can account for phonological phenomena occurring between the preceding verb and the head of the relative structure without returning it to the lexicon.[11] Rule (10) also can explain why the cyclic formation of phonological phrases from the innermost maximal projection is not appropriate to account for the phonological phenomena occurring in the matrix sentence. For example, I will show that (8a) and (8b) actually have the same phrasal structure. In (8a) and (8b), /cusin/ and /kɨlimɨl/ are always in the same phonological phrase even though the inner structure is changed in (8b). According to (10), the phrasal structures of (8a) and (8b) are as follows:

(13) a.

b.

(10a)
(10b)

4.3 Other morpho-syntactic phenomena

In section 4.2 we saw how the new framwork solves the problems caused by that of Cho-Yu (1987). In this part, I will show that the range of its application can be expanded to account for such morpho-syntactic cases as complex compound words, multiple subjects, topicalization, and rightward movement.

4.3.1 Complex compound word

I assume that there are two kinds of complex compound words in Korean. One type is a compound word composed of more than three lexcal items (N+N+N+...). The other is a compound word containing affixes (V+V+...+Affix) (Y-S. Kim 1985:157). In a compound word with more than three composite lexical items, the initial stop consonant of a certain lexical item is tensified according to the function of the preceding item: Adjunct or non-adjunct. Some examples of this are shown in (14). In (14a), /kuksu/ 'noodle' is modified by /hankuk/ 'Korea'; and, in (14b) /cip/ 'restaurant' is modified by /kuksu/. Thus, (14a) means 'a restaurateur of *Korean noodle*' while (14b) means 'a Korean in a *noodle restaurant*'.

    (14) a. [[hankuk kuksu]$_N$ [cip]$_N$ [salam]$_N$]$_N$
           Korean   noodle   restaurant person
           [hanguk   k'uks'u   c'ip   s'aram]

        b. [[hankuk]$_N$ [kuksu cip]$_N$ [salam]$_N$]$_N$
           Korea   noodle restaurant   person
           [hanguk   kuks'u   c'ip   s'aram]

According to the derivation illustrated in (11), tensification occurs within the endocentric compound with an adjunct and a head, which also constructs a phonological phrase. The analyses of the phrases in (14) are as follows:

(15) a.
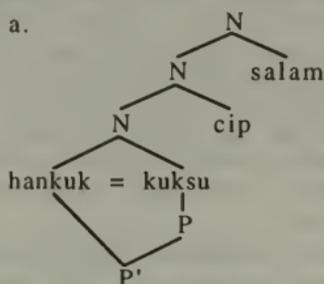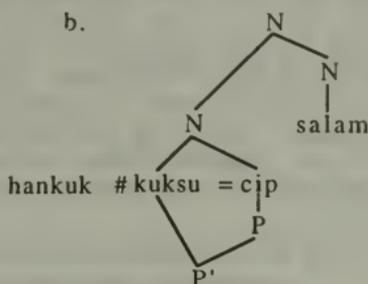
[hanguk k'uksu c'ip s'aram] [hanguk kuks'u c'ip s'aram]

(Chen 1987:129)

The examples in (16) are compound words which contain an affix. In (16a) the affix is attached only to the right element and changes the verb into a derived noun. In (16b) the affix is attached to a compound verb and changes it into a derived noun (Y-S. Kim 1985:154).

(16) a. [[hæ]$_N$ # [tot + i]$_N$]$_N$ 'sun rising'
         sun   rise + Nominalizer
         [hæ   toji]

     b. [[[mil] # [tat]]$_V$ + i]$_N$ 'sliding door'
         push   shut   Nominalizer
         [mi   taji]

Example (9) can explain how the compound words with different morphological structures show the same phonological result with respect to rules like palatalization. Even though (17a) and (17b) have different morphological structures, the definition in (9) can assign the phonological word to a verb-affix constituent in which palatalization occurs.

(17) a.

(Nespor & Vogel 1986:117)

4.3.2   Multiple subjects

In (18), I show two sentences structured with the same words which, however, undergo different phonological phenomenon, e.g., voicing. In (18a), the initial consonant of the second word is not voiced, but in (18b), the same consonant is voiced. In order to account for the difference, I will claim that (18a) and (18b) have different syntactic structures. (18a) will be regarded as a double subject sentence which is possible in Korean (Y-J. Yim (1985) and YS. Yoon-James (1987)). If we assume that the subject markers (/-i/ and /-ka/) are optional, then we can generate (18a) without any problem. (18b) will be regarded as including a compound word subject.[12]

(18) a. [[khok'ili] [kwi] khɨta]   'elephant has big ears'
        elephant ear   big
        [khok'iri kwi khɨta]

     b. [[khok'ili kwi] khɨta]   'elephant's ears are big'
        elephant ear big
        [khok'iri gwi khɨta]

In order to account for the difference we can assign the phonological phrase differently where voicing occurs. The diagrams in (19) show how the domain is assigned.

(19) a.

b.

4.3.3 Topicalization (Yang 1973)

In (20) I illustrate a pair of sentences that behave differentially with respect to the tensification rule even though they are composed of the same words. The initial part of (20a) does not have any tensified consonant, but that of (20b) does.[13]

(20) a. [[cip] [puca-ka] ciəsta]   'a richman built a house'
      house richman-SUB built
      [cip **p**ujaga   ciətt'a]

   b. [[cip puca]-ka ciəsta]   'a man of many
      [cip **p'**ujaga   ciətt'a]   houses built (a bldg.)'

In order to account for the different phonological output, I claim that (20a) and (20b) have different syntactic structures. The first one is structured with topicalization which moves a word located in the middle of the sentence to the initial position of the sentence. The second one has a compound word in the subject position.

(21) a.
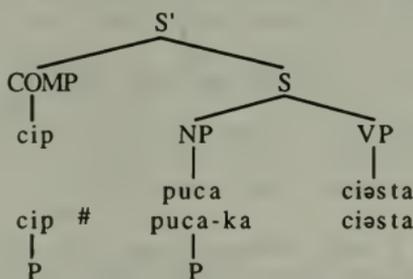
b.
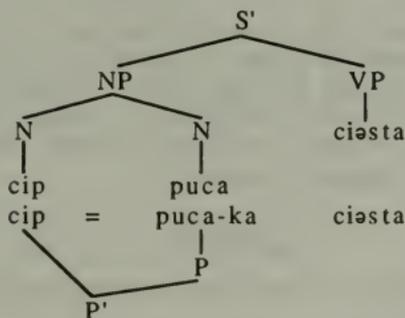
4.3.4 Rightward movement (Choe 1987)

The sentence in (22) is one which does not undergo voicing even though it includes the appropriate environment for the phonological rule.[14]

(22) cangnim-i khitako mitninta **ki** cip-i.
　　 blind-SUB big   believe that house-SUB
　　 [cangnimi khitago minninta **ki** cibi]

Although this appears to be an exceptional case, I claim that it is not because the sentence is derived by moving /ki cip/ to the final position of the sentence. (23) shows how the sentence is constructed and how the phonological phrase is assigned to the sentence.

(23)
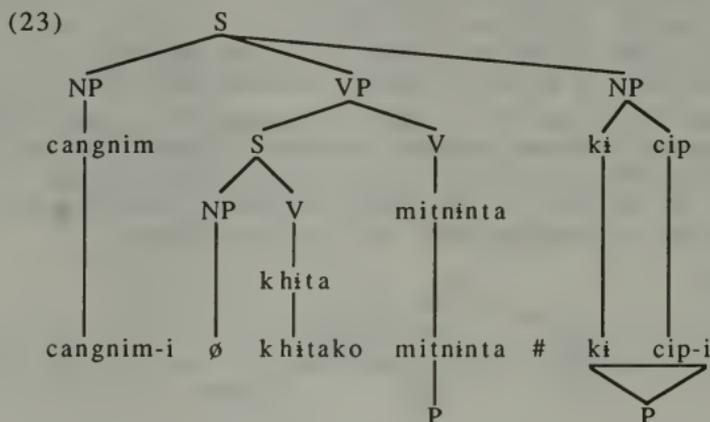
5. Conclusion

In this paper I have attempted to show that the prosodic conditions of Nespor & Vogel (1982, 1987) are more appropriate than those of Cho-Yu (1987, 1990). In order to support this position, I have illustrated three problems not addressed in Cho-Yu (1987, 1990), and have examined them in detail. In the last part of this paper, I also have showed how the prosodic conditions of Nespor & Vogel (1986) can readily account for other morpho-syntactic structures such as complex compound words, multiple subjects, topicalization, and rightward movement.

NOTES

¹ In this paper, I will deal only with the phonological word and phonological phrase.

² The definition in (2) does not allow a derivational suffix in the phonological word. Thus, (3a) is not an appropriate example to illustrate (2).

³ The examples are not relevant to the rule because /l/ is not an obstruent.

⁴ When the preceding verb ends with the inflectional suffix of the present tense /-nɨn/, the initial consonant of the following head does not become tensed.

⁵ In order to account for tensing in compounding, several people have proposed a rule of insertion of a segment such as *t* (C-W. Kim 1970b), ʔ (C-B. Kim 1974), and *X* (H-S. Sohn 1987).

⁶ It is to erase a segment which is not linked to any syllable. It also works in consonant cluster simplification.

⁷ According to S-C. Ahn (1975), the lexicon of Korean is stratified as follows:

> (1) Subcompound
> Cocompound
> Derivation
> Inflection

⁸ In modern linguistics, syntactic rules are context-free and phonological rules are context-sensitive.

⁹ For the purpose of this paper I have paraphrased the definition of Nespor & Vogel (1987:141).

¹⁰ In Korean, it does not seem to be possible to have some complements on the nonrecursive side, unlike English and French which are right recursive and have some examples where an adjective follows a noun.

> (2) something special
> robe élégante (Fr.)   'elegant dress'

¹¹ In Korean, the Tensing Rule should be applied in both the lexicon and post-lexicon, when the preceding element ends with *l*. In the case of the post-lexicon, *l* is originated from the inflectional suffix of the future tense. Cho-Yu (1987:329-331) states that tensification occurs in both parts and also shows how the rule looks.

¹² The full representations of each sentence are as follows:

> (3) a. khok'ili-**k a** kwi-**k a** khɨta.
> b. khok'ili-**ɨy** kwi-**k a** khɨta.

¹³ The full representations of (20) are as follows:

> (4) a. cip-ɨl pucaka ciəsta   (← puca-ka cip-ɨl ciəsta)
> b. cip   pucaka ciəsta

¹⁴ The structure before rightward movement is as follows:

> (5) cangnim-i kɨ   cip-i   khɨtako mitnɨnta.
> blind-SUB that house-SUB big   believe
> 'a blind believes that that house is big'

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THE PRAGMATICS OF THE PRAGMATIC MORPHEME *COM* 'A LITTLE' IN KOREAN

Han-gyu Lee

Pragmatic morphemes in Korean are used to represent different presuppositions or attitudes of the speaker in a discourse. They play an important role in a discourse to help the hearer to understand the speaker's intention or goals. This paper is a study of how a speaker uses the pragmatic morpheme *com* 'a little' and how the hearer interprets it in the discourse.

This paper intends to describe how a speaker uses the pragmatic morpheme *com* 'a little' and how the hearer interprets it in the discourse. The term 'Pragmatic Morphemes' (PM) will be used to indicate bound morphemes which do not make a contribution to the truth-conditional meaning of a sentence containing them, but which affect pragmatic interpretations of the sentence, and which are attached to any syntactic category in a sentence such as NP, VP, PP, AdvP, and S. For instance, each parenthesis in (1) indicates a possible position for pragmatic morphemes.

(1) Suni-ka-() alumtawun kongwen-eyse-() Yonghi-lul-()
      NM   beautiful   park-in   AC
    cacwu-() mannasseyo-().
    often   met
    'Suni often met Yonghi in the beautiful park.'

There are dozens of PMs in Korean. They are used to represent different presuppositions or attitudes of the speaker in a discourse without changing the truth-conditional meaning of a sentence containing them. The purpose of this paper is to describe the uses of the PM *com* according to the Gricean Cooperative Principle.

The PM *com* has various uses in a discourse. The speaker can use it to show politeness by minimizing a threat to the hearer, or to insult her by belittling her ability, and the like.[1] For instance, the speaker can say (2a) or (2b) to achieve his goal (getting the salt) by making the hearer pass him the salt at a dinner table. The only difference between (2a) and (2b) is whether the PM *com* is used or not. As a request, however, utterance (2a) containing the PM *com* sounds polite, while (2b) without it sounds rude.

(2) a. sokum-**com** cwuseyyo.
    salt-PM   give
    'Please, pass me the salt.'

   b. sokum cwuseyyo.
    salt   give
    'Pass me the salt.'

When the speaker says (2b) without the PM *com*, he gives the impression that he has a right to order the hearer to give him the salt and that she is responsible for doing what he orders. This is why (2b) sounds rude as a request. On the other hand, utterance (2a) as a request is not rude in this way because of the politeness function of the PM *com*. In a discourse, the speaker can use the PM *com* to show politeness toward the hearer by minimizing a face-threatening act such as a request or an order.

Depending on context, an utterance containing the PM *com* may sound ruder than the corresponding one without it. For instance, when the speaker scolds the hearer, a student, who does not study, but just goofs off, he can say (3a) or (3b) to urge her to study. However, (3a) sounds ruder than (3b), because the PM *com* implies that the speaker threatens the hearer's face by minimizing the hearer's ability of studying.

(3) a. kongpu-**com** hayla.
    study   do
    'Please, do study.'

   b. kongpu hayla.
    study   do
    'Study.'

Furthermore, different locations of the PM *com* in a sentence represent the speaker's different goals in a discourse, as seen in (4).

(4) A: mues-ul manhi cwulkka?
    what-AC a lot give-shall
    'What shall I give you a lot of?'

   B: a. ppang-ul-**com** manhi cwuseyyo.
       bread-AC   a lot   give
       'Please, give me a lot of BREAD.'

     b. #ppang-ul manhi-**com** cwuseyyo.
       bread-AC a lot   give
       'Please, give me A LOT OF bread.'

As an answer to A's question in (4), only (4a) is appropriate. The only difference of (4a) and (4b) is in the location of the PM *com*; after *ppang* 'bread' in (4a) and after *manhi* 'a lot' in (4b). Different

locations of the PM *com* results in the (in-)appropriateness of (4a) and (4b) in situation (4). The speaker draws the hearer's attention to a phrase whose information is significant for his goal, by placing the PM *com* after that phrase. Because of this focus use of the PM *com*, (4b), not (4a), will be good as an answer to the question (4').

(4') ppang-ul elmana cwulkka?
bread-AC how much give-shall
'How much bread shall I give you?'

I will demonstrate in this paper that various pragmatic uses of the PM *com*, such as those illustrated in (2) and (3), are inferred from the sense of the PM *com* in accordance with the Gricean Cooperative Principle (CP), and that the location of the PM *com* in a sentence interacts with its sense to produce an enriched pragmatic interpretation of the sentence as seen in (4). Following Lee (1992), I am using the term 'sense' to refer to how a form functions to contribute to an interpretation of a sentence's truth-conditionally or non-truth-conditionally. I claim that the sense of the PM *com* is that the significance of what a *com*-suffixed phrase represents is little (or minimized). What kind of significance will be minimized depends on the speaker's goals in a discourse. When the speaker uses the PM *com* in a request sentence like (2a), the amount of salt he needs is minimized so that he expects the hearer to understand that passing a little amount of salt will not be a burden to her. Using the PM *com*, he can hedge his request by diminishing the burden or pressure it puts on the hearer. This is why (2a) sounds polite as a request. The speaker can also use the PM *com* to insult the hearer by belittling her ability to do what a *com*-suffixed phrase represents, as seen in (3a). By saying (3a), the speaker implies that a little studying is enough from the hearer even though more than a little is expected. In this way, the speaker can belittle the hearer's ability.

This paper is organized in the following way. In section 1, I describe how a speaker and a hearer engage in a conversation according to the Gricean cooperative principle. In section 2, I will distinguish the PM use of the form *com* 'a little' from its adverb use, demonstrating their differences. In 3, various pragmatic uses of the PM *com* are discussed as inferences from its basic sense. Employing the concept 'face' (Brown & Levinson 1978, 1987), I will describe the pragmatic uses of the PM *com*. In section 4, I show how the location of the PM *com* is relevant to the speaker's goals, that is, how the sense of the PM *com* interacts with its location in a sentence to affect the total pragmatic interpretation of the sentence. I claim that the focus use of the PM *com* is a side effect of its pragmatic uses.

1. The Gricean Cooperative Principle and the PM *c o m*

Grice (1975) takes discourse to be a purposive behavior: Talk exchanges are cooperative efforts in that the speaker converses rationally to achieve his goals and the hearer tries to recognize what they are. Grice (1975:45) states this as the Cooperative Principle.

The Gricean Cooperative Principle (CP)
Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.

According to the CP, when a speaker utters what he intends to say, he has goals, and believes that his hearer assumes his utterance is rational for his goals and that she is rational enough to be able to work them out from what is said.[7,8] When hearing what is said, the hearer believes that the speaker uttered it to achieve his goals, and she rationally infers what they must be. So even when what the speaker said appears not to be directly related to his goals in a discourse, the hearer assumes that his utterance is goal-oriented, and she will infer how it is relevant to the goals which she assumes he has. The Gricean inferences account for the gap between what is literally said and what is intended to be understood, and keep talk exchanges rational and reasonable.

The talk exchange in (5) is one of the examples which Grice presents to show how what is intended to be understood is inferred from what is said according to the CP. In example (4), A and B are talking about a mutual friend, C, who is working in a bank.

(5) A: How is C getting on in his job?
    B: Oh quite well, I think; he likes his colleagues, and he hasn't been to prison yet. (Grice 1975:43)

In B's answer, the remark that C hasn't been to prison yet is apparently irrelevant as an answer to A's question, and B appears to make no conversational contribution (violates the CP). However, what B intended in the remark is that C is potentially dishonest and his colleagues are also treacherous. He believes that A is able to infer his intended interpretation from the literal meaning of his utterance, if she believes that he is abiding by the CP. When hearing B's saying, which is apparently irrelevant, A assumes that B's remark was uttered as a reasonable answer to her question, and she will have to figure out how B's remark is relevant to his goal in the discourse in order to make his remark consistent with the assumption that B is conforming to the CP. That is, A thinks that B's remark will be rational if A supposes that B implies that C is dishonest because dishonest persons are in jail. So A understands that B intended to imply that C is potentially dishonest.

In a way similar to the Gricean conversational inferences just discussed, how the speaker uses the PM *com* and how the hearer understands its uses can be explained according to the CP. That is, the speaker's using the PM *com* in his utterance is relevant to his goal at the moment in the way indicated by the sense of the PM *com*. When the speaker uses the PM, he expects the hearer to be able to recognize why he used it. The hearer assumes that the speaker used the PM to support his goal, and she will infer from its sense how it is relevant to his goal. In section 3, I will describe how the speaker uses and the hearer interprets the PM *com* in conformity with the CP.

2. PM uses and adverb uses

The form *com* is a contraction of the adverb *cokum* 'a little'. It has been taken for granted by Korean linguists that the form *com* is a free morpheme since *cokum* is a free morpheme. My argument here is that the form has two uses, PM use and adverb use, and the PM use (called PM *com* here) is a bound morpheme while the adverb use (called Adverb *com* here) is a free morpheme.[2] I will show this by comparing the linguistic (syntactic, semantic, and phonological) behaviors of the PM use and the adverb use of the form *com*.

There are three phonological reasons to distinguish the PM *com* from the adverb *com*. First, although the adverb *com* and the PM *com* have the same form, a native Korean speaker distinguishes between them when uttering sentences containing them. As illustrated in (6a)-(6b), the PM *com* is pronounced in a sequence with its immediately preceding word as if it were a part of the word, so that they form a phonological word; that is, the speaker does not put a slight pause between the PM *com* and its preceding word. On the other hand, in (6c), a slight pause comes between the adverb *com* and its preceding word.

(6) a. ton-ul   **com** cwul-kka, manhi cwul-kka?
       money-AC a little give-Q   much give-Q
       'Shall I give you a small amount of money or large
       amount of money?'

   b. *ton-ul-**com** cwul-kka, manhi cwul-kka?
       money-AC-PM give-Q   much give-Q
       'Shall I give you a small amount of money or large
       amount of money?'

   c. ton-ul-**com** cwul-kka, sathang-ul-**com** cwul-kka?
       money-AC-PM give-Q   candy-AC-PM   give-Q
       'Shall I give you money or candy?'

In sentences (6a) and (6b), the two quantitative words, *com* 'a little' and *manhi* 'much' are in contrast. To convey the intended meaning,

com in (6a) and (6b) is pronounced as an independent word by placing a pause before the word *com*. When *com* is pronounced as a part of its preceding word *ton-ul* 'money' as in (6b), the sentence cannot represent such a contrast as in (6a). When Koreans hear (6b), they expect some noun in contrast with *ton* 'money' in the first clause to appear in the second clause, because they realize that *com* in (6b) has no literal meaning and it is a PM. However, the second clause in (6b) does not have such a noun. This is why (6a) is good and (6b) is bad for conveying the intended meaning. On the other hand, in (6c), two things, *ton* 'money' and *sathang* 'candy', are in contrast and the PM *com* is pronounced as a part of both words.

Second, the PM *com* undergoes tensification which occurs right after a stop within a phonological word level, but not between words. The first sound /c/ of the PM *com* is tensified where the word preceding the PM *com* ends with a stop, so that it is pronounced /ts/. On the other hand, the first sound /c/ of the adverb *com* is not tensified in the same environment. So the PM *com* in (7a) is pronounced /tsom/, and the adverb *com* in (7b) as /com/.

> (7) a. ttek-**com** manhi cwuseyyo.
>   cake-PM much give
>   'Please, give me a lot of cake.'
>
>   b. ttek **com** manhi cwuseyyo.
>   cake a little much give
>   'Give me a little more cake.'

Third, the PM *com* is not stressed in a sentence, while the adverb *com* can be. When the adverb *com* is stressed, it tends to undergo tensification to be pronounced /tsom/, irrespective of its circumstance.

Semantically, the PM *com* does not affect the truth-conditional meaning of a sentence containing it, while the adverb *com* does. For instance, in (8a) where the PM *com* is used, if it is interpreted as 'a little', then the sentence would imply that the speaker is asking the hearer to read a lot. However, this interpretation is quite the opposite of the intended meaning given in (8a). Instead, the PM *com* is interpreted as 'please' because it indicates that the speaker's politeness comes from softening his request or order. On the other hand, the adverb *com* in (8b) has the meaning 'a little'.[3]

> (8) a. chayk-**com** po-cimaseyyo.
>   book-PM   see-don't
>   'Don't read the book, please.'
>
>   b. kwuk-i **com** ccayo.
>   soup-NM a little is-salty
>   'The soup is a little salty.'

Syntactically, there are four reasons to distinguish the PM *com* from the adverb *com*. First, they occur in different syntactic positions in phrases. The PM *com* is placed right after a phrase in a sentence (9), while the adverb *com* comes before the phrase it modifies (10a), but not after the phrase (10b).

(9) nay-ka Suni-lul cacwu-**com** mannassta.
    I-NM   AC   often-PM   met
    'I met Suni often.'

(10) a. nay-ka Suni-lul **com** cacwu mannassta.
        I-NM   AC   a little often met
        'I met Suni somewhat often.'

     b. *nay-ka Suni-lul cacwu **com** mannassta.
        I-NM   AC   often a little met
        'I met Suni somewhat often.'

Second, the PM *com* can be placed after any phrase of a sentence as shown in (11), while the adverb *com* cannot, as in (10b).

(11) a. nay-ka-**com** Suni-lul cacwu mannassta.
        I-NM-PM   AC   often met
        'I met Suni often.'

     b. nay-ka Suni-lul-**com** cacwu mannassta.
        I-NM   AC-PM   often met
        'I met Suni often.'

     c. nay-ka Suni-lul cacwu-**com** mannassta.
        I-NM   AC   often-PM   met
        'I met Suni often.'

     d. nay-ka Suni-lul cacwu mannassta-**com**.
        I-NM   AC   often met-PM
        'I met Suni often.'

Third, the PM *com* can occur more than once in a sentence; it can appear in every possible position simultaneously, as illustrated in (12a). However, the adverb *com* lacks this property (12b).

(12) a. chayk-ul-**com** manhi-**com** ilke-**com** poseyyo-**com**.
        book-AC-PM   many-PM   read-PM   try-PM
        'Please, please, read many books.'

     b. *cahyk-ul **com** manhi **com** ilke **com** poseyyo **com**.
        book-AC   a little many   read   try
        *Read a little a little more a little books a little.'

Fourth, the PM *com* can occur adjacent to the adverb *com* or its original form *cokum* 'a little' in a sentence, while the adverb *com*

cannot modify or be modified by *cokum* or itself, as seen in (13)-(15).

> (13) a. ton-ul-**com cokum** cwuseyyo.
>   money-AC-PM a little give
>   'Please give me some money.'
>
>   b. *ton-ul   **com cokum** cwuseyyo.
>   money-AC a little a little give
>   '?Give me some, some money.'
>
> (14) a. ton-ul-**com com** cwuseyyo.
>   money-AC-PM a little give
>   'Please give me some money.'
>
>   b. *ton-ul   **com   com** cwuseyyo.
>   money-AC a little a little give
>   '?Give me some, some money.'
>
> (15) a. ton-ul   **cokum-com** cwuseyyo.
>   money-AC a little-PM   give
>   'Please give me some money.'
>
>   b. *ton-ul   **cokum com** cwuseyyo.
>   money-AC a little a little give
>   '?Give me some, some money.'

There is no superficial difference in standard orthography between each pair of (a) and (b) in (13)-(15). However, when uttered, they are clearly distinguished by a pause, as we have already observed. The PM *com* is pronounced in a sequence with its preceding word, and a slight pause follows. On the other hand, a pause is placed before the adverb *com*.

3. Pragmatic uses

I claimed that the sense of the PM *com* is that the significance of what the *com*-suffixed phrase represents is minimized. In this section, I demonstrate how the pragmatic uses of the PM *com* are conversationally inferred from its sense, according to the Gricean CP. I also describe how a speaker exploits strategies for using the PM *com* depending upon various situations.

I will describe various uses of the PM *com* within the framework of the theory of 'face' as proposed by Brown & Levinson (1978, 1987). They explain social relations between the speaker and the hearer, employing the concept 'face'. 'Face' refers to the want that one's actions be unimpeded by others (negative face) or that his wants be desirable to others (positive face). According to Brown & Levinson (1978, 1987), each one's face is vulnerable in interaction with others and people cooperate in maintaining or keeping their

own face. However, in certain situations, the speaker purposely damages his hearer's face or his own face, depending on the social relations with her.

If the speaker threatens the hearer's face, he knows that she will have negative feelings toward him and that she is not likely to cooperate with him in getting his goal accomplished. So the rational speaker tries to maintain the hearer's face in order to fulfill his goal. The rational hearer perceives the speaker's cooperative effort. In this sense, I believe, 'Be polite' is a corollary to the Gricean CP. The speaker's use of the PM *com* in his utterance is one of the strategies Koreans exploit to be polite toward the hearer.[4]

When the speaker makes a request or an order to the hearer, he knows that his request or order impedes her freedom to act by putting some pressure on her to do (or refraining from doing) a certain act that he wants her to do (or refrain from doing): that is, the speaker damages the hearer's face. The rational speaker tries to minimize the threat to the hearer's face in a normal situation. This is what the PM *com* does pragmatically. When the speaker uses the PM *com* after a phrase in a request sentence to show politeness to the hearer, he believes she knows its sense, and he expects her to reason from the sense in the following way: the sense of the PM *com* is that the significance of what a *com*-suffixed phrase represents is minimized; since a *com*-suffixed phrase is a part of his request, minimizing the information of that phrase implies that what he asked her to do will be little burden or pressure to her; thus he intended to redress a threat to her face by minimizing the burden or pressure she will perceive from his request. In this way, the speaker can save the hearer's face from being damaged by his request and show politeness to her.

For instance, the speaker at a dinner table can utter either (2a) or (2b) repeated below, when he is asking the hearer to pass him the salt.

(2) a. sokum-**com** cwuseyyo.
　　　 salt-PM　　　give
　　　 'Please, pass me the salt.'

　　 b. sokum cwuseyyo.
　　　 salt　give
　　　 'Pass me the salt.'

The speaker of (2a) (believes the hearer) knows that he impedes her freedom of action by asking her, and not the others, to pass the salt. His intention of using the PM *com* after the phrase *sokum* 'salt' in (2a) is to diminish the face-threatening effect of his request by minimizing its burden on the hearer, which is implied from

minimizing the amount of salt requested. When hearing (2a) containing the PM *com*, the hearer infers from its sense that the amount of salt the speaker needs is minimized so that he believes that his asking her to pass a small amount of salt will be only a small burden to her. Then she understands that he intended to alleviate a threat to her face to achieve his goal (getting the salt) by diminishing the burden she got from his request, and that his using the PM *com* is an effort to maintain her face. This is why (2a) sounds polite. On the other hand, utterance (2b) without the PM *com* sounds blunt because nothing mitigates the speaker's face-threatening act.

When a face-threatening act such as a request is implicated according to the CP, the speaker may use the PM *com* to maintain the hearer's face. Take for instance the situation in (16) below, where A boarded a plane and found that his seat was already taken by B.

(16) cali-ka pakkwuyessnundeyyo.
　　　　seat-NM was-changed.
　　　　'You took the wrong seat.'

When B hears (16), she tries to figure out why a total stranger, A, uttered it to her, and how the utterance in the situation is relevant in the situation which A and B are engaged in. With the belief that A's utterance is goal-oriented, B interprets his speech act this way: 'He said that I took the wrong seat; I have no reason to suppose that he is not observing the CP; if I think that I am taking his seat, his utterance is consistent with my supposition; so he implies that he wants me to leave the seat for him.' In this way, a request is implicated from (16). This indirect speech act makes (16) polite.

In this situation, using the PM *com* after the phrase *cali-ka* 'seat' as in (16'), the speaker intends to maintain B's face by minimizing the significance of what that phrase conveys, that is, B's transgression of taking the wrong seat. This is what makes (16') sound more polite than (16).

(16') cali-ka-**com** pakkwuyessnundeyyo.
　　　　seat-NM-PM was-changed.
　　　　'You took the wrong seat.'

I demonstrated that the use of PM *com* is intended to show the speaker's politeness when his utterance or his intention (goal) threatens the hearer's face. So the speaker may not use the PM *com* under the circumstances where he barely damages the hearer's face, for example, where he provides her with offers which are purely in her interest (17a), or where face-saving is not a concern any more to him in the situations of robbing, coercing or such (17b).[5]

(17) a. phyenhi   ancuseyyo.
         comfortably sit-down
         'Make yourself at home.'

   b. ton   naynoa.
         money take-out
         'Give me your money.'

Saying (17a), the speaker is making an offer for the hearer to sit down. The offer is purely for the benefit of the hearer, and the threat to her face is very small. She understands that he is not damaging her face because the offer is clearly in her interest. Therefore, even though the speaker does not use the PM *com* in (17a), the utterance does not sound rude. When a mugger intends to take money away from a person by threatening him, (17b) can be used. In this situation, the mugger does not care about the hearer's face, and using the PM *com* is unnatural.

   Even if the speaker's offer is obviously in the hearer's interest, he also can use the PM *com* as seen in (18).

(18) phyenhi-**com** ancuseyyo.
         comfortably-PM sit-down
         'Make yourself at home, please.'

The utterances (17a) and (18), however, are used in different situations. When somebody visits my home, I can ask her to sit down, uttering (17a) but not (18), which is awkward in the situation. However, when the visitor has already had a seat but looks uncomfortable, then I can utter (18). Although my offer is for the hearer's benefit, I am threatening her face by inviting her to do what I want her to do. So I can use the PM *com* after the phrase *phyenhi* 'comfortably' in (18) which represents the way in which I want the hearer to sit. Hearing (18), the hearer understands from its sense that I intended to save her face by implying that a little effort will be enough for her to sit in the way I want her to sit.

   By placing the PM *com* after more than one phrase in his request sentence, the speaker intends to multiply the minimization of the threat to the hearer's face because the burden or pressure of his request is multiply redressed through the minimization of what each *com*-suffixed phrase represents. Since excessive politeness means that the speaker humbles himself excessively, he is damaging his face by using more than one *com* with the politeness use. In a normal situation, however, the speaker tries to save his own face in interaction. So when the speaker uses the PM *com* more than once, the hearer assumes that multiple occurrences of *com* are relevant to his goal, and recognizes from its sense and the context that his goal is

so urgent that he may damage his own face himself. Take the examples in (19) for instance.

(19) a. cepal-**com** sallye-**com** cwuseyyo-**com**.
　　　　please-PM　save-life-PM　give-PM
　　　　'Please, please, don't kill me, please.'

　　　b. i　kes-**com** kkok-**com** hay cwuseyyo.
　　　　this thing-PM surely-PM do　give
　　　　'Please, please, do this for me without fail.'

The speaker can utter (19a) when a gangster tries to kill him. In this situation, the speaker's urgent goal is to save his life, and his desire to keep his face is not stronger than his goal. By using more than one *com* in his utterance, he expects a gangster to understand how urgently he wants to save his life. And a speaker can utter (19b) when his goal (getting the work done) needs to be urgently accomplished, and he believes that it can be done only by the hearer, or when he knows that she doesn't want to or won't accept his request at the moment of uttering. In situations like (19), the hearer guesses why the speaker uses more than one *com*, and understands that his desire or longing to get his goal fulfilled by the hearer is greater than his want to keep his face in the interaction.

　　Being humble is another way of being polite. People have an interest in having their desire recognized by others. So self-conceit or self-praise of the speaker's doings, ability, talents and so on can damage the hearer's face since he gives an impression that her ability, talent or such is poorer than his. In order not to threaten the hearer's face, the speaker can use the PM *com* and expects her to understand from its sense that he is minimizing his ability, talents or such to show humility as seen in (20).

(20) A: wuntong-ul cohahaseyyo?
　　　　sports-AC　　like
　　　　'Do you like sports?'

　　　B: ney, tennis-**com** chyeyo.
　　　　yes tennis-PM　play
　　　　'Yes, I play tennis.'

Even though B plays tennis well, he does not tell the truth because he knows that such self-praise can make him look presumptuous and that it can make the hearer feel that he believes that she can't play tennis as well as he. Instead, by using the PM *com*, he expects the hearer to infer that he is minimizing his ability in (playing) tennis.

　　Likewise, if the speaker uses the PM *com* when he is talking about the hearer's ability, doings, talents and so on, it implies that he is minimizing her desire that her wants be recognized by others so

that her face is threatened. Therefore, in such a context the speaker does not use the PM *com* as in (21).

(21) tennis-**com** chiseyyo?
    tennis-PM   play
    'Do you play tennis?'

Using the PM *com* in (21) has the effect of depreciating the hearer's ability in (playing) tennis. That is, the speaker damages the hearer's face because he disregards her desire that her ability be recognized by others. Therefore, in a situation of asking whether the hearer can play tennis or not, the utterance (21') without the PM *com* sounds more polite than the corresponding one (21) with it.

(21') tennis chiseyyo?
     tennis play
     'Do you play tennis?'

In a way similar to the case of example (20), when he refuses the hearer's request indirectly, the speaker can use the PM *com* to redress a threat to her by minimizing the importance of the reason why he refuses her request. A person has a desire for his wants to be desirable to others. When such wants are considered undesirable by others, his face is damaged. So when the speaker refuses the hearer's request, her face is damaged. Furthermore, if he makes light of her request but thinks much of the reason why he refuses it, her face will be much more threatened. However, he can mitigate the threat to her face if he gives the impression that he does not regard the importance of her request. The PM *com* used in an indirect speech act of refusing the hearer's request has this function. It allows the hearer to recognize from its sense that the speaker intends to imply that he does not disregard her request because he is minimizing the importance of why he refuses it. For instance, Lee's friend A gave a call to ask him to give her a ride to Chicago tomorrow afternoon, but he refused the request with the utterance in example (22).

(22) nayil   ohwu-ey   yaksok-i-**com**   issnundeyyo.
    tomorrow afternoon-in appointment-NM-PM have
    'I have an appointment tomorrow afternoon.'

By saying (22), Lee intends for B to figure out that he cannot give her a ride since he has something else to do tomorrow. The *com*-suffixed phrase 'appointment' is in contrast with giving B a ride, so that it is significant for Lee's goal of refusing her request. Since refusing the request threatens B's face, Lee intends to redress the threat to her face by implying that he is minimizing the importance of his own appointment. Accordingly he can imply that he does not disregard B's request. B will recognize from the literal meaning of (22) that Lee is

refusing her request, and will understand the politeness function of the PM *com* by inference from its sense.

The PM *com* can be used in a declarative sentence like (23) when the speaker believes that his utterance is not as informative as is required for what he assumes his hearer wants to know. Using the PM *com*, he expects his hearer to understand that he is restricting all the information he believes she wants to know to merely what he is saying through the utterance containing it, and that he is mitigating the threat to the hearer's face which results from the fact that her desire to know all the information she wants to know has not been satisfied.

    (23) A: ecey   eti   kasesseyo?
             yesterday somewhere went
             yelepen   cenhwahay-to an patusiteyyo.
             several times phone-although not answer
             'Did you go somewhere yesterday? I called you several
             times, but you didn't answer.'

        B: ney. Seoul-ey-**com** kasseyo.
          Yes to-PM   went
          'Yes. I went to Seoul.'

In the situation (23), A is asking why B didn't answer the phone yesterday and B answers that he went to Seoul. If B believes from the context that what A wants to know is not just that he went to Seoul, but the reason why he went to Seoul, and believes that he does not have to explain all of this to A at the moment of uttering, then he may threaten A's face with (23). Using the PM *com*, B intended to save A's face, which he believes is threatened by not giving her all the information he believes she wants.

However, when the speaker believes that his utterance represents all the information he believes the hearer wants to know, or that she can figure out all the information she wants from his utterance, her knowledge of the world and the discourse up to then, using the PM *com* is stupid as illustrated in (24). In the situation, A visited his friend Insik's house to see him and learned from B, Insik's mother, that he is serving in the army now.

    (24) A: Insik-i cip-ey isseyo?
          NM   house-at stay
          'Is Insik at home?'

        B: a. kwunday-ey kassta.
            army-to   went
          b. #kwunday-ey-**com** kassta.
            army-to-PM   went
            'He joined the army.'

In Korea, all young men serve in the army for 30 months by law. All Koreans know this. So when Insik's mother answers A, she believes that he can infer why Insik joined the army from her utterance and his knowledge of the world, and that she does not have more to say to him at the moment. So Insik's mother does not need to use the PM *com* in the situation. On the contrary, using the PM *com* in this situation is inappropriate as seen in B's answer (b) in (24).

Even when the subject of a speaker's utterance (sentence) is in the third person, the PM *com* can be used if the speaker believes that what he says can be a threat to the hearer's face directly or indirectly. Take for instance the situation in (25) below, where Inse's father, coming back home from work, is looking for his son who does not study hard, and his wife says that Inse went to his friend's.

(25) Father: Inse-ka an poicyana.
           NM   not is-seen
           'I can't see Inse. (= Where is Inse?)'

   Mother: chinkwu cip-ey-**com** nolle kasseyo.
           friend house-to-PM play went
           'He went to his friend's to play.'

As should be clear by now, the PM *com* is used in the direct interaction between the speaker and the hearer in order to express politeness. However, in (25), Mother is informing Father of the fact that their son went to his friend's. It is not the speaker, but the third person Inse that performed the action of going to a friend's. So Mother appears to have no reason to show her politeness to the hearer by using the PM *com*. However, if Father told Inse not to go to his friend's but to study, and Mother knows this, Inse's having gone to his friend's threatens his father's face since he disobeyed his father. Mother believes that conveying the fact is a threat to Father's face, and by using the PM *com* she tries to minimize the face-threatening effect of her utterance and save his face. In addition, since Mother knows what Father told Inse, she feels a sense of responsibility for not stopping Inse from going to his friend's, and she believes that her allowing Inse to go to his friend's against Father's command has threatened Father's face. So she uses the PM *com* to mitigate the threat to his face. When Father hears the PM *com* in (25), he understands from its sense that Mother uses it to redress his threatened face which she believes he can figure out from the conventional meaning of her utterance and his knowledge of the world. In the situation in (25), Mother can use the PM *com* even when Father did not enjoin Inse from going to his friend's. Because she assumes that parents are responsible for their children so that they have to discuss together anything concerning their children, she believes that she threatened Father's face by disregarding his

opinion on the matter of whether or not to allow Inse to go to his friend's. So she can use the PM *com* to show politeness in minimizing the threat to Father's face. He understands her intention of using the PM *com* as required, since he knows its sense and what she assumes.

The speaker can use the PM *com* to insult the hearer by belittling her ability on purpose, in cases where she has been negligent in doing her responsibility, where she has behaved badly, or where she did not do what he had asked her to do. In these situations he does not have to maintain her face, since she herself threatened her own face by not doing what she should do. Using the PM *com* in these situations, the speaker expects the hearer to understand from its sense that he is threatening her face by minimizing her ability to do what a *com*-suffixed phrase represents with respect to an event he is describing. Using the PM *com* under these situations is an insult to the hearer, and makes the speaker's utterance sound ruder and more coercive than when it is not used.

Take for instance example (26). The speaker can utter it when the hearer whom he lent money broke her promise several times to pay it back on the due dates.

> (26) ton-**com** cwuseyyo.
>   money-PM give
>   'Pay back my money.'

In this situation, the hearer threatened her own face by breaking a social convention (returning borrowed money on the due date). Because she did not keep her promise to return his money, the speaker has negative feelings toward her. Using the PM *com* after the phrase *ton* 'money' in this situation, the speaker implies that the amount of money the hearer can pay will be just a little even though she is expected to be able to pay more than a little. In this way, he is belittling her ability to pay the money and insulting her. He expects her to figure out that he is urging her to pay back the money soon because he is insulting toward her as a result of her failure to do it.[6]

Similarly, Korean parents and teachers often say (27) to the hearer, a student, who does not study but only goofs off.

> (27) kongpu-**com** hayla.
>   study-PM do
>   'Please, do study.'

Studying is what a student has to do. The hearer, however, damages her own face by just goofing off. By using the PM *com* after *kongpu* 'study' in (25), the speaker expects the hearer to understand from its sense that he intends that a little studying will be enough from her even though more than a little is expected.

Utterances (28)-(29) can be used in the same situations as utterances (26)-(27) are. The only difference is that (28)-(29) do not contain the PM *com*. Because of the exploited use of the PM *com* discussed just before, (26)-(27) sound ruder and more coercive than (28)-(29).

(28) ton   cwuseyyo.
     money give
     'Pay back my money.'

(29) kongpu hayla.
     study   do
     'Study.'

4. Interaction of the sense of the PM *com* and its location

In this section, I will describe according to the CP how different locations of the PM *com* affects pragmatic interpretations of a sentence. In a discourse the speaker places the PM *com* after a phrase whose information is relevant to his goal at the moment in a way indicated by its sense, and the hearer's attention is drawn to the phrase. In 4.1, I will demonstrate how the location of the PM *com* is relevant to the speaker's goals, that is, how its sense interacts with its location to affect total pragmatic interpretations of a sentence. I claim in 4.2 that the 'focus' use of the PM *com* is a side effect of its pragmatic uses.

4.1. Interaction of senses and locations of PMs

The speaker can use the PM *com* to minimize the face threatening act or to belittle the hearer's ability. As described in section 3, those uses are inferred from the sense of the PM *com* which I claimed is that the significance of what a *com*-suffixed phrase represented is minimized. 1 will show how the speaker places the PM *com* after different phrases in a sentence, depending on the situation. In this section, I will show that the speaker uses the PM *com* after a phrase whose information is relevant to his goals in a way indicated by its sense and that its sense interacts with its location to produce an enriched pragmatic interpretation of a sentence.

For instance, in different contexts, Mrs. Lee started a discourse, uttering (30) and (31) to her husband who just came back home. Mrs. Lee and her husband were hesitating in sending their three-year-old son to a nursery school because of the monthly fee which would be a burden for them. Her husband suggested to her to run a baby-pool.

(30) Daewoong-i-**com** ywuawon-ey ponayyo.
    nursery   school-to   send
    talun yaytul-to ta ywuawon-ey taninteyyo.
    other kids-also all nursery   school-to go-heard
    'Please, send DAEWOONG to a nursery school. All the other
    kids also go to a nursery school, I heard.'

(31) Daewoong-i ywuawon-ey-**com** ponayyo.
               nursery school-to   send
    phwulhal yaytul-i epseyo. na-to icey cichyesseyo.
    do-pool   kids-NM are-not I-also now is tired
    'Please, send Daewoong TO A NURSERY SCHOOL. I couldn't
    find kids for a pool. I am tired of it.'

Mrs. Lee's request sentences containing the PM *com* in (30) and (31)
have the same literal meaning, but have the PM *com* in different
places. By using the PM *com* in both situations, Mrs. Lee intended to
imply that her face-threatening act will not be much of a burden.

In the context of (30), informing her husband that all the kids
she knows go to a nursery school, Mrs. Lee expects him to infer that
she thinks that they could afford to send their son to a nursery
school, too, which she wants. Her goal is to make her husband allow
their son to go to a nursery school like other kids. So, placing the PM
com after the phrase *Daewoong*, she is minimizing (or restricting) the
persons to send to a nursery school just to Daewoong. Thus she
intended that it is just Daewoong who they need to send to a nursery
school, so that sending just Daewoong cannot be much of a burden.

In the context of (31), Mrs. Lee intends to convince her husband
that there is no choice but to send their son to a nursery school
because she didn't find kids for a pool. So, placing the PM *com* after
ywuawon-ey 'to a nursery school', she is restricting the places where
to send Daewoong only to a nursery school, and expects her husband
to understand that sending Daewoong only to a nursery school will
not be a big burden to him.

Other examples are (32) and (33) which the speaker can utter to
a mechanic at an auto-repair shop.

(32) i   ke-**com** onul kochye cwuseyyo.
    this thing   today repair give
    cenyek-ey Seoul-ey ka-ya   hayyo.
    evening-in   to go-have to
    'Please, fix THIS (CAR) today.
    I have to go to Seoul this evening.'

(33) i   ke   onul-**com** kochye cwuseyyo.
    this thing today   repair give
    cenyek-ey Seoul-ey ka-ya   hayyo.
    evening-in   to go-have to
    'Please, fix this (car) TODAY.
    I have to go to Seoul this evening.'

The speaker can utter (32) after hearing the mechanic say that she has several cars to fix today. His goal in this situation is making the mechanic understand that what should be repaired today is his car (which is necessary for accomplishing his ultimate goal which is driving it to Seoul this evening). So placing the PM *com* after *i ke* 'this (car)', the speaker intended to minimize the significance of what the mechanic should repair today, and he expects her to infer that fixing his car, not others, will not be a burden. The mechanic understands that what the speaker wants her to fix today is his car. On the other hand, the speaker can utter (33) when the mechanic tells him to pick up the car tomorrow. In this situation, his goal is making the mechanic repair his car today, not tomorrow (his ultimate goal is driving his car to Seoul this evening). So placing the PM *com* after *onul* 'today', the speaker intends the mechanic to figure out why he placed it there, from its sense and location, and the context. The mechanic understands that the time the speaker wants her to fix his car is today, not tomorrow or the other day, and that he intended to alleviate his face-threatening request by minimizing the significance of the time when she has to fix the car.

4.2. Focus use

In the previous section, I showed that the information of a PM *com*-suffixed phrase is relevant to the speaker's goal in a way indicated by the sense of the PM *com*; that is, a total pragmatic interpretation of a sentence is a function of the sense of the PM *com* and its location (and the literal meaning of the sentence, a context and so on). In this section, I demonstrate how the hearer's attention is drawn to a PM *com*-suffixed phrase, not any other phrases in a sentence, and that the focus use of the PM *com* is a side effect of its pragmatic uses.

If different locations of the PM *com* do not affect pragmatic interpretations, sentences containing it in different positions would have the same pragmatic interpretation and they could be uttered in the same discourse context. For instance, in the wh-question and answer context in (34), the two utterances (34a) and (34b) containing the PM *com* could be used appropriately as an answer to A's question 'What shall I give to Yonghi?'.

(34) A: Yonghi-hantey mues-ul cwulkka?
　　　　　　　to　　　　what-AC　give
　　　　'What shall I give to Yonghi?'

　　B: a. Yonghi-hantey ppang-**com** cwuseyyo.
　　　　　　　　to　　　　bread　　　give
　　　　'Please, give Yonghi BREAD.'

　　　　b. #Yonghi-hantey-**com** ppang-ul cwuseyyo.
　　　　　　　　to　　　　bread-AC　give
　　　　'Please, give YONGHI bread.'

However, only (34a) is appropriate as an answer in this situation.
The only difference of (34a) and (34b) is the locations of the PM *com*;
after *ppang* 'bread' in (34a) and after *Yonghi-hantey* 'to Yonghi' in
(34b). Different locations of the PM *com* in (34a) and (34b) make a
difference in their appropriateness.

　　The focus use of the PM *com* as seen in example (34) is not a
main use of the PM, but a side effect of its pragmatic uses which are
inferred from its sense. For instance, when the speaker is making a
request, he can use the PM *com* to minimize his face-threatening act.
Using the PM *com* after a phrase allows the hearer to figure out from
its sense that the speaker intended to imply that what that phrase
represents is insignificant. However, the PM *com* can be placed after
any constituent in a sentence. So when the speaker uses it after a
specific phrase, the hearer guesses why he placed it after that
phrase, not any other phrase in his utterance. She assumes that he
did not choose the phrase for it without purpose and that minimizing
the significance of what that phrase represents is relevant to his goal
at the moment, because she believes that his speech act is goal-
oriented. Then her attention is drawn to that phrase. The speaker
exploits the hearer's belief about his conforming to the CP, and can
use the PM *com* after any phrase whose information fits in with his
goal at the moment in the way indicated by its sense. In this way the
speaker draws attention to a *com*-suffixed phrase.

　　For example, the PM *com* in both (34a) and (34b) is used to
minimize the burden implied by his request. However, it is placed
after different phrases; after *ppang* 'bread' in (34a) and after *Yonghi-
hantey* 'to Yonghi' (34b). In the context of (34), B's immediate goal is
to give A the correct information which is 'bread'. So the rational
speaker places the PM *com* after the phrase 'bread' and focuses
attention on that phrase by seeking to minimize the amount of bread
that is needed. When A hears (34a), she recognizes that using the PM
after the phrase 'bread', not any other phrase, is consistent with the
goal she assumes he has at the moment. This is why (34a) sounds
appropriate in the context. However, (34b) is inappropriate as an

answer to A's question, because the sense of the PM *com* applied to Yonghi is not consistent with B's goal. Utterance (34b) will be appropriate as an answer to the question 'To whom shall I give bread?'

5. Conclusion

I described according to the CP how the speaker uses the PM *com* and how the hearer interprets it. When the speaker uses the PM *com* in his utterance, the hearer believes that his use of it supports his goals she assumes he has, and she rationally reasons its uses which she believes are relevant to the goals in a way indicated by its sense. The speaker exploits the hearer's belief like this to achieve his goals by using the PM *com*. In section 3, I have shown that various pragmatic uses of the PM *com* are inferred according to the Gricean CP from its sense, which I claimed is that the significance of what a *com*-suffixed phrase represents is minimized. For the description of pragmatic uses of the PM *com*, I employed Brown & Levinson (1987, 1987)'s concept 'face'. The speaker uses the PM *com* to show politeness to the hearer by minimizing the face-threatening act which his utterance constitutes, or to insult her by minimizing her ability. The hearer interprets the PM *com* in the way that the speaker intended because she knows its sense and assumes that he uses it in conformity with the CP. In every use of the PM *com*, I demonstrated how using the PM *com* contributes to getting the speaker's goal at the moment accomplished.

I also showed that different locations of the PM *com* produce different pragmatic interpretations which are used in different situations; that is, the speaker places it after a phrase whose information is significant to his goal in the way indicated by its sense, and draws attention to the phrase. I claimed that the focus use of a PM is a side effect of its pragmatic uses which are inferred from its sense according to the CP.

This study of the PM *com* in Korean will contribute to the field of teaching Korean as a foreign language. Korean has a number of pragmatic morphemes and sentence-final particles, which play important roles in a discourse to help the hearer to understand the speaker's intention (or goals). Koreans use and interpret them intuitively and subconsciously, but they cannot explain consistently to foreign language learners how they use and interpret them in different ways in different situations. Nevertheless, there has been no systematic and theoretic study about them up to now. As a Korean teacher, I have experienced difficulties in teaching students how to use and understand PMs in a discourse, and I found foreigners have a hard time learning them.

I claimed that all uses of the PM *com* are conversationally derived from its sense according to the CP, and that the location of the PM *com* is relevant to the speaker's goal in a discourse. Believing that Korean learners are rational enough to make cooperative efforts to understand the speaker's goals in a discourse, a Korean instructor just let his students know the sense of the PM *com* and point out how its sense and location interact to contribute to the speaker's goals in different situations. Then they will be able to use and interpret the PM *com* appropriately in a discourse. I believe that the claim made in the study of the PM *com* can apply to the study of other PMs in Korean, which will also contribute to the field of teaching and learning Korean.

NOTES

1 Strictly, 'hearer' is different from 'addressee', in that even by-passers who happen to hear what a speaker is saying can be hearers, but not addressees. Nevertheless, I use the familiar term 'hearer' for 'addressee' here.

For the sake of expository convenience, third person, male, singular pronoun is used to refer to a speaker, while third person, female, singular pronoun refers to a hearer.

2 My claim that the PM *com* is treated as a bound morpheme is different from the general view of the form *com* held by Korean linguists. Korean linguists consider the form *com* as a free morpheme irrespective of its uses, PM use or Adverb use, in light of the fact that it is spelled as an independent word in written materials, even though they intuitively know the distinctions of the PM *com* and the adverb *com* discussed in §2.

3 The speaker can utter (8b) in the situation where the hearer cooked him the soup, which is too salty for him. In (8b), the adverb *com* also can show the speaker's politeness toward the hearer. However, its politeness comes from a lie because it is not truth-conditionally true that the soup is a little salty.

4 The social convention 'Be polite' is even more important in the Korean culture where deferring to superiors in age or social position, expressing humbleness, not imposing on the hearer and so on have been considered highly-valued virtues. It is conventionalized in the Korean language and every aspect of Korean society. The complicated honorific system in Korean is an example.

5 An offer can threaten the hearer's face if it implies weakness on her part. Then the speaker can use the PM *com*.

⁶ Likewise, example (2a) can also be used in a situation where the speaker is upset and impatient because the hearer did not pass the salt he asked her to pass. In this case, by using the PM *com*, he intended to minimize or doubt her ability in passing the salt and to threaten her face. He expects her to infer that his intentional threat to her face resulted from her disregarding his desires so that he is urging her firmly to do what he wants her to do.

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THE PRAGMATICS OF NEGATION IN KOREAN

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This paper argues that a principle of least effort governs the choice between the short and long form of negation in Korean. It is also suggested that while the short form of negation may be unambiguously descriptive, the long form is not the preferred device for expressing metalinguistic negation.

1. Introduction

Previous studies of the two types of negative declarative sentences in Korean have been primarily concerned with syntactic and semantic analyses of two constructions: Short NEG in which the negative morpheme *an(i)* is placed before the verb and Long NEG in which the verb is nominalized using *ci*, followed by the negative morpheme *an(i)* and the verb *hata* 'to do' (usually shortened to the negative auxiliary *anh-ta*). For the affirmative sentence in (1), both (2) with Short NEG and (3) with Long NEG are possible negations.

(1) Mary- ka   ca-   ess- ta
 NOM sleep PAST DECL
'Mary slept.'

(2) Mary- ka an ca- ess- ta
 NEG
'Mary did not sleep.'

(3) Mary- ka ca- ci   an ha- ess- ta
 NMZ   do
'Mary did not sleep.'

In the first part of this paper I argue that choice of Short NEG or Long NEG is governed in part by the "least effort" principle (McCawley 1978).[1] In the second part of the paper I discuss Horn's (1985, 1989) claim that negation is pragmatically ambiguous between cases of descriptive negation and metalinguistic negation and support his suggestion that Short NEG in Korean might be viewed as unambiguously descriptive but argue against his suggestion that Long NEG is used metalinguistically.

2. The principle of "least effort"

We conversationally implicate not only by what we say but also by what we do not say. McCawley (1978) proposed that when we choose one utterance rather than others that could have been produced, a conversational implicature results by virtue of the choice. In other words, when a speaker uses an utterance which takes more effort than other utterances that might be used in a given situation, he is conversationally implicating something by choosing the more complex utterance. In support of this least effort analysis, McCawley cites Householder's (1971) observation that while the adjective *pale* can readily be combined with a great many color words (*pale green*, *pale blue*), it does not readily combine with others (*?pale red*). Householder suggests that *pale red* sounds strange because there is a common English word for 'pale red', namely *pink*. *Pale blue* and *pale green* do not sound odd because English does not have specific lexical items to designate these shades. McCawley notes that *pale red* requires more effort than *pink* due both to its greater complexity in surface structure and to its containing more phonological material.[2] Therefore, unless there is some particular reason for the extra effort involved in saying *pale red*, *pink* is preferred. When a speaker uses *pale red* instead of *pink*, he conversationally implicates something, for example, that the color in question is not pink but rather is some other shade of red, a shade which is paler than what might normally be considered red but not so pale as to be considered pink.

This least effort analysis can also offer insights into the distribution of the Short and Long negative forms in Korean. Short NEG is less complex in surface structure and contains less phonological material than Long NEG. According to McCawley's least effort concept then, we can expect that the shorter, less complex Short NEG will be used by speakers unless there is some reason not to use that form. Furthermore, if the longer, more complex Long NEG is used rather than Short NEG, we should expect that the speaker is conversationally implicating something by virtue of the fact that he is expending the extra effort to produce the more complex utterance.

If this is in fact the case, one obvious question is what might be conversationally implicated by the use of Long NEG rather than Short NEG. I argue that the fact that Short NEG is the negative construction of least effort is the reason it is viewed appropriate in casual, informal conversational situations, and that the relatively greater length and structural complexity of Long NEG, a construction demanding extra effort on the part of the speaker, is the reason it is considered appropriate in more formal conversational situations as

well as in written forms. In other words, Long NEG is used to imply formality.

Since Short NEG takes less effort than Long NEG, the principle predicts that Long NEG would not be used unless there were some reason for expending the extra effort. Long NEG is generally considered to be a more formal, more deferential form, and I contend that this is the case due to the fact that it is the form requiring extra effort. In other words, use of the longer, more complex Long Form in more formal, more deferential, more polite speech comes about as a result of speakers operating on the principle of least effort. When the use of Long NEG is not necessitated by the grammar, what is most often being conversationally implicated when a speaker uses Long NEG is formality and/or deference.[3]

McCawley's least effort principle offers a straightforward explanation for a speaker's preference for Short NEG in casual conversational settings and for the fact that Long NEG is used almost exclusively in written forms and formal speeches. According to the principle of least effort, unless there is some reason to use a more complex linguistic form when there is a simpler form which will express what the speaker wants to express, the speaker will choose to use the simpler form. Since the Short NEG construction is shorter in length and syntactically simpler than the Long NEG construction, Short NEG involves less effort than the longer, more complex Long NEG construction. Therefore, unless there is some special reason for using the longer, more complex structure, a speaker would choose to use the form involving the least effort. I claim, therefore, that adherence to the principle of least effort is the reason that Short NEG is a more casual form than Long NEG and used by speakers in informal speech situations.

3. Metalinguistic negation and pragmatic ambiguity

Horn (1985, 1989) takes the position that negation "...must be taken as pragmatically ambiguous, with marked negation as an extended metalinguistic use of a basically truth-functional operator" (1985:121). Rejecting theories which view negation as semantically ambiguous or invariably truth functional, Horn argues that external, presupposition-canceling negation is part of a wider phenomenon of negation used to convey a speaker's unwillingness to assert a given proposition in a given way, i.e., a speaker's use of negation to object to the content or form of an utterance rather than to the proposition contained in the utterance. A speaker might object on any number of grounds including phonetic, morphological, syntactic, semantic or pragmatic, as well as stylistic or implicational.

Before going any further, I will exemplify the difference between the two types of negation discussed by Horn, descriptive

and metalinguistic. Internal negation, called descriptive by Horn, is used by a speaker to deny a proposition, in other words, it reverses the truth value of an affirmative proposition, as illustrated in (4a) with its negative counterpart in (4b).[4]

(4) a. Jane is a student.
    b. Jane is not a student.

If (4a) is true, then (4b) must be false. Put simply, descriptive or internal negation is everyday, garden-variety proposition-denying negation.

Speakers, however, do not limit their usage of negative constructions to simply deny propositions, as illustrated in the now classic example in (5).

(5) The King of France is not bald (because there is no King of France).

If we take the above example without the parenthetical continuation as internal or descriptive negation, we must judge it to be either false or to lack truth value. Given, however, that France is a republic and does not have a king, the example in (5) is true in a sense since that which does not exist cannot logically be bald. In (5) it is not only the proposition *The King of France is bald* that is canceled but also the presupposition that such a person as the King of France exists. This type of presupposition-denying or external negation is considered by Horn to be an instance of metalinguistic negation.

Other examples of metalinguistic negation include instances of "more than" negation of scalar predicates in which the upper-bounding implicature is removed, as exemplified in (6b).

(6) a. Steve is smart.
    b. Steve is not smart, he's brilliant.

Examples of negation used to object to previous assertions on lexical, phonetic, and stylistic grounds are given in (7), (8), and (9) respectively.

(7) (The baby bited the dentist's finger.)
    No, the baby didn't bited the dentist's finger, she bit the dentist's finger.

(8) (She was sexually harrássed.)
    She was not sexually harrássed; she was sexually hárrassed.

(9) (The old coot kicked the oxygen habit.)
    The old coot did not kick the oxygen habit; your grandfather passed away.

Since these non-proposition-denying uses of negation do not alter truth conditions, Horn argues persuasively that they cannot be semantically analyzed in terms of truth but rather should be analyzed in terms of a speaker's unwillingness to assert something in a given way.

Horn (1985) speculates that Korean is a language in which there is an unambiguous distinction between descriptive and metalinguistic negation in the sense that Short NEG can be used only descriptively which Long NEG may be used either descriptively or metalinguistically. However, such a distinction does not adequately describe the facts in Korean. In the following discussion of data, it is shown that neither Short NEG nor Long NEG is normally used for metalinguistic negation. Instead a periphrastic construction is used to express metalinguistic negation. In addition to Short and Long negation, there is a cleft construction in Korean which is used to negate declarative sentences. Examples are given in (10) and (11).

(10) Na- nun kyohoy- ey ka- n   kes- i   ani- la
     I TOP church to go MOD COMP NOM NEG but
     hakkyo- ey ka- ass- ta
     school to go PAST DECL
     'I didn't go to church, but I went to school.'

(11) kongpu- hal ttay ttetul-   nun key ani- ta
     study do time make noise MOD COMP NEG DEC
     'You shouldn't make noise when studying.'

     (*key* is the contraction of *kes* and the nominative marker *i*.)

Horn cites the sentence in (12) as an example of a metalinguistic scalar predicate negation in which the upper bounding implicature is removed.

(12) Max doesn't have three children — he has four.

In this example the proposition that Max has three children is not negated, but rather the implicature that he has ONLY three children is negated.

Song (1982) presents a similar example in which Short NEG may be used for this type of metalinguistic negation.

(13) John-i sakwa-lul twu kay ani mek-ess-ta
     -NOM apple-ACC two piece not ate-PAST-DECL
     'John didn't eat two apples.'

Song suggests that the sentence in (13) could be used to assert simply that John did not eat two apples, i.e., he ate less than two apples, in which case it would be descriptive negation. However, Song also points out that it can be used to assert that John ate more than two apples, as is shown in the expanded sentence in (14).

(14) John-i sakwa-lul twu kay an mek-ko yele kay mek-
                                eat-and several
     ess-ta
     'John didn't eat two apples, but ate several.'

The reading in (14) is an example of the same type of upper-bounding-implicature-removing metalinguistic negation as that in (12) and Short NEG is used. These data indicate that Short NEG in Korean is not unambiguously descriptive as Horn suggests. However, Song's example when considered in conjunction with additional Korean examples of the type of negation which Horn considers to be metalinguistic suggests that while Short NEG in Korean may not be ruled out for metalinguistic usage in an absolute sense, it is in fact extremely awkward when used metalinguistically. While no native speaker of Korean judged (14) ungrammatical, many thought it to be awkward. In order to try to get as accurate a reading as possible of how metalinguistic negation is actually expressed in Korean, I asked native speakers to indicate the most natural way they would express certain external negations and then, after getting their responses, asked about the appropriateness of alternative constructions. When I elicited scalar predicate data, the results were consistent: (1) neither the Short or Long negative construction was the first choice, but rather the *key ani-ta* cleft construction was chosen first, (2) the Long NEG construction was preferred over the Short NEG construction, and (3) the Short NEG construction was judged awkward. The following examples illustrate these findings.

(15) a.   Mary-nun yeyppun-key ani- ko alumtap-ta
                  TOP pretty   CMP NEG but beautiful
           'Mary isn't pretty, she's beautiful.'

     b. # Mary-nun yeyppu- ci   anh- ko alumtap-ta
                  TOP pretty   NOM NEG but beautiful
           'Mary isn't pretty, she's beautiful.'

     c. ## Mary-nun an yeyppu- ko alumtap-ta
                  TOP NEG pretty   but beautiful
           'Mary isn't pretty, she's beautiful.'

(16) a.   onul nalssi- nun ttattus-han- key ani- ko tep-ta
           today weather TOP warm   CMP NEG but hot
           'It (the weather) isn't warm today, it's hot.'

     b. # onul nalssi- nun ttattus-ha- ci anh- ko tep-ta
           today weather TOP warm   NMZ NEG but hot
           'It isn't warm today, it's hot.'

     c. ## onul nalssi- nun an ttattus-ha ko tep-ta
           today weather TOP NEG warm   but hot
           'It isn't warm today, it's hot.'

In (15) and (16) an embedded sentence construction followed by the negative linking verb *ani-ta* was preferred over the Long NEG construction, and the Short NEG construction was judged very awkward.

Since both (15) and (16) contain description verbs and at least some speakers prefer to negate description verbs with Long NEG rather than Short NEG, it is possible that judgements could be affected by this factor. To eliminate such possible interference, the verb in examples (17) and (18) is a monosyllabic action verb. Song's earlier example is repeated and expanded in (18). The judgements remained consistent with those in (15) and (16).

(17) a.   ne- nun kwaca- lul myech kay- man mek-
          you TOP cookie ACC a few counter only eat-
          un key ani- ko ta mek-ess-ta
          ADJ COMP NEG but all ate
          'You didn't eat some of the cookies, you ate all of
          them.'

   b. # ne- nun kwaca- lul myech kay- man mek-
          ci anh- ko ta mek-ess-ta
          NMZ NEG but all ate
          'You didn't eat some of the cookies, you ate all of
          them.'

   c. ## ne- nun kwaca- lul myech kay- man an
                                              NEG
          mek-ko ta mek-ess-ta
          'You didn't eat some of the cookies, you ate all of
          them.'

(18) a.   John-i sakwa-lul twu kay mek- un key
          apple   two pieces eat   ADJ COMP
          ani- ko yele   kay mek-ess-ta
              several pieces ate
          'John didn't eat two apples but several.'

   b. # John-i sakwa-lul twu kay mek- ci anh- ko
                                        NMZ NEG but
          yele kay mek-ess-ta
          'John didn't eat two apples but several.'

   c. ## John-i sakwa-lul twu kay ani mek-ko yele kay
                                        NEG
          mek-ess-ta
          'John didn't eat two apples but several.'

Now, comparing these above scalar predicate negations with "more than" readings to their corresponding "less than" readings, the results are quite different. For the less than readings, an embedded sentence

with *key ani-ta* was not used at all, and while Long NEG was the first response given, all speakers indicated that Short NEG was just as acceptable.

(19) a. Mary- nun yeyppu- ci   anh-ta
                    TOP pretty   NMZ
        'Mary is not pretty.'

    b. Mary- nun an yeyppu-ta
                    NEG
        'Mary is not pretty.'

(20) a. onul- un tep-ci   anh-ta
        today TOP hot NOM NEG
        'It isn't hot today.'

    b. onul- un an tep-ta
                    NEG
        'It isn't hot today.'

(21) a. ne- nun kwaca- lul mek- ci   anh-ass-ta.
        you TOP cookies ACC eat   NMZ NEG
        'You didn't eat the cookies.'

    b. ne- nun kwaca- lul an mek-ess-ta.
                            NEG
        'You didn't eat the cookies.'

Looking now at some nonscalar metalinguistic negations, the following examples contrast plain forms of verbs with honorific forms. All verbs and some other lexical items in Korean have both plain and honorific forms. In the following examples the subject nouns *kyoswunim* 'professor' and *moksanim* 'minister' refer to persons of high social status. To use the plain form of the verbs, *cwuk-ta* 'die' and *mek-ta* 'eat', with such subject nouns would be extremely insulting to the subject referents. If a child or an unknowing foreigner used the inappropriate verbs, she might be corrected as in (22) and (23).

(22) a.   kyoswunim-un cwuk-   un key ani- ko
           professor   die (plain) TOP COMP NEG but
           tolaka-syessta
           passed away (HON)
           'The professor did not die, he passed away.'[5]

    b. # kyoswunim-un cwuk- ci   anh- ko tolaka-syessta
                            NMZ NEG
           'The professor did not die, he passed away.'

    c. ## kyoswunim-un an cwuk-ko tolaka-syessta
                            NEG
           'The professor did not die, he passed away.'

(23) a. moksanim-un cenyek-ul mek-   un   key
         minister   dinner   eat (plain) ADJ COMP
         ani-ko capswu-syessta
         NEG   ate (HON)
         'The minister didn't eat dinner, he ate dinner.'[6]

   b. # moksanim-un cenyek-un mek- ci   anh-ko
         capswu-syessta
                                 NMZ   NEG
         'The minister didn't eat dinner, he ate dinner.'

   c. ## moksanim-un cenyek-un an mek-ko capswu-
         syessta
                            NEG
         'The minister didn't eat dinner, he ate dinner.'

Again, native speakers responded first with the (a) utterances using the *key ani-ta* construction. The Short NEG in the (c) sentences was judged extremely awkward and the Long NEG, shown in the (b) sentences, was considered preferable to the Short NEG construction but not as appropriate as the *key ani-ta* construction. Based on this data, Korean appears to have a periphrastic negative form especially suited for metalinguistic negation. This is not to say, however, that the periphrastic construction is limited to metalinguistic usage; it may be used either descriptively or metalinguistically.

The existence of a form which if especially appropriate for expressing metalinguistic negation is not unique to Korean. Horn (1989) includes Japanese data from McGloin (1982) which indicate that a periphrastic form must be used in order to negate the upper bounding implicature associated with scalar predicates, as shown in (24).

(24) a. Atsui dokoroka nietagit-te i-ru yo.
         hot   far from boiling   be-PRES
         'It's far from being hot; it's boiling.'

   b. Atsui nante yuu mon ja na-i. Nietagit-te i-ru yo
                     say
         'It's not something you can call hot. It's boiling.'

Horn further notes that the Japanese construction *wake de wa nai* is described by Kato (1985) as being specialized for metalinguistic negation. In (25) Kato demonstrates that an adverb which cannot appear in negative sentences (either in or out of the scope of negation) can occur within the scope of *wake de wa nai*.

(25) a. Kuruma ga totsuzen {tomat-ta/   *tomar-anakat-ta}.
         car   suddenly stop-PAST   stop-NEG-PAST
         'Our car suddenly {stopped/*didn't stop}.'

  b. Kuruma ga totsuzen tomat-ta wake de wa na-i.
     'It's not that our car stopped suddenly.' [It stopped
     gently, etc.]

4. Conclusions

To sum up, Korean and Japanese exhibit a stricter division of labor in the use of negative constructions than English does. While in English we sometimes employ *it is not the case that...* or *it is not true that...* to express a metalinguistic type of negation, both of these constructions have a rather formal, stilted sound. English speakers are, therefore, inclined to simply use what is normally a descriptive negation to express a metalinguistic negation. For instance, (26a) sounds more natural than (26b).

  (26) a. He's not (just) smart. He's brilliant.
       b. It is not the case that he's just smart. He's brilliant.

In Korean, and in Japanese as well, however, periphrastic constructions which involve greater effort on the part of the speaker are used for metalinguistic negations, and the comparatively lesser-effort constructions are reserved for descriptive negation. The periphrastic constructions, however, are not limited to metalinguistic usage but may be used either descriptively or metalinguistically. Thus, the Korean data reinforces the general pattern discerned by Horn (1989) that "...no language contains two negative operators corresponding exactly to descriptive and marked [metalinguistic] negation" (442).

While the Long NEG *ci anh-ta* construction is at least somewhat more acceptable for metalinguistic negation than the Short NEG *an* construction, neither of these is the negative construction preferred by speakers for metalinguistic negation. Instead, the periphrastic *key ani-ta* is the negative construction of choice.

In the first part of this paper, the use of Short NEG in informal speech situations was analyzed as an instance of McCawley's least effort principle, and I now suggest that the preference for a more syntactically complex construction for metalinguistic negation than that used for descriptive negation is an example of the other side of the least effort coin. Of the three negative constructions discussed in this paper, Short NEG requires the least effort and the periphrastic construction the most effort, both phonologically and syntactically. Since natural language negation is overwhelmingly descriptive, it is logical that the lesser effort negative forms are appropriate for descriptive negation and that the negative construction requiring greater effort is more appropriate for the more pragmatically complex metalinguistic negation. The fact the Long NEG is more acceptable than Short NEG for metalinguistic negation but less

acceptable than the periphrastic construction is also predictable from the principle of least effort since the Long NEG form occupies the middle slot as far as the amount of effort required.

NOTES

[1] Phonological and morphological restrictions which necessitate the use of Long NEG with certain verbs are not discussed in this paper.

[2] Syntactic and phonological complexity are not the only factors which McCawley takes into account, but they are the only ones relevant to negation in Korean.

[3] Though the notions of formality, deference, and politeness are interrelated, they are not interchangeable. I consider deference to imply formality but not necessarily vice versa. If a speaker is deferential to an addressee, the deference will be reflected in more formal speech. Formality in speech, therefore, may be a reflection of deference. On the other hand, formality in speech may be used by a speaker to distance himself from the listener(s). For example, if an employer uses a formal style of speech to an employee, it would more likely be a reflection of the difference in status between them than deference. Politeness seems to be a feature of both deference and formality.

[4] This is not to imply that all negative propositions are uttered in response to or in the context of a corresponding affirmative proposition.

[5] In this context *cwukta* might be more appropriately translated with an idiom such as 'kicked the bucket' or 'bought the farm'.

[6] In this context mekta might be more appropriately translated 'gobble' or 'pig out' or 'chow down'.

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INFLECTIONAL STRUCTURES IN KOREAN AND HEADEDNESS*

James Hye Suk Yoon

In this paper, I critically review the arguments presented in Sells (1991) that inflectional structures in Korean are lexically formed and left-headed. I show that the arguments for left-headedness lose force upon scrutiny and conclude the paper by rehearsing well-known arguments for the syntactic independence of i-affixes.

1. Introduction

Sells (1991) presents a number of morphosyntactic arguments for a LEXICAL analysis of Korean I(NFLECTIONAL)-STRUCTURES[1] against the backdrop of much current research that takes i-structures in these languages to be formed in the syntax (cf. Ahn & Yoon 1989, Yoon & Yoon 1990, Whitman 1989, etc.) Sells' attempt is worthy of note, since most syntactic analyses seem driven by an implicit desire to make the clausal structure of Korean parallel to those posited for English and French by Chomsky (1988) and Pollock (1988). Characteristically absent from the majority of syntactic analyses are robuts morphosyntactic ARGUMENTS that i-affixes must be heads in Korean syntax.[2]

The major component of Sells' analysis centers on the claim that i-structures are LEFT-HEADED. While the claim of L-headedness is logically independent of the issue of where i-structures are formed,[3] if i-structures are L-headed AND formed in the syntax, they would systematically violate the generalization that Korean syntax[4] is otherwise head-final, weakening the syntactic position considerably.

It is my goal in this paper to examine two contrasting claims about the LOCUS and HEADEDNESS of i-structures — one that claims that i-structures are LEFT-HEADED and formed in the LEXICON, and the other which claims that i-structures are formed in the SYNTAX and are RIGHT-HEADED. We argue that the weight of the evidence points in favor of the latter.

2. Two analyses of Korean I-structures

2.1. A lexical analysis

According to Sells, the proper analysis of an inflected verbal form such as *mek-ess-ta* (eat-Past-Decl) is as in example (1). In this

structure, only V^0, and not any proper subpart of it, is visible to rules of syntax. Thus, in the words of DiSciullo & Williams (1987), it is a syntactic atom. In addition, Sells makes the claim that an inflected V is consistently left-headed, since categorial features are determined by the left-hand member at each level of structure.

(1)   ... VP^5
        / \
             V^0
            / \
         V^{-1} af
         / \ |
      V^{-2} af -ta
       | |
      V^{-3} -ess
       |
      mek-
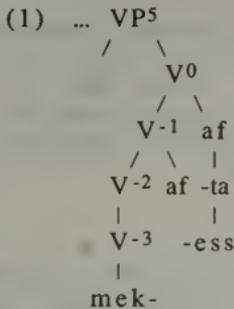
2.2. A syntactic analysis: I-affixes as phrasal affixes

In this paper, I defend a syntactic analysis which specifically claims that a form like (1) consists of not one, but three distinct syntactic atoms, the Verb Stem (*mek-*), Tense (*-ess*) and Mood (*-ta*) morphemes, each heading their own projections (VP, TP, and MP, respectively) in syntax. The Tense and Mood affixes are therefore "phrasal affixes", since they are affixes subcategorizing for a phrase syntactically, even though phonologically they appear as affixes on verb stems. In the proposed structure, TP dominates VP and MP dominates TP. This is motivated both by logical 'scope' considerations and generalizations concerning affix ordering.[6]

(2)   MP
       / \
            M'
           / \
        TP   M
        / \ |
          T' -ta
         / \
       VP   T
       / \ |
         V' -ess
        / \
          V
          |
        mek-
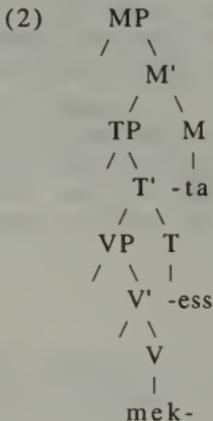
This type of analysis requires a mechanism to derive the actual inflected form of the verb. This could be achieved in either of two ways. In a derivational alternative, head movement raises V to T and this complex in turn raises to M. In a non-derivational, Autolexical-like alternative, (2) is the syntactic representation associated with the string *mek-ess-ta*. To this a morphological representation is associated in accordance with general principles. The Tense and Mood formatives, being clitic-like, are attached to the periphery of constituents they combine with syntactically. In either approach, the morphological representation would be as follows.[7]

```
(3)           M
            /  \
          T     M
         / \    |
        V   T  -ta
        |   |
      mek-  -ess
```
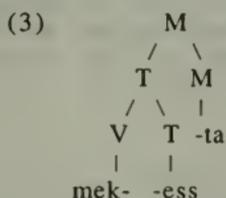
In sum, in the syntactic analysis, inflectional structures are HEAD-FINAL, both syntactically (cf. 2) and morphologically (cf. 3), and the morphological and syntactic analyses of a string like *mek-ess-ta* are different and required independently.

We turn now to arguments Sells offers for his analysis and show that they are either untenable or else turn out to be neutral with respect to the choice between the lexical and syntactic analyses.

3. Arguments for a lexical account of inflection

3.1. Phonological arguments

The first class of arguments that Sells gives for the lexical view are phonological. The gist of these arguments is that phonologically, i-affixes behave clearly as AFFIXES, rather than as CLITICS or INDEPENDENT WORDS - i.e., there is a closer phonological cohesion between i-affixes and stems/roots than between clitics and their hosts or between two independent phonological words. They are lexically attached in this sense.

In presenting this type of argument, Sells is relying on the "null hypothesis" - i.e, it is better to have an analysis in which the characterizations of "word" is uniform phonologically, morphologically, and syntactically. However, the independence of what is phonologically a word (P-word) and what is morphologically a word (M-word) is well-documented. Likewise, what is morpho-phonologically determined to be lexical (i.e., M/P-word) need not necessarily be a syntactic word (syntactic atom). Besides, even if the

null hypothesis turned out to be ultimately correct, this is exactly what Sells is trying to defend, and therefore arguments presupposing its correctness cannot be used to argue FOR it. Therefore, we do not find the phonological arguments terribly bothersome. We turn now to more robust morphosyntactic arguments offered by Sells.

3.2. Non-local selection

Auxiliary verbs in Korean select for the form ("COMP", à la Sells) of main verbs. For example, the negative auxiliary *anhta* constrains the main V it combines with to be in the *-ci* COMP form, as shown by the contrast between (4a) and (4b) below. However, certain kinds of suffixes can intervene between the *-ci* suffix and the selecting auxiliary, breaking the LOCALITY of selection (cf. 4c).

(4) a. cek-**ci**   anhta
        small-COMP   not
     b. *cek-**key**   anhta
        small-COMP   not
     c. cek-**ci**-man-un   anhta
        small-COMP-only-TOP-not

Sells reasons that such a state of affairs will prove problematic for the syntactic view which holds that i-affixes are heads, since selection would have to "see" through several layers of affixes, in violation of selectional adjacency which is common in morphology and syntax.

(5)   V P
                     /   \
                   Af3   V
                  / \ |
                Af2   af anh-
               / \ |
             Af1 af -un
            / \ |
           V   af -man
           | |
         cek- -ci
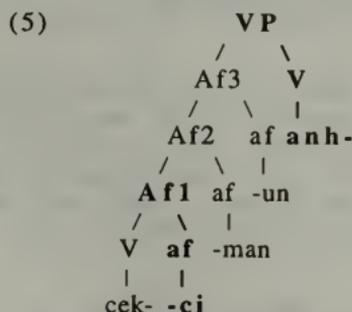
However, if V is taken to be the head, selection can remain local, as shown in (6), which is adapted from Sells (1991). The requirement that the sister of the negative auxiliary be in [FORM:CI] is inherited through the sequence of head nodes to V^0, as desired.

(6) V as Head:

```
                                                    VP
                                                   / \
                                                  /   \
                                                 /     \
                          V⁰[TYP:V-MOD, FORM:CI]  V[FORM:CI]
                           /                \      |
              V⁻¹[TYP:V-MOD, FORM:CI]       Af  anhta
                /                \           |
   V⁻¹[TYP:V-MOD, FORM:CI]      Af      -un[TYP:V-MOD]
      /            \             |
 V⁻²[TYP:NO]       Af      -man[TYP:V-MOD]
    |               |
 V⁻³[TYP:NO]  -ci[TYP:V-MOD, FORM:CI]
    |
  cek-
```
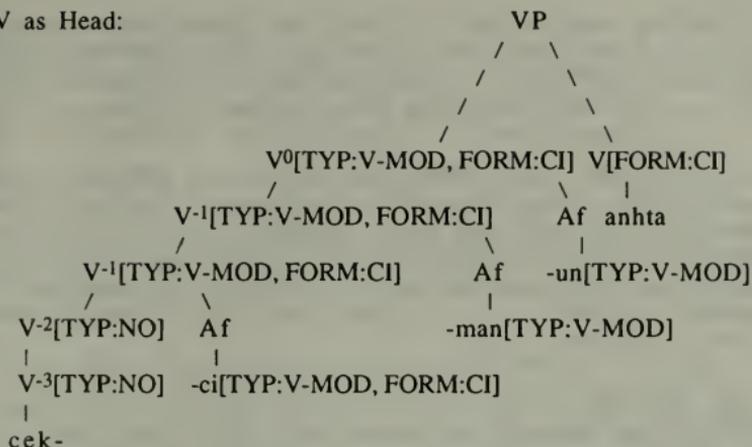
It is not difficult to come up with an alternative syntactic analysis that does not countenance problems of non-local selection. One simply has to make the assumption (Grimshaw 1991) that the affixes that intervene (the so-called Delimiters) have no effect on selection because they are CATEGORY-NEUTRAL AFFIXES/HEADS, allowing categorial and selectional information on the non-head member to percolate through (cf. 7).

(7) Affixes as Heads:

```
                                       VP⁸
                                      / \
                                     /   \
                                    /     \
                 VP[+V, -N, CI]   V[SUBCAT:<+V, -N, FORM:CI>]
                  /        \          |
                 /          \        anh-
          VP[+V, -N, CI]   DEL[0V, 0N, FORM:0]
            /        \         |
           /          \       -un
      VP[+V, -N, CI]  DEL[0V, 0N, FORM:0]
        /  \              |
       /    \            -man
     VP    COMP[+V, -N, CI]
    /  \        |
 ...cek    -ci
```
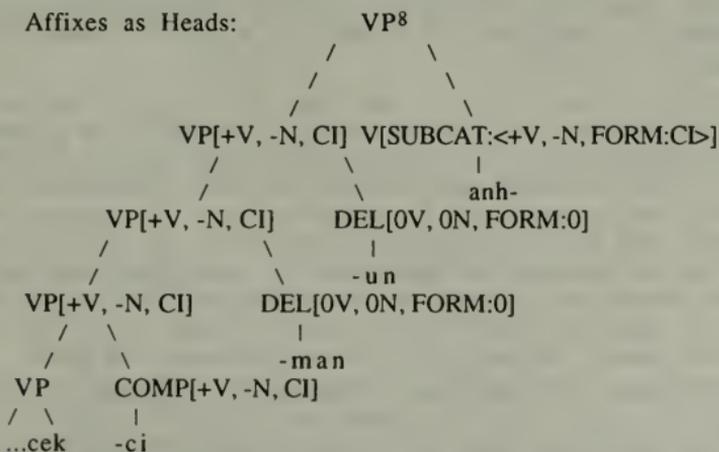
There is good evidence for taking the delimiters to be category/selection-neutral. As is well-known, they suffix indiscriminately to a variety of categories.

(8) a. mek-e-nun   'eat-Comp-Top' (affixation to V-e)
    b. mek-key-nun   'eat-Comp-Top' (affixation to V-key)
    c. John-un   'John-Top'   (affixation to N)
    d. John-eykey-nun 'John-Dat-Top' (affixation to N-eykey)
    e. ppalli-nun   'quickly-Top'   (affixation to Adv)

We have just demonstrated that a syntactic right-headed analysis can cope with apparent problems of non-local selection. We now like to point out some problems with Sells' claim that i-structures are uniformly L-headed in Korean. A problem for this claim comes from i-suffixes OTHER THAN THE NEUTRAL ONES, as these crucially determine the COMBINATORIC (distributional) potential of a given root/stem.

To see this, we need some background in the feature system that Sells uses. Sells uses two different kinds of features in his account. The feature TYP, whose value ranges over {NO, V-MOD, N-MOD} is a COMBINATORIC feature, while the binary Boolean features V and N are CATEGORIAL features. We need not discuss the latter since its usage is familiar. Let us briefly discuss the function of the TYP feature.

The TYP feature determines the syntactic distribution of a given item, in the following way. Constituents marked TYP:V-MOD combine with verbal categories, while TYP:N-MOD constituents combine with nominal categories. Stems/Roots, since they are by themselves incapable of occurring as sisters to N or V constituents, are categorized as TYP:NO.

Now, it turns out to be the case that it is the i-affixes which crucially determine the COMBINATORIC POSSIBILITY of a given form. This is shown by -ci in (6) above, which turns V^{-2} of TYP:NO into TYP:V-MOD. A similar role is played by the CASE-MARKERS in the N system. The affixation of Case-markers turns N^{-2}, which would be TYP:NO, into TYP:V-MOD/N-MOD. Needless to say, the prerogative of heads is to determine the distribution of constituents that they head. To the extent that i-affixes are responsible for this, one would want to view them as heads in the relevant sense. If so, we have a situation where i-affixes, the right-hand elements are heads.

Of course, the traditional CATEGORIAL FEATURES V and N are always determined by the left-hand elements in Sells' analysis. However, the significance of this fact in Sells' system is not at all obvious, because these features do not play a crucial role in syntax and inflectional morphology in his system, for the following reasons. Normally, these features are taken to be responsible for constraining the syntactic distribution of constituents, that is, in the terminology just introduced, they are categorial AS WELL AS combinatoric features. But in Sells' system, since the latter function is taken over by the TYP

feature, it is not clear what the role of V and N are in syntax/inflectional morphology. They obviously have a role to play in category-changing derivational morphology, which Sells does not deal with in the paper, but appear to have no direct relevance in syntax.

Therefore, even if an analysis such as (6) proved to be correct, one must maintain the conclusion that V (left-hand element) is the head only in so far as the CATEGORIAL (what appear to be syntactically irrelevant) features are concerned, but (certain) i-affixes are heads regarding the COMBINATORIC (syntactically relevant) features, despite the fact that they are right-hand elements.

3.3. Paradox between movement and selection

Sells considers an alternative syntactic analysis, different from the one we proposed in the previous section. He shows that while this alternative may avoid problems of non-local selection, a paradoxical situation is reached, thus making it unworkable. We shall see that there is a simple solution to this "paradox" under the syntactic approach.

Sells presents a strawman syntactic analysis which can avoid problems of non-locality noted earlier because this analysis takes selection for form to be determined AFTER head-movement. Taking (9) to be the S-structure formed after movement, we see that the constituent that is sister to *anh-* contains the *-ci* affix.

```
(9)                   VP
                    /    \
                  Af3     V
                 /   \    |
               Af2   af  anh-
              /   \   |
           Af1   af  -un
          /   \   |
        V    af  -man
        |     |
      cek-   -ci
```
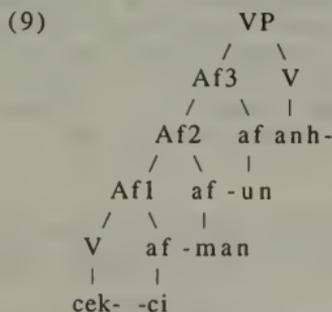
Sells reasons that this alternative predicts that morphological selection will be insensitive to outside affixes, since all that is required is that head movement put the subcategorized constituent in a position sister to the subcategorizing constituent by S-structure, regardless of how many other affixes may be added.

However, he shows that contrasts such as those in (10a,b) falsify this. What (10) shows is that the requirement that the Copula select an N^{-1} (N-stem) is satisfied in both structures after head movement in the strawman analysis we are considering, since the constituent

containing N^{-1} is sister to the Copula in both structures. However, the presence of -un, which turns an N^{-1} into an N^0, makes (10b) ill-formed. Therefore, one cannot conclude that selection is satisfied AFTER movement, since the relevant contrast can only be explained if we assume that selection must be satisfied in the pre-movement structure. Only in (10a) is this requirement met.

(10) a. John-eykey-man-ita   vs. b. *John-eykey-man-un-ita
        [[[[N⁻³] N⁻²] N⁻¹]]   [[[[N⁻³] N⁻²] N⁻¹] N⁰]]
        John-DAT-only-COP   John-DAT-only-TOP-COP

        -ita selects N^{-1}

Let us see how this contrast may be dealt with in a syntactic analysis. As we have seen, in the syntactic account, there are two levels at which well-formedness can be stated — syntax and morphology. Since phrasal affixes are syntactic atoms, they select syntactically. However, being affixes, they must satisfy particular morphological requirements as well. Thus, phrasal affixes have a dual subcategorization, both of which must be independently satisfied (Sadock 1990). Taking the Copula to be such an affix, we could state its twin requirements as follows.

(11) -ita: +V,-N, TYP:N-MOD, [XP ____] (Syntax)
            +V,-N, TYP:N-MOD, [X⁻¹ ____] (Morphology)

(11) states that syntactically, the Copula combines with any maximal projection, but that morphologically, it has to be able to affix to a stem.[9] Given this, the Copula is free to combine syntactically with the relevant PP/DPs in (10a) and (10b). However, in (10b) the morphological requirement that Copula be a suffix on N^{-1} (N-stem) is violated, since morphologically, *John-eykey-man-un* is an N^0.

3.4. Double marking

Sells presents the following as another potential problem for the syntactic approach. Irregular honorific V-stems prohibit affixal honorific marking, as seen below.

(12) *capsusi-si-ta 'eat (HON)-HON-Decl'
     *tusi-si-ta   'eat (HON)-HON-Decl'

Sells argues that this is not predicted if HON is a head in the syntax (constituting AgrS, in the system of Chomsky 1992). Sells reasons that in the lexical view, MORPHOLOGICAL BLOCKING can account for (12), since suppletive forms already have honorific information marked, thus blocking redundant marking.

One could respond to this in a variety of ways. J-M Yoon (1990) argues on the basis of constituency tests (cf. §4 below) that -*si* does not form an independent projection in syntax. If so, nothing need be added to Sells' lexical account. Since the attachment is lexical, it will be subject to whatever principles constrain lexical forms.

Another response may be along the following lines. The irregular honorific V-stems always incorporate -*si* as part of its stem/root. Given this, further affixation of an identical affix would run afoul of the principle restricting duplicate affixation of the same affix — No Vacuous Affixation Principle (Marantz 1984).

Still another way would be to assume that -*si* is Agr in syntax, but that selects a VP whose head cannot be marked [+HON] inherently. This is the syntactic analogue of "blocking" and is no less ad hoc than any lexical account of blocking, as far as I can tell.

Sells also argues that if Case-markers head their own projections (DPs or KPs) in syntax, the redundant double marking of Nominative in example (13) remains a problem, since there would have to be two DPs headed by two Nominative affixes.

(13) apeci-**kkeyse**-man-**i** 'father-HON NOM-only-reg. NOM'

In responding to this argument, we wish to draw attention to the fact that Korean quite regularly allows double morphological combinations of Case-markers, as long as they are Inherent and Structural Case-markers, occurring in that order (J-M Yoon 1991). This is seen in example (14).

(14) a. John-**eykey**-**ka**   (J-DAT-NOM)
        Inh-Str
     b. *John-**ka**-**lul**   (J-NOM-ACC)
        *Str-Str
     c. John-**eykey**-man-**i** (J-DAT-only-NOM)
        Inh-...-Str
     d. apeci-**kkeyse**-man-**i** (father-hon. NOM-only-pl. NOM)
        Inh-...-Str
     e. *John-**ka**-**eykey**   (J-NOM-DAT)
        *Str-Inh

Such Case-doubling is allowed because the two types of Case-markers differ morphologically, the Inherent Case-markers being N^2 affixes, and Structural Case-markers being N^{-1} affixes. Now, if we make the reasonable assumption that honorific NOM is Inherent Case and regular NOM is a Structural Case, their combination would be allowed without stipulation.[10]

I have thus far either rebutted or presented alternative syntactic accounts of some of the facts that Sells considered problematic for a syntactic account. In the next section, I quickly rehearse some previously presented arguments FOR a syntactic analysis of Korean i-structures.

4. Arguments for a syntactic account of Korean inflection[11]

4.1. Constituency and coordination

As noted in Yoon (1989), Yoon & Yoon (1990), J-M Yoon (1990), coordinate structures in Korean allow certain i-affixes to be missing in all but the final conjunct. In such cases, the information borne by the i-affixes on the final conjunct takes a distributive scope over the unmarked non-final conjuncts. This is illustrated below in (15).

(15) a. John-i pap-ul   mek-ess-ta, kuliko Mary-to pap
        J-NOM meal-ACC eat-Pst-Decl and   M-also meal
        -ul   mek-ess-ta
        -ACC eat-Pst-Decl
        'John ate the meal and Mary (also) ate the meal'

     b. John-i pap-ul   mek-ess-(*ta)-ko Mary-to pap
        J-NOM meal-ACC eat-Past-Conj   M-also meal
        -ul   mek-ess-ta
        -ACC eat-Past-Decl
        'John ate the meal and Mary (also) ate the meal'

     c. John-i pap-ul   mek-ko Mary-to pap-ul   mek
        J-NOM meal-ACC eat-Conj M-also   meal-ACC eat
        -ess-ta
        -Pst-Decl
        'John ate the meal and Mary (also) ate the meal'

In non-affixal coordination, (15a), verbs of both conjuncts are independently inflected for Tense and Mood. However, in affixal coordination, (15b,c), Mood marking is prohibited, (15b), while Tense marking may be absent, (15c), in non-final conjuncts. Despite the absence of such marking, the verb of the initial conjunct is interpreted as Past and Declarative.

In the works cited above, this peculiar behavior of coordination is taken to be evidence that TP and VP are syntactic CONSTITUENTS. Under the assumption that only constituents can be coordinated, it is proposed that (15b) instantiates coordinated TPs and (15c) coordinated VPs. This, together with the hypothesis that subjects are

VP-internal (and may remain there), accounts for word order and the obligatory distributive scope of final conjunct i-affixes.[12]

(16) a. (=15b)   MP
```
                   /    \
               TP        M
              /   \       |
             /     \     -ta
          TP        TP
         /  \      /  \
        /    \    /    \
    mek-ess-ko  mek-ess-
```

b. (=15c)   MP
```
                   /    \
               TP        M
              /   \       |
            VP      T    -ta
           /  \      |
          /    \   -ess
        VP      VP
       /  \    /  \
    mek-ko  ..mek-
```
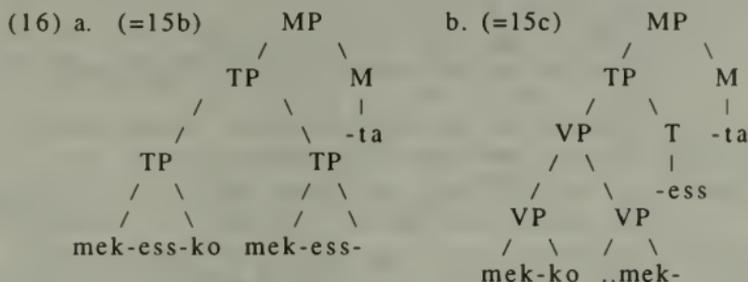
4.2. Negation and coordination

The interaction between postverbal negation and coordination provides another piece of evidence for the posited constituent structures. Postverbal negation on the final conjunct can have distributive scope over non-final conjuncts. However, it cannot do so when the verb of non-final conjunct is inflected for Tense (cf. 17a vs. 17b).

(17)[13] a. John-i pap-ul   **mek-ko** Mary-ka swul-ul
         J-NOM meal-ACC eat-Conj M-NOM   beer-ACC
         masi-ci   anh-ass-ta
         drink-COMP not-Pst-Decl
         'John did not eat the meal and Mary did not drink
          beer'
      b. John-i pap-ul **mek-ess-ko** Mary-ka swul-ul **masi-ci**
         anh-ass-ta
         'John ate the meal and Mary did not drink beer'
         'John did not eat the meal and Mary did not drink
          beer'

J-M Yoon (1990) accounts for this contrast in the following way. Postverbal negation requires an uninflected V but precedes Tense. Therefore, it is natural to posit Neg as a head between VP and TP. Given this, If TP is selected without Neg (cf. 17b), such a clause will be necessarily interpreted as affirmative, while if VP is selected (cf. 17a), Neg can have distributive scope over it.

4.2. One tense-V per clause restriction

Cho & Morgan (1987) note that two adjacent INFLECTED V's are always interpreted as clausal conjunction, while the sequence of uninflected and inflected Vs may be interpreted clausal or sub-clausal conjunction. This is curious, since if Korean patterns like English, where subclausal coordination demands identically inflected V's (cf. 19), the sequence of two V's should be interpreted as

subclausal or clausal conjunction.[14] However, when the first V is inflected, the structure can only be interpreted as S-conjunction.

(18) a. John-i **mek-ko** (pro) ca-ss-ta
       = 'John ate and slept' (VP conjunction)
       = 'John ate and he/someone slept' (S conjunction)
   b. John-i **mek-ess-ko** pro ca-ss-ta
       = 'John ate and he/someone slept' (S conjunction)
       ≠ 'John ate and slept' (VP conjunction)

(19) a. John **ate the meal and drank beer** (VP conjunction)
   b. John **bought and drank** Kirin beer (V' conjunction)

This contrast between English and Korean is expected under the structures we have been assuming. The presence of inflected V implies the presence of Tense, which in turn implies TP, a clausal node.

NOTES

*An earlier version of this paper was presented at the Seoul International Conference on Linguistics (SICOL) in August 1992.

[1] The term *i-structures* designates any inflected (as opposed to derived, compounded) form of word, or a part of it.

[2] This is not surprising in view of the fact that neither Pollock nor Chomsky offered any morphosyntactic arguments for the dissociation of INFL into Tense and Agr. The strategy used (by Pollock, at least) to arrive at the intended conclusion seems to be as follows. There are at least three positions that verbs can occur in a clause in English/French. Supposing one is the base position inside VP, the other two must be Tense and Agr, respectively. This is hardly a morphosyntactic consideration, as should be obvious.

[3] The independence of these two issues is driven home in Lapointe (1991), who, working in Autolexical framework, recognizes the morphosyntactic independence of i-affixes in Korean but treats them as modifiers rather than heads.

[4] And non-inflectional morphology, such as derivation and compounding.

[5] Sells (1991) and Cho & Sells (1990) posit three levels of structure below the WORD (x0) for Korean morphology, where x^{-3} level is the ROOT, x^{-2} the SUB-STEM, and x^{-1} the stem. This division is motivated by the loosely templatic character of Korean inflection. However, the distinction is sometimes obliterated in surface forms since direct inheritance into higher bar-levels without affixation is also possible.

While different kinds of i-affixes can be attached to a V-root, two kinds of affixes are obligatory, Tense and Mood affixes. These are the ones which "shift" the bar-levels to a higher level in Sells' system. In the syntactic alternative, this translates into the requirement that the projections of T and M are obligatory, while those of others will be optional.

6 That is, while Tense and Mood are verbal affixes, their logical scope is over the entire proposition (sentence). See J-M Yoon (1990) for detailed justification. The significance of affix-ordering generalizations for syntax is due to Baker (1985).

7 The mapping between (2) and (3) is sanctioned in ALS by the Incorporation Principle. Let us be a bit more specific. As phrasal affixes, M and T possess dual subcategorizations, thus, M syntactically selects TP, and morphologically selects T (a sub-stem). T s-selects VP and m-selects V (stem/root).

8 I take -ci to be a "Comp" on VP, and the delimiters to attach to VP, which in turn is selected by the Neg auxiliary.

9 The copula in Korean affixes to any category, and not just to nominals. We have adjusted the subcategorizations to reflect this fact.

10 There remains the question of how two NOM's may be asssigned to a single NP syntactically. The analysis is similar to that proposed for DAT-NOM combinations (Yoon & Yoon 1991). Assuming subjects to originate within the VP, honorific NOM would be assigned there, while regular NOM assigned when the subject raises to SpI. The optional raising of Case-marked NPs to SpI is well-attested in Korean, even though such movement is not required by the Case Filter. Cf. Yoon & Yoon (1991) for more discussion.

11 The arguments sketched here are presented in much more detail in Yoon (1993) and interested readers are referred to that work.

12 Yoon (1989) provides further evidence for TP and MP from various kinds of nominalizations. For reasons of space, I do not go into details.

13 (17a) marginally allows a reading where negative scope is confined to the final conjunct, meaning, "John eats the meal, but/and Mary did not drink beer." This possibility arises because the Present tense morpheme may be null in Korean. The oddity of this reading is due to an unnatural sequence of tenses.

14 This possibility exists because Korean is a pro-drop language.

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