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Korean verbal morphology: Inflectional affixes are heads

Lee, Dong-Jae, Ph.D.
University of Hawaii, 1992

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KOREAN VERBAL MORPHOLOGY: INFLECTIONAL AFFIXES ARE HEADS

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN LINGUISTICS MAY 1992

By Dong-Jae Lee

Dissertation Committee:
Roderick A. Jacobs, Chairperson
Ho-Min Sohn
William O'Grady
Anatole Lyovin
P. Gregory Lee
John Haig
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by

Dong-Jae Lee
DEDICATION

I dedicate this dissertation to

the gracious and kind support of

Mr. and Mrs. Chul Run Park
of Honolulu, Hawaii

April, 1992
ACKNOWLEDGEMENT

I am grateful to the University of Hawaii for welcoming and sustaining me, a prodigal son. I am in debt to numerous people in the completion of my Ph.D.

First and foremost, special thanks go to Professor Roderick A. Jacobs, my academic advisor and chairman of my committee, from whom I learned how to do linguistics in and out of his classes. But for his ever-present guidance, encouragement, and patience, this dissertation would not have been possible. My gratitude to him is beyond expression. Professor William O'Grady has played no less a role in my endeavor to finish the program: his interest in what I have been doing and his insight in linguistics and the Korean language gave me the courage to create a dissertation out of my sometimes naive and unorganized thoughts. He generously shared his precious talent and time with me. I also thank Professor Ho-Min Sohn. His immense knowledge of Korean made it possible for me to avoid major errors in my understanding of Korean grammar: I always learned a lot from his comments during our discussions. I feel particularly guilty to him because he had to bear various departmental chores alone.

My sincere gratitude goes to Professors Gregory P. Lee, John Haig, and Anatole Lyovin for their comments and discussions, which always stimulated me to rethink and sharpen my ideas.
I am indebted to Professor Emeritus Howard McKaughan, a former chairman, and Professor Byron Bender, the current chairman of the Department of Linguistics for their unfailing moral support and concern; without it, I sometimes wonder whether I would have ever returned to the linguistics program. I am also grateful to Professor Samuel Martin, who shared innumerable and invaluable discussions with me while he was visiting at the University of Hawaii. His influence is clearly visible in the data part of my dissertation.

I would like to thank my colleagues in the Department of East Asian Languages and Literature, Professors, David Ashworth, Gerald Mathias, and James Landers for their comments and insightful ideas.

Last but not least, my wife Hyung-Ja has given me never-ending support through the long and challenging road I have taken. She rightfully deserves her "Ph. T."
ABSTRACT

The purpose of this study is twofold: one is to present a systematic and comprehensive analysis of Korean verb paradigms and the other is to propose, on the basis of this analysis, that there is no need to distinguish among inflectional suffixes, derivational suffixes, and verb stems with respect to feature percolation.

Korean verbs have been classified into two classes—processive verbs and descriptive verbs, corresponding approximately to English verbs and adjectives, on the criterion of selection of plain level statement endings. This criterion should be expanded to include plain level question endings. On the basis of these expanded criteria, we propose that Korean verb stems be classified into four subcategories: processive, descriptive, hybrid, and transparent. We propose that 'inflectional' suffixes and suffix phrases of verbs be classified according to the same criteria into the same four subcategories. This four-way classification immediately provides a descriptively adequate account of the 'peculiar' behavior of the so-called existentials.

A feature analysis is proposed to capture the native speaker's intuition that the four different subcategories form natural distributional classes in different combinations. The four subcategories are reanalyzed as complexes of two binary valued features [±P] and [±D].
Korean verb 'inflectional' suffixes bear subcategory features as well as inflectional features. Both types of features are multiply marked. However, as features of a suffix percolate, inflectional features accumulate while subcategory features of an outer suffix supersede those of an inner suffix.

Feature percolation theories proposed to date cannot account for this disparate behavior. Lieber (1989) presents a theoretical framework which, with certain modifications, could provide an adequate account of the Korean data. We propose that her framework be modified to treat 'inflectional' affixes as heads.

The major conclusion of this study is that there is no need to distinguish among inflectional suffixes, derivational affixes, and verb stems (cf. free morphemes) with respect to feature percolation. This analysis represents a generalization of the feature percolation in 'inflectional' word formation for Korean, Yavapai, and Latin, one which holds promise for consideration as a language universal.
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LIST OF ABBREVIATIONS AND SYMBOLS

3p  3rd person
I  first person
II second person
A  adjective
AUTH authoritative
ASP aspect
C/P causative/passive
C(AU) causative
COMM command
COMP complementizer
CMPL completive
CONC concrete
CONJ conjunctive
DAT dative
D(ESC) descriptive
EXC(L) exclamation
FAM familiar speech level ending
FEM feminine
FML formal speech level ending
GEN genitive
FUT future
H(YER) hybrid
HON honorific
HUM humble
IND indicative
INF infinitive
INFL inflectional affixes
INT intimate speech level ending
MASC masculine
ME modifier ending
MOD modifier
N noun
NEG negation
NOM nominative
NOML nominalizer
OBJ object
PASS passive
PFCT perfective
pl plural
PLN plain speech level ending
POLI polite speech level ending
P(ROC) processive
PROG progressive
PROP propositive
Q(UES) question
RETR retrospective
S sentence
s.b. somebody
s.c. subcategory
LIST OF ABBREVIATIONS AND SYMBOLS (Cont’d)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE</td>
<td>sentence ending</td>
</tr>
<tr>
<td>sg</td>
<td>singular</td>
</tr>
<tr>
<td>SITU</td>
<td>situational</td>
</tr>
<tr>
<td>S.S.</td>
<td>same subject</td>
</tr>
<tr>
<td>s.t.</td>
<td>something</td>
</tr>
<tr>
<td>STL</td>
<td>style</td>
</tr>
<tr>
<td>STM(T)</td>
<td>statement</td>
</tr>
<tr>
<td>SUBJ</td>
<td>subject</td>
</tr>
<tr>
<td>T(TRANS)</td>
<td>transparent</td>
</tr>
<tr>
<td>TNS</td>
<td>tense</td>
</tr>
<tr>
<td>TOP</td>
<td>topic</td>
</tr>
<tr>
<td>TRANS</td>
<td>transferentive</td>
</tr>
<tr>
<td>V</td>
<td>verb</td>
</tr>
<tr>
<td>VBLZ</td>
<td>verbalizer</td>
</tr>
<tr>
<td>V/C</td>
<td>volition/conjecture</td>
</tr>
<tr>
<td>VS</td>
<td>verb stem</td>
</tr>
<tr>
<td>*</td>
<td>ungrammatical</td>
</tr>
<tr>
<td>?</td>
<td>marginal element</td>
</tr>
<tr>
<td>??</td>
<td>more marginal element</td>
</tr>
<tr>
<td>&quot;...&quot;</td>
<td>direct quotations</td>
</tr>
<tr>
<td>'...'</td>
<td>new or unfamiliar terms,</td>
</tr>
<tr>
<td></td>
<td>or terms being discussed</td>
</tr>
</tbody>
</table>

The Yale Romanization system is used for the transcription of Korean.
1.1 The Issues

The goals of this study are twofold: one is to present a systematic and comprehensive analysis of Korean verb paradigms and the other is to propose, on the grounds of this analysis, a theory of feature percolation.

Korean verb inflectional suffixes bear subcategory features (see Chapter 2 for definition) in addition to inflectional features. Both types are multiply marked. The issue of multiple marking for a feature in a single lexical item has been receiving considerable attention in the last decade (cf. Anderson 1982, 1985, 1988; Jensen and Stong-Jensen 1984; Lieber 1989). Lieber (1989) attempts to account for the multiple marking by means of feature percolation. She distinguishes inflectional and derivational word formation, claiming that morphosyntactic features (see Chapters 2 and 9 for a definition) are additive in inflectional word formation but, in derivational word formation, the values for morphosyntactic features of outer morphemes supersede those of inner morphemes.

In Korean inflectional word formation, inflectional and subcategory features, which are morphosyntactic, behave disparately. We will show that, as features of a suffix percolate, the inflectional features accumulate while the subcategory features of an outer suffix supersede those of
an inner suffix. We will construct a percolation theory to account for both the 'additive' and 'superseding' phenomena in inflectional word formation.

The specific issues involved in achieving the above goals are in two areas--Korean verbal morphology and percolation.

1.1.1 In Korean Verbal Morphology

(1)
   a. Are the plain level speech statement endings an adequate criterion for the subclassification of verbs?
   b. How many subclasses need to be posited for Korean verb stems?
   c. Are verb suffixes to be classified on the same criteria and into the same subclasses as verb stems?
   d. Are suffix phrases also to be classified in the same way as the verb stems and suffixes?
   e. How is the native speaker's intuition to be captured with respect to the subclassification of verb stems, suffixes, and suffix phrases?
   f. What is the structure of verb paradigms consisting of the verb stem, suffixes, and sentence endings?
1.1.2 In Percolation

(2)

a. Is an inflectional suffix a head?

b. Are features always cumulative in inflectional word formation?

c. Do inflectional affixes, derivational affixes, and stems differ with respect to percolation of subclassification features?

d. Do diacritic features percolate?

1.2 Overview of Korean and Korean Verbal Morphology

In this section, we present a brief and general overview of the characteristics of Korean which are relevant to the present study. Korean is typologically a verb-final and agglutinative language. The distinction observed between verbs and adjectives in many other languages is lacking. Word order is free in general as illustrated in the following examples:

(3)

a. John-i cip-eyse kimchi-lul mek-nun-ta
   SUBJ home at OBJ eat STMT
   'John eats kimchi at home.'

b. Kimchi-lul John-i cip-eyse mek-nun-ta
   OBJ SUBJ home at eat STMT
   'John eats kimchi at home.'

c. Cip-eyse John-i kimchi-lul mek-nun-ta
   home at SUBJ OBJ eat STMT
   'John eats kimchi at home.'

Korean is a left-branching language. Whatever the type of modifier, the modifier precedes the modified. The
modifier can be adjectival, adverbial, or conjunctive as follows:

(4)

a. Cip-eyse kimchi-lul mek-nun John
   home at OBJ eat MOD
   'John who eats kimchi at home'

b. John-i cip-eyse kimchi-lul cacwu mek-ni?
   SUBJ home at OBJ often eat Q
   'Does John eat kimchi often at home?'

c. John-i cip-eyse kimchi-lul mek-ciman
   SUBJ home at OBJ eat although
   hakkyo-eyse mek-ci anh-nun-ta
   school at eat not STMT
   'Although John eats kimchi at home, he does not eat it at school.'

As shown in the matrix sentence in (4c), except for the verb, sentence constituents may be freely deleted if recoverable from the context or situation. Another example of such deletion is in (5) below, in which, (5b) rather than (5c) is a typical response to the question (5a):

(5)

a. John-i cip-eyse kimchi-lul mek-ni?
   SUBJ home at OBJ eat Q
   'Does John eat kimchi at home?'

b. Kulay, mek-nun-ta
   yes eat STMT
   'Yes, (he) eats (it) (there).'

c. Kulay, ku-ka ku-kes-ul keki-eyse mek-nun-ta
   yes he SUBJ it OBJ there at eat STMT
   'Yes, he eats it there.'

The Korean language has a complex system for representing social relationships. Depending on the power
and solidarity relationship between the speaker and addressee, the speech changes: the "higher" person in the power and solidarity hierarchy speaks differently from a person who is "lower" on the scale. Various linguistic mechanisms encode the difference. Korean has two statuses, some honorific/humble lexical items and six distinctive speech levels. The two statuses are the subject honorification expressed by the agglutinative suffix -(u)si or nothing as we will see below. Honorific and humble lexical items include the personal pronouns such as ce 'I', the humble counterpart of na 'I' (neutral), and nouns such as cinci, the honorific form of pap 'meal or rice', and verbs such as capswusi- 'eat', the honorific counterpart of mek- 'eat', kyeysi 'stay', the honorific counterpart of iss- 'stay', tuli- 'give', the humble form of cwu- 'give' used for beneficiary honorification, and mosi- 'accompany', the humble form of tayli- 'accompany' used for object honorification. The six speech levels are: formal, polite, authoritative, familiar, intimate, and plain, all of which are encoded by sentence endings.

1.2.1 Endings

Endings are of two types: one indicates that the sentence to which it is suffixed may be used as complete

---

sentences. The sentence endings showing the power and solidarity relationship between the speaker and addressee belong to this type. The other type indicates that the sentence to which the ending is suffixed stands in construction with other elements in a matrix sentence. This type includes modifier endings, with which we are especially concerned in this study. We will begin with the endings which encode the speech level and completion of the sentence. These will be referred to as sentence endings.

1.2.1.1 Sentence Endings

Martin (1964:408) observes, "Koreans are forced to make a choice alien to us [English speakers]: that of speech levels." Depending on the relationship between the speaker and addressee (and sometimes the hearer), English expression, "Is the water deep?" can be said as follows:

(6)

<table>
<thead>
<tr>
<th>Type</th>
<th>Ending</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Formal</td>
<td>mwul -i kiph-sup-ni-kka?</td>
<td>water SUBJ deep FML SE</td>
</tr>
<tr>
<td>b. Polite</td>
<td>mwul -i kiph -e -yo?</td>
<td>POLI SE</td>
</tr>
<tr>
<td>c. Authoritative</td>
<td>mwul -i kiph -so?</td>
<td>AUTH SE</td>
</tr>
<tr>
<td>d. Familiar</td>
<td>mwul -i kiph -e?</td>
<td>FAM SE</td>
</tr>
<tr>
<td>e. Intimate</td>
<td>mwul -i kiph -na?</td>
<td>INT SE</td>
</tr>
<tr>
<td>f. Plain</td>
<td>mwul -i kiph -uni?</td>
<td>PLN SE</td>
</tr>
</tbody>
</table>

2. Martin’s term for this level is "deferential".
As is exhibited in (6), different speech levels are encoded by sentence endings, which are comprised of different components. The sentence endings in (6) are question endings. The statement, proposal, and command sentence endings in addition to the question endings of different speech levels belong the following paradigms:

(7) Sentence Endings for Different Speech Levels

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>STATEMENT</th>
<th>PROPOSAL</th>
<th>COMMAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORMAL</td>
<td>-(su)p-ni-kka</td>
<td>-(su)p-ni-ta</td>
<td>-p-si-ta</td>
</tr>
<tr>
<td>POLITE</td>
<td>-INF-yo</td>
<td>-INF-yo</td>
<td>-INF-yo</td>
</tr>
<tr>
<td>AUTH</td>
<td>-(s)o</td>
<td>-(s)o</td>
<td>-(s)o</td>
</tr>
<tr>
<td>FAMILIAR</td>
<td>-na</td>
<td>-ney</td>
<td>-sey</td>
</tr>
<tr>
<td>INTIMATE</td>
<td>-INF</td>
<td>-INF</td>
<td>-INF</td>
</tr>
<tr>
<td>PLAIN</td>
<td>-ni/-uni</td>
<td>-nun/ŋ-ta</td>
<td>-ca</td>
</tr>
</tbody>
</table>

As we see from (7), some sentence endings consist of three suffixes (formal level speech), some of two (polite level and plain level speech), and other sentence endings of one. Formal level speech is used to show the highest level of deference to the addressee by the speaker and the others in a descending degree of deference following the hierarchy listed in (7), the plain level speech being the lowest. The plain level, being the lowest in the order and deprived of trappings of different levels of deference, is often used as an editorial type of speech and as the basis for indirect

---

3. INF stands for the term 'infinitive'. We use this term for a formative used in various constructions, one of which is sentence endings. It has several shapes. Phonologically predictable ones are ə and e, the former occurring after the sound ə or o and the latter elsewhere. Since e has much wider distribution, INF is represented by e hereafter.
quotative sentences. Since the present study is mainly concerned with the plain level speech and occasionally with formal level speech, we consider examples comprised of these two speech levels. A typical dialogue situation to show how these two levels are employed is the pair of sentences following:

(8)

a. Apenim, cinci capswusi - p - ni - kka?
   father meal eat FML SE
   'Father, you are going to eat (honorific) the meal (honorific)?'

b. Ung, mek - nun -ta
   Hmm eat PLAIN SE
   'Hmm, (I) am going to eat (it).'

Apenim, cinci, and capswusi are the honorific counterparts respectively of the nouns apeci 'father', pap 'meal', and the verb mek- 'eat'. The speaker of (8a), who must be a son/daughter of the father, uses these honorific terms and the highest speech level sentence ending. The speaker of (8b) must be the father himself. A father cannot show deference to himself and cannot use the honorific suffix or honorific lexical item capswusi- 'eat' instead of the neutral form mek- 'eat'. The sentence ending he employs is that of the lowest speech level, plain level speech, which is used to one's offspring or to children in general. We have seen above two instances of plain level speech sentence endings. They are (6f) and (8b), repeated respectively as (9) and (10) below:
(9) (=6f)
   mwul -i kiph -uni?
   water SUBJ deep PLAIN SE
   'Is the water deep?'

(10) (=8b)
   Ung, mek - nun -ta
   Hum eat PLAIN SE.
   'Hum, (I) am going to eat (it).'

The predicates in (9) and (10) are different in that kiph-in (9) is an adjective while mek- in (10) is a verb. (See 1.2.2 below for different terms for verbs and adjectives and other subclasses of verbs.) (9) is a question and (10) a statement. We will add the statement and question counterparts to (9) and (10) as follows:

(11)
   a. mwul -i kiph -uni?
      water SUBJ deep PLAIN Q SE
      'Is the water deep?'
   b. mwul -i kiph -ta
      water SUBJ deep PLAIN STMT SE
      'The water is deep.'

(12)
   a. mek - nun -ta
      eat PLAIN STMT SE
      '(I) am going to eat (it).'
   b. mek - ni?
      eat PLAIN Q SE
      '(Are) you going to eat (it)?'

What we find here is that the sentence endings (henceforth SE's) differ depending on the type of predicate to which they are suffixed. The difference can be represented as in (13):

 four. The interjection Ung is irrelevant to our discussion and will be omitted.
(13) Plain Level Speech Sentence Endings (to be revised)

<table>
<thead>
<tr>
<th>Verbs</th>
<th>Adjectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement</td>
<td>-nun-ta</td>
</tr>
<tr>
<td>Question</td>
<td>-ni</td>
</tr>
</tbody>
</table>

Note, however, that the verb and adjective in (11) and (12) end in a consonant. When a stem ends in a vowel, the shape of the SE can be different, as shown here:

(14)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| a. | Mwul -i ssa -ni?
|    | water SUBJ cheap PLAIN Q SE
|    | ‘Is the water cheap?’ |
| b. | Mwul -i ssa -ta
|    | water SUBJ cheap PLAIN STMT SE
|    | ‘The water is cheap.’ |

(15)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| a. | Sa - n-ta
|    | buy PLAIN STMT SE
|    | ‘(I) am going to buy (it).’ |
| b. | Sa - ni?
|    | buy PLAIN Q SE
|    | ‘(Are) you going to buy (it)?’ |

The question SE after a vowel is not -uni but -ni and the statement SE suffixed to a verb which ends in a vowel is -n rather than -nun. This can be incorporated into (13) above as follows:

(16) Plain Level Speech Sentence Endings (revised)

<table>
<thead>
<tr>
<th>Verbs</th>
<th>Adjectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement</td>
<td>-(nu)n-ta</td>
</tr>
<tr>
<td>Question</td>
<td>-ni</td>
</tr>
</tbody>
</table>

10
The modifier endings are used when the sentence to which they are suffixed function as modifiers of the noun which follows:

(17)

a. Hakkyo -ey o-nun haksayng
   school to come student
   'a student who is coming to school'

b. Hakkyo -ey o -n haksayng
   school to come student
   'a student who came to school'

c. Hakkyo -ey o -l haksayng
   school to come student
   'a student who will/would come to school'

d. Hakkyo -eye se pappu -n haksayng
   school at busy student
   'a student who is busy at school'

The underlined suffixes -nun, -n, -l, and -n all are modifier suffixes. These occur after a stem which ends in a vowel but may have different shapes after a stem ending in a consonant, as shown in the following examples:

(18)

a. Kimchi-lul mek-nun haksayng
   OBJ eat MOD student
   'a student who eats kimchi'

b. Kimchi-lul mek-un haksayng
   OBJ eat MOD student
   'a student who ate kimchi'

c. Kimchi-lul mek-ul haksayng
   OBJ eat MOD student
   'a student who will/would eat kimchi'

d. Maum -i kiph-un haksayng
   heart SUBJ deep MOD student
   'a student whose heart is deep (a considerate student)'
The modifier suffixes in (18) have the shapes -nun, -un, -ul, and -un, which are suffixed after a stem which ends in a consonant. Note here that the modifier suffix -nun is the same whether the preceding stem ends in a vowel or a consonant. On the other hand, the other endings have the linking vowel -u when the stem ends in a consonant. In Korean, some formatives have one shape (e.g., -nun) and others two or more shapes. Those which have two shapes, in general, show the hiatus phenomenon; if the stem ends in a vowel, and the formative begins with a vowel, the linking vowel -u is deleted to avoid the vowel succession and to maintain the consonant-vowel alternating pattern as in the case of three modifier suffixes above. We will indicate the deletion of the linking vowel -u by parentheses as in -(u)n, -(u)l, and -(u)n.

We will now consider the function of these modifier suffixes. They are suffixed to a sentence and make the sentence into what is equivalent to a relative clause in English. Martin (1954) calls them adnominal suffixes signifying that these suffixes make the sentence additive to a head noun. Following the general tradition, we call them modifier endings (ME's hereafter) (See Chapter 4 for detailed analysis of these forms).

Korean has two tenses: past and non-past (see 1.2.3.3 below for the past tense suffix -ess). As shown in (17) and (18), -nun is suffixed only to a verb and encodes the non-
past, -(u)n signifies the past tense if suffixed to a verb and non-past if affixed to an adjective. The suffix -(u)l is normally used with a verb and is generally analyzed as encoding the future tense. It has been called the 'future' modifier ending. However, we follow H-M Sohn (1974 and 1987) in considering it to be a modal and we call it the volition/probability modifier ending. Observe the following examples:

(19)
   tomorrow school to come MOD person TOP hand OBJ raise COMM
   'Ones who will come to school tomorrow, raise your hands!'

b. Nayil hakkyo-ey o -(u)l salam-un son-ul tul -e-la.
   tomorrow school to come MOD person TOP hand OBJ raise COMM
   'Ones who would come to school tomorrow, raise your hands!'

In (19a), the English translational equivalent is in the future tense: i.e., -nun can refer to some event or situation which is in the future. It shows that the suffix -nun encodes the non-past tense, which includes the present and future tenses in the natural time. The -(u)l in sentence (19b) encodes the volition or conjecture of the speaker; the English translational equivalent is 'would' in the sense of '(one who) intends to (come)' or '(one who) will probably (come)'. The meaning is the same as that borne by the inflectional suffix -keyss, which we will discuss in 1.2.3 below. The past tense and volitional/conjecture forms of adjectives are not represented by these modifier endings in Korean. They are, instead, indicated as in (20):
a. hakkyo -eyse pappu -ess -te -n haksayng
   school at busy PAST RETR student
   'a student who was busy at school'

b. hakkyo -eyse pappu -e ci -l haksayng
   school at busy become student
   'a student who would become busy at school'

The adjective has no volition construction. The constructions in (20) involve other complex phenomena outside of the scope of this study.

We can summarize the modifier endings as follows:

(21) Modifier Endings

<table>
<thead>
<tr>
<th></th>
<th>Verbs</th>
<th>Adjectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past</td>
<td>-(u)n</td>
<td>x</td>
</tr>
<tr>
<td>Non-Past</td>
<td>-nun</td>
<td>-(u)n</td>
</tr>
<tr>
<td>Vol/Conj</td>
<td>-(u)l</td>
<td>x</td>
</tr>
</tbody>
</table>

1.2.2 Verb Stems

Korean verbs have traditionally been divided into two classes: those which are processive and those which are descriptive. Processive verbs and descriptive verbs are also called verbs and adjectives respectively. We argue in Chapter 3 that there are two other types of verbs--one of which is generally referred to as the "existential part-of-speech", the other includes the verbalizer ha- and toy- 'become, be'. For the present, we use the terms verbs and adjectives; later we will see that terms processive verbs and descriptive verbs are more accurate.
1.2.2.1 Verbs (or Processive Verbs) and Adjectives (or Descriptive Verbs)

In the preceding section, we stated that Korean SE’s are affixed two types of stems—verb stems and adjective stems. Verb stems include mek- ‘eat’, capswusi- ‘eat (honorific)’, sa- ‘buy’, q- ‘come’, tul- ‘lift’. Adjective stems include kiph- ‘deep’, ssa- ‘cheap’, pappu- ‘busy’.

One characteristic of Korean verb and adjective stems is that they are bound forms: i.e., the stems cannot be used without being suffixed by endings which include sentence endings and modifier endings discussed in the previous section. Korean verbs and adjectives are different from English verbs and adjectives. The English adjective ‘busy’, for example, may be used without a suffix as an attribute as in (22a) and as a predicate following a copula as in (22b):

(22)

a. the busy doctor
b. The doctor is busy.

In either usage, the Korean adjective pappu- ‘busy’, for example, has to be suffixed by a ME or SE as in:

(23)

a. pappu - n uysa
   busy ME doctor
   ‘the busy doctor (=the doctor who is busy)’

b. Uysa -ka pappu -ta
   doctor SUBJ busy SE
   ‘The doctor is busy.’

Verbs behave exactly in the same way. Observe how the verb q- ‘come’, for example, is used:
Both verb stems and adjective stems may be suffixed by any or all of the following suffixes:

We will choose the past tense suffix -ess as an example to show the conjugation of both verb and adjective stems:

As attributes, both verb and adjective stems are suffixed with the affixes in (25). We select the retrospective suffix as an example:

\[ \text{(27)} \]
\[
\begin{align*}
\text{a. } & \text{o} -\text{te} -n \text{ uysa} \\
& \text{come RETR ME doctor} \\
& \text{‘the doctor whom I found was coming’}
\end{align*}
\]
\[
\begin{align*}
\text{b. } & \text{pappu-te} -n \text{ uysa} \\
& \text{busy RETR ME} \\
& \text{‘the doctor whom I found to be busy’}
\end{align*}
\]

---

\[ ^5 \text{. See the next section for functions of these suffixes.} \]
From this perspective, verb stems and adjective stems behave in the same way. In (26), both verb stems and adjective stems are inflected for tense; in (27), both are inflected for the retrospective and are made into attributes by means of the modifier ending. What, then, is the distinction between verb stems and adjective stems? One crucial distinction is revealed in the plain level speech sentence endings summarized in (16) in the previous section and are repeated below:

(16) Plain Level Speech Sentence Endings (revised)

<table>
<thead>
<tr>
<th></th>
<th>Verbs</th>
<th>Adjectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement</td>
<td>-(nu)n-ta</td>
<td>-ta</td>
</tr>
<tr>
<td>Question</td>
<td>-ni</td>
<td>-(u)ni</td>
</tr>
</tbody>
</table>

The other distinction is in the modifier endings summarized in (21), in the previous section, and repeated below:

(21) Modifier Endings

<table>
<thead>
<tr>
<th></th>
<th>Verbs</th>
<th>Adjectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past</td>
<td>-(u)n</td>
<td>x</td>
</tr>
<tr>
<td>Non-Past</td>
<td>-nun</td>
<td>-(u)n</td>
</tr>
<tr>
<td>Vol/Conj</td>
<td>-(u)l</td>
<td>x</td>
</tr>
</tbody>
</table>

Verbs, but not adjectives, may be converted into predicates for commands and proposals using command and proposal SE’s shown here:

(28)

a. mek - e - 1a
   eat COMMAND SE
   ‘Eat (it)!’
b. *kiph - e - la  
depth COMMAND SE

(29)
a. mek - ca  
eat PROPOSAL SE  
'Let's eat (it).'

b. *kiph - ca  
depth PROPOSAL SE

On the basis partly of the plain level speech statement endings and partly of the command and proposal forms, Martin (1954) calls verb stems 'processive verbs' and adjective stems 'descriptive verbs'. In this chapter, instead of Martin's these terms, we will use the terms verbs and adjectives, which are more commonly employed by the majority of Korean linguists, including Martin (1963, 1967), Y-S Kang (1986), Cheong-Soo Suh (1990), and H-M Sohn (forthcoming).

There are two other types of verb. One is the so-called 'concaasa', the literal meaning of which is 'existential part-of-speech'. These verbs are called 'existentials.'

1.2.2.2 Existentials

This type includes iss- 'have, exist, stay', its negative eps-, and its honorific counterpart kyeysi-. We will discuss their properties in Chapter 4. It suffices here to point out that they appear to behave like both verbs
and adjectives, especially in the selection of SE's.

Observe the examples in (30):

(30)

a. Uysa -ka ton -i iss -ta
   doctor NOM money NOM have STMT SE
   'The doctor has money.'

b. Uysa -ka cip -ey iss -ta
   doctor SUBJ house at exist STMT SE
   'The doctor is at home.'

c. Uysa -ka cip -ey iss -nun-ta
   doctor SUBJ house at stay STMT SE
   'The doctor stays at home.'

The question counterparts of sentences in (30) are shown in (31):

(31)

a. Uysa -ka ton -i iss -ni
   doctor NOM money NOM have Q SE
   'Does the doctor have money?'

b. Uysa -ka cip -ey iss -ni
   doctor SUBJ house at exist Q SE
   'Is the doctor at home?'

c. Uysa -ka cip -ey iss -ni
   doctor SUBJ house at stay Q SE
   'Does the doctor stay at home?'

The peculiarity of iss-, a concaysa ("existential part-of-speech") is that it selects different statement SE's as in (30) but the same question SE's as in (31). This cannot be accounted for by the two-way distinction represented in (16) above and repeated below:

---

6. In this study, the term 'select' is not necessarily used in the established sense found in such terms as "C-select". See note 8.
Plain Level Speech Sentence Endings (revised)

<table>
<thead>
<tr>
<th>Verbs</th>
<th>Adjectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement</td>
<td>-(nu)n-ta</td>
</tr>
<tr>
<td>Question</td>
<td>-ni</td>
</tr>
</tbody>
</table>

See Chapter 3 for an account of how concaysa selects SE, ME, and other endings.

Like verbs and adjectives, the items in concaysa "existential part-of-speech" may be suffixed with any of the inflectional affixes listed in the verb paradigm (25) above, as shown in the examples in (32):

(32)

a. Uysa -ka ton -i iss -ess -ta
   doctor NOM money NOM have PAST STMT SE
   'The doctor had money.'

b. Uysa -ka cip -ey iss -ess -ta
   doctor SUBJ house at exist PAST STMT SE
   'The doctor was at home.'

c. Uysa -ka cip -ey iss -ess-ta
   doctor SUBJ house at stay PAST STMT SE
   'The doctor stayed at home.'

As attributives, the elements in concaysa are like verb and adjective stems in being suffixed by the same affixes, those shown in (25). We will use the retrospective suffix as an example:

(33)

a. ton -i iss -te -n uysa
   money NOM have RETR MOD
   'the doctor whom I found have money'

b. cip -ey iss -te -n uysa
   house at exist RETR MOD
   'the doctor whom I found to have been at home'
Seen from this perspective, stems of "existential part-of-speech" type, behave exactly in the same way as verb stems and adjective stems.

1.2.2.3 Verbalizers ha- and toy-

The other type of verbs includes the verbalizers ha- and toy- 'become, be'. Ha- as an independent element is a bona fide verb in the meaning of 'do', as in (34):

(34)

a. Mwues-ul ha -ni?
   what OBJ do Q SE
   'What are you doing?'

b. Ii -ul ha -n-ta
   work OBJ do STMT SE
   'I am doing work.'

When affixed to a noun, ha- is a verbalizer:

(35)

a. Kongpwu -ha -n-ta
   study VBLZ STMT SE
   '(I) am studying.'

b. Hayngpok -ha -ta
   happiness VBLZ STMT SE
   '(I) am happy.'

In (35), kongpwu is a processive noun and hayngpok a descriptive noun. The verbalizer ha- converts these nouns into a processive verb and a descriptive verb respectively as can be seen from the SE they take. The ha- does not add any appreciable semantic content to the newly derived verb.
Ha- itself is neither a processive nor a descriptive verb. We discuss this point further in Chapter 3.

Toy- is also used as an independent verb in the meaning of 'become':

(36)
a. Salam-un cwuk-e-se sin-i toy n -ta
   man TOP die after god NOM become SE
   'Man becomes a god after death.'

b. Haksayng-i sensayng-i toy -ess -ta
   student SUBJ student NOM become PAST SE
   'A student became a teacher.'

Toy- as an independent verb behaves like a processive verb. When suffixed to nouns, toy- converts these nouns into processive and descriptive verbs depending on the type of nouns they are attached to, as can be seen from the SE they take:

(37)
a. Sicak -toy -n-ta
   begin become STMT SE
   '(Something) gets started.'

b. Cham -toy -ta
   truth is STMT SE
   '(Someone) is truthful.'

Toy- derives a verb and adds a kind of passive meaning to the verb if the noun to which it is suffixed is a processive noun. Toy- itself is also neither processive nor descriptive.

In conclusion, Korean has four subclasses of verbs: verbs, adjectives, "existential part-of-speech", and the verbalizer ha- and toy- ‘become, be’. The SE-selection by these subclasses can be summarized as in (38):
Classification of Verbs.

<table>
<thead>
<tr>
<th>Sentence Endings</th>
<th>Statement</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbs mek-/ka-</td>
<td>nun/n</td>
<td>ð</td>
</tr>
<tr>
<td>eat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>go</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjectives</td>
<td>ð</td>
<td>(u)</td>
</tr>
<tr>
<td>noph-/ssa-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>high</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cheap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existentials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iss7-(eps-)</td>
<td>cannot be defined as yet</td>
<td></td>
</tr>
<tr>
<td>have, exist, stay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbalizer ha-</td>
<td>does not select</td>
<td></td>
</tr>
<tr>
<td>toy- 'become, be'</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We have now observed that there is no crucial difference between the so-called categories of verbs and adjectives in their behavior. Rather, they, along with existentials, exhibit the same kind of behavior. The verbalizers ha- and toy- create verbs or adjectives which behave just as any non-derived verbs or adjective. To capture this generalization, we will now use the category verb to cover all four types and consider each type as a subcategory of the category verb. These subcategories will be labeled 'processive verbs', 'descriptive verbs', 'hybrid verbs,' and 'transparent verbs'. We will use the term subcategory features to refer to the features which make them select associated SE's, ME's and other endings.

---

7. We will demonstrate in Chapter 3 that the verb iss- in the meaning of 'stay' is a bona fide 'verb' and not a "existential part-of-speech".

8. Since the term 'subcategory' is used in this special way, the term 'subcategorization' is not necessarily used in the sense found in established terms such as 'subcategorization frame'. See note 6.
1.2.3 Suffixes

A verb stem may be affixed by the following agglutinative suffixes and SE or ME discussed in 1.2.1 above:

<table>
<thead>
<tr>
<th>Status</th>
<th>Tense</th>
<th>Tense</th>
<th>Modal</th>
<th>Modal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verb Stem</td>
<td>i</td>
<td>usi</td>
<td>ess</td>
<td>ess</td>
</tr>
<tr>
<td>CAU/PASS</td>
<td>HON</td>
<td>PAST</td>
<td>PAST</td>
<td>V/C</td>
</tr>
</tbody>
</table>

We will present below a brief description of each of these suffixes.

1.2.3.1 The Causative/Passive Suffix -i

The causative/passive suffix has allomorphs -li after [l]; -ki after nasals, [kk], and [s]; and -hi after other fricatives and stops; -wu; -chwu; etc. We will first discuss causative -i. Observe the following examples:

(39)

a. Ai -ka pap-ul mek-nun-ta
   child SUBJ rice OBJ eat SE
   'The child eats rice.'

b. Emeni -ka ai-eykey/lul pap-ul mek -i-n-ta
   mother SUBJ child to/OBJ rice OBJ eat CAUS SE
   'The mother makes/lets the child eat the rice.' or
   'The mother gets the child to eat the rice.'

(40)

a. Ai -ka miek-ul kam-nun-ta
   child SUBJ bath OBJ take SE
   'The child takes a bath.'

b. Emeni -ka ai-eykey/lul miek-ul kam -ki-n-ta
   mother SUBJ child to/OBJ bath OBJ take CAUS SE
   'The mother makes/lets the child take a bath.' or
   'The mother gets the child to take a bath.'
The examples (39) and (40) show that:
1) the causative suffix -i adds a new subject and changes
the original subject into either the dative or accusative;
2) the meaning added by the causative suffix -i does not
distinguish among causation by coercion, permission, or
persuasion.

When the causative suffix contains an -i, the vowel of
the verb stem may have an alternative form. The
causativized verbs in (39b) and (40b) may have alternative
pronunciations as follows:

(41)
39b. mek-i-n-ta vs. meyk-i-n-ta
40b. kam-ki-n-ta vs. kaym-ki-n-ta [kayng-gi-n-da]

The meaning conveyed by the verb to which -i is affixed
cannot always be predicted from that of the base verb, as
shown in (42) and (43):

(42)
a. John-un nach-i . pwulk-ta
   TOP face SUBJ red SE
   'John has a red face.'

   TOP face OBJ red CAUS SE
   'John blushes.' or
   'John becomes angry.'

(43)
a. Yen -i nal-nun-ta
   kite SUBJ fly SE
   'A kite flies'

   SUBJ kite OBJ fly CAUS PAST SE
   'John flew a kite.' or
   'John lost a kite.'
The causative suffix converts a descriptive verb into a processive verb as in (42) above: the SE -ta is changed to -n-ta.

In addition to the causative built from the suffix -i, there is a syntactic causative construction using -key ha-:

(44)
\[
\begin{align*}
&\text{a. John-i ka-n-ta.} \\
&\text{SUBJ go SE} \\
&\text{‘John is going.’}
\end{align*}
\]

\[
\begin{align*}
&\text{b. Mary-ka John-i/lul/eykey ka-key ha-n-ta} \\
&\text{SUBJ SUBJ/OBJ/DAT go CAUS SE} \\
&\text{‘Mary makes/lets John go.’}
\end{align*}
\]

(45)
\[
\begin{align*}
&\text{a. John-i hayngpok-ha-ta} \\
&\text{SUBJ happy SE} \\
&\text{‘John is happy.’}
\end{align*}
\]

\[
\begin{align*}
&\text{b. Mary-ka John-i/lul/eykey hayngpok-ha-key ha-n-ta} \\
&\text{SUBJ SUBJ/OBJ/DAT happy CAUSE SE} \\
&\text{‘Mary makes John happy.’}
\end{align*}
\]

(46)
\[
\begin{align*}
&\text{a. Mary-ka kimchi-lul salang-ha-n-ta} \\
&\text{SUBJ OBJ love SE} \\
&\text{‘Mary loves kimchi.’}
\end{align*}
\]

\[
\begin{align*}
&\text{b. John-i Mary-ka/lul/eykey kimchi-lul salang-ha-key ha-n-ta} \\
&\text{SUBJ SUBJ/OBJ/DAT OBJ love CAUS SE} \\
&\text{‘John makes Mary love kimchi.’}
\end{align*}
\]

The syntactic causative construction is fully productive while the i-causative is restricted to four hundred to five hundred verbs all of which are native Korean verbs: an i-causative cannot be based on Sino-Korean verbs (verbs which originate from ancient Chinese) such as hayngpok-ha ‘happy’ in (45). However, although the verbs ka- ‘go’ in (44) and salang-ha- ‘love’ in (46) are native Korean verbs, they too cannot have i-causatives.
The change in argument structure, the unpredictable change in pronunciation, the unpredictability in the meaning of -i suffixed words, the subcategory change from a descriptive verb to a processive verb, and the unpredictability of the stems to which the causative suffix -i may be affixed make it necessary to list the words derived by the causative suffix -i in the dictionary.

Nothing can intervene between the verb stem and causative -i while at least the honorific suffix -(u)si may precede the syntactic causative -key-ha- as in:

(47)

a. Emeni-ka ai-eykey/lul pap-ul mek-*usi -i-n-ta
   mother SUBJ child DAT/OBJ rice OBJ eat HON CAUS SE
   'The mother makes/lets the child eat rice.'

b. Mary-ka emeni-i/lul/eykey ka-si-key ha-n-ta
   SUBJ mother SUBJ/OBJ/DAT go HON CAUS SE
   'Mary makes mother go.'

All the affixes in the verb paradigm (25) above can follow the causative suffix -i as shown in (25) itself.

The suffix -i and its allomorphs can also be used to derive the passive counterparts of a verb stem:

(48)

a. Hankwuk-eys e yeng-e-lul ssu-n-ta.
   Korea at English OBJ use SE
   'They use English in Korea.'

b. Hankwuk-eys e yeng-e -ka ssu -i -n-ta.
   Korea at English SUBJ use PASS SE
   'English is used in Korea.'

(49)

a. Koki-lul cap-nun-ta.
   fish OBJ catch SE
   '(S.o.) catches fish.'
b. Koki-ka cap -hi-n-ta.
   fish SUBJ catch PASS SE
   'Fish is caught.'

(50)
a. Ai -ka pap -ul mek-nun-ta
   child SUBJ rice OBJ eat SE
   'The child eats rice.'
b. Pap -i ca l mek-hi-n-ta.
   rice SUBJ well eat PASS SE
   '(I) have a good appetite.'

Most of the characteristics attributable to the causative -i words above are also applicable to the forms with the passive -i as follows:
1) Alternative pronunciation is observed: for example, in (49) and (50) above, cap-hi- and mek-i- may be pronounced cayp-hi- and meyk-i- respectively,
2) Unpredictably meaning change is found: in (50), mek-hi- may mean that somebody has a good appetite;
3) The number of verbs to which the passive suffix -i may be suffixed are very limited and the type of verbs which take this -i form no obviously definable class;
4) Nothing can intervene between the verb stem and the passive suffix.

The major formal differences between causative -i and passive -i are:
1) Only transitive verbs are passivized and the object is changed to the subject as can be seen in (50): the object NP pap-ul has become the subject NP pap-i;
2) Both non-passive and passive verbs remain processive and select the same SE's;
3) The subject of the non-passive sentence is usually not expressed as in (50).

1.2.3.2 The Honorific Suffix -(u)si

This suffix is used to show the speaker’s deference to the subject of a sentence (see below for qualification).

Compare the following sentences:

(51)

   teacher Hon SUBJ school-to go HON FML SE
   'The teacher (a deferential teacher) goes to school.'

   student SUBJ school-to go FML SE
   'The student goes to school.'

The deference shown is based on power relationships such as social status, kinship, age, sex, etc. The deference shown by the honorific suffix -(u)si reflects the relationship between the subject of the sentence in general and the speaker of the sentence. In (51a), the person referred to by the subject is supposedly one who commands deference from the speaker and in (51b), the student is not a person who is in a higher position than the speaker. Note that in both sentences, the SE employed is that of formal level speech: this indicates that the speaker is showing deference to the addressee. The same pair of sentences in (51) appears in plain level speech as follows:

(52)

a. Sensayng-nim-i hakkyo-ey ka-si-n-ta.
   teacher Hon SUBJ school-to go HON PLN SE
   'The teacher (a deferential teacher) goes to school.'
b. Haksayng-i hakkyo-ey ka-n-ta.
student SUBJ school-to go PLN SE
'The student goes to school.'

The message conveyed and the power relationships between the subject and the speaker is the same as in (51) but the relationship between the speaker and the addressee is different. The addressee is treated like a child by the speaker and the plain speech level sentence ending is chosen.

We call -(u)si the subject honorification suffix because it cannot be used for someone represented by a noun in other syntactic position:

(53)
son SUBJ father OBJ meet PAST SE
'The son met the father.'
son SUBJ father to speak PAST SE
'The son spoke to the father.'
son SUBJ father with together go PAST SE
'The son went with the father.'

The person higher in the power and solidarity relationship, apeci 'father,' is not the subject of the sentence.

Although we call -(u)si the subject honorification suffix, it can be used to refer to a deferential person in the following constructions (See S. Shin (1988)):

(54)
a. Sensayng-nim-un hakkyo-ey ka-si-n-ta
teacher HON TOP school to go SE
'As for teacher, he goes to school.'
(55)
   SUBJ yesterday school-to go PAST SE
   ‘John went to school yesterday.’

b. John-i onul hakkyo-ey ka -∅ n-ta
   SUBJ today school-to go SE
   ‘John goes to school today.’

c. John-i nayil hakkyo-ey ka -∅ n-ta
   SUBJ tomorrow school-to go SE
   ‘John will go to school tomorrow.’

As can be seen from (55a), the past tense is encoded by the past tense suffix -ess. (55b) and (55c) are without an
explicit past tense suffix and are interpreted as non-past, which includes the 'future', as in (55c). In some sentences, as in (56) below, the perfective/non-perfective distinction is clearly exhibited:

(56)

a. John-i hakkyo-ey ka-ø-ta-ka o- n-ta
   SUBJ school to go TRANSF come SE
   'John is on his way to school but comes back.'

b. John-i hakkyo-ey ka-ess-ta-ka o- n-ta
   SUBJ school to go PAST TRANSF come SE
   'John arrived at school but comes back.'

In (56a), John is on his way but without completing his action of 'going' and therefore without arriving at school, he comes back. In (56b), John's going is completed and he arrives at school and then comes back.

1.2.3.4 The past past tense suffixes -ess-ess

The -ess -ess is a reduplication of the single -ess and refers to the past in the past. This is the proposal made by Martin (1954), Huh (1977) and Gim (1985). S. Shin (1988:57) calls it the "pluperfect" and quotes the definition of "pluperfect" from Comrie (1985:65) which reads "there is a reference point in the past,...the situation in question is located prior to that reference point." Note in the example, below, the time at which the train left is located prior to the time the speaker arrived at the station:
When I arrived at the station, the train had already left.

A situation that is located prior to another situation can be completive as in:

When I arrived at the classroom, the teaching had already ended.

In this sentence, the first -ess signals perfective aspect, a property of -ess discussed in the preceding subsection.

The primary function of -keyss is to encode either volition or conjecture on the part of the speaker or hearer. As such, volition is exhibited when the sentence is a statement in which the subject is in the first person, as in (59a) below, or when it is a question sentence as in (59b) below:
(59)
a. Pi-ka o-a-to na-nun hakkyo-ey ka-keyss-ta.
   rain SUBJ come even I TOP school-to go STMT
   'Even if it rains, I will go to school.'

b. Pi-ka o-a-to ne-nun hakkyo-ey ka-keyss-ni?
   rain SUBJ come even you TOP school-to go Q
   'Even if it rains, will you go to school?'

In other types of sentences, the prevailing meaning is
certainty by the speaker in statement sentences and
certainty by the addressee in question sentences. Observe the following examples:

(60)
   also come STMT
   'John will come too.'

b. Pi-ka o-keyss-ni?
   rain SUBJ come Q
   'Will it rain?'

Thus, both volition and conjecture tend to be about future situations or events. -keyss is usually translated as 'will'. However, -keyss may cooccur with the past tense suffix -ess as in:

(61)
a. Pi-ka o-ess-keyss-ta.
   rain SUBJ come STMT
   'It must have rained.'

b. Na-ka pwuth-ess-keyss-ni?
   I SUBJ pass Q
   'Would I have passed (the examination) ?'

We see that an analysis treating -keyss as the future tense marker is unjustified.
1.2.5 The Retrospective Suffix -te

This suffix has traditionally not been treated as one of the inflectional suffixes in the verb paradigm. Rather it has been analyzed as one component of the SE discussed in 1.2.1 above. We propose that this be analyzed as one of the inflectional suffixes in Chapter 4. It will suffice here to examine its properties:

(62)

a. John-i kimchi-lul mek -te -la
   SUBJ OBJ eat RETR STMT
   '(I) found John eating kimchi.'

b. John-i kimchi-lul mek -te - n -ka?
   SUBJ OBJ eat RETR MOD QUES
   'Did (you) find John eating kimchi?'

Compare these with following sentences:

(63)

a. John-i kimchi-lul mek -ess -ta
   SUBJ OBJ eat PAST STMT
   'John ate kimchi.'

b. John-i kimchi-lul mek -ess -nun-ka?
   SUBJ OBJ eat PAST MOD QUES
   'Did John eat kimchi?'

The difference in the statement SE and the modifier ending between sentences in (62) and (63) will be discussed in Chapter 4. We find that the replacement of the past tense -ess with -te adds the meaning of 'I found....' to the statement and 'Did you find...?' in the question. Martin (1954) calls -te the retrospective suffix. Its meaning is 'I have observed...,' or 'I remember...,' etc., in statements and 'Did you observe...?' or 'Do you recall...?' etc., in questions.
This concludes an overview of the verb suffixes listed in the verb paradigm (25) at the beginning of this subsection. As the verb paradigm and the examples listed in this section illustrate, these suffixes, like verb stems, call for a SE or ME.

1.2.4 Suffix Phrases

The term 'suffix phrase' is a new term. Suffix phrases are syntactically derived complex forms, some of which behave like a single word and others like phrases. Observe the following examples:

(64)

a. John-i 0 ess -l-kes -i -ta
   SUBJ come PAST ME fact is SE
   'John might have come'

b. John-i wuncen-ha -l cwul al- nun-ta
   SUBJ drive ME know SE
   'John knows how to drive.'

The underlined formatives -l-kes-i- 'will (=probably)' and -l cwul al- 'know how to' are suffix phrases. The former is comprised of the ME -l, the noun -kes 'thing, fact' and the copula verb -i. -l cwul al- contains the ME -l, the noun cwul (the meaning is not known), and the verb al- 'know'. They are suffixed either to a verb stem (as in (64b)) or to a verb suffix (as in (64a)) and call for SE. -l-kes-i- behaves like a single word and nothing can intervene between the components -l, -kes, and -i. In the case of -l cwul al, the object case marker -lul or other words may be inserted as in these examples:
(65)
a. John-i wuncen-ha -1 cwul lul al- nun-ta
   SUBJ drive ME OBJ know SE
   'John knows how to drive.'

b. John-i wuncen-ha -1 cwul lul cal al- nun-ta
   SUBJ drive ME OBJ well know SE
   'John knows how to drive well.'

These suffix phrases call for their own SE's-- -1 kes
i- an SE of a descriptive verb and -1 cwul al- that of a
processive verbs. Further examples are shown below:

(66)
   SUBJ OBJ eat must SE
   'John must eat kimchi.'

   SUBJ OBJ eat may SE
   'John may eat kimchi.'

(67)
   Korea at TOP SUBJ cheap must SE
   'Kimchi has to be cheap in Korea.'

   Korea at TOP SUBJ cheap may SE
   'Kimchi may be cheap in Korea.'

What we observe here is that, regardless of the type of the
verb stem to which -e-ya ha- 'must' or -e-to kwaynchanh-
'may' is suffixed, these two items call for their own SE:
the former that of a processive verb stem and the latter
that of a descriptive verb stem.

There are other types of phrase suffixes--those which
do not select their own SE's and those which behave like a
concaysa in such a way that they apparently cannot be
delineated either as processive or descriptive. Some
examples of the first type are:
a. John-i kimchi-lul mek -ci anh- nun-ta
   SUBJ OBJ eat do not SE
   'John does not eat kimchi.'

b. John-i pappu -ci anh- ta
   SUBJ busy is not SE
   'John is not busy.'

(69)
a. John-i kimchi-lul mek -ci mos ha- nun-ta
   SUBJ OBJ eat cannot SE
   'John cannot eat kimchi.'

b. John-i thunthun-ha -ci mos ha- ta
   SUBJ healthy cannot SE
   'John cannot be healthy.'

Neither -ci anh- 'do not' nor -ci mos ha- 'cannot' select its own SE but the verbs mek- 'eat', pappu- 'busy', or thunthun-ha 'healthy' choose their own SE: mek- 'eat' that of a processive verb and the latter two that of a descriptive verb.

Suffix phrases which have, as their final constituent, the 'existential part-of-speech' iss- for example, choose their own SE's as in:

(70)
a. Umsik -i pang-ey nam -e iss- ta
   food SUBJ room at remain INF exist SE
   'The food remains in the room.'

b. John-i pang-ey nam -e iss- nun-ta
   SUBJ room at remain INF exist SE
   'John is remaining in the room.'

The suffix phrase -e iss- behaves like a descriptive verb in (70a) and like a processive verb in (70b). We leave a detailed analysis of this behavior to Chapters 3 and 4.
We conclude that suffix phrases behave just like verb stems and verb suffixes in the selection of SE's (and ME's, which we do not discuss here.).

1.3 Outline of Dissertation

In Chapter 2, we review the subcategory analysis of Korean verbs. On the basis of the selection of plain level statement endings, Korean verbs have been classified into two subcategories—processive verbs and descriptive verbs, sometimes referred to as verbs and adjectives respectively. But we will demonstrate, in section 1, that this two-way analysis cannot account for the peculiar behavior of the so-called existential verbs. In section 2, the percolation analysis of Korean verb paradigm is reviewed. Section 3 reviews various theories of percolation in general. In Chapter 3, we argue that the criteria for classification of verbs should be expanded to include plain level question endings. On the basis of these expanded criteria, we propose that Korean verb stems be classified into four

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10. Chapters 3 and 4 also include modified versions of sections from the paper "Headhood of Suffixes and Suffixal Phrases in Korean" presented at the 7th International Conference on Korean Linguistics, August 1 - 5, 1990 at Osaka Japan.
subcategories: processive, descriptive, hybrid, and transparent. The existential verb -iss 'stay, exist, have' is analyzed as two verbs, processive and hybrid. In Chapter 4, we extend to verb suffixes and suffix phrases this four-way subcategorization of verb stems. We argue that Korean verb suffixes and suffix phrases should be construed as heads with respect to the selection of sentence endings. Chapter 5 shows how the analyses in chapters 3 and 4 account for the existential verbs and sentence-ending selection by different subcategories of verbs, verb suffixes, and suffix phrases. To capture the intuition that these different subcategories form natural distributional classes in different combinations, a feature analysis is proposed. Four subcategories are re-analyzed as complexes of two binary valued features [+P] and [+D]. Processives are designated [+P,-D], descriptives [-P,+D], hybrids [-P,-D], and transparents [uP,uD]. In Chapter 6, we argue for hierarchical structure of verb paradigms on the grounds that the suffixes in the verb paradigm, in general, are syntactic affixes. The syntactic behavior of these affixes supports the claim that the sentence-ending selection is not morphotactic but morphosyntactic. The finding (in Chapter 4) that suffixes carry subcategory features, the binary feature analysis of subcategory features (in Chapter 5), and the hierarchical and syntactic structure analysis of the verb paradigm (in Chapter 6), all serve as a foundation for a
review of existing percolation theories and the construction of a new feature percolation theory in the remainder of this thesis.

In Chapter 7, theories proposed by Lieber (1980), Williams (1981), Selkirk (1982), Di Sciullo and Williams (1987), and Lieber (1989) are examined in light of the Korean data and our findings as to the multiple marking of inflectional and subcategory features. We show that none of these theories adequately handle the two types of multiple markings. Lieber (1989), however, provides a theoretical framework which, with certain modifications, can lead to an adequate account of the Korean data. Chapter 8 is essentially a review of Lieber's 1989 theory, in which four of her five conclusions are questioned, in particular, her claim that inflectional affixes are nonheads. Chapter 9 contains further evidence for the claim that sentence-ending selection is morphosyntactic and not morphotactic. We propose that inflectional affixes be analyzed as heads with full categorial signatures and present both empirical and theoretical justification for this proposal. The analysis presented here accounts for the additive as well as superseding phenomena in inflectional word formation in Korean. This analysis, with a minor modification to Lieber's 'check-up' system, also accounts for the percolation of morphosyntactic features in Lieber's own Yavapai data and supports the percolation analysis of
diacritic features in Lieber's data from Latin. This proposal that inflectional affixes are to be construed as heads leads to the conclusion that there is no distinction among inflectional affixes, derivational affixes, and free morphemes with respect to feature percolation. It also leads to the conclusion that there is no reason not to include diacritic features in the categorial signature. This proposal represents a generalization of feature percolation in 'inflectional' word formation for Korean, Yavapai, and Latin and, presumably, all languages.

Chapter 10 summarizes the proposals made in the preceding chapters with respect to Korean data and feature percolation theory and specifies some residual topics for future investigation.
Chapter 2 REVIEW OF THE LITERATURE

This chapter is organized as follows. Section 1 deals with works on Korean language itself. In 2.1.1, we review works by Martin (1954, 1963, 1969) on the classification of Korean verbs and call into question his criteria, suggesting that the criteria have to be augmented. In 2.1.2, observations on what Martin calls 'quasi-processives' and Cheong-Soo Suh (1990) calls 'existential part-of-speech' are reviewed. Martin and Suh find these 'peculiar' or 'similar to verbs (or adjectives)' respectively. Section 2 reviews percolation theories (Lieber 1980, Williams 1981, Selkirk 1982, Di Sciullo and Williams 1987, and Lieber 1989) from a perspective of feature "summing up" from nonheads. In section 3, we examine the percolation analysis of Korean by Y-S Kim (1985).

2.1 Analysis of Korean Data

Verbs may be classified into different categories on the basis of, for example, morphological, syntactic, semantic, and functional criteria. The transitive/intransitive verb dichotomy, for example, is based on the subcategorization frame--whether a verb takes an object or not. Korean verbs have been divided into two classes--processive verbs and descriptive verbs--from the perspective
of 'morphotactics', in particular, from the perspective of what SE's they cooccur with.

2.1.1 Classification of Verbs

Authors who classify Korean verbs on these morphotactic criteria include Martin (1954, 1963, and 1969) and Y-S Kim (1985). Martin (1954:17), for example, sets up two classes of verbs, processive and descriptive, and defines them as follows:

(1)  
a) Processive verbs lack the category of plain indicative assertive -\( \text{ta} \) (replacing it by the processive assertive -\( \text{nun}/-\text{n.ta} \) ...  

b) Descriptive verbs lack the following paradigmatic forms: subjunctive forms (suggestion, command), processive forms (processive modifier, processive assertive, processive adjunctive).

Martin's term 'the indicative assertive \( \text{ta} \)' is an abbreviation for 'the indicative aspect \( \emptyset + \) assertive mood -\( \text{ta} \)', the two elements making up the plain speech level descriptive statement ending. His term 'the processive assertive -\( \text{nun}/-\text{n.ta} \)' is an abbreviation for 'the processive aspect -\( \text{nun}/-\text{n} + \) the assertive mood -\( \text{ta} \)', of which the plain speech level processive statement ending is composed. As discussed in Chapter 1, Korean has, among others, descriptive verbs and processive verbs. The SE -\( \emptyset -\text{ta} \) is the

\(^1\) Following the structuralist tradition, I use here the term 'morphotactics' to describe the superficial linear order of Korean verb paradigms.
one chosen by descriptive verb stems. Martin's term, 'the indicative assertive ta' does not represent this fact. In this study, the terms, 'descriptive statement SE' and 'processive statement SE', are used rather than Martin's 'indicative assertive' and 'processive assertive' respectively. Their interrogative counterparts are the 'descriptive question SE' and the 'processive question SE' respectively.

Martin, as noted above, classifies verbs on the basis of SE-selection, (1a) above, and other criteria (1b). His processive/descriptive verb dichotomy is based only on plain statement endings—the plain (speech level) descriptive statement SE -ğa-ta and the plain (speech level) processive statement SE -nun/n-ta. This criterion of plain statement endings for the dichotomy has since not been called into question and has been adopted by Korean linguists (e.g., Y-S Kim 1985:52) without argument. However, we propose, in chapter 3, that the criteria be expanded to include plain question SE's. Within the criteria Martin adopts, descriptive verbs have to be defined, as Martin does in (1b) above, in terms of other additional criteria than SE selection and in terms of negation. In Martin's classification system, it is also impossible to provide a principled explanation for the behavior of the verb iss- 'stay, exist, have', its negative counterpart eps- and its
honorific homonym kyeysi- as Martin and Suh observe, which we review in the next subsection.

2.1.2 Peculiarity of iss-/eps-/kyeysi-/ess/-keyss

The 'peculiarity' of the verbs iss-, eps-, and kyeysi- has long been documented in Korean linguistics literature. Traditional grammarians such as Sung Pin Park (1935), Hyun Bae Choi (1937, 1959, 1965), Hee Sung Lee (1955) have discussed it along with more recent writers such as Kwang Soo Sung (1976), Young-Hie Han (1977), and Shibatani (1978). As we noted in Chapter 1, iss-, eps-, and kyeysi- are generally referred to as concaysa 'existential part-of-speech' or 'existentials'. Martin (1954, 1963, 1969) includes the past -ess and the 'future' -keyss in this class and call them 'quasi-processive elements' (see below). Cheong-Soo Suh (1990), following the grammatical tradition, calls them 'existential part-of-speech' or 'existential adjectives'.

2.1.2.1 Martin's Quasi-Processives

Martin points out that the paradigms for quasi-processive elements are different from those of processive and descriptive verbs, stating:

46
Quasi-Processives (iss- 'exist, stay', eps- 'not exist' and the past element -ess- etc. and the future element -keyss- (which are both derived from iss-)) have all the processive forms except the processive assertive. (In other words, for a plain-style statement it is itta not *innunta, epta not *emnunta; and it is -etta, -keytta.) All but iss- seem to lack subjunctive forms, and these are not common with iss-.

Although few in number, quasi-processive elements call for special scrutiny because the verb iss- (and its negative counterpart eps-) plays a major role in the subcategory system we are concerned with in this study--it participates in the system as a verb itself, presumably as a component of the past suffix -ess and the 'future' suffix -keyss, and as the last constituent of many suffix phrases.

Martin (1963:315-316) also points out that these items 'quasi-processive elements' behave like processive verbs in the selection of modifier endings:

...the processive modifier forms iss.nun and eps.nun
...are more common than the simple [descriptive--addition mine, DJL] modifier forms iss.un and eps.un....

He specifies these elements as "quasi-verbs intransitive (qvi)," commenting that "the base iss- is particularly tricky; see...for evidence that it should be treated as three homonyms 'stays', 'is', and 'has'.' He later expands

---

2. itta, innunta, epta, emnunta, etta and keytta are all phonetic surface forms of jssta, issnunta, epsta, epsnunta, essta, and keyssta, which are their morphophonemic representations.
his description of the trickiness of the base _iss-/eps-
(1969:203) as:

(4) 

*Iss.ev yo* and *eps.ev yo* are peculiar in that they 
sometimes behave like processive verbs (especially 
*iss.ev yo*) and sometimes behave like descriptive 
verbs (especially *eps.ev yo*). With respect to the 
processive modifiers, they both usually behave 
like processive verbs:

\[
\text{chayk i iss- ey yo} \rightarrow \text{iss- nun chayk}^3
\]

\[
\text{book SUBJ have SE have MOD book}
\]

\[
\text{\textit{\textquoteleft(s.o.) has a book.\textquoteright}} \quad \text{\textit{book (s.o.) has}}
\]

\[
\text{chayk i eps- ey yo} \rightarrow \text{eps- nun chayk}
\]

\[
\text{book SUBJ not have SE not have MOD book}
\]

\[
\text{\textit{\textquoteleft(s.o.) does not have a book\textquoteright}} \quad \text{\textit{book (s.o.) does not have}}
\]

2.1.2.2 Cheong-Soo Suh’s Existentials

Suh calls *iss-, eps- and kyeysi- ‘existence part-of-
speech’ and subtitled them ‘existence adjectives’\(^4\) in 
parentheses. This term ‘adjective’ contrasts with Martin’s 
view above exhibited in his term ‘quasi-processive 
intransitive (qvi)’ above. We will refer to them here by 
the term ‘existentials’. Suh does not subclassify *iss- (and 
others above) into different subcategories taking them as 
inseparable units and contrasts them with adjectives and 
verbs. He observes that existentials behave like verbs in

\[^3\] The gloss and translations are mine--DJL.

\[^4\] In this subsection, I use the terms ‘verbs’ and ‘adjectives’ which Suh uses, instead of ‘processive verbs’ and ‘descriptive verbs’.
two aspects and like adjectives in two other aspects. The two constructions in which they are like verbs are 1) in the selection of adverbs and 2) in their occurrence in command and proposal sentences. The instances in which existentials behave like adjectives are 1) in the modifier construction and 2) in the progressive construction. His examples for the adverb selection are:

(5)
a. i. *Salam -tul -i maywu iss-ta/ eps-ta /anyeysi-ta people PL SUBJ very exist not exist exist (HON) 'People (do not) very exist.'
   ii. Salam -tul -i maywu manh-ta/coh-ta. people PL SUBJ very are many/good 'People are very many/good.'
b. i. Yocum cal iss-nun-ka these days well exist SE 'Are you (existing) well?'
   ii. Ai-tul -to cal nol-nun-ka children too well play SE 'Are children playing well?'

The adverb maywu 'very' co-occurs with adjectives as in (5aii) and cal 'well' with verbs as in (5bii). (5ai) shows that the existentials cannot be modified by maywu but may be by cal as in (5bi), which suggests that existentials behave like verbs rather than adjectives.

Suh's second set of examples to illustrate that existentials except eps- (negative existential) are like verbs in command or proposal sentences is:
(6)  
  a. i. Ne-nun yeki iss-e-la  
you TOP here exist COMM  
'You stay here!'  

  ii. Ne-nun yeki *yeyppu -e-la  
you TOP here beautiful COMM  
'You beautiful here!'  

  b. i. Wuli-nun yeki iss-ca  
we TOP here exist PROP  
'Let's stay here.'  

  ii. Wuli-nun yeki sal-ca  
we TOP here live PROP  
'Let's live here.'  

(6ai) and (6bi) show that the existential iss- may be made into command and proposal sentences like a verb may be as in (6bii). (6aii) illustrates that an adjective cannot be made into a command sentence.

The examples Suh uses to show that existentials show similarity to adjectives rather than to verbs are:

(7)  
  a. i. Ku-nun kwake-ey iss-un il-ul icepeli-ess-ta  
he TOP past at exist PAST MOD event OBJ forgot  
'He forgot what happened in the past.'  

  ii. Ku-nun kwake-ey kyekk-un il-ul icepeli-ess-ta  
he TOP past at undergo PAST MOD event OBJ forgot  
'He forgot what he underwent in the past.'  

  b. i. Ku ai-nun cikum cip-eyse iss-nun-ta  
The child TOP now house at exist SE  
'The child is at home now.'

5. Since Suh treats iss as one word, I am using the same gloss 'exist' for his examples.

6. Suh uses here the same verb yeyppu- 'beautiful' that he uses for (aii) above. I have changed it to sal- 'live' to show the 'similarity' between the existential verb iss- and other verbs.
Suh claims that the existential iss- cannot occur in the past modifier construction, as in (7ai), whereas a verb may, as in (7aii), and that iss- cannot cooccur with the progressive form -ko iss as in (7bii). Verbs can typically occur in progressive structures:

\[(8) \quad \text{Ku ai -nun cikum cip-eyse nol -ko iss-ta} \]
\[\quad \text{The child TOP now house at play PROGRESS SE} \]
\[\quad \text{‘The child is playing at home now.’} \]

2.2 Percolation Theories on Feature "Summing up"

Feature percolation is assumed in the morphological theories of Lieber (1980), Williams (1981), Selkirk (1982), Di Sciullo and Williams (1987) (DW henceforth), and Lieber (1989), among others. In this section, we will consider:

1) whether these theories distinguish inflection from derivation;

2) whether they permit the "summing up", from nonheads, of features not specified in the head;

3) what mechanisms are provided for such "summing up". The five theories can be summarized as follows:
(9) **Summary**

<table>
<thead>
<tr>
<th>Is Inflectional affix head?</th>
<th>Summing up features from nonhead</th>
<th>Mechanism for summing up nonhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lieber (1980)</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Williams (1981)</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Selkirk (1982)</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>DW (1987)</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Lieber (1989)</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>

2.2.1 **Lieber (1980)**

Lieber assumes that lexical items carry meanings in the form of feature specifications which percolate to the word node to give a full word its meaning. She proposes the following feature percolation conventions:

(10) **Lieber (1980:49-54)**

Consortion I: all features of a stem morpheme including category features percolate to the first nonbranching node dominating that morpheme.

Convention II: all features of an affix morpheme including category features percolate to the first branching node dominating that morpheme.

Convention III: if a branching node fails to obtain features by Convention II, features from the next lowest labeled node are automatically percolated up to the unlabeled branching node.

7. Her Convention IV is concerned with compounding and is not included in this discussion.

8. A crucial problem is that this requirement makes percolation possible only in a binary and hierarchical structure, thereby making percolation a motivation for assuming such a configuration for any structure in which percolation is operative. This requirement is not assumed in Williams (1981) nor in DW (1987). See below for details.
Lieber does not distinguish derivational from inflectional affixes, as can be seen from her Convention II in which the term 'an affix morpheme' includes both derivational as well as inflectional affixes. As Lieber (1989:96) herself states, her theory (1980) makes use only of an implicit notion of 'head' but it can be inferred from her Convention II that the head of a word for her is the outermost affix. Her Convention III checks whether the next lowest node is labeled by a feature that the first branching node fails to obtain by Convention II and if it does, Convention III percolates it. In Lieber, the percolation from a head has the priority over that from a nonhead, yet the features specified in nonheads are not ignored.

This formulation is differs from Williams (1981) which we discuss below.

2.2.2 Williams (1981)

Williams' statement on percolation is:

(11) Williams (1981:247)

"If both X and the head of X are eligible members of category C, then X∈C = head of X∈C."

Selkirk (1982:21) rephrases this as follows:

(12) Percolation

If a constituent α is the head of a constituent β, α and β are associated with an identical set of features (syntactic and diacritic).
Williams’ (11) above is supplemented by his Righthand Head Rule (RHR hereafter), which he (p.248) defines as:

(13) Righthand Head Rule

...the head of a morphologically complex word...[is] the righthand member of that word.

Williams also takes a unitary approach and assumes that both inflectional affixes and derivational affixes are heads, as is indicated by (13). There is, however, a critical difference between Lieber and Williams. In the Williams’ account, features percolate exclusively through the path of a head; a nonhead does not participate in percolation: there is no ‘summing up’ of features which are specified in nonheads. Selkirk (1982) points out the inadequacy of this head-only hypothesis. We will discuss Selkirk’s argument in conjunction with her definition of percolation (14) below.

2.2.3 Selkirk (1982)

Selkirk defines percolation as follows:

(14) Percolation (p.76 (3.20))

a. If a head has a feature specification $[\alpha F_i]$, $\alpha \neq u$, its mother node must be specified $[\alpha F_j]$, and vice versa.

b. If a nonhead has a feature specification $[\beta F_j]$, and the head has the feature specification $[uF_j]$, then the mother node must have the feature specification $[\beta F_j]$. 

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Selkirk provides the theory with a mechanism (18b) for the percolation of features from a nonhead and, in particular, from multiple nonheads, each of which carry features.

She concludes (p.76):

Given (3.20) (=our (14)), we need no longer consider inflectional affixes to be heads at all, since Percolation may be defined between the mother and its nonhead constituents as well. It is thus possible to construe the verbal base...as the head, and to consider the syntactic features of the affixes to be unmarked, e.g., [uN,uV].

One of the examples that she attempts to account for is:

(15) (=Selkirk (3.17d))

\[
N \rightarrow N \text{ Af Af Af} \\
\text{[m gend][m plur][m case]}
\]

What her percolation convention (14b) does is to "sum up" in the mother node the features associated with the daughter nodes. The percolation convention (14) above will apply as follows. (14a) will first specify the mother node with the category feature of the N as follows:

(16)

\[
\begin{array}{c}
(a) \rightarrow [N] \\
[N] \text{ Af Af Af} \\
\text{[m gend][m plur][m case]}
\end{array}
\]

9. To Selkirk, a head has category feature specification of [+N +V]. In derivational word formation, her revised RHR will designate as the head the rightmost element with the category features (see Selkirk for details).
Next, three successive application of Selkirk's (14b) will sum up the features in the affixes as follows:

(17)

An immediate problem facing Selkirk’s analysis is that it cannot account for the selection of the person/number (p/n hereafter) suffix in the Latin example (18) below, which Lieber (1980, 1989) discusses:

(18)

First, the mother node would be specified by the diacritic feature [+T,-D][11] borne by the head via (18a) (=Selkirk’s (3.20a)) as follows:

(19)

10. Lieber (1980, 1989) assumes a binary and hierarchical structure for (22). While Selkirk claims that her percolation works regardless whether a word has a flat or hierarchical structure, I assume that (22) has a flat configuration. The empirical result is the same.

Now, the diacritic feature of the nonhead -era cannot be specified in the mother node by (14b) since the head is specified with the diacritic feature [+T,-D] as in (20):

\[(20)\]

\[\text{ama-\_era (p/n suffix) \_era \_V} \]

Only the incorrect p/n suffixes -i/-isti/... subcategorized for [+T,-D] can attach as follows:

\[(21) *\]

\[\text{ama-\_era \_V} \]

---

12. Following the general convention, I have placed the diacritic features [+T,-D] a node higher than its original one in order to illustrate the current operation: the attachment of the p/n suffixes. This could have been illustrated as follows:

\[\text{ama-\_era \_\_V} \]

This diagram, however, does not distinguish the current operation from the previous one. Throughout this work, I will adopt this representation for the attachment of a subsequent affix without necessarily assuming a higher node in a binary and hierarchical structure. The dotted line does not indicate the path of percolation but simple attachment of p/n suffixes.
2.2.4 Di Sciullo and Williams (1987)

Responding to several problems with the notion "head of a word," in particular, the problem that ensues from the one-head-per-word hypothesis (Selkirk p. 27), DW relativize the notion "head" (p. 26), as in (22) below:

(22) Definition of "head_{F}" (read: head with respect to the feature F):

The head_{F} of a word is the rightmost element of the word marked for the feature F.

DW allow relativized definitions of multiple heads. With regards to the relativized definitions, they (fn.2, p.27) state:

These definitions have empirical effects similar to those of Selkirk's...percolation conventions... Our proposal is conceptually quite distinct, however, because it preserves the role of "head" in determining the character of derived words....

One conceptual difference (p.27) they point out is that, in their theory, inflectional affixes are not distinguished from derivation affixes, as is the case in Selkirk's.

Although DW claim that their relativized definitions have empirical effects similar to those of Selkirk's ((14) above), The Latin example (18) above shows that Selkirk's and DW's proposals are empirically different. We observed above that Selkirk's percolation definitions (14a) and (14b) cannot account for the correct selection of p/n suffixes.
Let us look at how DW’s work with the same Latin data (18) above, repeated below:

(18)

\[
\begin{array}{ccc}
\text{ama} & \text{era} & (\text{p/n suffix}) \\
[+T] & [+T] & V \\
[-D] & & \\
\end{array}
\]

Both the stem \textit{ama-} and the affix \textit{-era} are specified by the diacritic feature. The head with respect to the diacritic feature of the word is the rightmost element \textit{-era} of the word and this feature will be shared between the head and the node dominating it as in (23):

(23)

\[
\begin{array}{ccc}
\text{ama} & \text{era} & (\text{p/n suffix}) \\
[+T] & [+T] & V \\
[-D] & & \\
\end{array}
\]

Now the correct p/n suffix \textit{-m/-s/-t...} subcategorized for \([+T (-D)]\) can attach, as in (24) below:

(24)

\[
\begin{array}{ccc}
\text{ama} & \text{era} & -m/-s/-t...
\end{array}
\]

The empirical difference between DW and Selkirk is that DW’s theory yields a well-formed structure, while Selkirk’s cannot.
2.2.5 Lieber (1989)

Lieber refers to the mechanisms for percolation of the head and nonhead in the four statements of percolation above as the simplest of 'traffic rules'. Her goal is "...to develop and make more explicit the theory of feature percolation", one which can account for multiple markings of same features in a single lexical item. This is a new area of feature percolation which the other four theories did not deal with. She proposes the following definition of percolation conventions:

(25) (=her (26))

a. Head Percolation:
Morphosyntactic features are passed from a head morpheme to the node dominating the head. Head Percolation propagates the categorial signature.

b. Back Up Percolation:
If the node dominating the head remains unmarked for a given feature after Head Percolation, then a value for that feature is percolated from an immediately dominated nonhead branch marked for that feature. Back Up Percolation propagates only values for unmarked features and is strictly local.

Her theory is different from others in the following ways:

(26)

a) Her percolation conventions propagate either the categorial signature on bloc by Head Percolation (HP hereafter) or only values for unmarked features by Back Up Percolation.

13. Terms such as 'categorial signature', 'marked' and 'unmarked', and 'is strictly local' will be clarified in Chapter 8.
Percolation (BUP hereafter). Features themselves are not allowed to percolate in her theory.

b) She makes explicit the notion of categorial signature. She (p. 134) concludes that:

(27) 
...inflectional affixes are typically not treated as heads with respect to percolation, whereas derivational affixes are.

This conclusion is based on her observation (p. 133) that:

(28) 
...inflectional word formation...is additive in terms of morphosyntactic features in a way that derivational word formation apparently is not. In derivational word formation the value for a feature of an outer morpheme supersedes a value for the same feature on an inner morpheme.

The summing up of multiply marked features which are additive is achieved by 1) pre-positing these features in the categorial signature, and 2) marking these features with values by BUP if they remain unmarked after HP.

The above review of the five percolation theories can be summarized as (9) presented at the beginning of this section.

2.3 A Percolation Analysis for Korean Data

Y-S Kim (1985) has put forward a percolation analysis of Korean verb morphology. He (p. 55) proposes the following flat structure for inflectional suffixes in Korean verb paradigms:
(29) (=Kim's (6))

\[ V^0 \]

\[ V^1 \rightarrow [m \text{ hon}] [m \text{ past}] [m \text{ fut}] [m \text{ hum}] [m \text{ asp}] [m \text{ mood}] \]

where \( m = +, - \).

He states the general rule for inflection as follows:

(30) (=Kim's (8))

Inflection: \( X \rightarrow X^1 Y^*, \) where each \( Y = \) predetermined set of \( 1(+) \) features

Kim (p. 62) concludes that, in Korean, 1) inflection is formally different from derivation in that inflection has no internal brackets; 2) inflectional affixes do not bear category features; and 3) inflectional affixes are not heads.

A number of assumptions, theoretical and empirical, underlies Kim's (29) and (30).

First, the zero-bar marking on the \( V \) in the paradigm in (29) represents his hypothesis (p. 117), which states:

(31)

...that all morphology, be it derivational or inflectional, operates in the lexicon, ...that words, not stems, can be inserted directly into syntactic structures (cf. Halle 1973).

The thesis that all morphology operates in the lexicon has long been challenged (e.g., J-M Kim (1986), H-S Choe (1988) for Korean. See also Chapter 6 of this study, for data that make the strong lexicalist hypothesis difficult to maintain.).

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Second, Kim's assignment of the zero-bar level to V in (29) represent his claim that it is a word, which he defines (p. 117) as "an input to lexical insertion".

Third, in the verb paradigm (29) above, Kim notes all the suffixes with $m$ which represents the value $[+]$ or $[-]$. In the same vein, $y^*$ in (30) above is over simplification: $y^*$ means "any number of $Y$" including no $Y$ at all. This is not true for Korean. Y-S Kim's statement (p. 55) that "... the final mood marker must appear to make the verb complete" contradicts these two notations.

Fourth, marking all six suffixes with the same symbol $m$ is an oversimplification. This does not accurately represent the linguistic facts. The first three suffixes, hon, past, and "fut" are indeed optional individually: they may or may not occur independent of each other. The last three suffixes, hum, asp, and mood, however, are not freely dropped. These three suffixes together make up the SE in formal level speech as we examined in Chapter 1 (7), repeated below (only the statement SE's are repeated):
The SE of one level may be replaced in toto by that of other speech levels. In each SE, however, each constituent is not optional independent of each other. For example, in formal level speech, which Y-S Kim discusses here, the mood suffix -ta cannot occur by itself without being obligatorily preceded by both the humble suffix -(su)p and the indicative suffix -ni.

Fifth, as discussed in Chapter 1, defining -keyss as the future tense suffix is less than satisfactory. It is a suffix which encodes the volition or conjecture of the speaker.

2.4 Summary

Martin’s analysis on Korean verb classification has been accepted without argument and there has hardly been any debate over the issue. The status of the so-called

14. INF stands for the term ‘infinitive’. An infinitive is a formative which is used in various constructions, one of which is that of sentence endings. It has several shapes. Phonologically predictable ones are a and e, the former occurring after the sound a or o and the latter elsewhere. Since e has much wider distribution, INF is represented by e hereafter.
existentials have been discussed without much success. A number of percolation analyses have been proposed, of which the most promising with respect to Korean verb paradigms is Lieber (1989).
Chapter 3  FOUR CLASSES OF KOREAN VERB STEMS

The aim of this chapter is to argue for four, rather than the usual two, subcategories of verbs in Korean. This chapter is organized as follows. In section 1, we claim that plain level question endings have to be included in the criteria, on the basis of which verbs have been dichotomized into processive verbs and descriptive verbs. The addition of plain level question endings leads us to posit a subcategory of 'hybrid' verbs. Section 2 is devoted to arguments for establishing this verb subcategory. A fourth subcategory of verbs, consisting of the 'transparent' verbs ha- and toy-, is argued for in section 3. Section 4 summarizes the discussions and proposals made in this chapter.

3.1 Expanded Criteria for Classification of Verbs into Processives and Descriptives

As we pointed out in Chapter 2, Martin (1954:17) sets up two classes of verbs, processive and descriptive, on the basis of two sets of criteria, presented as (1) in Chapter 2 and repeated below:

(1)

a) Processive verbs lack the category of plain indicative assertive -ta (replacing it by the processive assertive -nun/-n.ta )...

b) Descriptive verbs lack the following paradigmatic forms: subjunctive forms (suggestion, command), processive forms (processive modifier, processive assertive, processive adjunctive).
Our concern in this chapter is with the subclassification of verb stems on the basis of the selection of the SE, which is stated in (1a) above. Recall that we noted that the terms, 'descriptive statement SE' and 'processive statement SE', rather than Martin's 'indicative assertive' and 'processive assertive' respectively, are more appropriate for the subclasses they represent. We refer to their interrogative counterparts as the 'descriptive question SE' and 'processive question SE' respectively.

As we commented in Chapter 2, Martin's processive/descriptive dichotomy is based only on plain statement (=assertive) endings--the plain descriptive statement SE -Ø-ta and the plain processive statement SE -nun/-n-ta. However, the criteria need to be expanded to include plain question SE's, which, as mentioned already, consist of aspect and mood suffixes. For both classes of verbs, the aspect suffix is represented by the indicative Ø; the question mood suffixes are different---ni for the processive and -(u)ni for the descriptive:

(2)

a. Processive Statement SE
   Ssal -ul mek -nun -ta 'I eat rice.'
   rice OBJ eat PROC STMT
   Ssal -ul sa -ta 'I buy rice.'
   rice OBJ buy PROC STMT

b. Descriptive Statement SE
   Mwul -i kiph -Ø -ta 'The water is deep.'
   water SUBJ deep IND STMT
   Mwul -i ssa -Ø -ta 'Water is cheap.'
   water SUBJ cheap IND STMT
c. Processive Question SE
   Ssal -ul mek -Ø -ni 'Do (you) eat rice?'
   rice OBJ eat IND QUES
   Ssal -ul sa -Ø -ni 'Do (you) buy rice?'
   rice OBJ eat IND QUES

d. Descriptive Question SE
   Mwul -i kiph -Ø -uni? 'Is water deep?'
   water SUBJ deep IND QUES
   Mwul -i ssa -Ø -ni 'Is water cheap?'
   water SUBJ cheap IND QUES

These data clearly show that a further distinction between processive and descriptive verbs exists in the question mood suffix: -ni for the processive and -(u)ni for the descriptive. On the basis of this, we propose that plain question endings be added to the criteria for classification of verbs (as well as verb suffixes and suffix phrases, the topic of Chapter 4). This proposal is well motivated for the following reasons:

1) In Martin’s system, the difference in the question SE’s between processive and descriptive verbs would be an accident that cannot be accounted for.

1. In many people’s speech, particularly young people’s, -ni replaces -uni as in:

   a. Mwul -i kiph -Ø -uni? 'Is water deep?'
      water SUBJ deep IND QUES
   b. Mwul -i kiph -Ø -ni? 'Is water deep?'
      water SUBJ deep IND QUES

This may be due to analogy. However, what is clear is that such alternation is not found with the processive question ending:

   a. Ssal-ul mek -Ø -ni? 'Do (you) eat rice?'
      rice OBJ eat IND QUES
   b. Ssal-ul mek -Ø -uni? 'Do (you) eat rice?'
      rice OBJ eat IND QUES
2) This proposal justifies, as we will see below, the analysis of iss- 'stay, exist, have' as two verbs
iss₁- 'stay' and iss₂- 'exist, have', the former being a processive verb and the latter what we call a hybrid (see below). If we followed Martin's criteria, it would be impossible to provide a principled explanation for the special behavior ('tricky' and 'similar to one rather than the other') of the verb iss- 'stay, exist, have', its negative counterpart eps- and its honorific homonym kyeysi- as Martin and Suh observe.

3) Our proposal opens up a way of classifying inflectional suffixes and suffix phrases, in particular, those 'quasi-processive' elements which end in -ss, such as -ess (the past tense suffix) and -keyss (the volition and conjecture suffix) following the same criteria (see Chapter 4).

4) We will not need to define descriptive verbs in terms of criteria other than SE selection or to define descriptives in terms of the forms that they lack\(^2\), as Martin does in his (1b) above. Criterion (1b) for the definition of descriptive verbs is now unnecessary: SE

\(^2\) See (1b) on page 64. Descriptive verbs, also called stative verbs, indeed lack suggestion and command sentences. However, this is to be expected of descriptive verbs, which are [+stative] and cannot involve volition or controllability. Martin (personal communication) suggests that the distinction between processive and descriptive verbs can be expressed in positive terms as "processive verbs have suggestion and command sentences".
selection by verb stems alone serves an adequate
criterion for identification of both descriptive verbs and
processive verbs. We can now define processive verbs as
those which have the processive SE -nun/n-ta in statements
and -ni in questions. Descriptive verbs can similarly be
defined as those which have the descriptive SE -ta in
statements and -(u)ni in questions, as discussed in Chapter
1 (16), repeated below:

(16) Plain Level Speech Sentence Endings (revised)

<table>
<thead>
<tr>
<th>Verbs</th>
<th>Adjectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Processive V)</td>
<td>(Descriptive V)</td>
</tr>
<tr>
<td>a. Statement</td>
<td>-(nu)n-ta</td>
</tr>
<tr>
<td>b. Question</td>
<td>-ni</td>
</tr>
</tbody>
</table>

Now that the processive and descriptive verb stems have
been defined on the basis of these expanded criteria, we can
look again at Martin’s ‘quasi-processive elements,’ Suh’s
existential part-of-speech iss-, and its negative
counterpart eps-, and honorific kyeysi-. We use the term
‘existentials’ rather than ‘quasi-processive elements’ for
these elements since we need to exclude the past tense
suffix -ess and the volition/conjecture suffix -keyss, which
are included in ‘quasi-processive elements’. These latter
two suffixes will be discussed in Chapter 4.

3.2 The ‘Existential’ iss-

This section is organized as follows. First, we select
criteria for comparison of three iss-’s in 3.2.1. We
attempt to show in 3.2.2 that they can actually be analyzed as two iss-'s: iss₁- and iss₂-. In 3.2.3, these two iss-'s are contrasted with processive verbs and descriptive verbs and it is shown that iss₁- behaves exactly like any other processive verbs. We find, on the other hand, in 3.2.4, that iss₂- behaves partly like a processive verb and partly like a descriptive verb in SE selection and in modifier ending selection. We therefore call it a hybrid (of processive and descriptive verbs).

3.2.1 Criteria for Comparison

We will tentatively refer to the three iss-'s as iss₁- 'stay', iss₂- 'exist', and iss₃- 'have'. The selection of appropriate criteria for comparing these forms is crucial here.

Martin (1963:485-486) separates iss- in terms of criteria other than the selection of plain SE's. We want to account for this selection in the classification of verbs, suffixes, and suffix phrases. So, we will take the selection of plain SE by iss- as the main criterion. As noted in 3.1, Korean has the following plain statement and question SE's:
We also adopt the selection of modifier suffixes by **iss-** as a further criterion. One reason is that modifier suffixes may also be analyzed as mood markers or as a combination of the aspect and mood markers (cf. Martin 1954) which comprise the SE. A second reason for adopting this criterion is that the controversies over the 'peculiar' behavior of existentials center around the occurrence or non-occurrence of the modifier suffixes with **iss-**. The modifier suffixes, as presented in Chapter 1 (21), are:

(4) Modifier Suffixes (=Modifier Endings)

<table>
<thead>
<tr>
<th>Non-Past</th>
<th>Processive</th>
<th>Descriptive</th>
</tr>
</thead>
<tbody>
<tr>
<td>-nun</td>
<td>-(u)n</td>
<td>-(u)n</td>
</tr>
<tr>
<td>Past</td>
<td>-(u)n</td>
<td>x</td>
</tr>
<tr>
<td>Vol/Conj</td>
<td>-(u)l</td>
<td>x³</td>
</tr>
</tbody>
</table>

³. Marking this column with x³, as if it does not occur with descriptive verbs, is an oversimplification. It is possible to find a context in which -(u)l is marginally acceptable in a construction which modifies a full noun. -(u)n, however, is fully acceptable when it is used with a descriptive verb in what we call suffix phrases. We will only consider, however, its use in constructions modifying independent noun heads.
3.2.2 Dichotomy of iss- into iss₁ and iss₂-

We will show that, according to our criteria, iss₄- ‘stay’, iss₅- ‘exist’, and iss₆- ‘have’ belong to two classes, labeled iss₁- and iss₂-. Compare iss₄- ‘stay’ with iss₅- ‘exist’ and iss₆- ‘have’ with respect to the SE’s they take:

(5) Statements
a. Na-nun cip-ey iss₄-nun/*∅ -ta. ‘I (will) stay at home.’
   I TOP house at stay SE
b. UH-ka Hawaii-ey iss₅-∅/nun-ta. ‘UH exists in Hawaii.’
   SUBJ at exist SE
c. Con-nun ton-i iss₆-∅/nun-ta. ‘John has money.’
   John TOP money SUBJ have SE

(6) Questions
a. Na-nun cip- ey iss₄-*uni/ni? ‘Do I stay at home?’
   I TOP house at stay SE
b. UH-ka Hawaii- ey iss₅-*uni/ni? ‘Is UH in Hawaii?’
   SUBJ in exist SE
c. Con-nun ton-i iss₆-*uni/ni? ‘Does John have money?’
   John TOP money SUBJ have SE

We need to explain why (5a) with ∅-ta is shown as ungrammatical. We indicated in (5a) that the sentence shown below as (7) is as unacceptable:

(7) Na-nun cip- ey iss₄-*∅-ta. ‘I (will) stay at home.’
   I TOP house at stay SE

The unacceptability judgement for (7) in the meaning given may not be obvious. However, the iss₄- ‘stay’ can be separated from iss₅- ‘exist’ and iss₆- ‘have’ as on the basis of the data in:
(8)
a. Con -un pan -ey nuckey-kkaci nam- e-iss, -nun/Ø-ta
   John TOP class at late until remain stay SE
   'John remains in the class until late.'

b. Chayk -i pan -ey nuckey-kkaci nam- e-iss_b-Ø/*nun-ta
   book SUBJ class at late until remain exist SE
   'A book remains in the class until late.'

c. Con -un chayk -i iss_c-Ø/*nun-ta
   John TOP book NOM have SE
   'John has a book.'

(8a) shows iss, 'stay' can take either -nun/n-ta or Ø-ta
while iss_b 'exist' and iss_c 'have' can have only Ø-ta as in
(8b) and (8c) above. We assume that the iss- used with Ø-ta
in (8a) is iss_b 'exist', which may be used with an animate
subject. Thus the distinction.

In questions, on the other hand, all three iss's behave
in the same way in that they take the SE -ni.

Now consider the three iss's with respect to modifier
suffixes:

(9) Non-Past Modifier

a. cip -ey iss, -nun na  'I who stay at home'
   house at stay MOD I

b. Hawaii-ey iss_b -nun UH 'UH which exists in Hawaii'
   at exists MOD

c. ton -i iss_c-nun con 'John who has money'
   money SUBJ have MOD John
(10) Past Modifier
a. cip-ey iss-un' na 'I who stayed at home'
b. Hawaii-ey iss-un' UH 'UH which existed in Hawaii'
c. ton-i iss-??un con 'John who had money'

(11) Vol/Conj Modifier
a. cip-ey iss-ul na 'I who will stay at home'
b. Hawaii-ey iss-ul UH 'UH which will exist in Hawaii'
c. ton-i iss-??ul con 'John who will have money'

Note that, although iss- 'exist' and iss- 'have' do not behave exactly alike with respect to the past and vol/conj modifier suffixes, the acceptability of these two iss's is dubious at best. They differ from iss- 'stay', which is completely acceptable. We conclude, therefore, that there is a second disparity between iss- 'stay' on the one hand and iss- 'exist' and iss- 'have' on the other. Although all three behave alike in the non-past tense, they behave differently in the past tense and volition/conjecture mode, as summarized in (12) below:

(12) iss- 'stay' contrasted with iss- 'exist' and iss- 'have'.

a. SE Selection

<table>
<thead>
<tr>
<th>iss- 'stay'</th>
<th>iss- 'exist'</th>
<th>iss- 'have'</th>
</tr>
</thead>
<tbody>
<tr>
<td>na-nun iss nun ta</td>
<td>UH-ka iss *nun ta</td>
<td>ton-i iss *nun ta</td>
</tr>
<tr>
<td>*∅</td>
<td>*∅</td>
<td>*∅</td>
</tr>
<tr>
<td>ni</td>
<td>ni</td>
<td>ni</td>
</tr>
<tr>
<td>*uni</td>
<td>*uni</td>
<td>*uni</td>
</tr>
</tbody>
</table>

4. A more common form for this modifier construction may be cip-ey iss-te-n na. This may be ascribed to an analogical process patterned after the modifier construction involving iss- and iss- which are more frequent in usage.
b. Modifier Suffix Selection

<table>
<thead>
<tr>
<th></th>
<th>iss₁- 'stay'</th>
<th>iss₂- 'exist'</th>
<th>iss₃- 'have'</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-past</td>
<td>iss nun na</td>
<td>iss nun UH</td>
<td>iss nun con</td>
</tr>
<tr>
<td>past</td>
<td>(u)n</td>
<td>?(u)n</td>
<td>??(u)n</td>
</tr>
<tr>
<td>vol/conj</td>
<td>(u)l</td>
<td>?(u)l</td>
<td>??(u)l</td>
</tr>
</tbody>
</table>

On the basis of the differences shown above, we conclude that iss₁ and iss₂₉—are distinct verbs and name them iss₁- and iss₂- respectively.

Martin (1963:486) shows that the negative of iss₁- 'stay' is formed by either the short negative an- or the long negative -ci anh-, which derive the regular negative constructions. On the other hand iss₂- 'exist' may have either the regular negative constructions or the suppletive eps-, while iss₃- 'have' has only the suppletive eps-. It is clear then that eps- does not belong in the same class with iss₁-. Our discussion hereafter concerning iss₂- is equally applicable to negative eps-.

3.2.3 Iss₁- is a Processive Verb

Now, we will compare iss₁- 'stay' with processive and descriptive verbs. Some examples are:

(13) Statements
a. Na-nun cip-ey iss-nun/*ə-ta. 'I (will) stay at home.'
   I TOP house at stay SE
b. Kimchi-lul mekp-nun/*ə-ta. '(I) eat kimchi.'
   OBJ eat SE

The difference in acceptability between iss₁- and iss₃- in past and vol/conj modifier constructions is not important for our study.
c. San -i noph*-nun/ Ø-ta 'The mountain is high.'

mountain SUBJ high SE

(14) Questions
a. Na-nun cip-ey iss-ni/*uni? 'Do I stay at home?'
b. Kimchi-lul mek-ri/*uni? 'Do (you) eat kimchi?'
c. San-i noph*-ni/uni? 'Is the mountain high?'

We see that iss - 'stay' behaves exactly like the processive verb mek- 'eat', and not like the descriptive verb noph- 'high'. Now, consider the following examples to see how the three verbs behave in conjunction with modifier endings:

(15) Non-Past Modifier
a. cip -ey iss-nun na 'I who stay at home'
   house at stay MOD I
b. kimchi-lul mek-ri-nun na 'I who eat Kimchi'
   OBJ eat MOD I
c. noph*-un san 'the mountain which is high'
   high MOD mountain

(16) Past Modifier
a. cip-ey iss-un na 'I who stayed at home'
b. kimchi-lul mek-un na 'I who ate Kimchi'
c. noph*-un san 'the mountain which was high'

(17) Vol/Conj Modifier
a. cip-ey iss-ul na 'I who will stay at home'
b. kimchi-lul mek-ul na 'I who will eat Kimchi'
c. noph*-ul san 'the mountain which will be high'

We find again that iss - 'stay' behaves exactly like a processive verb, not like a descriptive verb. These behaviors are summarized in (18) below:
(18) iss₁- contrasted with processive and descriptive verbs

a. SE Selection

<table>
<thead>
<tr>
<th>Processive</th>
<th>iss₁-</th>
<th>Descriptive</th>
</tr>
</thead>
<tbody>
<tr>
<td>mek- 'eat'</td>
<td>iss₁- 'stay'</td>
<td>noph- 'high'</td>
</tr>
<tr>
<td>mek nun ta</td>
<td>iss nun ta</td>
<td>noph nun ta</td>
</tr>
<tr>
<td>*Ø</td>
<td>*Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>ni</td>
<td>ni</td>
<td>*ni</td>
</tr>
<tr>
<td>*(u)ni</td>
<td>*(u)ni</td>
<td>(u)ni</td>
</tr>
</tbody>
</table>

b. Modifier Suffix Selection

<table>
<thead>
<tr>
<th>Processive</th>
<th>iss₁-</th>
<th>Descriptive</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-past mek nun na</td>
<td>iss nun na</td>
<td>noph un san</td>
</tr>
<tr>
<td>past (u)n</td>
<td>(u)n</td>
<td>*(u)n</td>
</tr>
<tr>
<td>vol/conj (u)l</td>
<td>(u)l</td>
<td>*(u)l</td>
</tr>
</tbody>
</table>

(18) clearly shows that, in all its conjugations, iss₁- 'stay' behaves exactly like the processive verb mek- 'eat' and not like the descriptive verb noph- 'high'.

3.2.4 Iss₂- is a Hybrid Verb

We will now proceed to compare iss₂- 'exist, have' with processive and descriptive verbs:

(19) Statements

a. Na-nun ton -i iss-*nun/Ø-ta. 'I have money.'
   I TOP money SUBJ have SE

a'. UH-ka Hawaii-ey iss-*nun/Ø-ta. 'UH is in Hawaii.'
   SUBJ in exist SE

---

6. Kwang Soo Seng (1976) separates iss’s into three verbs and establishes iss₁ as a ‘main verb iss’ (as opposed to the auxiliary verb iss). He includes -ko iss (a suffix phrase) as one of the three. See Seng for details.
b. Kimchi-lul mek-\textsubscript{nun}/*\textsubscript{\textalpha}-ta. \quad \text{‘(I) eat kimchi.’} \\
OBJ eat SE

c. San -i noph\textsubscript{\texteta}-*\textsubscript{nun}/\textsubscript{\texteta}-ta \quad \text{‘The mountain is high.’} \\
mountain SUBJ high SE

(20) Questions
a. Na-nun ton-i iss-ni/*uni? \quad \text{‘Do I have money?’}

b. Kimchi-lul mek-ni/*uni? \quad \text{‘Do (you) eat kimchi?’}

c. San-i noph-*ni/uni? \quad \text{‘Is the mountain high?’}

These examples show that \textit{iss} \textsubscript{2} ‘exist, have’ behaves like a descriptive verb in statements and like a processive verb in questions. The following examples show how these three verbs behave in conjunction with modifier endings:

(21) Non-Past Modifier
a. ton -i iss-nun na \quad \text{‘I who have money’} \\
money SUBJ have MOD I

b. kimchi-lul mek-nun na \quad \text{‘I who eat Kimchi’} \\
OBJ eat MOD I

c. noph*-un san \quad \text{‘the mountain that is high’} \\
high MOD mountain

(22) Past Modifier
a. ton-i iss-*un na \quad \text{‘I who had money’} \\

b. kimchi-lul mek-*un na \quad \text{‘I who ate Kimchi’} \\
c. noph-*un san \quad \text{‘the mountain that was high’} \\

(23) Vol/Conj Modifier
a. ton-i iss-*ul na \quad \text{‘I who will have money’} \\

b. kimchi-lul mek-*ul na \quad \text{‘I who will eat Kimchi’} \\
c. noph-*ul san \quad \text{‘the mountain that will be high’} \\

We see that \textit{iss} \textsubscript{2} ‘exist, have’ behaves like a processive verb in the non-past modifier construction, but like a descriptive verb in the past and volition/conjecture
modifier constructions. These characteristics are represented in (24) below:

(24) iss₂- 'exist, have' contrasted with processive and descriptive verbs

a. SE Selection

<table>
<thead>
<tr>
<th>Processive</th>
<th>iss₂-</th>
<th>Descriptive</th>
</tr>
</thead>
<tbody>
<tr>
<td>mek- 'eat'</td>
<td>iss₂- 'exist, have'</td>
<td>noph- 'high'</td>
</tr>
<tr>
<td>mek nun ta</td>
<td>iss *nun ta</td>
<td>noph *nun ta</td>
</tr>
<tr>
<td>*∅</td>
<td>∅</td>
<td>*ni</td>
</tr>
<tr>
<td>ni</td>
<td>ni</td>
<td>(u)ni</td>
</tr>
<tr>
<td>*(u)ni</td>
<td>*(u)ni</td>
<td></td>
</tr>
</tbody>
</table>

b. Modifier Suffix Selection

<table>
<thead>
<tr>
<th>Processive</th>
<th>iss₂-</th>
<th>Descriptive</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-past mek nun na</td>
<td>iss nun ton/UH</td>
<td>noph *nun san</td>
</tr>
<tr>
<td>'I'</td>
<td>'money'</td>
<td>'mt.'</td>
</tr>
<tr>
<td>past</td>
<td>(u)n</td>
<td>*(u)n</td>
</tr>
<tr>
<td>vol/conj</td>
<td>(u)l</td>
<td>*(u)l</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We see from (24) that iss₂- is ambivalent with respect to both plain endings and modifier constructions. There appears to be a difference between iss₂- and descriptive verbs in the past tense: the former is marginally acceptable with -(u)n while the latter are totally unacceptable with the same suffix. This is because -(u)n is not available to descriptive verbs because it is already used for the non-past structure of processive verbs. On the basis of the ambivalent behavior of iss₂- 'exist, have', we will call it a hybrid verb.
What we further observe above with respect to the plain-level endings is that iss₂ - 'exist, have' selects the simpler form of the possible alternants: i.e., in the statement ending, iss₂ - 'exist, have' chooses the simpler descriptive form ṣ-ta rather than the processive nun/n-ta, and, in the question ending, the simpler processive ṣ-ni rather than the descriptive (u)ni.⁷

It therefore seems clear that the three iss's should be classified into iss₁ - 'stay' and iss₂ - 'exist, have' with respect to SE's and modifier suffixes, and also that iss₁ - is a bona fide processive verb while iss₂ - is a hybrid of processive and descriptive verbs.

Our discussion in this section is summarized in (25):

(25) Classification of Verbs

<table>
<thead>
<tr>
<th>Mod. Suffix</th>
<th>STMT</th>
<th>QUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processive</td>
<td>-ta</td>
<td>-ni</td>
</tr>
<tr>
<td>Processive</td>
<td>nun</td>
<td>(u)n</td>
</tr>
<tr>
<td>Processive</td>
<td>nun</td>
<td>(u)n</td>
</tr>
<tr>
<td>Descriptive</td>
<td>nun</td>
<td>(u)n</td>
</tr>
<tr>
<td>Descriptive</td>
<td>nun</td>
<td>(u)n</td>
</tr>
<tr>
<td>Hybrid</td>
<td>nun</td>
<td>(u)n</td>
</tr>
<tr>
<td>Hybrid</td>
<td>nun</td>
<td>(u)n</td>
</tr>
</tbody>
</table>

⁷ Why does iss₂ - 'exist, have' choose the simpler forms? We might speculate that its ambivalence in the selection of endings is already complicated enough, and that the selection of the simpler of the two alternants in statements and questions seems to be a sort of compensatory phenomenon. Martin (personal communication) thinks that it may represent the oldest forms of all verbs.

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3.3 Transparent Verbs ha- and toy-

Our analysis in 3.2 has revealed three distinct subcategories of verbs in Korean: processive, descriptive, and hybrid. We argue in this section that a fourth subcategory has to be posited, one consisting of transparent verbs ha- and toy- "become, be". We discuss ha first.

Martin (1963) calls nouns in a noun + ha₂ₘ verbed construction such as (26) below verbal nouns:

(26)
a. yenkwu ha-n-ta
   research do SE
   '(somebody) researches (something)'

b. kyelhon ha-n-ta
   marriage do SE
   '(somebody) gets married'

c. hayngpok ha-∅-ta
   happiness be SE
   '(somebody) is happy'

8. The subscript 2 indicates that this ha- is distinguished from the true verb ha- as in (i) below:

i. a. yenkwu-lul ha-n-ta 's.o) does research'
   research ACC do SE

b. kyelhon-lul ha-n-ta 's.o) gets married'
   marriage ACC do SE

There is no reason to classify this ha- differently from, for example, mek- ‘to eat’ as far as feature percolation is concerned. We will be concerned only with the noun + ha₂ construction, which H. Ahn (1989, 1991) argues to be a "true light verb construction". The other type, referred to by J. Kim (1991) as the 'unincorporated verb construction', as in (i) above, will not be discussed in this work. See O'Grady (1990) and J. Kim (1991) for discussions of the difference between these two types of predication.
The verb ha- in (26a) and (26b) is a postnominal processive verb while ha- in (26c) above is a postnominal descriptive verb or adjective.

Martin defines (p.257) a verbal noun as a noun occurring typically before a postnominal verb and he divides verbal nouns into transitics (e.g., yenkwu 'research') and intransitics (e.g., kyelhon 'marriage', hayngpok 'happiness'). Intransitive verbal nouns are further divided into processive (e.g. kyelhon 'marriage') and descriptive or adjectival nouns (e.g. hayngpok 'happiness'). In Martin's system, all transitive verbal nouns are processive. Preverbal processive nouns therefore belong to one or other of the two types: transitive (e.g., yenkwu 'research') and intransitive (e.g., kyelhon 'marriage').

Martin states that adjectival nouns form constructions with descriptive postnominal verbs, which he call also 'postnominal adjectives'. Recall that Martin's 'adjective' is equivalent to our 'descriptive.' If we follow Martin's analysis, the subcategory features of the verb constructions in (26) above would be as follows:

(27)

a. yenkwu ha- n-ta
   proc proc
   research do SE
   '(somebody) researches (something)'

b. kyelhon ha- n-ta
   proc proc
   marriage do SE
   '(somebody) gets married'
This is clearly a case of double marking of the preverbal nouns and postnominal verbs, encoding both in each pair as either processive or descriptive. It also concurrently involves an overspecification of ha- into two ha-’s, one processive and the other descriptive.

We propose that both ha’s be treated as one and that this ha- be classified as a transparent verb. This is in line with the proposal (Cattell 1984; H Ahn 1989, 1990; J Kim 1991) that ha- in such constructions is a light verb.9

It is clear that verbs consisting of a noun and the verb ha-(N + ha- construction hereafter), yenkwu ‘research’ + ha- and hayngpok ‘happiness’ + ha-, can be classified into the two classes of processive and descriptive on the basis of the testing frames adopted in

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9. J. Kim (1991:1) states:

Light verbs are generally understood to be verbs which do not have a fully specified argument structure; thus, they can be functional only when they are a part of complex predicates (Cattell 1984), and their arguments are transferred from a predicational noun (Grimshaw and Mester 1988) or some other source, such as another verb.

In the case of subcategory features of processive/descriptive distinction, these features are not ‘transferred’ but are percolated to a node dominating both the ‘predicational noun’ and the ‘light verb’. See Chapter 8 and 9 for details of percolation.
this study. Note the following (sa- means 'to buy' and ssa- 'to be cheap'):

(28)

<table>
<thead>
<tr>
<th>Ending</th>
<th>Aspect</th>
<th>Mood</th>
</tr>
</thead>
<tbody>
<tr>
<td>processive statement</td>
<td>sa-</td>
<td>n</td>
</tr>
<tr>
<td>processive question</td>
<td>yenkwu-ha</td>
<td>n</td>
</tr>
<tr>
<td>descriptive statement</td>
<td>sa-</td>
<td>ø</td>
</tr>
<tr>
<td>descriptive question</td>
<td>yenkwu-ha</td>
<td>ø</td>
</tr>
<tr>
<td></td>
<td>ssa-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hayngpok-ha</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ssa-</td>
<td>(u)ni</td>
</tr>
<tr>
<td></td>
<td>hayngpok-ha</td>
<td>(u)ni</td>
</tr>
</tbody>
</table>

Yenkwu-ha- 'to research' is like the simple processive verb sa- 'to buy' and hayngpok-ha- 'to be happy' like the simple descriptive verb ssa- 'to be cheap' (but not like sa- 'to buy'). The issues to be addressed here are 1) how we can avoid Martin's double marking and assign the subcategory feature of the N + ha- construction to either the preverbal noun or the postnominal verb ha- and 2) whether it would be possible, if the preverbal nouns can be assigned the subcategory features, to treat the two ha-’s as one. If so, what would be the subcategory feature of the unified ha-?

With respect to the first issue, we propose that the subcategory features be assigned to the preverbal noun rather than the postnominal verb ha-. The elements subcategorized for these subcategory features are sentence endings or other suffix phrases, both of which necessarily attach to verbs and not to nouns. The preverbal nouns (or predicational nouns), therefore, cannot precede or be subcategorized for by these elements. However, these nouns
occur in constructions headed by nouns denoting various notions of time relations. For example, -cwung ‘in the middle of’, -cikhwu ‘immediately after’, or -cikcen ‘immediately before’ (cf. Shibatani and Kageyama 1988) are heads that select processive complements:

(29) -cwung with a Processive Verb Complement

a. mek₁₀-nun cwung
   eat MOD middle
   ‘in the middle of eating’

b. *ssa₂-n cwung
   cheap MOD middle
   ‘in the middle of being cheap’

(30) -cikcen with a Processive Verb Complement

a. mek⁻ki cikcen
   eat NOML immediately before
   ‘immediately before eating’

b. *ssa₄-ki cikcen
   cheap NOML immediately before
   ‘immediately before being cheap’

(31) -cikhwu with a Processive Verb Complement

a. mek⁻un cikhwu
   eat MOD immediately after
   ‘immediately after (one) has eaten’

b. *ssa₄-n cikhwu
   cheap MOD immediately after
   ‘immediately after (something) has been cheap’

The verb mek⁻ ‘to eat’ in (a)’s is processive while ssa⁻ ‘to be cheap’ in (b)’s is descriptive. When these true verbs are replaced by preverbal nouns yenkwu ‘research’ and

---

10. The subscripts p, d, and h stand for processive, descriptive, and hybrid elements.
hayngpok 'happiness' respectively as (32) – (34) below, the same distinction holds:

(32)

a. yenkwu cwung
research middle
'in the middle of research'

b. *hayngpok cwung
happiness middle
'in the middle of happiness'

(33)

a. yenkwu cikcen
research immediately before
'immediately before research'

b. *hayngpok cikcen
happiness immediately before
'immediately before happiness'

(34)

a. yenkwu cikhwu
research immediately after
'immediately after research'

b. *hayngpok cikhwu
happiness immediately after
'immediately after happiness'

In these examples, we find that the preverbal noun yenkwu 'research' and hayngpok 'happiness' behave exactly like the processive verb sa- and the descriptive verb ssa- respectively in that yenkwu 'research' bears the processive feature and hayngpok 'happiness' the descriptive feature.

\[\text{11. Some speakers may find this acceptable. It is certainly better than (i) below:}\]

(i)

*ssa-n cikhwu
*may-un cikhwu.
There is further evidence for our proposal. Korean has
a V-ki to ha- structure meaning 'indeed'. It is used as
follows:

(35) With a processive verb

a. mekₚ-ki to ha-n-ta
   eat indeed SE
   'eats (a lot) indeed'

b. mekₚ-ki to ha-*Ø-ta
   eat indeed SE
   'eats (a lot) indeed'

(36) With a descriptive verb

a. ssa₃-ki to ha-Ø-ta
   cheap indeed SE
   '(very) cheap indeed'

b. ssa₃-ki to ha-*n-ta
   cheap indeed SE
   '(very) cheap indeed'

The structure in (35) -ki to ha-n-ta is subcategorized for a
processive verb mek- 'to eat' and -ki to ha-Ø-ta in (36) for
a descriptive verb ssa- 'to be cheap'. The suffix -ki is a
nominalizer and it is possible to interpret -to ha-n-ta or
-to ha-Ø-ta as attached to a processive and descriptive
nominalized element respectively. Preverbal nouns can occur
in place of these nominalized elements as follows:

(37)

a. yenkwu to ha-n-ta
   research indeed SE
   'do research (a lot) indeed'

b. *hayngpok to ha-n-ta
   happiness indeed SE
   '(very) happy indeed'
(38)
a. *yenkwu to ha-Ø-ta
   research indeed SE
   'do research (a lot) indeed'

b. hayngpok to ha-Ø-ta
   happiness indeed SE
   '(very) happy indeed'

These examples suggest that yenkwu 'research' and hayngpok 'happiness' bear the processive and descriptive features respectively.

What about an alternative analysis in which the postnominal verb is claimed to carry the processive and descriptive distinction while the preverbal nouns have no subcategory features, as shown in (39) below?

(39)
a. yenkwu ha- n-ta
   Ø      proc
   research do SE
   '(somebody) researches (something)

b. hayngpok ha- Ø-ta
   Ø      desc
   happiness be SE
   '(somebody) is happy'

If this alternative analysis were adopted, we would immediately face the inconsistency of designating 'preverbal nouns' as either processive or descriptive when they do not occur with the postnominal verb ha- as in (32) - (34) above, and as not bearing these subcategory features when they are in construction with ha-, as in (39). An equally perplexing problem is that, as is well documented (e.g., Martin 1963:256 fn (3)), postnominal ha- is very frequently deleted
without any effect on the meaning or grammaticality of the pattern. For example,

(40) With a processive element

a. yenkwu (ha- nun) cwung
   research (v) MOD middle
   'in the middle of researching'

b. *hayngpok (ha- n) cwung
   happy MOD middle
   'in the middle of being happy'

(41) With a Processive Element

a. yenkwu (ha-ki) to ha-n-ta
   research (v) indeed SE
   'research (a lot) indeed'

b. *hayngpok (ha-ki) to ha-n-ta
   happy indeed SE
   'be (very) happy indeed'

(42) With a Descriptive Element

a. hayngpok (ha-ki) to ha-Ø-ta
   happy indeed SE
   'be (very) happy indeed'

b. *yenkwu (ha-ki) to ha-Ø-ta
   research indeed SE
   'research (a lot) indeed'

If we designate the ha- as either processive or descriptive, and the preverbal nouns as not carrying subcategory features in these constructions, and if ha- is deleted, we cannot account for the well-formedness or ill-formedness of these constructions? It is therefore unreasonable to suppose that the postnominal (or the light verb) ha- carries the subcategory features.

It is also implausible to claim that ha- is underlingly affixed to a preverbal noun but is later
deleted after it has percolated its subcategory feature to the mother node dominating both the preverbal noun and ha- itself. This claim is refuted by the following data, in which ha- cannot be assumed to have been underlyingly there before deletion:

(43)
a. kyelhon-cwung
   marriage middle
   '(somebody) is married'

b. *kyelhon -ha-nun-cwung\(^{12}\)
   marriage do MOD middle
   '(somebody) is married'

(44)
a. cemlyeng-cwung
   occupation middle
   '(someplace) is under occupation'

b. *cemlyeng -ha-nun-cwung
   occupation do MOD middle
   '(someplace) is under occupation'

We therefore conclude that it is the preverbal nouns which carry subcategory features.

Now, we have to address the second issue: if preverbal nouns are assigned the subcategory features, what would be the subcategory features of the ha-? We assume that ha- is not to be separated into two elements--processive and descriptive. The verb carries no subcategory features. Instead, subcategory features borne by preverbal nouns pass through ha- and to SE's or other elements. For example, in (45) below, the head nouns cwung 'in the middle of,' cikcen

\(^{12}\) It is a well-formed construction in the meaning of '(somebody) is being married'.

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'immediately before,' and cikhwu 'immediately after' selected respectively by N + ha- are the same as those selected by the preverbal noun itself:

(45)
a. yenkwu (ha- nun) cwung
   research VBLZ MOD middle
   'in the middle of researching'
b. yenkwu (ha- ki) cikcen
   research VBLZ NOML immediately before
   'immediately before research’
c. yenkwu (ha- n) cikhwu
   research VBLZ MOD immediately after
   'immediately after research’

The verbalizer ha- does not determine the subcategory of the N + ha- construction and let the subcategory features of the preverbal nouns it is attached to pass through so to speak. This is the characteristic of what we call transparent elements 13.

The derivation of yenkwu-ha may be illustrated as follows:

(46)14

yenkwu-ha-
    [processive]

yenkwu -ha
    [processive]

13. This type of element could be called a null type, following Lieber (1980:88)

14. See Chapter 4 for the headhood of ha- and Chapter 8 and 9 for a detailed account of percolation in N + ha- and N + toy- constructions.
The second verb which behaves like the verbalizer ha-
is toy\textsuperscript{15}. Martin (1967:497) lists this as a postnominal verb or adjective. He explains its function as replacing hata to make a kind of passive for certain verbal nouns. His gloss is 'becomes, gets to be, is'. Although Martin considers it to be a postnominal verb or adjective, toy- is verbal (or processive in our term) only when it is suffixed to a preverbal noun (or a processive preverbal noun) and adjectival only after an adjectival preverbal noun:

\begin{verbatim}
(47)
a. sicak toy -n-ta
   beginning become SE
   '(something) gets started.'

b. cham toy -\emptyset-ta
   truth be SE
   '(somebody) is truthful.'
\end{verbatim}

As the gloss indicates, sicak 'beginning' and cham 'truth' are processive and descriptive preverbal nouns respectively. For the same reasons that we have advanced above with respect to N + ha- construction, we assign the processive and descriptive subcategory features to preverbal nouns and consider toy- not to carry any subcategory features. Thus, toy-, like ha-, is a transparent verb.

3.4 Summary

Korean linguists define the dichotomy between processive and descriptive verbs on the basis of plain level

\textsuperscript{15}. H-M Sohn (personal communication) pointed this out to me.
statement endings alone. We have argued that the plain level question endings should be added to the criteria. If this is done, we can account for the occurrence of in the plain descriptive question ending, which otherwise would be a systematic accident not accounted for in any systematic way. Such an addition also makes it possible to define verbs in positive terms, i.e., by what they are rather than what they lack. This addition, crucially, provides us with symmetrical paradigmatic formulae on the basis of which ‘quasi-processives’ or ‘existentials’ may be delineated.

With the help of new criteria (and the modifier suffixes), our analysis has led us to propose that the three iss-'s distinguished by Martin be reduced to two iss-'s, iss₁- and iss₂-. iss₁- is classified as a bona fide processive verb and iss₂- as a hybrid verb. In the selection of plain level SE's, a hybrid verb behaves like a processive verb in a question and like a descriptive verb in a statement. A hybrid is ambivalent also in modifier suffix selection: in the non-past, it behaves like a processive verb and in the past and volitional/conjecture usage, like a descriptive verb.

The verb iss₁- (and its negative counterpart eps-) plays a major role in the subcategorization system with which we are concerned--it participates in the system as a verb itself, as a possible component of the past suffix -ess and the vol/conj suffix -keyss, and as the last constituent
of many suffix phrases (See chapter 4). This delineation of \textit{iss\textsubscript{2}} as a hybrid opens up a way of classifying verb suffixes and suffix phrases into different subcategories just as we have classified verb stems into different subcategories. We attempt this classification in the next chapter.

We have also proposed that we posit a fourth type of verb subcategory, the transparent verb \texttt{ha-} and \texttt{toy-} which do not carry their own subcategory features but allow those of preceding elements to pass through.
We will argue in this chapter that not only verbs but also 'inflectional' verb suffixes and verb suffix phrases should be classified on the basis of their morphotactic behavior. As noted in Chapter 2, a similar proposal was made by Martin (1954:17). He includes the past tense suffix -ess and the volition/conjecture suffix -keyss in the class of what we established in the preceding chapter as the hybrid subcategory and calls (1963:315) them quasi-verbs intransitives.

Our first task is to determine the subcategories not only for -ess and -keyss but for all the verb suffixes except the SE itself. We will show that the suffixes should be classified into the four different subcategories--processive, descriptive, hybrid, and transparent. Following the same criterion, we will classify suffix phrases into the same four subcategories. If these proposals can be maintained, we will then argue that both verb suffixes and suffix phrases should be construed as heads.

Selkirk (1982) and Y-S Kim (1985:62) have claimed that the fact that inflectional affixes tend not to be 'category-changing' suggests that these affixes are not heads. We argue that, although 'inflectional' suffixes and suffix phrases are indeed not 'category-changing', they are "subcategory-changing" and should be construed as heads. In
the Di Sciullo and Williams' (1987) theory, the identifying feature of a head is that the properties of the head are those of the whole. (p.23) The properties here can be many and the same element can be a head or nonhead with respect to different properties. To accommodate this concept, DW (p.26) relativize the notion "head" as in (1) below:

(1) Definition of "head\(_f\)" (read: head with respect to the feature \(F\)):

The head\(_f\) of a word is the rightmost element of the word marked for the feature \(F\).

Besides the transparent verbs -ha (verbalizer) and -toy 'become, is', there are the honorific suffix -(u)si and a number of suffix phrases including, for example, -ci anh- (negation), all of which are transparent. These elements are transparent with respect to the subcategory features processive and descriptive; that is, they lack their own subcategory features; those of the preceding element pass through them so that the properties of the preceding element are those of the whole. With respect to other features, however, these transparent elements may be construed as heads. For example, the honorific suffix -(u)si is a head with respect to selection of the subject of a sentence. For this reason, when headhood is at issue, it is crucial for us to clarify which are the features for which so-called transparent element is classified as a head. According to Lieber (1989), certain transparent elements may be heads even though the feature values are unmarked.
In Lieber (1989), only morphosyntactic elements are construed as heads. We will tentatively assume that the selection of SE by suffixes and suffix phrases is a morphotactic phenomenon. In Chapter 6, we will argue that verb suffixes, including SE, are syntactic affixes and that the SE selection is morphosyntactic rather than morphotactic.

This chapter is organized as follows. In section 1, we propose that inflectional suffixes be classified, on the basis of SE-selection, into four subcategories: processive, descriptive, hybrid, and transparent. Using the same criteria we claim that inflectional suffixes are heads. Section 2 is devoted to establishing the transparent verbs ha- and toy- as heads with respect to features other than the processive and descriptive distinction. We propose, in section 3, that suffix phrases also be classified into four subcategories and that they also should be construed as heads, following the same criteria. Section 4 summarizes the proposals and discussion.

4.1. Four Classes of Verb Suffixes and Their Headhood

In Korean, verb suffixes can occur in sequence. Martin (1963:358) presents the following matrix representing the maximum possibility of seven sequence positions:

(2) Status Tense Tense Tense Style Aspect Mood
    usi ess ess keyss sup ni ta
    HON PAST PAST FUT HUM IND STMT
This sequence is for the formal level of speech, which is characterized by an SE consisting of the last three suffixes in the sequence. This formal level SE is not sensitive to the subcategory distinction of its preceding element while the plain-level SE is. This is why we have used plain-level SE's as criteria for the classification of verbs in Chapter 3 (and of verb suffixes and verb suffix phrases in this chapter). Both plain-level question SE's and plain-level statement SE's, are included in the criteria. We therefore replace the statement formal-level SE in (2) with the plain-level statement and question SE's as follows (cf. Chapter 1 (25)):

(3) Status Tense Tense Modal Aspect Mood
    usi ess ess keyss nun/∅ ta/(u)ni
    HON PAST PAST VOL/CONJ PROC/IND STMT/QUES

Lee (1989) adds the causative/passive suffix$^1$ to the sequence of suffixes as in (4):

(4) Status TNS TNS Modal ASP Mood
    i usi ess ess keyss nun/∅ ta/(u)ni
    C/P HON PAST PAST V/C PROC/IND STMT/QUES

How are these suffixes to be classified? Although both SE-selection and ME-selection were used as criteria for

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$^1$. See immediately below and chapter 5 and 6 for arguments for the inclusion of the causative/passive suffix -ɨ.
classification of the verb iss- in Chapter 3, we will use only SE-selection as the criterion for classification of suffixes and suffix phrases.

We exclude the SE itself from our classification since the SE differs from other suffixes in (4) in several respects. For one thing, it does not carry the subcategory feature distinction of processive versus descriptive.

4.1.1 Hybrid Suffix Heads -ess and -keyss

We will first consider the past tense suffix -ess and the V/C suffix -keyss. They can be suffixed to verb stems of all three subcategories\(^2\): to mek- 'eat', noph- 'high', and iss- 'exist or have-', for example, and they select the SE's shown in (5):

(5)

\[
\begin{array}{ccc}
\text{PAST} & \text{V/C} & \text{SE} \\
\text{mek}_p \text{-ess/-keyss} & \emptyset & \text{ta} \\
\text{eat} & \emptyset & \text{ni} \\
nophh \text{-ess/-keyss} & \emptyset & \text{ta} \\
\text{high} & \emptyset & \text{ni} \\
iss_s \text{-ess/-keyss} & \emptyset & \text{ta} \\
have/exist & \emptyset & \text{ni} \\
iss_s \text{-ess/-keyss} & \emptyset & \text{ni}
\end{array}
\]

Compare these with SE-selection by verb stems themselves discussed in Chapter 3 and repeated below:

\(^2\) The fourth category, consisting of transparent verbs -ha and toy-, does not concern us since it derives either processive or descriptive verbs.
The sequence of a verb stem plus the past tense -ess or the V/C suffix -keyss behave exactly like the hybrid verb stem iss- in (6c) above, that is, the processive aspect -nun in the statement and the descriptive mood -(u)ni in the question are not selected regardless of the subcategory of the verb stem. -Ess and -keyss make their own selection of SE's. So, we have no reason not to extend the subcategory membership to the past suffix -ess and the V/C suffix -keyss. Selection of -ta in statements and -ni in questions is characteristic of the hybrid and we have no reason to exclude -ess and -keyss from the subcategory hybrid.

Are -ess and -keyss heads with respect to subcategory features? The derivation of mek-ess and mek-keyss, for example, may be represented as follow:

(7) a.  

\[ \text{mek-ess}_h \]
\[ \text{mek}_p \]
\[ -\text{ess}_h \]

b.  

\[ \text{mek-keyss}_h \]
\[ \text{mek}_p \]
\[ -\text{keyss}_h \]

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The inflectional suffixes -ess and -keyss are subcategory changing and are heads in Selkirk's theory. They are also heads according to DW's definition since the identifying feature of a head is that the properties of the head are those of the whole.

Based on these data, we assume that Williams' (1981: 248) Righthand Head Rule is applicable to Korean:

(8) Righthand Head Rule (RHR)

The head of a morphologically complex word is the righthand member of that word.

4.1.2 The Processive Suffix Head -i

Now, consider how the suffix -i (causative/passive) behaves with respect to the selection of SE's. Observe the following examples:

(9)

<table>
<thead>
<tr>
<th>CAUS</th>
<th>SE</th>
<th>Aspect</th>
<th>Mood</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>mekₚ-i</td>
<td>nun</td>
<td>ta</td>
</tr>
<tr>
<td></td>
<td>eat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mekₚ-i</td>
<td>ø</td>
<td>ni</td>
</tr>
<tr>
<td>b.</td>
<td>noph₄-i</td>
<td>nun</td>
<td>ta</td>
</tr>
<tr>
<td></td>
<td>high</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>noph₄-i</td>
<td>ø</td>
<td>ni</td>
</tr>
</tbody>
</table>

---

1. Note again, that although we use the term 'subcategory' here, subcategories are equivalent to full categories in works such as Martin (1963), Suh (1991), and Sohn (forthcoming); in these works our 'descriptive verbs' are 'adjectives' and 'processive verbs' are equivalent to 'verbs'.

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Recall that the processive verb mek- 'eat' selects the statement SE -nun-ta and not -Ø-ta, and the question SE -ni rather than -uni. These SE's are exactly those the causative -i takes regardless of the verb it is attached to. Therefore we assign the causative suffix -i to the processive subcategory. The causative suffix -i thus determines the category of the constitute it is part of, as illustrated below:

\[(10)\]
\[
noph\rightarrow \text{ -i} \quad \text{p}
\]
\[
noph\rightarrow \text{ -i} \quad \text{p}
\]

The causative suffix -i changes the subcategory of the stem and the properties of -i become those of the whole constitute. Thus, the suffix -i is the head.

Given this analysis, how does causative -i differ in its effect from the past suffix -ess or the volition/conjecture suffix -keyss? Some might object to the inclusion of this suffix -i in the same group as the other

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4. eps- is a negative counterpart of iss-. A morphophonemic mapping rule converts eps + i + ha into eps-ay-.

5. We find Hockett's (1958) term 'constitute' useful for a precise designation of a complex item built by immediate constituents. Hockett (p.165) defines a constitute as "a composite form, but only when being discussed as the product of ICs [immediate constituents] joined by a specific construction."
suffixes discussed here since it also changes the argument structure of the preceding verb. Like the Japanese causative verb suffix -sase, -i bears an external argument, the causative agent, which becomes the external argument of the whole. The arguments of the nonhead verb stem, including its external argument, become the internal arguments of the whole (cf. DW p.32).

In addition to changing the argument structure, the causative suffix has a number of allomorphic variants. However, since neither of these properties is typical of derivational suffixes, we will consider them idiosyncratic properties of this suffix and not those of derivation.

More significantly, the causative suffix -i, like -ess and -keyss and other suffixes to be considered next, changes the subcategory of the stems to which it is suffixed. For these reasons, it seems reasonable to include the causative/passive suffix in the same class.

4.1.3 The Transparent Suffix Nonhead -(u)si

If the honorific suffix -(u)si is added to verb stems of different subcategories, we find the following SE's:

---

6. The passive suffix -i reduces an argument. However, it behaves like the causative suffix: i.e., it changes the subcategory of the verb stem to which it is suffixed.
The SE's selected by the complex constitutes with the honorific suffix -(u)si are the same as those selected by the verb stems themselves (cf (6) above). Thus, the honorific suffix -(u)si does not determine the subcategory of the derived constitute. The subcategory features of the stem pass through. This is characteristic of transparent elements.

The derivation of mek-usi- goes as follows:

(12)
\[
\begin{array}{c}
\text{mek-usi} \\
\text{mek_p-}
\end{array}
\]

The inflectional suffix -(u)si is not subcategory changing and thus is not the head. The verb stem is the head because its features are those of the whole. Y-S Kim's claim that Korean inflectional affixes are not heads holds for the honorific suffix -(u)si with respect to SE-selection.

We have determined that the suffixes in (4) above, may usefully be classified as hybrid, processive, and
transparent suffixes. This classification will be represented by subscripts as follows:

(13) \[ i_{\text{proc}} \ u_{\text{usm}} \; \text{ess}_{\text{hyb}} \; \text{ess}_{\text{hyb}} \; \text{keyss}_{\text{hyb}} \; \text{nun}/\emptyset \; \text{ta}/(u)\text{ni} \; C/P \; \text{HON} \; \text{PAST} \; \text{PAST} \; V/C \; \text{PROC/IND} \; \text{STMT/QUES} \; SE \]

We have claimed that the hybrid suffixes -ess and -keyss and the processive suffix -i are heads while the transparent suffix -(u)sı is a nonhead with respect to SE-selection.

### 4.1.4 The Descriptive Suffix Head -te

What is missing is a descriptive suffix. Does Korean have a descriptive suffix which exhibits the same selectional behavior as descriptive verbs? The retrospective -te appears to be a good candidate. However, it is quite restricted in its behavior (cf. C-H Cho 1982), and it is therefore difficult to ascertain if indeed it behaves like a descriptive suffix with respect to the selection of an SE. The following sentences with -te preceding the SE's are ill-formed:

(14) a. *Mek -te -ta
   eat RETR STMT

   "(I) found him eating."

b. *Mek -te -ni?
   eat RETR QUES

   "Did (you) find him eating?"

However, with -la and -(u)n-ka, statement and modifier question endings respectively, the sentences are well-formed:

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(15)
a. Mek -te -la (I) found him eating.
   eat RETR STMT SE
b. Mek -te -(u)n-ka? Did (you) find him eating?
   eat RETR MOD QUES

Sentences (15a) and (15b) are embedded sentences in (16) below:

(16)
a. Mek -te -la ko mal-ha-n-ta
   eat RETR STMT SE QUO say SE
   'I am telling you that (s.o.) was eating.'
b. Mek -te- (u)n-ka molu -keyss-ta
   eat RETR MOD QUES not know V/C SE
   'I don't know if (s.o.) was eating.'

We assume that the matrix clauses ko mal-ha-n-ta and molu-
keyss-ta are omitted from (16a) and (16b) because they are
understood from the context. (16a) is a quotative sentence
and (16b) non-quotative. In the quoted clause [mek-te-la]
in (16a), an SE -la is used and in a non-quotative embedded
clause [mek-te-(u)n-ka] in (16b), a modifier suffix -(u)n is
used. We have to consider what SE’s and modifier suffixes
are selected by the retrospective -te. In quoted clauses,
the processive, descriptive, and hybrid distinction for SE-
selection is as follows:

7. -Ka is a dependent question complementizer meaning
   'if' or 'whether', and -(u)n is a modifier suffix modifying
   the complementizer. See below.

8. I owe H-M Sohn (personal communication) for this
   analysis.
(17)
Proc: [Mek -nun/n -ta] ko mal-ha-n-ta
eat SE QUO say SE
'(s.o.) says that (s.o) is eating.'

Desc: [Noph ø -ta] ko mal-ha-n-ta
high SE QUO say SE
'(s.o.) says that (s.t.) is high.'

Hybrid: [Iss ø -ta] ko mal-ha-n-ta
exist SE QUO say SE
'(s.o.) says that (s.t.) exists.'

Compared to the SE's in independent sentences (6) above, the SE's in quoted clauses are the same as those in independent sentences. In the non-quotative embedded clauses, the distinction between processive, descriptive, and hybrid verbs is the same as that exhibited by modifier constructions in independent sentences summarized in Chapter 3 (23), repeated below:

(18)9 Modifier Suffixes

<table>
<thead>
<tr>
<th></th>
<th>non-past</th>
<th>past</th>
<th>vol/conj</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processive</td>
<td>mek-/ka-</td>
<td>nun</td>
<td>(u)n</td>
</tr>
<tr>
<td>'eat' 'go'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Descriptive</td>
<td>noph-/ssa-</td>
<td>(u)n</td>
<td>ø</td>
</tr>
<tr>
<td>'high' 'cheap'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hybrid</td>
<td>iss-(eps-)</td>
<td>nun</td>
<td>(u)n</td>
</tr>
<tr>
<td>'exist, have (not)'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Only modifier suffixes are repeated here.

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This can be ascertained from the following examples:

(19)

Proc: Mek-nun ka molu -keyss-ta
eat MOD QUES not know MOD STMT
'I don't know if (s.o.) eats.'

Desc: Noph-(u)n ka molu -keyss-ta
high MOD QUES not know MOD STMT
'I don't know if (s.t.) is high.'

Hybr: Iss -nun ka molu -keyss-ta
have MOD QUES not know MOD STMT
'I don't know if (s.o.) has it.'

As can be seen above, the distinction between three different subcategories of verbs in the embedded non-quotative sentences is the same as that for the modifier endings exhibited in independent sentences.

How does the retrospective -te behave in the selection of SE and modifier suffixes? In the statement sentence (15a) mek-te-la above, -la is a variant of the -ta which we find in quotative sentences like (20b) below:

(20)

a. Con -i ø -ta
John is STMT
'It is John.'

b. Con -i ø -la ko ha-n-ta 'It is said that it is John.'
John is STMT is said

In (15a), we see that -te in mek-te-la occurs without -nun/n. This is characteristic of descriptive and hybrid verbs. On the basis of the selection of an SE in statements, the retrospective -te behaves like either a

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10. Here, we compare only the present tense modifier endings because, as we argue immediately below, -te occurs only with present tense modifier suffixes.
descriptive or hybrid element. In the question sentence
(15b) ka-te-(u)n-ka?, if -(u)n is a modifier suffix, there
are two possible alternative analyses as shown in (18)
above. One is the non-past descriptive modifier suffix and
the other is the past processive modifier suffix. We will
first examine if it is the former, the non-past descriptive
modifier suffix. Observe the following examples:

(21)

a. Coh -un -ka 'Is it good?'
good MOD QUES
Ssa -n -ka 'Is it cheap?'
cheap MOD QUES

b. Ka-nun-ka 'Are you going?'
go MOD QUES
Mek-nun-ka 'Are you eating?'
eat MOD QUES

c. Iss -nun-ka 'Is it (there)?'
exist MOD QUES

The -te in (15b) ka-te-(u)n-ka? occurs with the descriptive
modifier suffix -(u)n, as in (21a), in contrast with -nun
which occurs with a processive verb as in (21b) and a hybrid
verb as in (21c). In non-past tense question sentences,
then, retrospective -te behaves like a descriptive verb
rather than a processive or hybrid verb.

The other possibility—that -(u)n in (15b) mek-te-(u)n-ka?
may be the past tense processive modifier suffix--
is particularly plausible because the suffix -te, being a
retrospective, is always related to the action or situation
in the past. However, the past modifier suffix -(u)n
includes the past tense (or aspect) in itself and cannot
follow a past tense element. In modification constructions headed by -ci, both the sequence of -ess + nun and its suppletive -(u)n are acceptable as shown by (22a) and (22b) respectively:

(22)

a. Mek-ess -nun -ci molu -keyss-ta
   eat PAST MOD QUES not know V/C STMT
   'I don’t know if (he) has eaten.'

b. Mek -un -ci molu -keyss-ta
   eat MOD(Past) QUES not know V/C STMT
   'I don’t know if (he) has eaten.'

However, the suppletive form -(u)n cannot be preceded by an element which indicates the past tense:

(23)

Mek-ess *-un -ci molu -keyss-ta
eat PAST MOD(Past) QUES not know V/C STMT
'I don’t know if (he) has eaten.'

This shows that the modifier suffix -(u)n in (15b) mek-te-(u)n-ka? is not the past tense modifier for processive verbs. We can safely assume that -te belongs to the descriptive subcategory in question sentences. Combining its behavior in the statement and question, we conclude that -te conforms to the descriptive verb subcategory.

The following examples also demonstrate that -te behaves like a descriptive suffix. The -te in (24d) and (25d) below behaves exactly like the descriptive verb in (24b) and (25b) respectively, rather than like the processive verb in (24a) and (25a), or like the hybrid verb in (24c) and (25c):
So we show the following derivation for **mek-te-**:

![Diagram](image)

The retrospective suffix **-te** is 'subcategory changing', determining the subcategory of the whole. It is, therefore, construed as a descriptive suffix head.

We have shown in this section that Korean verb suffixes fall into the same four subcategories as verbs and that (contra Y-S Kim and Selkirk) inflectional suffixes are indeed, in general, subcategory-changing. They are thus, in general, heads. Inflectional suffixes, like verb stems,
have to be construed as lexical items with respect to SE-(and ME-) selection.

4.2 Headhood of Transparent Verbs ha- and toy-

In 3.3, we claimed that in constructions like (a) and (b) of (27) and (28) below, ha- and toy- lack subcategory features;

(27)
(a) yenkwu + ha- n-ta
   proc
   research do
   '(somebody) researches (something)

(b) hayngpok + ha- Ø-ta
   desc
   happiness be
   '(somebody) is happy'

(28)
(a) sicak + toy- n-ta
   proc
   beginning become
   '(something) gets started'

(b) cham + toy- Ø-ta
   desc
   truth be
   '(somebody) is truthful'

Only the preverbal nouns bear the subcategory features of the N + ha-/toy- constructions, as in (29) and (30):

(29)
(a) yenkwu ha- n-ta
   proc Ø
   research do
   '(somebody) researches (something)

(b) hayngpok ha- Ø-ta
   desc Ø
   happiness be
   '(somebody) is happy'
These subcategory features of the preverbal nouns pass through ha- or toy- and select SE’s or other suffix phrases. This is characteristic of transparent elements.

We need to determine now whether ha- and toy- are heads with respect to some other features. We take ha- as the example. The derivation of the constitutes (29) can be illustrated as follows:

(31)

(a) yenkwu-ha-p-    (b) hayngpok-ha-d-
    yenkwu p-    hayngpok d-    ha-    ha-

We see that ha- is not '(sub)category changing' and is not the head. The subcategory features of the noun are those of the whole; the noun is the head.

If we look at (31a) and (31b) from the perspective of their category features rather than their subcategory features, the head and nonhead relationship look more like this:

(32)

(a) yenkwu-ha_v-
    yenkwu_N ha_v-

(b) hayngpok-ha_v-
    hayngpok_N ha_v-
The transparent verb ha- is the head in each derivation since it is the category changing element and the properties of the whole are those of the verb.

Both features are morphosyntactic and have to percolate so that each feature is available to be interpreted by the grammar. The derivation is shown as follows:

\[(33)\]
\[(a) \text{yenkwu-} ha_{vp}-\quad (b) \text{hayngpok-} ha_{vd}-\]

\[\text{yenkwu}_{Np} \quad ha_{vl}-\quad \text{hayngpok}_{Nd} \quad ha_{vl}-\]

Both constituents are heads in each derivation, but with respect to different features; the verb is the head with respect to the category feature, and the noun with respect to subcategory features. The conclusions we arrive at with respect to ha- equally apply to toy-.

4.3 Four Classes of Suffix Phrases and their Headhood

Now we turn to the classification of verb suffix phrases and the determination of their headhood. Verb suffix phrases are phrases which begin with a suffix and are suffixed by another endings (See Chapter 1). They are like verbs or verb suffixes in that they select SE’s, for example. We claim that verb suffix phrases fall into four subcategories, just as verbs and verb suffixes do. We argue that suffix phrases are in general heads, as are verbs and verb suffixes. The four subcategories of verb suffix phrases are shown in (34):
(34) Classification of Verb Suffix Phrases

<table>
<thead>
<tr>
<th>SE-Selection</th>
<th>Statement</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc</td>
<td>-e ya ha-</td>
<td>nun/n</td>
</tr>
<tr>
<td>Desc</td>
<td>-e to kwaynchanh-</td>
<td>(u)</td>
</tr>
<tr>
<td>Trans</td>
<td>-ci anh-</td>
<td>nun/n</td>
</tr>
<tr>
<td>Hybrid</td>
<td>-(u)l swu iss₂-</td>
<td>nun/n</td>
</tr>
</tbody>
</table>

The morphotactic behavior of these suffix phrases is exactly the same as that of the verbs and verb suffixes of the same subcategories. We present one example each of processive and transparent suffix phrases.

The processive suffix phrase -e ya ha- ‘must’ calls for SE’s of a processive element, regardless of the type of verb, or suffix to which it is added. Consider the following examples:

(35) Processive Suffix Phrase Head -e ya ha- after:

SE-Selection

a) Verbs
P: Mek-e ya ha-nun-ta  ‘(I) have to eat.’
   eat must SE
   Mek-e ya ha-Øni”??

D: Noph-a ya ha-nun-ta  ‘It has to be high.’
   high must SE

H: Eps-e ya ha-nun-ta  ‘It must not be (there).’
   lack must SE

\[1\]. The question sentences will not be repeated.
b) Suffixes

P: Noph-i-e ya ha-nun-ta 'It has to be raised.'
   high CAUS must SE

D: Noph-te-*e ya ha-nun-ta 'It was observed that
   high RETR must SE it had to be high.'

T: Noph-usi-e ya ha-nun-ta 'One (honored) has to be
   high HON must SE high (e.g., in rank).'

H: Noph-ass-e-ya ha-nun-ta 'One had to be high.'
   high PAST must SE

Compare this with the SE-selection by a processive verb mek-
'eat' in (6a) above, repeated below:

(6a)
Mek-nun-ta '(I) eat.'
Mek-∅-ni? 'Do (you) eat?'

It is clear that -e ya ha- 'must' selects its own SE's,
which are processive. The derivation of noph-a ya ha-nun-ta
and noph-ass-e ya ha-nun-ta is shown as follows:

(36)
a. noph-a ya ha-
   nophₐ- a ya ha-
   nophₐ- a ya ha-

b. noph-ass-e ya ha-
   noph- assₑSAMPLE a ya ha-

We see that -e ya ha- 'must' is subcategory changing and
that its properties are those of the whole. We can therefore classify -e ya ha- as the head bearing the
processive subcategory features.

Now we will examine the SE-selection by a transparent
suffix phrase -ci anh- 'do not'. Observe the following
examples:

---

12. This construction does not occur, presumably due to
   the limited distribution of -te (See C-H Chc 1982).

13. For the derivation of noph-ass-, see 4.1.1.
(37)
a) After Verbs
P: Mek-ci anh-nun-ta
   eat not SE
   Mek-ci anh-∅-ni?
   'Doesn’t (s.o.) eat?'

D: Noph-ci anh-∅-ta
   high not SE
   Noph-ci anh-∅-uni?
   'Isn’t (s.o.) high?'

H: Iss-ci anh-∅-ta
   exist not SE
   Iss-ci anh-∅-ni?
   'Isn’t (s.o.) (there)?'

b) After Suffixes
P: Noph-i-ci anh-nun-ta
   high CAUS not SE
   Noph-i-ci anh-∅-ni?
   'Doesn’t (s.o.) raise (it)?'

D: Noph-te-*ci anh-∅-ta
   high RETR not SE
   'I did not observe (it) high.'

T: Noph-usi-ci anh-∅-ta
   high HON not SE
   Noph-usi-ci anh-∅-ni?
   'Isn’t (s.o.) (honored) high?'

H: Noph-ass-*ci anh-∅-ta
   high PAST not SE
   '(It) was not high.'

Compare these with SE’s selected by verbs themselves:

(38)

<table>
<thead>
<tr>
<th>SE</th>
<th>Aspect</th>
<th>Mood</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. mek_{V,prox}</td>
<td>nun</td>
<td>ta</td>
</tr>
<tr>
<td>mek_{V,prox}</td>
<td>∅</td>
<td>ni</td>
</tr>
</tbody>
</table>

| b. noph_{V,desc} | ∅ | t |
| noph_{V,desc} | ∅ | uni |

| c. iss_{V,bybr} | ∅ | ta |
| iss_{V,bybr} | ∅ | ni |

14. The negative -ci_anh- does not occur after tense suffixes.
It is immediately clear that the negative -ci anh- does not select its own SE’s and that the selectional restriction of the preceding element, be it the verb stem or suffix, is passed through -ci anh-. This is characteristic of a transparent verb or suffix, and we thus extend the same subcategory membership to -ci anh-.

Now consider the derivation of mek-ci anh- ‘does not eat’ and noph-usi-ci anh-(Somebody honored) is not high (in his rank):

(39) a. mek-ci anh, b. noph-usi-ci anh

We see here that the suffix phrase -ci anh- (negative) is not subcategory changing and that the properties of the stem are those of the whole; -ci anh- is not the head.

Some examples of verb suffix phrases that belong to the four different classes are listed below:

(40) Processive
-e ya ha- ‘must’
-e ya toy- ‘must’
-key ha- ‘make/let...do/be...’
-e ha- (e.g., coh-a-ha-) changes descriptive verb into processive verb
-e po- ‘try ...ing’
-nun/(u)n chek ha- ‘pretend to’
-e ci- ‘become’
MOD-cwul (lo) al- (molu-) ‘expect (not) to’
-(u)l cwul al- (molu-) ‘know (not) how to’
-ci mal- ‘Don’t....’
-e iss1- resultative
-k0 iss1- progressive
(41) Descriptive
-e to kwaynchanh- 'may'
-ko siph- 'want to'
-nun/un-ka po- 'it appears'
-na po- 'it appears'
MOD-tus ha- 'it appears'
N man mos ha- 'inferior to'
-(u)l man-ha- 'worthy of'
MOD-kes kath- 'it looks'
-(u)l kes i- 'it is sure that'

(42) Transparent
-ci anh- 'do not'
-ci mos ha- 'cannot'
-ki to ha- 'indeed'
V1-ki nun V1- concessive
-ta siphi ha- 'almost'
-(u)l i-kka mal-kka ha- 'wonder if'

(43) Hybrid
-(u)l sswu iss-/eps- 'can/cannot'
MOD cek-i iss-/eps- 'occasion is...'
-nun/- (u)n il-i iss-/eps- 'event is...'
-e iss,- resultative
-ko iss,- progressive

There are two types of suffixes and suffix phrases--those whose behavior in the selection of SE may be predicted on the basis of their last constituent, and those whose behavior cannot be so predicted. Those which may be predicted are:

1) Suffixes: -ess, and -keyss, are predictable on the basis of iss,-, which is assumed to be their last component.

2) Suffix phrases: those such as -(u)lkes kath,- or -(u)l cwul al,- on the bases of the behavior of the last component; kath,- and al,- respectively.

However, the last constituent is not always a clue to their behavior. For example, ha- is found in all the categories except the hybrid, po- in two--processive and
descriptive, and the phrase mos-ha- again in two
categories--descriptive and transparent. The verb iss- is
found in two categories, processive and hybrid. This is
expected because there are two iss’s--iss₁-‘stay’ and iss₂-
‘exist, have’--the former being a processive verb and the
latter a hybrid. For example, the iss- in -e iss- and -ko
iss- in the processive category behaves like iss₁- and the
one in the hybrid category like iss₂-.

Meaning can be helpful in classifying such suffix
phrases as -key haₐ- ‘make/let...do/be’ or MOD-tus haₐ- ‘it
seems’. This is also true of most verbs--most of the
meanings which are expressed by English verbs belong to the
processive subcategory and those expressed by English
adjectives to the descriptive subcategory. However, meaning
is not a clue in all cases. For example, for -ko iss- and -
a iss- in sal-ko iss-ta ‘Somebody is living’ and sal-a iss-
ta ‘Somebody is alive’, the meaning difference is of no
help. Both of them behave both as hybrid and processive
phrases.

4.4 Summary

We have argued that not only verbs but also verb
suffixes and verb suffix phrases should be classified into
four subcategories on the same criteria that we have used
for verb classification. We have proposed four
subcategories: processive, descriptive, transparent, and
hybrid. This analysis allows us to capture the same generalization with respect to SE-selection across the board. Our claim is that inflectional suffixes and suffix phrases are actually heads.

We have also argued that, although ha- and toy- are transparent verbs and non-heads with respect to the subcategory features, they should be construed as heads with respect to the category feature V.

Now that we have delineated the properties of the suffixes -ess and -keyss included in Martin’s quasi-processive elements, we will, in the next chapter, clarify the peculiarities of quasi-processive elements or the so-called ‘existentials’ in Cheong Soo Suh and other Korean linguists. We will find that the peculiarities noted for those elements are not so much due to their intrinsic and indefinable complexity as to their underspecification by Martin and other Korean linguists.
Chapter 5 FOUR-WAY CLASSIFICATION AND ITS BINARY FEATURE ANALYSIS

On the basis of the selection of the plain level SE, we proposed in Chapter 3 that Korean verb category be classified into four subcategories: processives, descriptives, hybrids, and transparents. Following the same criterion, we further established in Chapter 4 that Korean inflectional suffixes and suffix phrases could be classified into the same four subcategories. In section 1 of this chapter we will see that this classification helps account for the 'peculiarity' or 'similarity/dissimilarity' of the so-called quasi-processive or existentials. In section 2, we show that this classificational system captures a major generalization over the seemingly very complicated phenomena of SE- and ME-selection. Section 3 is devoted to the binary feature representation of these four classes so that the generalizations captured may be depicted in a more economic and systematic way. The discussions are summarized in Section 4.

5.1 An Explanation for Peculiarity of 'Quasi-processives' (or 'Existentials')

Martin, Suh, and others have noted that the so-called 'quasi-processives' or existentials resist systematic analysis. We proposed, in Chapter 3 and 4, a new classification of verbs, verb suffixes, and suffix phrases into four subcategories. The apparently idiosyncratic
behavior of these elements becomes explicable when these elements are more fully specified. The peculiarity noted by Martin and Suh arises from their underspecification of these elements.

More specifically, the proposal in Chapter 3, to reduce Martin's three iss's to two -- iss₁ - 'stay' and iss₂ - 'exist, have' -- and the subsequent classification of the former as a bona fide processive and the latter as a hybrid all shed some light on the problems that Martin and Suh faced in their analysis. The peculiarities Martin (1954:17 and Chapter 2 of this study) points out in reference to SE-selection are the following:

(1) For a plain level statement, instead of the expected forms (i) we get (ii) in (a) - (d) below:

a. With respect to iss- 'stay, exist, have'

i. iss  -nun-ta
     SE
     '(Someone) stays, is, has (something)'

ii. iss  -∅ -ta

b. With respect to eps- 'do not exist, have'

i. eps  -nun-ta
     SE
     '(Someone) does not exist or have (something)'

ii. eps  -∅-ta

c. With respect to -ess (past tense suffix)

i. -ess  -nun-ta
     SE
     (past tense statement)

ii. -ess  -∅-ta
d. With respect to -keyss (volitional/conjecture suffix)

   i. -keyss -nun-ta
      SE (volitional/conjecture statement)

   ii. -keyss -Ø-ta

(2) all but iss- 'stay, exist, have' seem to lack command and proposal forms, and

(3) command and proposal forms are not common with iss-.

The explanation for (1b) is straightforward. According to Martin's analysis, eps- is necessarily the negative counterpart of iss₁- 'exist' or iss₂- 'have', which we have separated from iss₁- 'stay' and posited as the single form iss₂- 'exist, have'. Iss₂-, which we classify as a hybrid, behaves like processive verbs in plain questions and like descriptive verbs in plain statements. This is clear from the SE-selection by verbs of different subcategories, as was shown in (25) in Chapter 3, repeated as (4) below:

(4)

<table>
<thead>
<tr>
<th>SE</th>
<th>Statement</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-ta</td>
<td>-ni</td>
</tr>
<tr>
<td>a. Processive</td>
<td>mek-/ka-nun/n</td>
<td>Ø</td>
</tr>
<tr>
<td></td>
<td>including</td>
<td>iss₁- 'stay'</td>
</tr>
<tr>
<td>b. Descriptive</td>
<td>noph-/ssa-Ø</td>
<td>(u)</td>
</tr>
<tr>
<td></td>
<td>'high' 'cheap'</td>
<td></td>
</tr>
<tr>
<td>c. Hybrid</td>
<td>iss₂-(eps-)Ø</td>
<td>Ø</td>
</tr>
<tr>
<td></td>
<td>'exist,have'(negation)</td>
<td></td>
</tr>
</tbody>
</table>

If this classification is correct, the explanation for eps-Ø-ta rather than eps-nun-ta in (1b) offers itself as a natural consequence of this classification, that is, the
natural consequence of this classification, that is, the plain statement of eps-, a hybrid, is eps-∅-ta as in (4c) rather than *eps-nun-ta (as it would be if it were a processive and conjugated as in (4a)). The remaining -ess-∅-ta in (1c) and keyss-∅-ta in (1d) are explainable in the same manner: -ess and -keyss are suffixes we classify as hybrids and as such they select the SE in (4c) and they cannot take the processive SE in (4a).

Now let us return to (1a). Martin’s observation that, for a plain level statement, instead of the expected form iss-nun-ta, we get iss-∅-ta, is simply an oversight. Both of these forms occur. As discussed in Chapter 3, iss-nun-ta is a well-formed conjugation of iss₁ (cf. 4(a)) and iss-∅-ta is a well-formed conjugation of iss₂- (cf. 4(c)).

The peculiarities (2) and (3) regarding command and proposal forms are due to underspecification of the three iss’s: iss₁- ‘stay’ as a bone fide processive verb does have command and proposal endings. Only processive verbs may have these conjugations. It follows from our classification of iss₂- and its negative and honorific counterpart eps- and kyeysi- as hybrids that these words cannot have command and proposal forms. (3) is predictable since the frequency of iss₁- is low as compared to eps-, kyeysi-, and iss₂-, which in turn consists of iss₃- ‘exist’ and iss₄- ‘have’.

With reference to modifier forms, Martin (1963:315) points out that iss- and eps- occur more commonly with the
'processive' modifier suffix -\text{nun} than the descriptive modifier suffix -(u)\text{n}. The explanation for this also follows naturally from our analysis. The iss- includes the processive verb iss₁- and the hybrid verb iss₂-. As we observed in Chapter 3, in modifier constructions a hybrid conjugates ambiguously: it behaves like a processive verb in the non-past, and like a descriptive verb in the past and volition/conjecture usage. This is clearly illustrated by (25) in Chapter 3, repeated as (5) below:

(5)

\begin{center}
\begin{tabular}{|c|c|c|c|}
\hline
Mod. Suffix & Non-Past & Past & VOL/CONJ \\
\hline
a. Processive & mek-/-ka- & nun & (u)\text{n} & (u)\text{l} \\
& & including iss₁- & 'stay' & \\
& & iss₂- & 'eat' & 'go' \\
b. Descriptive & noph-/-ssa- & (u)\text{n} & * & ?(u)\text{l} \\
& & 'high' & 'cheap' & \\
c. Hybrid & iss₂-(eps-) & nun & ?(u)\text{n} & ?(u)\text{l} \\
& & 'exist, have' & (neg.) & \\
\hline
\end{tabular}
\end{center}

The fact that iss-, whether a processive or a hybrid, occurs with the modifier suffix -\text{nun} (cf. (5a) and (5c)) in the non-past tense is therefore predictable on our analysis. The occurrence of -\text{nun} with eps- is also predictable since eps- is the negative of iss₂- and both are hybrids (cf. (5c)). As (5b) shows, iss- or eps- do not occur with the non-past descriptive modifier suffix -(u)\text{n}. Iss₁- 'stay' can be used with the past processive modifier suffix -(u)\text{n} (cf. (5a)) and its frequency is bound to be lower than that of all other iss's together. Eps-, again the negative of
the hybrid iss-, behaves like a descriptive verb in the past. As (5) shows, the past modifier construction built of a hybrid and a modifier suffix is very dubious in acceptability. If it is found at all, it is possibly a form created by analogy in some people's speech\(^1\).

The other 'peculiarity' that Martin (1969:203 and Chapter 2 of this study) points out for iss- and eps-, is presented in polite-level speech. This 'peculiarity' however, is the same as those in his earlier work we have discussed above, and may be explained in the same way.

Suh's examples of existentials for similarity and dissimilarity to verbs or adjectives can be accounted for in the same way. For instance, one of his examples which indicate that existentials behave like verbs shows that the existential iss- can be used is command and proposal sentences (cf. (6) in Chapter 2). It is predicted in our analysis because iss- is a processive verb. His note that eps- is excluded from this possibility is also predictable because eps- is a hybrid which cannot be made into command and proposal sentences. The claim that iss- behaves like a (processive) verb is a tautology now.

One of the examples Suh uses to show that the existential iss- behaves like an adjective is in the

---

1. I was born and brought up in Seoul, and issun does not occur except in the past tense meaning of iss- 'stay', and epsun does not occur at all in my speech.
in a progressive form, as in (7bii) of Chapter 2, repeated below:

(6)  
Ku ai -nun cikum cip-eys *iss-ko iss-ta
The child TOP now house at exist PROGRESS SE
'The child is existing at home now.'

Note that we gloss *iss- as 'exist', since Suh considers it
not behaving like the verb 'stay' in this sentence. *iss-,
even in the usage of *iss- 'stay', indeed cannot occur with
the progressive suffix phrase -ko *iss-. We treat this as an
idiosyncratic property of *iss-. However, the evidence that
*iss- 'stay' is a bona fide processive verb is pervasive.
For example, the processive usage of *iss- is found in the
behavior of various suffix phrases built of it. We
presented this example already in Chapter 3 (8) and repeat
it:

(7) In SE-Selection
a. Con -un pan -ey nuckey-kkaci nam- e-iss-nun-ta
   John TOP class at late until remain exist SE
   'John remains in the class until late.'

b. Chayk -i pan -ey nuckey-kkaci nam- e-iss-@-ta
   book SUBJ class at late until remain exist SE
   'A book remains in the class until late.'

The suffix phrase -e-*iss- is both processive as in (7a) and
descriptive as in (7b). In our analysis, *iss- in the former
is a bone fide processive verb and the one in the latter is
a hybrid verb. The processive usage of *iss- can also be
found in modifier selection:
(8) In ME-Selection

a. Ecey pan-ey nuckey-kkaci nam- e-iss-un John yesterday class at late until remain exist ME
   'John who remained in the class until late yesterday'

b. Ecey pan-ey nuckey-kkaci nam- e-iss-*un chayk yesterday class at late until remain exist ME book
   'a book which remained in the class until late yesterday'

As is obvious by now, the iss- in (8a) is the
processive verb iss₁- and, as such, may occur with the past
tense modifier suffix -(u)n, whereas the iss- in (8b) is the
hybrid iss₂- and cannot occur with it. Our analysis
indicates that Suh's so-called existential iss- can be a
verb (in Suh's term) but not an adjective, and that the
existential part-of-speech iss- should be analyzed as a
covering term for two pasts-of-speech, processive and hybrid
verbs excluding descriptive verbs.

5.2 A Generalization for SE-Selection (ME-Selection)

In this section, we will show that the classificational
system proposed in this study captures a major
generalization over the seemingly very complicated SE- and
ME-selection. We have shown that Korean has four distinct
subcategories of verbs, and that these verbs may be followed
by any and all of the inflectional suffixes. These verb
plus suffix forms may, in turn be followed by any of the
suffix phrases listed in (80) - (83) in Chapter 4. The
suffix phrases can be concatenated with other suffix
phrases, which can again be followed by inflectional
suffixes. This concatenation of verbs, suffixes, and suffix phrases can be illustrated by following examples:

(9)

a. Verb Stem + Suffix + Suffix Phrase

\[ \text{ka -si -ci anh -go HON not } \]
\[ '(s.o. honored) does not go...' \]

b. Verb Stem + Suffix Phrase + Suffix

\[ \text{ka -ci anh -usi -go not HON } \]
\[ '(s.o. honored) does not go...' \]

c. Verb Stem + Suffix + Suffix Phrase + Suffix

\[ \text{ka -si -ci anh -usi -go HON not HON } \]
\[ '(s.o. honored) does not go...' \]

Suffixes and suffix phrases may be repeatedly concatenated as in (10) below:

(10)

\[ \text{Ka si ci-anh usi ci-mos ha si ess keyss te } \overset{0}{\text{ta}} \]
\[ \text{go HON not HON cannot HON PAST V/C RETR ASP STMT } \]
\[ \text{i ii iii iv v vi vii viii ix SE } \]
\[ \text{ 'I found that it must have been the case that (someone) could not afford not to go'} \]

In (10), (i) is the verb; (ii), (iv), (vi), (vii), (viii), and (ix) are suffixes; and (iii) and (v) are suffix phrases. The length of the sequence theoretically is limited by the processing ability of the human brain. In (10), the retrospective -te, which is adjacent to the SE, selects the SE made up of the zero aspect marker and the statement ending ta. However, it is not necessarily the case that

\[ ^2 \text{(C) with two honorific suffixes show more respect to the subject than (a) or (b). These two are equal in the degree of respect to the subject.} \]
adjacency is required for selection of a proper SE. For example, observe (11):

(11)  
\[
\text{Ka si ci-anh usi ci-mos ha si nun ta}
\]
\[
go \text{HON not HON cannot HON ASP STMT}
\]
\[
i ii iii iv v vi
\]
\[
'(\text{s.o. honored}) \text{ cannot afford not to go.}'
\]

The processive verb ka- selects the processive aspect suffix -nun, which happens to be separated from it by five elements—three suffixes and two suffix phrases. This 'remote control' can be illustrated by a schematic tree for (11) as follows:

(12) (the subject sensayngnim 'teacher' is added)

\[
\text{The teacher cannot afford not to go.}'
\]

---

3. This "remote" control together with the hierarchical structure of these suffixes (see Chapter 6) compels us to adopt a feature percolation analysis (see Chapters 7, 8, and 9).
In a system in which only verbs are classified for their SE-selection, such remote control would be a mystery and the system could not offer any explanation. In our system, the SE-selection follows naturally; both the three suffixes (indicated by ii, iv, and vi) and the two suffix phrases (marked by iii and v) belong to the transparent category and their presence does not affect the SE-selection.

The concatenation of verbs, verb suffixes, and suffix phrases can be indefinite in its variety, too. These different concatenations can take different endings. We will take the plain statement ending as an example and see what SE's different concatenations select. Note the following examples:

(13) Plain Statement Endings -nun/n∅-ta

1. mek-nun-
2. noph-∅-
3. i-∅-
4. iss-nun-
5. iss-∅-
6. eps-∅-
7. mek-i-n-
8. noph-i-n-
9. eps-ay-n-
10. mek-usi-n-
11. noph-usi-∅-
12. iss-usi-n-
13. iss-usi-∅-
14. mek-ess-∅-
15. noph-ass-∅-
16. iss-ess-∅-
17. mek-keyss-∅-
18. noph-keyss-∅-
19. iss-keyss-∅-
20. mek-te-∅-
21. noph-te-∅-
22. iss-te-∅-
23. mek-e-ya-ha-n-
24. noph-a-ya-ha-n-
25. iss-e-ya-ha-n-
26. mek-e-to kwaynchanh-∅-
27. noph-e-to kwaynchanh-∅-
28. mek-ko-siph-∅-
29. yeyppu-ko-siph-∅-
30. mek-ci-anh-nun-
31. noph-ci-anh-∅-
32. mek-ci-mos ha-n
33. noph-ci-mos ha-∅-
34. mek-ko iss-∅-
35. sal-a iss-∅-

This is only a partial list.

What generalization can we offer to define the distribution of the aspect suffixes -nun/n and ∅ in the statement SE's? In a system in which only verbs are classified into two subclasses of processive and descriptive and in which the iss's have not been clearly distinguished, it is impossible to define the morphotactic behavior of -nun/n and ∅. In the classificational system proposed here, the transparent elements do not affect the morphotactic behavior and we can simply state the following:

(14) Plain Statement Endings
a. -NUN/N COMBINES WITH A PROCESSIVE ELEMENT (VERB, SUFFIX, AND SUFFIX PHRASE)
b. -∅ ELSEWHERE.

The system makes it simple to describe the distribution of other suffixes not discussed in this study, but behave in a similar way. We will present one more example--the situational ending has the shape of -nun/(u)n tey. What is the distribution of the aspect suffix in the following examples?
(15) Situational Endings -nun/(u)n-tey

1. mek-nun
2. noph-un
3. i-n
4. iss-nun
5. eps-nun
6. mek-i-nun
7. noph-i-nun
8. eps-ay-nun
9. mek-te-n
10. noph-te-n
11. iss-te-n
12. mek-usi-nun
13. noph-usi-n
14. iss-usi-nun
15. iss-usi-n
16. mek-ess-nun
17. noph-ass-nun
18. mek-keyss-nun
19. noph-keyss-nun
20. mek-e-ya-ha-nun
21. noph-a-ya-ha-nun
22. mek-ko-siph-un
23. yeypu-ko-siph-un
24. mek-ci-anh-nun
25. noph-ci-anh-un
26. mek-ci-mos ha-nun
27. noph-ci-mos ha-un
28. mek-ko iss-nun
29. sal-a iss-nun

Again, in a system in which only verbs are classified into two subcategories, it is impossible to define the morphotactic behavior of the aspect suffix -nun and -(u)n before -tey. In the classificational system proposed here, we can simply state the following (of course, with the understanding that transparent elements do not affect the selection):
(16) Situational Endings

a. -(U)N COMBINES WITH A DESCRIPTIVE ELEMENT (VERB, SUFFIX, AND SUFFIX PHRASE)
b. -NUN ELSEWHERE.

Our analysis is descriptively adequate with respect to the selection of aspect suffixes in Korean. But our proposals also provide explanatory adequacy, as we will demonstrate in the next section.

5.3 Binary Feature Analysis\(^3\) of Four Subcategories

We observed in 5.1 that our proposals describe in a principled way the 'peculiarities' of 'tricky' quasi-processive elements. As we saw in 5.2, we can also, specify SE and ME selection by verbs, verb suffixes, suffix phrases, and any combination of them in an equally principled way. However, those descriptions are mainly in terms of tables like the one in 5.1 and lists as the one in 5.2. For example, in 5.1, in an effort to account for the 'peculiarity' of iss, we made use of the table (5) in 5.1, repeated as (17) below:

\(^3\) I thank Professor William O'Grady (personal communication) for his suggestion of binary features for the representation of subcategories.
In 5.2, the description of aspect marker selection for the situational ending is achieved by listing subcategories of verbs, verb suffixes, and suffix phrases as in (14) of 5.2, repeated as (18):

(18) Plain Statement Endings

a. -NUN/N COMBINES WITH A PROCESSIVE ELEMENT (VERB, SUFFIX, AND SUFFIX PHRASE)

b. -Ø ELSEWHERE.

In (18b), although we used the term 'elsewhere' for it, the environment represents a list of six sets of elements--processive elements (verbs, verb suffixes, suffix phrases) and hybrid elements (verbs, verb suffixes, suffix phrases).

Accurate though our table (17) and the list in (18) may be, tables and lists are arbitrary, and have no explanatory value since a table or a list could, in principle, contain any random set of elements. What we have to do here to attain explanatory adequacy is to capture the intuition that certain elements form a natural distributional class. We will adopt Chomsky's (1972:46-61) proposal that syntactic
categories be analyzed as sets of syntactic features. We can reanalyze four subcategories not as unitary elements, but as sets of two binary features of \([\pm P]\) and \([\pm D]\) (i.e., processive and nonprocessive, and descriptive and nondescriptive). The four subcategories, processive, descriptive, hybrid, and transparent can be represented as in (19):

\[(19)\]
\[
a. \text{Processive } = [+P,-D] \\
b. \text{Descriptive } = [-P,+D] \\
c. \text{Hybrid } = [-P,-D] \\
d. \text{Transparent } = [\pm P,\pm D]
\]

On the other hand, combinations of these different subcategories can be represented as:

\[(20)\]
\[
a. [-P] = \text{Descriptive and Hybrid} \\
b. [-D] = \text{Processive and Hybrid}
\]

Given the analysis in (19) and (20), (17) above can be represented by these binary features as in (21):

\[(21)\] Plain Level Sentence Endings

<table>
<thead>
<tr>
<th>SE</th>
<th>Statement</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>[+P,-D] (=Processive)</td>
<td>nun/n</td>
<td>\ø</td>
</tr>
<tr>
<td>[-P,+D] (=Descriptive)</td>
<td>\ø</td>
<td>(u)</td>
</tr>
<tr>
<td>[-P,-D] (=Hybrid)</td>
<td>\ø</td>
<td>\ø</td>
</tr>
</tbody>
</table>

The binary feature system represented in (21) explains why the hybrid *iss*- behaves like a descriptive verb in statements, and like a processive verb in questions. In statements, the hybrid and descriptive verbs share the property of being \([-P]\) (see (20a) above), and in questions,
the hybrid and processive verbs share the property of being [-D] (see (20b)).

The generalization (18) above, is repeated as (22) below with the list of elements specified:

(22) Plain Statement Endings
a. -NUN/N COMBINES WITH A PROCESSIVE ELEMENT (VERB, SUFFIX, AND SUFFIX PHRASE)
b. -Ø COMBINES WITH A PROCESSIVE ELEMENT (VERB, SUFFIX, AND SUFFIX PHRASE) AND WITH A HYBRID ELEMENT (VERB, SUFFIX, SUFFIX PHRASE)

This would be reformulated as in (23):

(23) Plain Statement Endings
a. -NUN/N combines with [+P]
b. -Ø combines with [-P]

(23b) illustrates that descriptives and hybrids form a natural distributional class together because they share the property of being [-P].

This binary feature analysis also provides a neat way of handling in a unitary way a nearly unmanageable problem with respect to both the similarities and differences between distinct and identical subcategories. For example, the suffix phrases in (24) below belong to the processive subcategory, as listed in Chapter 4:

(24)
- key ha-  'make/let...do/be...'
- e po-   'try ...ing'
- e ci-    'become'
- ci mal-  'Don’t....'

However, they differ in the subcategories they may be suffixed to as indicated in (25) (P, D, and H stand for the
processive, descriptive, and hybrid subcategory respectively): 4:

(25) [+P,-D] Suffix Phrases Attach to:

a. P, D, H  -key ha-  'make/let...do/be...'
b. P, D, H  -e po-  'try ...ing'
c. D        -e ci-  'become'
d. P        -ci mal-  'Don't....'

On the other hand, suffix phrases which belong to the descriptive subcategory may also be attached to elements of different subcategories as follows:

(26) [-P,+D] Suffix Phrases Attach to:

a. P, D, H  -e to kwaynchah- 'may'
b. P, D, H  -ko siph- 'want to'
c. P, H     -na po-  'it appears'

These suffix phrases could be represented by a two layer feature system: the upper layer indicating to what subcategories a suffix phrase may be attached and the lower layer indicating to what subcategories an it belongs. Items which can be attached to all three subcategories, (a) and (b) of (25) and (a) and (b) of (26), would be identified simply by their own subcategory features, such as [+P,-D], as in (27a), and [-P,+D], as in (27b) respectively. On the other hand, (25c), (25d), and (26c), which have limited distribution, would be represented by two layers of

4 As we stated in Chapter 4, the lists provided there are initial and tentative which need further study and the lists would multiply. The purpose here is not to attempt an exhaustive listing or analysis of the subcategories they may be attached to, but to suggest the potential of the binary feature analysis in capturing and representing the property shared by those which have similarities and differences.
features, as in (27c) below, the upper layer representing to what specific subcategories they can attach (=the input) and the lower layer marking their own subcategories (=the output):

(27)

a. \([+P,-D]\) (that is, this processive suffix phrase is affixed to all three subcategories)

b. \([-P,+D]\) (that is, this descriptive suffix phrase is affixed to all three subcategories)

c. i. \(=(25c)\) \([-P,+D]\) (that is, this processive suffix phrase is affixed to descriptive subcategory)

ii. \(=(25d)\) \([+P,-D]\) (that is, this processive suffix phrase is affixed to processive subcategory)

iii. \(=(26c)\) \([-D]\) \([-P,+D]\) (that is, this descriptive suffix phrase is affixed to processive and hybrid subcategories)

It is also possible that certain suffix phrases, -e iss- (resultative) and -ko iss- (progressive) for example, belong to two subcategories with respect to the SE they select and yet they attach to the same elements as in (28):

(28)

<table>
<thead>
<tr>
<th>Suffix Phrase Attaches</th>
<th>SE-Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. P -e iss- Ø -ta ([-P,-D]) (=hybrid)</td>
<td></td>
</tr>
<tr>
<td>P -e iss nun-ta ([+P,-D]) (=processive)</td>
<td></td>
</tr>
<tr>
<td>b. P -ko iss- Ø -ta ([-P,-D]) (=hybrid)</td>
<td></td>
</tr>
<tr>
<td>P -ko iss- nun-ta ([+P,-D]) (=processive)</td>
<td></td>
</tr>
</tbody>
</table>

-E iss- and -ko iss- belong to hybrid and processive respectively, yet both are suffixed to the same processive
subcategory. The properties of these suffix phrases may be represented as in (29):

(29) Distribution of \(-e\) iss- and \(-ko\) iss-

\[ [+P,-D] (=\text{suffixed to processives}) \]
\[ [-D] (=\text{belongs to processive and hybrid categories}) \]

Note that (29) is a way that captures elegantly the generalization with respect to the distribution of \(-e\) iss- and \(-ko\) iss- in a unitary fashion. It encodes the fact that both suffixes are similar in the following complex respects:
1) what subcategory they are attached to (by the upper layer) and 2) that they belong to two subcategories themselves with respect to what SE’s they select (by the lower layer).

We have, of course, other motivations for adopting the feature analysis system, since the main thesis of this work concerns feature percolation (See Chapters 7, 8, and 9). Representing items not as unitary elements, but rather as complexes of features is an a priori necessity.

Returning to our generalization (18) above, we presented it as follows in 5.2:

"In the classificational system proposed here, we can simply state that (with the understanding, of course, that transparent elements do not affect the selection):

(18) Plain Statement Endings

a. \(-\text{NUN/N COMBINES WITH A PROCESSIVE ELEMENT (VERB, SUFFIX, AND SUFFIX PHRASE})\)
b. \(-\emptyset\ \text{ELSEWHERE}.\)

Note that (18) is not a complete generalization but was specified under the condition that "transparent elements do
not affect selection". Under the binary feature system, together with the assumption that feature percolation is at work, an assumption needed independently in the language (see Chapters 8 and 9), the condition would not be needed, and (23) above, repeated below, would be all we need to capture the generalization regarding the distribution of -nun/n and -∅:

(23) Plain Statement Endings
a. -NUN/-N combines with [+P]
b. -∅ combines with [-P]

5.4 Summary

We have shown in this chapter that the 'peculiarity' issues discussed in Chapter 2 are accounted for in a principled manner by the analyses proposed in Chapters 3 and 4. It was further demonstrated that the same proposals provide a descriptively adequate account of the seemingly intractable distribution of SE’s and other suffixes. In section 3, a feature analysis of four subcategories of verbs, verb suffixes, and suffix phrases, was proposed. We argued that this analysis provides an explanatory adequacy to the proposals for the four-way distinction of verbs, verb suffixes and suffix phrases. In this binary feature system, the inflection part of the verb paradigm (13) in Chapter 4, repeated below, would be represented as in (30):
This feature analysis together with the hierarchical structure analysis of the suffix sequences (see the next chapter) lay the groundwork for feature percolation analysis in Chapters 7, 8, and 9.
Chapter 6  HIERARCHICAL STRUCTURE OF KOREAN VERB PARADIGMS

In Chapter 4, we extended subcategory membership to suffixes which mark inflectional features and argued that they should be construed as heads. In Chapter 5, we proposed that these subcategory features be represented in a binary feature system as in (30), repeated below as (1):

\[
\begin{array}{cccccc}
\text{Status} & \text{TNS} & \text{TNS} & \text{Modal} & \text{Modal} \\
\mathbb{V} & \text{i} & \text{usi} & \text{ess} & \text{ess} & \text{keys} & \text{te} & \text{SE} \\
\mathbb{C}/\mathbb{P} & \mathbb{HON} & \mathbb{PAST} & \mathbb{PAST} & \mathbb{V/C} & \text{RETR} \\
\end{array}
\]

The issue to be addressed here is the structure of this verb paradigm. As noted in Chapter 2, Y-S Kim (1985:85) claimed the following structure the Korean verb paradigm:

\[(2) = (Y-S \text{ Kim (6)})\]

\[
\begin{array}{c}
\text{V}^0 \\
\text{V}^1 \quad [m \text{ hon}] \quad [m \text{ past}] \quad [m \text{ fut}] \quad [m \text{ hum}] \quad [m \text{ asp}] \quad [m \text{ mood}] \\
\end{array}
\]

where \( m = +, - \).

J-M Kim (1986:59) has proposed a similar analysis as can be seen from her phrase structure rules below:

\[(3) = (J-M \text{ Kim (2.26)})\]

\[
\begin{array}{c}
S' \rightarrow S \text{ (comp)} \\
S \rightarrow \text{NP VP Aux} \\
\text{Aux} \rightarrow \text{(status) (tense) (style) (aspect) mood} \\
\end{array}
\]

As the last rewrite rule indicates, all the inflectional suffixes are derived from the same mother node Aux.

In this chapter, we argue against the assumption of a flat inflectional structure without internal structure. We
claim that (2) can be derived by syntactic phrase structure rules and that the suffixes in the verb paradigm are organized in binary and hierarchical structure; the verb paradigm has syntactic internal brackets. This is contrary to Y-S Kim's assumption that the inflectional structure is flat and has no internal brackets as is shown in (2).

Those arguing for a constituent structure for Korean verb paradigms different from (2) include I. Yang (1972), H-M Sohn (1974 and also 1986), and J-R Kim (1988). For example, J-R Kim (p. 205) cites the following linear sequence of verbal morphemes as typical:

(4) ka- si -ess -up -ni -ta
   VS HON TMP FML MD ST
   'went (honorified)'

J-R Kim proposes context-free phrase structure rules partly to properly represent constituency and partly to provide a device for systematically treating the phenomenon of recursion. Our immediate concern in this work is constituent structure, which J-R Kim represents as (p. 209):

\footnote{1. J-R Kim's terminology differs from that used in this work as follows:}

\begin{tabular}{|c|c|}
  \hline
  this thesis & J-R Kim \\
  \hline
  tense & TMP \\
  style & FML \\
  aspect & MD \\
  mood & ST \\
  \hline
\end{tabular}

FML (formal) and ST (statement) in J-R Kim are the subclasses of 'style' and 'mood' respectively.

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The honorific suffix -(u)gi, the past tense suffix -ess, and SE are considered to be syntactic affixes\(^2\) in construction with a phrase\(^3\).

In this analysis, a coordinate sentence like (6) below, for instance, has the skeletal structure (7):

\[
\text{(6) J-nun chicu-lul mek-\(\emptyset\)-ko Chel-un kimchi-lul mek-ess-ta}
\text{TOP cheese OBJ eat CONJ TOP OBJ eat PAST SE}
\]
\text{‘J ate cheese and Chel kimchi.’}

\[
\text{(7)}
\]

![](diagram.png)

The fact that the SE as a whole is a separate constituent, the sister of an S, can be seen in an example like (8), which has the skeletal structure (9):

\[
\text{\(2\). This term is inaccurate with respect to SE, since SE consists of three suffixes in formal level speech (cf. (5e)) and two in plain level speech (cf. Chapter 2). However, since SE behaves as a unit, we will refer it as an ‘affix’.
}

\[
\text{\(3\). Shibatani and Kageyama (1988) call it ‘phrasal affixation’ (cf. Botha 1984, Fabb 1984, Sugioka 1984, J-M Kim 1986). This affixation is different from the inflectional suffix affixation discussed here in that the head to which the phrase is attached is a complementizer.}
\]

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The modifier suffix, which we analyze as an SE (cf. Chapter 4), is also a separate constituent and the sister of an S, as shown in the following constituent structure:

Compared to (1) above, J-R Kim's example (4)\(^4\), both repeated below, does not include the causative/passive suffix -i, the second past tense suffix -ess, the modal -keyss, and the retrospective -te:

\(^4\) Recall that the last three suffixes comprise the SE.
(4)
ka- si -ess -up -ni -ta
VS HON TMP FML MD ST
'went (honorified)'

Except for the causative/passive -i, these suffixes are also syntactic affixes. The arguments J-R Kim advances in support of his assumption that the suffixes in (4) are syntactic affixes also support this claim. For example, the modal -keyss exhibits conjunction reduction as follows:

(11)
Palam-i pwul- ø- ko pi -ka o -keyss -ta
wind SUB blow V/C CONJ rain SUB come V/C SE
'It will probably be windy and rainy.'

This sentence has the following skeletal structure:

(12)

```
S
  \-- S
     \-- S
         \-- S
             \-- S
                 \-- palam-i pwul- ø- ko pi -ka o -keyss -ta
                 wind SUB blow CONJ rain SUB come V/C SE
```

On the basis of this analysis for -keyss, and similar analyses for the other inflectional affixes, J-R Kim's phrase structure rules should be expanded as follows:

(13) a. S --> S SE
b. S --> S Modal
c. S --> S TMP
d. S --> NP VP
e. VP --> VP HON
f. SE --> FML MD ST

\footnote{This coordination can be interpreted in terms of right node raising. Either way, the phenomenon is syntactic.}
We therefore assume that, except for the causative/passive suffix \(-i\), Korean verb structure (1) above, has the following syntactic binary and hierarchical structure:

(14)

We claim that the causative/passive suffix \(-i\) is also in a binary and hierarchical structure with the other suffixes, as follows:

(15)

---

6. This dotted line does not represent a percolation path. It indicates the attachment of the SE suffix.
A question to be raised here is: what is the justification for placing the causative/passive suffix -i, a 'derivational' suffix, in a binary and hierarchical construction with the rest of the elements in (15) above? After all, this -i is not a 'syntactic affix'; as (16) below reveals, the conjunction reduction allowed for other suffixes is not allowed for the causative/passive suffix -i:

(16) *[J-nun chicu-lul mek-Ø]-ko [C-nun kimchi-lul mek]-i-n-ta
                TOP cheese OBJ eat  CONJ  TOP OBJ eat  CAU SE
    'J feeds cheese and C feeds kimchi (to somebody).'

Sentence (16) is well-formed only in the sense of 'J eats cheese and C feeds kimchi (to somebody)." Lexical causative/passive formation must take place in the lexicon rather than in the syntax. There is, however, reason to treat -i in the same manner as the inflectional affixes in (15). The loci for word formation are different. The affixation of -i occurs in the lexicon while that of inflectional suffixes occurs in the syntax. The causative/passive suffix -i and inflectional affixes constitute a unitary class with respect to word formation rules, in particular, with respect to percolation. In Chapter 4, we argued that, except for SE\textsuperscript{8}, each of the

\textsuperscript{7} In addition to this 'lexical' causative/passive formation, Korean has much more productive 'phrasal' causative/passive formation.

\textsuperscript{8} SE is a syntactic suffix and is a head with respect to other features: i.e., it completes the sentence and enables the sentence participate in other syntactic constructions. I will not pursue this topic in this work.
suffixes in (15) is a head with respect to feature percolation. We observed that affixation of each suffix percolates its subcategory feature, superseding the subcategory features of the verb stem to which the suffix is attached. For example, in (8b) in the preceding section, repeated as (17) below, the subcategory hybrid of past -ess supersedes that of processive for mek- 'to eat':

\[
\text{mek-ess}_{\text{hybr}} \quad \text{mek}_{\text{proc}} \quad -\text{ess}_{\text{hybr}}^9
\]

This is true also of causative/passive suffix -i suffixation. In (12) in the preceding section, repeated as (18) below, the subcategory processive of the causative/passive -i supersedes that of descriptive for noph- 'to be high':

\[
\text{noph-}^i_{\text{proc}} \quad \text{noph}_{\text{desc}} \quad -^i_{\text{proc}}
\]

Thus, the past tense -ess and the causative/passive -i are alike in that both are heads whose subcategory features supersede those of the stems to which they are attached.

A further similarity between any of the inflectional suffixes in (1) and the derivational suffix -i is that both

---

9. I assume here without argument that inflectional suffixes bear the category feature V. For justification/arguments/reasons for this assumption, see Chapter 9.
select an SE which is a syntactic affix. Consider the following example:

(19)

\[
\text{J-nun chicu-lul mek } -\text{i } -\text{ko C-nun kimchi-lul mek- } -n-ta \\
\text{TOP cheese OBJ eat CAU CONJ TOP OBJ eat CAU SE}
\]

'J feeds cheese and C feeds kimchi (to someone).'

This sentence has the following structure:

(20)

\[
\begin{array}{c}
\text{S} \\
\text{CONJ} \\
\text{S} \\
\text{SE}
\end{array}
\]

\[
\begin{array}{c}
\text{J-nun chicu-lul mek-i } -\text{ko C-nun kimchi-lul mek-i } -n-ta \\
\text{TOP cheese OBJ eat CAU CONJ TOP OBJ eat CAU SE}
\end{array}
\]

'J feeds cheese and C feeds kimchi (to someone).'

Compare (20) with (7) above, repeated below:

(7)

\[
\begin{array}{c}
\text{S} \\
\text{CONJ} \\
\text{S} \\
\text{SE}
\end{array}
\]

\[
\begin{array}{c}
\text{John-un chicu-lul mek- } -\text{ko Chel-un kimchi-lul mek-ess } -\text{ta} \\
\text{TOP cheese OBJ eat CONJ TOP OBJ eat PAST SE}
\end{array}
\]

'J ate cheese and Chel kimchi.'

In (7) and (20), the past tense suffix -ess and the causative suffix -i each selects an SE which is a syntactic affix. There is thus no reason to treat -i differently from -ess and other suffixes in (1).

There is further motivation for our claim that (15) is the correct representation of the verb paradigm: the lexicon is also hierarchically structured. The fact that feature
percolation\textsuperscript{10} has to operate as illustrated in (18) provides us with an independent and compelling reason to treat the lexical causative formation as having a hierarchical structure. In (18) above, a binary hierarchical structure is assumed for \textit{noph-i} and the SE is attached to it as in (21) below:

(21)
\[
\text{noph-vproc} \quad \text{noph-vproc} \\
\text{noph\textsubscript{desc} - i\textsubscript{vproc} - nun-ta SE}
\]

It could be argued that flat structure analysis is viable, one which relies on adjacency. This alternative would select the SE, as in (22):

(22)
\[
\text{noph\textsubscript{desc} + i\textsubscript{vproc}...nun-ta}
\]

The processive feature of the causative/passive suffix selects the correct SE. However, the adjacency analysis breaks down if multiple features encoded in different constituents have to be interpreted as a single unit in the grammar. Consider a hypothetical (but familiar) case—a language in which one affix bears the person marking of the noun and another the number marking. Assume further that these two features together with the stem call for an \textit{-s} on the following verb if the verb is in the present tense. The

\textsuperscript{10} See Chapter 8 and 9 for details of percolation.
structure of this word would be:

(23) 
\[
\begin{array}{c}
[N] \\
[3p] \\
[sg]
\end{array}
\]

Now, the simple adjacency condition will not work because it is the feature complex consisting of third person, singular, and noun which calls for the suffix \(-s\) in the verb. What has to take place in (23) is that the three features have to percolate and accumulate in one node so that they together may be available to be interpreted by the grammar.

Following general convention, we assume that these features percolate up to the dominating branching node which is higher as in:

(24) 
\[
\begin{array}{c}
N \\
3p \\
sg
\end{array}
\quad \begin{array}{c}
N \\
3p \\
sg
\end{array}
\]

This feature complex calls for the \(-s\) if the following verb is in the present tense:

(25) 
\[
\begin{array}{c}
N \\
3p \\
sg
\end{array}
\quad \begin{array}{c}
N \\
3p \\
sg
\end{array}
\]

\[
\begin{array}{c}
[N] \\
[3p] \\
[sg]
\end{array}
\]

\[
V + -s
\]

[pres]
This provides us compelling justification for positing a hierarchical structure for the causative/passive, as shown below:

(26)

```
V
  [+P,-D]
V
/i
 [+P,+O] [+P,-O]
C/P
```

This structure for the derivation of causative/passive words can be juxtaposed with the inflectional verb paradigm (24) and (15) above is derived. We can safely assume that (1) above as a whole has the hierarchical structure illustrated in (15), repeated below:

(15)

We claimed in Chapter 4 that each 'inflectional' suffix bears subcategory features just as verb stems do. In Chapter 5, we argued that these subcategory features must be represented in a binary feature system to capture an explanatorily adequate generalization. Now we have proposed that these 'inflectional' suffixes are in a binary and hierarchical structure. The groundwork has been laid for
our scrutiny of various theories of feature percolation in Chapters 7 and 8, and for a new theory of percolation in Chapter 9.
We have specified the subcategory features of inflectional affixes and established in Chapter 6 that these inflectional affixes and SE's are in a hierarchical structure. Now it is time to look into how these subcategory features are percolated to the node dominating the whole constitute (i.e., become part of (cf. J. Jensen 1990)) and become accessible to the SE's and other syntactic elements. We will first examine the ways in which features are claimed to percolate in different theories.

In this chapter we consider the empirical consequences with respect to Korean data of five major theories of feature percolation:

1. Lieber (1980)
2. Williams (1981)

We argued in Chapter 6 that Korean verb structure is, in general, binary and hierarchical, as shown in (15), repeated here as (1):

---

1. Since Chapter 7 and 2.2 are similar in nature, some of the points discussed in 2.2, are repeated in this chapter.

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7.1 Percolation in Derivation

All five theories claim that the 'derivational' suffix -i (causative/passive) is the head in a construction like (2) below:

(2) \[ \text{nophj} \] _high [V] [C/P] -i_p \\

They also show that the derivational affix -i with the category feature V, as in (3) below:

(3) \[ \text{nophj} \] _high [V] [C/P] -i_p

All five theories claim that features borne by -i are percolated via 'head percolation'. Lieber (1980), for

---

2. We have not marked -i as carrying the category feature V in (1). This is to indicate that -i is no different from other inflectional affixes, for which we have yet to determine its category status. We claim in Chapter 9 that the C/P suffix along with all other inflectional affixes bears the category feature V.
example, formulates the set of percolation conventions discussed in 2.2 and repeated below:

(4) Lieber (1980:49-54)

Convention I: all features of a stem morpheme including category features percolate to the first nonbranching node dominating that morpheme.

Convention II: all features of an affix morpheme including category features percolate to the first branching node dominating that morpheme.

Convention III: If a branching node fails to obtain features by Convention II, features from the next lowest labeled node are automatically percolated up to the unlabeled branching node.

Convention I and II will apply and percolate the features of the stem and the C/P (causative/passive) affix respectively as follows:

(5)

Convention III does not apply because there is no feature which the branching node fails to obtain by Convention II and which can be percolated from the next lowest labeled node. This is the correct result: the SE subcategorized for the processive subcategory feature attaches as follows:
7.2 Percolation in Inflection

All five theories, however, fail to provide an adequate account for the multiply marked features in (1) above, repeated with these features underlined as in (7) below:

\[ V^p_{C/P} \]
\[ \rightarrow V^p_{C/P} \]
\[ noph-1 \]
\[ nun-ta \]

They fail in different ways to account for the subcategory features borne by each 'inflectional' affix and the two past tense features. For convenience, we will represent a stem + -i as a single new word, a processive verb\(^3\). We will not consider here, the suffix -usi since it is transparent\(^4\) and not multiply marked. We will be testing the competing theories on the following sequence:

\[ V_{s/s} \]
\[ i_p \]
\[ usi_1 \]
\[ ess_1 \]
\[ ess_2 \]
\[ keyss_1 \]
\[ te_d \]
\[ nun/\emptyset \]
\[ ta/la/(u)ni \]
\[ (n)un \]
\[ C/P/HON/PAST/PAST/V/C/RETR/PROC/IND/STM/QUE/MOD \]

---

\(^3\) As was discussed in chapter 6, this affixation is presumably done in the lexicon and changes, in addition to subcategory features, properties of case marking and argument structure (or theta roles), among others. These are tangential to the current discussion of percolation of multiply marked features and causative/passive verbs will not be marked with the C/V feature hereafter in this chapter.

\(^4\) We will discuss the property of the transparent suffix in conjunction with Lieber's (1989) theory in the next two chapter.
7.2.1 Lieber (1980)

Lieber does not distinguish inflection from derivation; inflectional affixes are treated in the same way as derivational affixes (p. 47). Lieber would assign the category feature V to the 'inflectional' affixes in (8), as in (9) below:

\[
\begin{array}{c}
\text{noph-i}_p^- \\
[V]
\end{array} \quad \begin{array}{c}
\text{-ess}_h \\
\text{[PAST]}
\end{array} \quad \begin{array}{c}
\text{-ess}_h^5 \\
\text{[PAST]}
\end{array}
\]

Convention I and II apply as follows:

\[
\begin{array}{c}
\text{[V]} \quad \text{[PAST]} \\
\text{[PAST]}
\end{array}
\]

Convention III does not apply because the branching node is labeled for all the features of the next lowest node. So far, Lieber's account provides a correct result. The next step is percolation of the features borne by the second -ess. Convention II applies as in (11) below:

---

5. For analysis of -ess-ess, see Chapter 1.
Note here that, because the branching node does not fail to obtain the feature PAST, the feature PAST in the next lowest labeled node cannot percolate up to the branching node by Convention III as in (12) below:

(12)

The branching node is labeled with the subcategory feature, hybrid, and selects a correct SE form as in (13) below:

(13)

But a serious problem arises at this stage. Although the structure with two past tense suffixes is supposed to mean '(someone) had heightened (something),' the branching node in (12) is labeled with only one past tense and means
'\( \text{(someone) heightened (something)} \)'. Lieber's (1980) theory cannot handle the semantics of a structure which has two past tense suffixes.

7.2.2 Williams (1981)

Now, consider how Williams' (1981) theory handles the percolation in (8) above, repeated below:

(8)

\[
\text{noph-i}_{\text{p}} - \text{ess}_{\text{h}} - \text{ess}_{\text{h}}
\]

Williams also takes a unitary approach, treating both derivational and inflectional affixes as heads, which thus carry category features. If we follow Williams' theory, (8) will have the same feature representation as Lieber's, as shown in (14) below:

(14)

\[
\text{noph-i}_{\text{p}} - \text{ess}_{\text{h}} - \text{ess}_{\text{h}}
\]

Williams defines a head as follows:

(15)

\[
\text{If both X and the head of X are eligible members of category C, then } X \in C = \text{head of } X \in C. \quad (p.247)
\]

The definition (15) is supplemented by his Righthand Head Rule (RHR hereafter). He defines it (p.248) as:
(16) Righthand Head Rule

...the head of a morphologically complex word...[is] the righthand member of that word.

In (14) above, the RHR designates the first -ess as the head and (15) percolates its feature to the node dominating it as shown below:

(17)

Now, in (17), RHR designates the second -ess as the head and (15) percolates its features to the node dominating it as follows:

(18)

The percolation ends here. The result is identical with that yielded by Lieber (1980): the dominating node has one less past tense feature than the sum of those in the structure and the semantics is incorrect.

The same unsatisfactory result is obtained even if we assume that (8) above has a flat structure, as in (19) below:
The RHR will designate the second -ess as the head and (15) percolates its features to the node dominating it as in (20) below:

There is, however, a critical difference between Lieber (1980) and Williams (1981); the former has Convention III, a mechanism by which the theory is capable of checking whether the next lowest node is labeled by a feature that the first branching node fails to obtain. If it does, Convention III percolates it. The difference is that, in Lieber, the percolation from a head has priority over a nonhead. In Williams, however, the features percolate exclusively through the path of a head and a nonhead does not participate in percolation.

7.2.3 Selkirk (1982)

As we pointed out in 2.2, Selkirk provides the theory with a mechanism for the percolation from nonheads as well as a head and, in particular, from multiple nonheads, each of which carries features. The problematic structures she
cites as those Williams (1981) cannot account for, as we have seen above already, are both hierarchical (=Selkirk (3.19a)) and flat (=Selkirk (3.19b)):

(21) (Selkirk's (3.19))

a. 

\[ \begin{array}{c}
  \text{V} \\
  \text{V} \\
  \text{V} \\
\end{array} \]

b. 

\[ \begin{array}{c}
  \text{V} \\
  \text{V} \\
  \text{V} \\
\end{array} \]

To account for structures either hierarchical or flat as in (21), Selkirk (1982:76 (3.20)) proposes the following reformulation of Percolation:

(22) Percolation

a. If a head has a feature specification \([ F_j ]\), \(\neq u\), its mother node must be specified \([ F_i ]\), and vice versa.

b. If a nonhead has a feature specification \([ F_j ]\), and the head has the feature specification \([ uF_j ]\), then the mother node must have the feature specification \([ F_i ]\).

She (p.76) proposes (22b) to allow "...some limited "summing up," in the mother node, of the features associated with the daughter nodes." She concludes (p.76) that, under her new definitions of percolation, inflectional affixes need not be construed as heads since features may also be percolated from nonhead daughters.

---

6. Selkirk (p.75) notes:

For the sake of argument, I assume, with Williams, that the affixes are themselves verbal, and thus (capable of being) heads in these configurations.
Let us examine how percolation conventions (22) apply to the Korean "inflectional" structure. We will assume, for the sake of argument, with Selkirk that the "inflectional" affixes are not heads. Under this assumption, (8) above will have the same feature specification as in (23) below:

(23)
\[
\begin{array}{c}
noph-i_p^- & -ess_h & -ess_h \\
[V] & [PAST] & [PAST]
\end{array}
\]

If this Korean verb structure had a flat configuration such as (21b) above, Selkirk's theory would account for the multiple marking of the past tense and eliminate the semantic incongruity between the percolated features in the mother node and the structure itself. The mother node would be specified by the syntactic category V and the subcategory p borne by the head via (22a) (=Selkirk's (3.20a)) as follows:

(24)
\[
\begin{array}{c}
noph-i_p^- & -ess_h & -ess_h \\
[V] & [PAST] & [PAST]
\end{array}
\]

Now, the mother node is specified as PAST via (22b) (=Selkirk's (3.20b)), as in (25) below, because the nonhead has the feature specification PAST and the head noph-i is not specified for it:

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Note, however, that the subcategory feature of the mother node remains the same as that of the head, because the head noph-i is already specified by the subcategory feature processive. Now, because the head noph-i is not specified by the past tense feature, the past tense feature of the second -ess is again specified in the mother node as follows:

Selkirk's percolation formation (22) yields the correct result with respect to the two past tense features. Despite this, the mother node cannot be specified again as carrying the subcategory feature hybrid because the head node noph-i- is already specified with a subcategory feature, processive. If the mother node is not specified by the subcategory feature of -ess, the correct SE -tøta can no longer attach, since it must attach to the subcategory hybrid. Only the incorrect SE -nun-ta can now attach:
Selkirk's percolation convention allows for the past tense features specified in the two suffixes but yields an ill-formed structure. Recall, however, that even this partially successful account for the multiple marking of the past tense feature assumes that Korean verb structure has a flat configuration as in (21b). Moreover, Selkirk's account will not work if the verb structure has a binary and hierarchical configuration as in (21a).

Consider how Selkirk's percolation convention (22) above operates with respect to (8) above under the assumption that it has a binary and hierarchical structure as in (28) below:

$$\text{(28)}$$

Percolation (22a) applies and the mother node is specified by the features with which the head is specified as follows:

$$\text{(29)}$$
Now, Percolation (22b) applies and the mother node is specified by the past tense feature carried by the nonhead daughter, the first -ess, as in (30):

(30)

Note again that the subcategory feature processive of the mother node remains the same as that for the head noph-i because the head is already specified by a subcategory feature. This yields a mismatch between the mother node and the structure noph-i-ess, the features of which the mother node is supposed to "sum" up. On the basis of this illicit representation, the percolation can end here. However, we will continue in order to see what Selkirk's percolation convention would do with respect to the multiple marking of the past tense -ess.

Percolation (22b) has to apply again for the second -ess. Recall here the definition of Percolation (22b):

(22b)

If a nonhead has a feature specification $[\beta F_j]$, and the head has the feature specification $[\alpha F_j]$, then the mother node must have the feature specification $[\alpha \beta F_j]$. What is the head at this stage of percolation with respect to the second -ess? A crucial difference between a level-ordered structure and a binary and hierarchical structure rests with the identification of the head. In the level-ordered version of the structure, the stem is always the
head in successive percolations as we have seen in (24) - (26). In a binary and hierarchical structure, however, the mother node created by the immediately preceding percolations, in (29) and (30) in our example, is the head daughter for the next percolation as in (31) below:

\[(31)\]

Now, (22b) should apply, but neither the subcategory feature *h* nor the past tense feature of the nonhead -ess can be specified in the mother node, as in (32) below:

\[(32)\]

It is again because of the requirement that that feature specification of non-head daughter percolates only when the head daughter is not specified by those features.

As noted earlier, the structure with two past tense suffixes has to mean '(someone) had heightened (something)'. The mother node, however, has only one past tense specified and means '(someone) heightened (something)'. In addition, Selkirk's (1982) percolation convention brings with it the problem of disparate marking of the subcategory features.
between the mother node and the structure itself, resulting in the selection of the wrong SE. Recall that Lieber (1980) and Williams (1981) did not have this problem, although they too were unable to account for the multiple marking of past tense features.

Selkirk's percolation conventions do not account for the Korean data in that 1) they generate an ill-formed structure with respect to the SE selection, and 2) the feature specification on the mother node cannot accommodate the multiple marking of past tense and thus yields the wrong semantic interpretation.

7.2.4 Di Sciullo and Williams (1987)

Responding to several problems with the notion "head of a word," in particular, the problem that ensues from the one-head-per-word hypothesis (Selkirk 1982:27), DW relativize the notion "head" (p. 26) as follows:

(33) Definition of "head_f" (read: head with respect to the feature F):

The head_f of a word is the rightmost element of the word marked for the feature F.

They (fn.2, p.27) state that their definition yields similar empirical effects to those of Selkirk's. We will see below that this is not correct. Let us see how the DW's theory works for (8) above, repeated as (34) below:

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We first look at how it works in a hierarchical structure and then determine whether it yields a different result if we assume a flat structure. We assume with OW that inflectional suffixes bear the category feature V as in (35):

(35)

\[ \text{noph-}i_p \quad \text{-ess}_h \quad \text{-ess}_h \]

\[ \text{[V]} \quad \text{[PAST]} \quad \text{[PAST]} \]

In OW, whether the Korean verb structure is flat or hierarchical, the selection of SE can be stated as follows:

(36) Selection of SE

SE is subcategorized for the subcategory features of the head.

In (34) above, all three constituents carry subcategory features. However, the last element \(-\text{ess}_h\) is the head, because, with respect to the subcategory features, it is the rightmost element. It bears the subcategory feature, hybrid, and the correct SE \(-\text{g-}ta\) would thus be selected. So far, this theory yields the correct result.

DW, however, cannot account for the marking of two PAST's on the mother node, since features are assumed to percolate up a morphological tree only along the path of the head. Consider (37) below:
DW's definition (33) above will percolate the subcategory h, the category V, and the tense feature PAST, since these are rightmost elements in the word:

The next step would be for the features marked on the second -ess to percolate, since these are now the rightmost elements:

DW cannot account for the marking of two PAST's on the mother node, since features are assumed to percolate up a morphological tree only along the path of the head.

DW would fail to account for the same fact even if the structure (8) above is assumed to have a flat structure. The reason is that it is only the rightmost PAST, and not the next rightmost, that would be the head in DW by their
definition of 'head'. Under this assumption the
construction (41) below would result:

(41)

\[
\begin{array}{c}
\text{noph-i}_p \\
\text{[V]} \\
-\text{ess}_h \\
\text{[PAST]} \\
\end{array} \!
\begin{array}{c}
\text{-ess}_h \\
\text{[PAST]} \\
\text{[PAST]} \\
\end{array}
\]

The structure is again incorrect in that the dominating node
has only one tense feature.

One empirical difference between the theories of OW and
Selkirk then is that DW's theory, unlike Selkirk's, at least
yields a well-formed structure. However, both yield
semantically inappropriate features on the mother node. On
the grounds of this illicit semantic interpretation, DW
(1987) must be ruled out as a viable theory for the Korean
data.

The explanatory adequacy for Korean of each theory can
be tallied as follows:

(42)

<table>
<thead>
<tr>
<th></th>
<th>Multiple Marking of PAST</th>
<th>Correct Selection of SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lieber (1980)</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Williams (1981)</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Selkirk (1982)</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>DW (1987)</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>

7.2.5 Lieber (1989)

Unlike the other theories, Lieber's (1989) theory is
able to account for the multiple marking of the past tense
feature. With respect to the selection of correct SE,
however, it fails. Lieber (1989:4) defines percolation conventions as follows:

(43) (=Lieber (4))
   a. Head Percolation:
      Morphosyntactic features are passed from a head morpheme to the node dominating the head. Head Percolation propagates the categorial signature.

   b. Back Up Percolation:
      If the node dominating the head remains unmarked for a given feature after Head Percolation, then a value for that feature is percolated from an immediately dominated nonhead branch marked for that feature. Back Up Percolation propagates only values for unmarked features.

Lieber (1989:note (6)) notes that her percolation conventions are similar to Selkirk’s theory of feature percolation we discussed above. Selkirk’s theory, however, as we have discussed above, cannot account for the multiple marking of the PAST, while Lieber’s (1989) can, as we see below. But neither Lieber’s (1989) nor Selkirk’s version of feature percolation can account for the correct selection of SE.

Lieber’s notion of ‘categorial signature’ provides an adequate account of the percolation of two past tense features. She means by categorial signature "...a frame, headed by category features [±N], [±V], and containing a list of all those morphosyntactic features that are of syntactic relevance for that category in that language."

7. For detailed discussion of Lieber (1989), see Chapters 8 and 9.
We assume here (see Chapter 8 and 9 for discussion) that Korean verbs have the following categorial signature:

\[(44) \begin{array}{c}
V \\
+D,+P \\
PAST \\
PAST
\end{array}\]

In Lieber (1989), as the percolation convention above specifies, the percolation is either that of categorial signatures or of values for the features in the categorial signature; features per se are not percolated. Subcategory features in this section are, therefore, represented by two binary values for the features \([D]\) and \([P]\). Processives are designated \([-D,+P]\), descriptives \([+D,-P]\), hybrids \([-D,-P]\), and transparents \([uD,uP]\).

We assume with Lieber that only stems and derivational affixes are heads with categorial signatures (p.134). We will further assume, along with Lieber, that inflectional affixes are not heads and contain only the features positively specified (p.130). In Lieber's theory, (8) above has the feature markings in (45) below before percolation:

\[(45) \begin{array}{c}
noph-i- \\
\begin{array}{c}
V \\
-D,+P \\
PAST \\
PAST
\end{array}
\end{array}\begin{array}{c}
-ess \\
\begin{array}{c}
-ess \\
-D,-P \\
+PAST \\
+PAST
\end{array}
\end{array}\begin{array}{c}
-D,-P \\
\begin{array}{c}
\begin{array}{c}
-ess \\
-D,-P \\
+PAST \\
+PAST
\end{array}
\end{array}
\end{array}\]

\[\text{\underline{8. Included are only the features relevant to the percolation of multiply marked subcategory and past tense features.}}\]
HP percolates the category feature of the verb stem as in (46):

\[
(46)
\begin{array}{c}
\text{V} \\
\text{[\(-D,+P\)]} \\
\text{PAST} \\
\text{PAST}
\end{array}
\]

\[
\text{noph-i-} \\
\text{-ess} \\
\text{-ess}
\]

Now, BUP percolates the [+\text{value}] of the past tense feature of the first -\text{ess}, since the node dominating the head remains unmarked for the feature, as in (47) below:

\[
(47)
\begin{array}{c}
\text{V} \\
\text{[-D,-P]} \\
\text{[+PAST]} \\
\text{PAST}
\end{array}
\]

\[
\text{noph-i-} \\
\text{-ess} \\
\text{-ess}
\]

The subcategory feature values [-D,-P] of the first -\text{ess}, however, cannot percolate, since the node does not remain unmarked with subcategory features. BUP applies again for the second -\text{ess} and its [+\text{value}] value percolates but again not the subcategory features, as in (48) below:
The node dominating the entire structure is marked with the subcategory features [\(-D, +P\)]. The correct SE cannot be selected.

7.3 Summary

We will summarize our discussion here by including Lieber's (1989) theory in our tally:

\[
\begin{array}{c|c|c}
\text{Multiple Marking} & \text{Correct Selection} \\
\text{of PAST} & \text{of SE} \\
\hline
\text{Lieber (1980)} & \text{no} & \text{yes} \\
\text{Williams (1981)} & \text{no} & \text{yes} \\
\text{Selkirk (1982)} & \text{no} & \text{no} \\
\text{DW (1987)} & \text{no} & \text{yes} \\
\text{Lieber (1989)} & \text{yes} & \text{no} \\
\end{array}
\]

Lieber (1989), despite its failure to select the correct SE, provides an adequate account of the multiple marking of the past tense feature. In the next chapter, we review in detail her proposals and propose in Chapter 9 that Lieber's theory be revised to allow inflectional affixes to be construed as heads for Korean, as well as for Yavapai and Latin. The necessary revision should adequately handle both
the multiple marking of past tense features and the correct selection of SE.
Lieber (1989), attempting to develop a more explicit theory of feature percolation, discusses the following issues (p.95):

(1) Issues
   a. What aspects of lexical information are encoded in features;
   b. Which features percolate;
   c. Where features are permitted to percolate from; and
   d. How percolation operates in languages where there may be multiple markings for a feature in a single lexical item.

She draws the following conclusions about feature percolation (p.135):

(2) Conclusions
   a. free morphemes and derivational affixes possess categorial signatures;
   b. categorial signatures contain only category and morphosyntactic features;
   c. lexical entries may contain diacritics and representations of argument structure but these do not percolate;
   d. languages must set the number of layers allowed for any given feature; and
   e. inflectional affixes contribute individual features to the categorial signature percolated from the head, but they do not themselves possess complete categorial signatures.

For ease of explication, we will break (2c) down into (2ci) and (2cii) as follows:

(2c)
   i. Lexical entries may contain diacritics but these do not percolate.
   ii. Lexical entries may contain representations of argument structure but these do not percolate.

We are not concerned with (2cii) and (2d) in this work. We will try to show that (2ci) and (2e) above, cannot be maintained. While conclusion (2a) is correct in itself, if
(2e) cannot be maintained, there is no reason to distinguish free morphemes and derivational affixes from inflectional affixes. Furthermore, if (2ci) is found to be untenable, there is little motivation to define the categorial signature as containing only morphosyntactic features as far as percolation is concerned as in (2b).

This chapter is organized as follows. After a general introduction to Lieber’s 1989 theory in section 1, we examine how derivational word formation (cf. (2a) above) is treated. In section 2, we point out the contributions of Lieber’s theory to the concepts of categorial signature (cf. (2b)) and value percolation as opposed to feature percolation, particularly, in relation to transparent elements. In section 3, we focus on problems that Lieber’s theory faces in the analysis of diacritic features in Latin (cf. (2ci) above). We also examine Lieber’s arguments for her claim that inflectional affixes are nonheads in Yavapai (cf. (2e)). A summary of the discussion appears in section 4.

8.1 Introduction

Lieber proposes to adopt the strongest restriction on percolation possible so that only morphosyntactic features percolate. She defines feature percolation conventions as in (3):

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(3) (= Lieber (26))

a. Head Percolation
   Morphosyntactic features are passed from a head morpheme to the node dominating the head. Head Percolation propagates the categorial signature.

b. Back Up Percolation
   If the node dominating the head remains unmarked\(^1\) for a given feature after Head Percolation, then a value for that feature is percolated from an immediately dominated nonhead branch marked for that feature. Back Up Percolation propagates only values for unmarked features and is strictly local\(^2\).

That is, Lieber (1989:103) proposes to restrict percolation so that it will, first, operate on morphosyntactic features excluding diacritic features and, second, propagate either the categorial signature en bloc by HP or only values for unmarked features by BUP. Features themselves are not allowed to percolate in her theory.

The crucial difference between Lieber’s new theory of percolation and that of Selkirk (1982), reviewed and found to be inadequate to handle Korean data in Chapter 7, is that Lieber makes explicit use of the notion of ‘categorial signature’ defined by her as in (4):

(4) categorial signature

\[\ldots\text{a frame, headed by category features } [+N], [+V], \text{ and containing a list of all those morphosyntactic features that are of syntactic relevance for that category in that language (p. 99)}\]

---

\(^1\) The terms ‘marked’ and ‘unmarked’ are used in Lieber (1989) to mean ‘specified’ and ‘unspecified’ respectively by the value either [-] or [+].

\(^2\) See section 5 for ‘strict locality’.
Syntactically relevant features in Lieber are "...those features which mark agreement across categories, possible sequences of clauses and the like". Lieber defines the categorial signature for nouns in English as in (5):

(5) Categorial signature for nouns in English:

\[
\begin{array}{c}
+\text{N}^3 \\
+\text{pl} \\
+\text{I} \\
+\text{II}
\end{array}
\]

She provides categorial signatures for particular nouns in English as in (6):

(6) a. table \[ N^4 \]  b. women \[ N \]

\[
\begin{array}{c}
-\text{pl} \\
-\text{I} \\
-\text{II}
\end{array}
\]

3. Lieber (p.100) provides a binary value here for N. Nouns cannot have the value \([-\text{N}]\). It should read either \([+\text{N},-\text{V}]\) or simply N.

4. We would take this N as \(N_1\) in (i) below:

i. \(N_1 \rightarrow N_2 + \text{pl}\) (cf. Lieber 1989:note 3)

We assume that \(N_2\), the form before the affixation of the plural suffix has taken place, has the categorial signature in (ii) below:

(ii) table \[ N \]

\[
\begin{array}{c}
\text{u} \\
-\text{I} \\
-\text{II}
\end{array}
\]

and also that the unmarked value for the feature plural in (ii) is filled in as in N(=6) above) by default (see Lieber pp.117 and 122, and below) after no affixation has taken place.
In these examples, the features are marked but features in the categorial signature can be unmarked as in the Russian diminutive -ushka below:

(7) (cf. Lieber p. 102)

-ushka

\[
\begin{array}{c}
\text{N} \\
\text{u Case}_1 \\
\text{u I} \\
\text{u II} \\
\text{u Fem} \\
\text{u Masc}
\end{array}
\]

On the unmarkedness of features in -ushka, Lieber (p. 102) notes that this morpheme is unmarked for gender in its lexical representation though it does not lack the feature itself.

How do Lieber’s percolation conventions work for derivational and inflectional word formation? We will consider Lieber’s example of German diminutives (=Lieber (54)) in this chapter and her Yavapai example (=Lieber (53)) in the next section and in chapter 9.

8.1.1 Derivational Affixes are Heads

Lieber’s (p.134) German example is Mann ‘man’ + the diminutive -chen. The derivation of Mannchen ‘man (diminutive)’ starts out before percolation as shown in (8):

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The mother noun *Männchen* bears [-Fem, -Masc] as in (9):

(9)

The values for gender features of the diminutive morpheme

-chen (neuter) supersede those of the stem *Mann* (masc.) it

attaches to. HP first applies to (8) and derive:

(10)

If -chen is assumed to be a nonhead and therefore does not

possess a full categorial signature, BUP has to apply and

values for features on -chen have to propagate. BUP,

however, cannot apply as shown in (11) below:

---

5. *Mann* and -chen are not marked as nouns in Lieber

(54). The nodes to which these features are percolated,

however, indicate that Lieber assumes such marking.
This is because Lieber's (1989) BUP only propagates values for unmarked features. Thus, the superseding of values in the mother noun in (9) cannot be effected if the derivational suffix -chen is construed as a nonhead lacking a full categorial signature. This is the motivation for Lieber's proposal (p. 134) to give derivational affixes full categorial signatures. Under this assumption, HP will apply twice to (9), deriving (12) below:

(12) (=Lieber (54))

The categorial signature of the derivational suffix -chen is propagated by HP, and this HP causes the feature values of

\[ N \]
\[ -\text{Fem} \]
\[ +\text{Masc} \]

\[ \text{Mann} \]
\[ N \]
\[ -\text{Fem} \]
\[ +\text{Masc} \]

\[ \text{chen} \]
\[ N \]
\[ -\text{Fem} \]
\[ -\text{Masc} \]

6. The category feature N is deleted. See section 2 for representation of inflectional affixes.
the affix to supersede those of the stem. This is the argument for Lieber’s conclusion (2a) above that free morphemes and derivational affixes possess categorial signatures.

In section 8.3.2, we examine an example of inflectional word formation, from which Lieber concludes (cf.2e above) that inflectional affixes do not possess categorial signatures but only contribute values for individual features in the categorial signature percolated from the head.

Based on observations on Yavapai which lead her to propose (2a) and (2e) above, Lieber (p. 134) concludes that, unlike derivational affixes, inflectional suffixes are not heads with respect to percolation.

Before we proceed to the discussion of inflectional word formation, we will examine the areas of percolation that Lieber’s theory makes explicit.

8.2 Lieber’s Contributions

Lieber makes explicit use of the notion of ‘categorial signature’, a notion only implicit7 in Lieber (1980), Selkirk (1982), and DW (1987). The difference between Lieber (1989) and the other three theories is that, in the latter, percolation "sums up" the features borne by the head and nonhead (cf 2.2 of this study). In Lieber, these

7. See Lieber (1989:2.1.) for details.
features are already "summed up" in the categorial signature; in addition, they are multiply listed when relevant. Under Lieber's notion of the categorial signature, since the features are listed \textit{a priori} in the categorial signature, percolation simply marks the feature values. A corollary to this value percolation is that transparent elements must bear features, though unmarked with values so that percolation can fill in the values. We will examine below why the notion of categorial signature\textsuperscript{8} has to be made explicit and how it makes necessary the convention of value percolation, a convention which in turn requires transparent elements to bear features.

8.2.1 Why the Categorial Signature?

We saw in Chapter 7 that only Lieber (1989) accounted for the multiple marking of the past tense feature in Korean. This is made possible because notion of categorial signature lists the morphosyntactic feature PAST twice. In other theories, percolation of a feature is allowed only when the mother node is not already marked; this prevents a second percolation of the same feature\textsuperscript{9}.

\textsuperscript{8} See Lieber 2.1 for justification in support of the concept of categorial signature.

\textsuperscript{9} See Chapter 7 for details. Note that Selkirk's percolation convention (as revised) can account for the multiple marking of PAST only under the assumption that the affixes have a n-ary and flat configuration.
A more crucial justification for the notion categorial signature, however, is that it prevents cross-categorial percolation and therefore rules any complex of features illicit for a particular category in a particular language. We will consider an example from the Korean data. In 3.1.4 we argued that the nouns yenkwu ‘research’ and hayngpok ‘happiness’ carry processive and descriptive subcategory features respectively and that the verbalizers ha- or toy- ‘become, be’ are transparent in that they do not bear subcategory features. The subcategory features, together with category features, can be represented in terms of the binary value system developed in 3.2, as in (13) below (we consider ha- only):

(13)
\[
\begin{align*}
\text{a. yenkwu- ha- n-ta} & \quad \left[ \begin{array}{c} N \\ [+P,-D] \end{array} \right] \left[ V \right] \left[ \emptyset \right] \quad \text{SE} \\
\text{b. hayngpok ha- } & \quad \emptyset \text{-ta} \\
& \quad \left[ \begin{array}{c} N \\ [-P,+D] \end{array} \right] \left[ V \right] \quad \text{SE}
\end{align*}
\]

The nouns to which the verbalizer ha- may attach, as Chung-Soo Suh (1991) argues, are restricted to those marked by a feature he refers to as [-substantial], a feature which might better be called [-concrete]. We represent this

10. For Lieber’s example of a ‘schematic word’ in a hypothetical language, see 2.1.

11. We will tentatively use \( \emptyset \) to represent the transparent subcategory features of the verbalizer until we determine their exact nature in 8.2.2 below.
feature as [-concrete]^{12} and encode this feature in the lexical entry of yenkwu and hayngpok as in (14):

(14)
a. yenkwu- ha- n-ta
\[
\begin{array}{c}
N \\
\text{+P,-D} \\
\text{-CONC}
\end{array}
\begin{array}{c}
V \\
\emptyset \\
\text{SE}
\end{array}
\]
b. hayngpok ha- \emptyset-ta
\[
\begin{array}{c}
N \\
\text{-P,+D} \\
\text{-CONC}
\end{array}
\begin{array}{c}
V \\
\emptyset \\
\text{SE}
\end{array}
\]

In the "summing up" theories, Lieber (1980) for example, this feature [-CONC] would be percolated together with other features. Yenkwu + ha-, for instance, would start out as follows before percolation:

(15)
yenkwu- ha- SE
\[
\begin{array}{c}
N \\
\text{+P,-D} \\
\text{-CONC}
\end{array}
\begin{array}{c}
V \\
\emptyset \\
\text{SE}
\end{array}
\]

Convention I and II would percolate the features as in (16) below:

(16)

---

^{12}. A further refinement of this feature is necessary: [+concrete] nouns cannot be verbalized but not all [-concrete] nouns are prenouns (see 3.1.4 for definition). For example, maum 'heart' is a [-concrete] noun. Yet, it cannot be verbalized as in maum + *hanta.
Now, since the branching node fails to acquire the features \([+P,-D]\) and \([-\text{CONC}]\), these features from the next lowest labeled node are automatically percolated by Convention III to the unlabeled branching node, as in (17):

\[
\begin{array}{c}
\text{V} \\
(-D) \\
\text{N} \\
(+P,-D) \\
\text{yenkwu-} \\
\text{ha- \ SE}
\end{array}
\]

The verb is now marked for the feature \([-\text{CONC}]\). It appears that this feature has no morphosyntactic relevance for the category of verb. Korean verbs are not marked for this feature\(^{13}\); the percolation in (17) of the feature \([-\text{CONC}]\) is an unlawful cross-categorial percolation and needs to be prevented. On the other hand the subcategory features \([+P,-D]\) have to be percolated so that the denominal verb \text{yenkwu-} \text{ha-} may select the correct SE.

What is required here is a selective percolation of different features. Only the features or value of those features relevant to a particular category may percolate. This is what justifies Lieber making the notion of categorial signature explicit. On the assumption that each category in each language has a categorial signature, Korean

\(^{13}\) This feature in the lexical entry of verbs may be relevant for selectional restrictions in some languages and, if so, it is to be included in the semantic representation of each lexical item.
verbs and nouns would have the following categorial signatures (disregarding features irrelevant to the current discussion):

(18)

a. Verbs
   \[\begin{array}{c}
   \{V\} \\
   \{+P,+D\} \\
   \text{etc.}
   \end{array}\]

b. Nouns
   \[\begin{array}{c}
   \{N\} \\
   \{+P,+D\} \\
   \{+\text{CONC}\} \\
   \text{etc.}
   \end{array}\]

When these categorial signatures for V and N are encoded in the lexical entries of yenkwu and -ha respectively in (16) above, each node will have the following representation:

(19)

\[
\begin{array}{c}
\begin{array}{c}
\text{yenkwu-} \\
\{N\} \\
\{+P,-D\} \\
\{-\text{CONC}\}
\end{array} \\
\begin{array}{c}
\text{-ha-} \\
\{V\} \\
\{uP,uD\}
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\text{SE} \\
\{V\} \\
\{uP,uD\}\]
\]

Now, recall Lieber's BUP, which is repeated below:

(20) Back Up Percolation

If the node dominating the head remains unmarked for a given feature after Head Percolation, then a value for that feature is percolated from an immediately dominated nonhead branch marked for that feature. Back Up Percolation propagates only values for unmarked features and is strictly local.

The percolation of the feature [-CONC] is ruled out because BUP simply fills in values for the features unmarked for them in the node dominating the head. The node lacks the

\[14\] For assigning \(\{uP,uD\}\) to the transparent verb -ha, see 8.2.2 immediately below.
feature [uCONC] and the value [-] for the feature [CONC] cannot be percolated (as line (a) shows) from the immediately dominated nonhead branch for the noun yenkwu-, which is marked for that feature. BUP, on the other hand, percolates the values of the subcategory features of the noun into the verb (as line (b) indicates).

8.2.2 Value Percolation and Transparent Elements

The verbs concerned with here are transparent verbs ha- and toy- discussed in 3.1.4. If it is correct that Korean verbs have a categorial signature containing the subcategory features marked [-] or [+], what are the values for these features of transparent verbs? The term 'transparent verb' can be interpreted in two ways. One is that, in theories in which features are summed up, transparent verbs would not carry subcategory features; the percolation (or the mechanisms for summing up (see Chapter 2. (9)) would sum up other features (e.g., the category V in ha- or toy-) carried by transparent verbs on the node dominating them. The other interpretation allows subcategory features themselves but not their values. As in Lieber 1989, since the explicit notion 'categorial signature' does not allow such feature percolation, a transparent verb has subcategory features though unmarked for values. When values are percolated into them, they select a correct SE in the same way as other
verbs. We are treating transparent verbs\textsuperscript{15} in the same way that Lieber treated the Russian diminutive morpheme -ushka. Lieber noted that this morpheme was unmarked for gender in its lexical representation though it did not lack the feature itself.

Ha- for example, can be represented in the lexicon as possessing the following categorial signature:

\begin{equation}
\begin{array}{c}
\text{ha-} \\
V \\
uP, uD \\
\text{etc.}
\end{array}
\end{equation}

(16) above with this categorial signature encoded is represented as in (22):

\begin{equation}
\begin{array}{c}
\text{yenkwu-} \\
N \\
+P, -D \\
-CONC
\end{array}
\begin{array}{c}
\text{ha-} \\
V \\
uP, uD
\end{array}
\begin{array}{c}
\text{SE}
\end{array}
\end{equation}

Now BUP percolates the values of the subcategory features borne by the closest nonhead branch marked for these features:

\begin{itemize}
\item We argued that, in addition to the verbalizer -ha, the honorific suffix -(y)si and suffix phrases, such as -ci anh- 'don't' and -ci mos-ha- 'cannot' (in Chapter 4) are transparent elements. We assume that they also bear features for which values are unmarked.
\end{itemize}
The subcategory features of the node dominating the head can select the correct SE as in:

(24)

```
yenkuw-ha- nun-ta
```

This is the motivation for BUP, which is defined specifically in terms of value percolation and not in terms of features themselves.

The justification for defining the transparent verb as having the unmarked subcategory features has been internal: it is the only way the percolation empirically works under the notion of the categorial signature, a notion which has to be independently assumed in the theory to prevent cross-category percolation.

Besides this empirical justification, it is also conceptually reasonable to assume that the transparent verb -ha bears subcategory features. This is because only the subcategory features select SE; the verbalizer ha- or toy- 'become, be' call for an SE although they cannot select it.
In the next section, we will show that Lieber's conclusion that diacritic features do not percolate is untenable.

8.3 Problems

We claim that Lieber's conclusions, repeated below, cannot be maintained:

(2ci) lexical entries may contain diacritics...but these do not percolate; and

(2e) inflectional affixes contribute individual features to the categorial signature percolated from the head, but they do not themselves possess complete categorial signatures [and are not morphological heads].

We discuss (2ci) in 8.3.1 and (2e) in 8.3.2 and in chapter 9. We will begin with (2ci).

8.3.1 Percolation Analysis for Diacritic Features

Vindicated in Lieber (1980)

Lieber maintains that percolation concerns only features in the categorial signature. This is what underlies (2ci) and (2b) above. She bases this conclusion on Latin verbal morphology, claiming that Latin morphemes derive their subcategorizations from the morpheme immediately to their left. Only if no percolation has occurred, she argues, can the correct person/number affixes be attached. (p. 104-5) We will refer to this as the simple adjacency solution.

We will demonstrate that, in Lieber’s 1980 theory, the subcategorization of P/N suffixes in Latin can in fact be
accounted for by the percolation of diacritic features; there is no need to resort to the simple adjacency solution checking only the morpheme immediately to the left.

The example which Lieber claims shows that diacritic features must not percolate is the derivation of Latin amaveram 'I loved' (Lieber's (13)). This pluperfect paradigm starts out as shown in (25) below:

(25) (=Lieber (13))

```
| amav | era | -m/-s/-t/...
| [+T] | [+T] |
| -D   | V    |
```

Lieber claims that, in a theory in which diacritic features percolate, the percolations described in (26) below take place as in (27) below:

(26) ...., the features [+T,-D] percolate to the node immediately dominating amav. [+T] then percolates from era to the node dominating it by Head Percolation.

Since this node is unmarked for the feature [D], [D] then percolates from the lower node by Back Up Percolation.

(27) (=Lieber (14))

```
*           [V]
  / \               |
 [V]  [V]          [+T]  [+T]
  |    |             -D    -D
 [V]  [V]          [+T]  [+T]
  |    |             -D    -D
[+T]  [+T]         [-D]  [-D]
```

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She further claims that if these percolations take place, only the incorrect P/N II suffixes -i/-isti/... can be attached as in (27) because the correct P/N suffixes -m/-ś/-t/... attach only to [+T,(+D)].

We will follow each step of her derivation and show that the results she claims to obtain are not in fact produced. First, the features [+T,−D] of the stem amav must percolate:

\[(28)\]

\[
\begin{array}{c}
\text{amav} \\
\text{era} \\
\text{P/N suffixes}^{16}
\end{array}
\]

Next, the feature [+T] percolates from era to the node dominating it, by Head Percolation and derives (29) below:

\[(29)\]

Finally, since the node is unmarked for the feature [D], [D] then percolates from the lower node by Back Up Percolation:

\[16. \text{The correct selection of P/N suffixes is still at issue. We will replace the P/N I suffixes -m/-ś/-t/... with the term covering both P/N I and P/N II suffixes until we have to choose one of them.}\]
This derivation is the basis for her claim that diacritic features need not and indeed should not percolate.

Lieber has proposed two distinct percolation theories. Her use of the terms HP (Head Percolation) and BUP (Back Up Percolation) indicates that it is the 1989 theory that she is applying here. When she refers to the percolation of the feature \([D]\) by BUP from a lower node to the "unmarked" node (the marked and unmarked are notions introduced anew in her 1989 theory) she again seems to refer to her definition of BUP in the 1989 theory.

On the other hand, there are several indications that Lieber is applying her 1980 version. First, she applies HP for the inflectional suffix \(-\text{era}\): that is, the suffix morpheme is treated as the head. In Lieber's 1980 theory, the head of a word is the outermost affix: this is not the case in the 1989 theory. Second, she applies BUP to percolate \([D]\) from the lower node. Recall that feature percolation is allowed in the 1980 theory but not in 1989 version. It seems then that Lieber is using the term HP in lieu of Convention I and II, and BUP instead of her Convention III. Her statement about the node being unmarked
for [D], presumably after HP for [+T] in (29), must mean that the node does not get the feature [D] by Convention II. This latter description is part of Lieber's 1980 percolation convention III (see below).

We apply Lieber 1980 to determine the validity of Lieber's claim regarding diacritic features. Lieber's 1980 percolation conventions are repeated below:

(31) Lieber (1980:49-54)

Convention I: all features of a stem morpheme including category features percolate to the first nonbranching node dominating that morpheme.

Convention II: all features of an affix morpheme including category features percolate to the first branching node dominating that morpheme.

Convention III: if a branching node fails to obtain features by Convention II, features from the next lowest labeled node are automatically percolated up to the unlabeled branching node.

The Latin example (25) above will start out before percolation as (32) below:

(32) amav  era  \\
  +T  V  \\
  -D  +T  P/N suffixes

Note here that both the stem and the suffix bear the category feature V (See 2.2 and chapter 7). Lieber's (1980) Convention I and II will apply and derive (41) below:

17 A crucial problem is that this requirement makes percolation possible only in a binary and hierarchical structure, thereby making percolation a motivation for assuming such a configuration for any structure in which percolation is operative. This requirement is not assumed in Williams (1981) nor in DW (1987). See below for details.
Does Convention III apply here? Recall that Lieber claims that BUP applies here since the branching node dominating -era is unmarked for the feature [D]. Her claim is that this BUP propagates [D] from the lower node as in (30) above, repeated as (34) below:

Further, Lieber claimed that, after BUP, only the incorrect P/N II suffixes -i/-isti/... as in (27) (=Lieber (14)) above, can be attached because the correct P/N suffixes -m/-g/-t/... attach only to [+T,(+D)].

The features at issue here are the features for which P/N affixes are subcategorized (P/N feature hereafter). The crucial question is whether the node to which the features of the inflectional suffix era have percolated (circled
below) **fails** to obtain P/N feature in (29) repeated below as (35):

(35)

```
        V
  (+T)   

  V   
 (+T) (-D)

  amav era P/N suffixes

[V] [+T]
```

The node is a branching node labeled by a P/N feature [+T], which is a complete P/N feature in itself in both of the 1980 and 1989 theories. This can be seen from her description of the diacritic feature convention. Lieber (1989: 103) sums up her 'diacritic' feature convention (1980: 93-95) as follows:

> In order for the morphological subcategorizations of inflectional suffixes to be able to refer to the particular stem forms they must attach to, stem forms are designated as bearing two binary valued diacritic features [+T] and [+D]. Roots are designated [-T,+D], theme vowel stems [+T,+D], and perfect stems [+T,-D]. Since some inflectional affixes also must attach to other inflectional affixes, some inflectional affixes are also marked with the diacritic feature [+T].

Then why does [D] percolate from the lower node by Back Up Percolation? Probably the strongest justification for the claim that [D] cannot percolate from the lower node by Back Up percolation in any theory is the empirical fact that this percolation will generate [+T,-D] if the [D] has the value [-], and [+T,+D] if [+]. Both [+T,-D] and [+T,+D] are already preempted in the language since they mark the vowel stems and perfect stems respectively.
Moreover, Lieber (1980) has no feature system without the value marked, and even in the 1989 theory, where value percolation is permitted, the branching node has to have the unmarked feature [uD] in a feature complex such as [+T,uD] (percolated from era), to which a value may be percolated. This feature complex [+T,uD] simply cannot represent the inflectional affix era ([+T]) no matter what value is assigned to the feature [D].

It is clear that Convention III does not apply. The node has [+T], to which P/N I affixes attach as in (36):

(36)

```
[ V ]
[ +T ]

[ V ]
[ +T ]

amav  era  -m/-s/-t/...
```

P/N I suffixes correctly attach to the [+T] feature of era. Thus, Lieber's claim that her 1980 analysis of the Latin verb paradigms argues against the percolation of diacritic features is untenable.

This Latin example is one of the three that Lieber uses to argue against diacritic feature percolation. Our conclusion would also apply to the other examples, [Learned] in French and [+strong] in German. Lieber's argument against percolation of diacritic features for these two examples is not based on the inapplicability of a percolation analysis but rather on their susceptibility to alternative accounts.
Thus, the percolation analysis of diacritic features is a valid one, one that, as we will see in 9.5 below, is vindicated in Lieber 1989 as well if a certain modification to be discussed in 9.3 is allowed.

8.3.2 Arguments for a Nonhead Analysis of Yavapai Inflectional Affixes

One important difference between Lieber 1980 and Lieber 1989 is that inflectional affixes are construed as heads in 1980, whereas they are treated as nonheads in 1989. We will argue in the next chapter that inflectional affixes should be treated as heads with respect to percolation in Lieber's 1989 theory. But first we must discuss Lieber's arguments for her claim that inflectional affixes, although contributing individual features to the categorial signature, lack categorial signatures and are not morphological heads.

This nonhead analysis is based on the derivation of Yavapai *?n-m-Ø-ta:v (her (53)). (37) below contains lexical entries for the morphemes figuring in the derivation:

(37) (cf. Lieber (37) and (38))

\[
\begin{array}{c}
ta:v \\
\text{stem} \\
\text{hit'}
\end{array}
\]

\[
\begin{array}{c}
\text{I} \\
\text{II} \\
\text{pl} \\
\text{COMP} \\
\text{etc.}
\end{array}
\]

\[\text{18. Features irrelevant to p/n marking will not be represented in diagrams below.}\]
We will momentarily regress here to discuss Lieber’s layering notation for person/number features and level analysis for affix morphemes attached to the verb stem. (38) below illustrates the order of person/number markings:

(38)  

a. \[ \begin{array}{c} m \\ [+I] \\ [+II] \end{array} \begin{array}{c} \emptyset \\ [-I] \\ [-II] \end{array} \begin{array}{c} \# \end{array} \begin{array}{c} \text{hit} \end{array} \]

'He hit you.'

b. \[ \begin{array}{c} ?n \\ [+I] \end{array} \begin{array}{c} m \\ [+II] \end{array} \begin{array}{c} \# \end{array} \begin{array}{c} \text{hit} \end{array} \]

'You hit me.'

She (p.119) proposes to represent these person/number features in two layers as shown in (39) (=her (33)) below:

(39)  

\[ \begin{array}{c} +I \\ +II \\ +PL \end{array} \begin{array}{c} [+I] \\ [+II] \\ [+PL] \end{array} \]

In (38), the inner layer encodes p/n features of the subject prefix and the outer layer those of the object prefix.

The categorial signature including person/number features for the category verb in Yavapai is represented as

---

19. See p.126 for the zero affix. Lieber states "...I will adopt the zero affix analysis here."

20. Features irrelevant to person/(number) representation are omitted.
The categorial signature given in (37) above is a simplified version of the categorial signature for the particular verb stem taːv 'hit' (cf. Lieber (37)).

With respect to the Level Ordered Analysis, she (p.121) assumes that Yavapai verbal morphology requires four levels and particular verbal morphemes belong to particular levels. We have shown in (37) above, the levels\(^{21}\) on which particular morphemes come into play. Lieber also assumes that the inflectional affixes for first, second, and third person contain only the person features and are not contained in a full categorial signature.

In Lieber (1989), the form *?n-m-∅-taːv would be derived through the following steps. It will start out before percolation as illustrated in (41):

\[(41) \begin{array}{c}
?n \\
[+I] \\
+II \\
+m \\
[I] \\
[II] \\
[-I] \\
[∅] \\
[-II] \\
[pl] \\
[pl] \\
taːv \\
[I] \\
[II] \\
\end{array}\]

\(^{21}\) See Lieber 3.3. for the justification. As Lieber herself states, "...this is to some extent an issue tangential to the main issue of feature percolation,..." we will not be concerned with this issue in detail.
At Level I, HP applies to (41) and, since no Level I affixes are attached\textsuperscript{22}, will derive (42) below:

\[(42)\]

\[
\begin{array}{c}
\text{?n} \\
[+I] \\
\text{m} \\
[+II] \\
\emptyset \\
[-I] \\
\text{ta:v} \\
[-II] \\
\end{array}
\]

At Level II, if no affix (=\emptyset) is added, the inner layer, which is the subject layer of the propagated categorial signature for \textsc{ta:v} receives the features [-I,-II] for the subject \emptyset 'he', and then the default value\textsuperscript{23} [-PI] at the end of Level II as in (43) below:

\[(43) (=\text{Lieber (39a)})\]

The Level III prefix \textsc{m} 'you', the object of the verb, now percolates the value [+] of the [II] feature in (43) to the outer layer by BUP and derives (44) below:

\[\ldots\]

\textsuperscript{22}. Level I involves affixation of post-verb suffixes such as -\textsc{y} passive and -\textsc{c} distributive, which are irrelevant to our discussion here.

\textsuperscript{23}. Lieber (p.134) assumes that "...negative values are filled in by default...at the end of each level."
The derivation up to this step is uncontroversial and the result is that the form \( m-\varnothing-ta:v \) would mean 'he hit you'. However, derivation can continue, and \(?n- 'I'\) can attach to an \( m-\) initial form since the subcategorization of \(?n- 'I'\) is \( v[ \_ \_ \_ \_ ] v[m] \). The following would be the derivation:

We have here an illicit derivation. Lieber (p. 134) claims that her theory, which specifies inflectional affixes only for positive feature values blocks this derivation:

\(?n-\) could not attach to Level III \( m-\) because its feature would have to add in to the outer layer to
which the feature [+II] from m- has already been percolated. The derivation would be ruled out on the grounds that [+I,+II] is not a possible feature combination in Yavapai.

She argues that there would be no way to block this illicit derivation if inflectional affixes were heads possessing full categorial signatures. If the affixes were heads, she claims, they would have the following full categorial signatures:

\[(46)\]
\[
a. \begin{array}{c}
\begin{array}{c}
{\text{[+I \ II]} \ [I \ II]} \\
{\text{pl \ COMPL}} \\
{\text{etc.}}
\end{array}
\end{array}
\]
\[
b. \begin{array}{c}
\begin{array}{c}
{\text{I \ II]} \\
{\text{pl \ COMPL}} \\
{\text{S.S. \ etc.}}
\end{array}
\end{array}
\]

The derivation starts out before percolation, as in (47)\(^{26}\):

\[(47)\] (cf. Lieber (52) and (53))
\[
\begin{array}{c}
\begin{array}{c}
{\text{[+I \ II]} \ [I \ II]} \\
{\text{pl \ COMPL}} \\
{\text{etc.}}
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
{\text{I \ II]} \\
{\text{pl \ COMPL}} \\
{\text{S.S. \ etc.}}
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
{\text{\emptyset \ II]} \\
{\text{pl \ COMPL}} \\
{\text{S.S. \ etc.}}
\end{array}
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
{\text{ta:v \ II]} \\
{\text{pl \ COMPL}} \\
{\text{S.S. \ etc.}}
\end{array}
\end{array}
\]

\[^{25}\] This is the categorial signature for m- in Lieber's (p.131) double representation analysis. See Lieber 3.4.

\[^{26}\] We are concerned here and elsewhere only with person/number features.

\[^{27}\] Whether or not the \emptyset possesses a categorial signature is an interesting issue but the discussion following does not hinge upon its characterization. We will simply leave it vague.
Lieber's percolation conventions would work in the following way. First, the categorial signature of the stem propagates via the HP, as follows:

\[(48)\]

At Level II, no affix \((=\emptyset)\) is added; the node dominating \(\emptyset \text{'he'}\), the subject of the verb, and \(\text{ta:v}\) bears the default features \([-I,-II,-PI]\) in its inner layer (=the subject layer) as in (49):

\[(49) (=\text{Lieber (39a)})\]

In (49) above, the categorial signature of \(m- \text{'you'}\) would be propagated by HP into the outer layer (=the object layer) as in (50) below:
Lieber (p. 131) correctly points out that m- 'you' has been propagated without its subcategorization v[-I being checked: i.e., at the time of this propagation, the values of the inner p/n are not marked and there is no way of checking whether such propagation is legitimate or not until the subsequent BUP has taken place. Lieber (p. 131) states that the subcategorization check of Level III m- would have to wait, at best, until after BUP has applied. The BUP of inner p/n feature values of the nonhead branch will effect the derivation in (51) below:
Lieber states that even if this checking of the subcategorization of $m$- is allowed to occur after BUP, another problem would arise at Level III: nothing prevents the prefix $?n$ from affixing to the form $m-\emptyset$-$ta:v$ 'he hit you' in (51), as in (52):

(52) (Lieber (53))

\[
\begin{array}{c}
\text{?n} \\
\begin{bmatrix}
+I \\
\text{II} \\
\text{pl}
\end{bmatrix}
\end{array}
\quad \begin{array}{c}
m \\
\begin{bmatrix}
?n \\
\begin{bmatrix}
+I \\
\text{II} \\
\text{pl}
\end{bmatrix}
\begin{bmatrix}
-I \\
\text{II} \\
\text{-pl}
\end{bmatrix}
\end{bmatrix}
\quad \text{ta:v}
\end{array}
\]

Lieber assumes that the inner p/n layer is filled by BUP with the negative values in the next closest node as indicated in (53):

(53)

\[
\begin{array}{c}
\text{?n} \\
\begin{bmatrix}
+I \\
\text{II} \\
\text{pl}
\end{bmatrix}
\quad \begin{array}{c}
m \\
\begin{bmatrix}
+?n \\
\text{II} \\
\text{pl}
\end{bmatrix}
\begin{bmatrix}
-I \\
\text{II} \\
\text{-pl}
\end{bmatrix}
\quad \text{BUP}
\end{array}
\end{array}
\quad \begin{array}{c}
\text{ta:v}
\end{array}
\]

Lieber (p. 132) states that the form $?n-m-\emptyset$-$ta:v$ ought to be able to mean 'he hit me' as shown by the feature
representation in the branching node in (53) but this is not the case. She argues that the illicit derivation of (53) cannot be prevented if the Yavapai p/n affixes had categorial signatures.

Lieber concludes (p. 134) that the fact that her analysis (=the nonhead analysis) is far less problematic than one in which inflectional affixes have categorial signatures suggests that inflection has to be distinguished from derivation, and that, unlike derivational affixes, inflectional affixes are not heads. The problems she refers to here are, to recapitulate:

(54)
At best we would have to wait until after BUP has applied to check the subcategorization of Level III m-.

Even if we allowed this delayed check-up, Lieber claims:

(55)
There arises another problem.

She claims that the problem is:

(56)
There is nothing at this point to prevent us from affixing the prefix ?n- to...the form m-Ø-ta:v.

We will tentatively agree with Lieber that, if inflectional affixes are treated as heads with respect to percolation, (54), (55), and (56) are correct. We will also accept for the moment Lieber's claim that inflectional affixes, although contributing individual features to the categorial signature, lack categorial signatures and are not morphological heads.
8.4 Summary

Of the theories we considered in this study, Lieber 1989 is the only one that accounts for the multiple marking of the feature PAST. She incorporates into her new theory the notions of a categorial signature and the concomitant value percolation. However, her claim that diacritic features do not percolate is not justified by her own Latin data. We will examine in Chapter 9, the internal justification for her claim that Yavapai inflectional affixes do not possess categorial signatures.
Chapter 9 INFLECTIONAL AFFIXES ARE HEADS

In this chapter, we apply Lieber's theory to Korean data. We show that her claim (8.(2e)) that inflectional affixes, although contributing individual features to the categorial signature, lack categorial signatures and are not morphological heads, cannot be maintained in Korean. On the basis of the Korean data, we propose that inflectional affixes be construed as heads with full categorial signatures in Korean, Yavapai, and Latin. This chapter is organized as follows. In section 1, we argue that Korean subcategory features are morphosyntactic. We propose in section 2 that Korean inflectional affixes be construed as heads in Lieber's 1989 system. In section 3, we present some theoretical justifications for this proposal. In section 4, we demonstrate that an analysis in which inflectional affixes are treated as heads can account for Lieber's Yavapai data. We will show in section 5 that such an analysis also accounts for Lieber's Latin data. A summary of Chapter 8 and 9 appears in section 6.

9.1 The Morphosyntactic Relevance of Subcategory Features

We argued in 8.3.1 that a percolation analysis of diacritic features is justified in Lieber (1980) and predicted that the same would be true in Lieber (1989) (See 9.5. below). If this is correct, no compelling justification can be provided to stipulate that the
categorial signature contains only morphosyntactic features. However, Lieber's theory has some major advantages. First, on an empirical level, it is more adequate than others in dealing with the Korean data. Secondly, it makes explicit the notions of categorial signature, value percolation, and transparent elements, as discussed in 8.2. We therefore follow Lieber's system fairly closely, assuming along with Lieber that the categorial signature contains only features morphosyntactically relevant in Korean. First, we must determine what features are to be included in the categorial signature in Korean. In particular, we will see that subcategory features need to be included.

As shown in Chapter 4, 5, and 6, Korean verb paradigms have a binary and hierarchical structure as follows:

(1)

The categorial signature was defined by Lieber (p.99) as "...[being] headed by those morphosyntactic features that are of syntactic relevance for that category in that language." She specifies syntactically relevant features, as features marking agreement across categories, possible sequences of clauses and the like. Which features in (1) are syntactically relevant? While the syntactic relevance
of the category \([V]\) itself\(^1\) is beyond dispute, the situation is clear for the causative/passive suffix, a derivational affix. This affix changes the argument structure of the preceding verb and is, in general, (sub)categorial-changing. On that basis, we argued that the causative suffix \(-i\) along with the passive, is inflectional like other suffixes in the verb paradigm. In this chapter, we assume, along with Lieber, that the derivational affix is not included in the categorial signature but is given a full categorial signature of its own (see below).

In chapter 6 we argued that all the inflectional suffixes are syntactic affixes. The features HON, PAST, PAST, \(V/C\), and RETR borne by these suffixes are thus syntactic features and are syntactically relevant. The subcategory features represented by binary valued features and carried by the verb stem and inflectional elements are also syntactically relevant since these features mark agreement either between the verb stem or inflectional affix and the syntactic suffix SE. In (1), this agreement is shown between adjacent elements but it also occurs between noncontiguous elements:

\[(2)\]
\[
a. \text{Coh- usi- ci anh-usi- } \emptyset \text{ ta} \quad \text{glad HON not HON ASP STATEMENT} \\
\text{'(The teacher) is not glad.')
\]

\(^1\) We do not deal with the case marking property of a verb, since, though an interesting issue, is not crucial to the determination of categorial signatures here with respect to inflectional suffixes.
b. Coh-usi-ci anh-usi- *n ta
glad HON not HON ASP STATEMENT
'(The teacher) is not glad.'

(3)
a. Ka-si-ci anh-usi-ci mos ha-si-*n ta
go HON not HON cannot HON ASP STATEMENT
'(The teacher) cannot afford not to go'
b. Ka-si-ci anh-usi-ci mos ha-si-*p ta
go HON not HON cannot HON ASP STATEMENT
'(The teacher) cannot afford not to go'

There is agreement between the subcategory features of the verb stem and the SE in the (a) sentences but such agreement is missing in the (b) sentences. We assumed in Chapter 6 that (3a), for example, has the following skeletal tree structure:

(4) (the subject sensayngnim 'teacher' is added)

```
NP
  S
    VP
      Comp
        V
          -si
            ani ha
              S
                Comp
                  VP
                    ci
                      pro
                        NP
                          mos ha
                            NP
                              S
                                VP
                                  HON
                                    V
                                      -si
                                        ani ha
                                          S
                                            Comp
                                              VP
                                                ci
                                                  pro
                                                    ka
                                                      NP
                                                        V
                                                          -si
                                                            HON
                                                              NP
                                                                V
                                                                  HON
                                                                    NP
                                                                      S
                                                                        Comp
                                                                                   VP
                                                                                     ci
                                                                                       pro
                                                                                           S
                                                                                               SE
                                                                                                 nun-ta

'The teacher cannot afford not to go.'
```
Again, in (4), the agreement, illustrated by an arrow, between the subcategory features of the verb stem ka- and the aspect marker -n of the SE clearly shows that subcategory features are syntactically relevant.

We will consider several other pieces of evidence which indicate that subcategory features are morphosyntactic. First, certain syntactic constructions such as -ko iss- (progressive) occur only with processive subcategory features:

(5)  
a. John-i mek\textsubscript{r} nun-ta  
\hspace{1cm} NOM eat SE  
\hspace{1cm} 'John eats (something).'

b. John-i mek\textsubscript{r} -ko iss- \textsubscript{0} -ta  
\hspace{1cm} NOM eat PROG SE  
\hspace{1cm} 'John is eating.'

(6)  
a. John-i kippu\textsubscript{h} \textsubscript{0} -ta  
\hspace{1cm} NOM happy SE  
\hspace{1cm} 'John is happy.'

b. John-i kippu\textsubscript{h} *-ko iss- \textsubscript{0} -ta  
\hspace{1cm} NOM happy PROG SE  
\hspace{1cm} 'John is being happy.'

(7)  
a. John-i caymi-ka iss\textsubscript{h} \textsubscript{0} -ta  
\hspace{1cm} NOM fun NOM have SE  
\hspace{1cm} 'John has fun.'

b. John-i caymi-ka iss\textsubscript{h} *ko iss \textsubscript{0} -ta  
\hspace{1cm} NOM fun NOM have \textsubscript{0} SE  
\hspace{1cm} 'John is having fun.'

Second, some adverbs, cham 'very' for example, modify

\[2\] We revert back to subscripts to represent the subcategory features.
only [-P] subcategories, namely descriptive and hybrid subcategories, as can be seen in:

(8)
a. John-i mekₚ-nun-ta
   NOM eat SE
   'John eats (something).'

b. John-i *cham mekₚ-nun-ta
   NOM very eat SE
   'John eats a lot.'

(9)
a. John-i kippuₚ-Ø-ta
   NOM happy SE
   'John is happy.'

b. John-i cham kippuₚ-Ø-ta
   NOM very happy SE
   'John is very happy.'

(10)
a. John-i caymi-ka issₜ-Ø-ta
   NOM fun NOM have SE
   'John has fun.'

b. John-i cham caymi-ka issₜ-Ø-ta
   NOM very fun NOM have SE
   'John has a lot of fun.'

Third, certain SE's such as -na pota³ 'it appears' occur only with [-D] elements: i.e., processive and hybrid subcategories, as in (11) and (12) and not in (13) below:

(11)
a. John-i kaₚ-nun-ta
   NOM go SE
   'John is going.'

³. -na pota 'it appears' is peculiar in that it does not conjugate and cannot even be made into a question form: *-na poni.
b. John-i kaₖ-na pota
   NOM go appears
   'John appears to be going.'

(12)
a. John-i ton- i iss₅- Ø-ta
   NOM money NOM have SE
   'John has money.'

b. John-i ton- i iss₅-na pota
   NOM money NOM have appears
   'It appears that John has money.'

(13)
a. John-i coh₉- Ø-ta
   NOM pleased SE
   'John is pleased.'

b. John-i coh₉-*na pota
   NOM pleased appears
   'John appears to be pleased.'

From examples (5) - (13), we note that different subcategories cooccur with different syntactic elements as follows:

(14)

<table>
<thead>
<tr>
<th></th>
<th>Processive</th>
<th>Descriptive</th>
<th>Hybrid</th>
</tr>
</thead>
<tbody>
<tr>
<td>-ko iss-</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>cham</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>-na po-</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>

Verbs with feature complex [+P,-D] and [-P,+D] are called processive and descriptive verbs respectively in this study. They are also referred to as verbs and adjectives respectively in other works. The subcategory features which distinguish one syntactic category from another should surely be morphosyntactic.

We conclude that the inflectional and subcategory features shown in (1) above are all syntactically relevant.
and that Korean verbs have the following categorial signature:

(15) Categorial signature for verbs in Korean:

\[
\begin{array}{c}
V \\
+P,+D \\
+\text{HON} \\
+\text{PAST} \\
+\text{PAST} \\
+\text{V/C} \\
(+)\text{SE}^5
\end{array}
\]

(16) below contains the categorial signatures for two verbs in Korean:

(16)  
a. mek- 'eat'  
\[
\begin{array}{c}
V \\
+P,-D \\
\text{HON} \\
\text{PAST} \\
\text{PAST} \\
\text{V/C}
\end{array}
\]

b. noph- 'high'  
\[
\begin{array}{c}
V \\
-P,+D \\
\text{HON} \\
\text{PAST} \\
\text{PAST} \\
\text{V/C}
\end{array}
\]

9.2 Head Analysis of Korean Inflectional Suffixes

Now we apply Lieber's percolation conventions to the Korean data. For the sake of brevity, we present one example each of derivational and inflectional suffixing. We will begin a derivational affix. The causative/passive

---

4. This is still just a working definition of the categorial signature for Korean verbs. For one thing, the case marking property has to be included (see note 1). Incomplete though it may be, our claim that inflectional affixes are heads and possess categorial signatures does not hinge upon a further refinement of the categorial signature.

5. It is the only obligatory element in (1) and is represented by the parenthesized feature [+]. It is parenthesized because it is not the property of the verb stem itself (like the subcategory features) but has to be affixed. The SE will not be represented in the categorial signature of each verb.
suffix occurs between the verb stem and the honorific suffix -usi as shown here:

(17)

\[
\begin{array}{cccccccc}
    & \text{Status} & \text{TNS} & \text{TNS} & \text{Modal} & \text{Modal} \\
V & i & \text{usi} & \text{ess} & \text{ess} & \text{keyss} & \text{te} & \text{SE} \\
\end{array}
\]

\([-P, -D] \quad [+P, -D] \quad [uP, uD] \quad [-P, -D] \quad [-P, -D] \quad [-P, -D] \quad [-P, +D] \\
C/P \quad \text{HON} \quad \text{PAST} \quad \text{PAST} \quad \text{V/C} \quad \text{RETR} \\
\]

We assume with Lieber (1989) that the causative -i is a head with the following categorial signature:

(18) -i

\[
\begin{array}{c}
\text{CAUSATIVE/PASSIVE} \\
\end{array}
\]

\[
\begin{array}{c}
\begin{array}{c}
\text{V} \\
\text{+P, -D} \\
\text{HON}^6 \\
\text{PAST} \\
\text{PAST} \\
\text{V/PR} \\
\end{array}
\end{array}
\]

The causativized verb calls for the SE -nun-ta as follows:

(19)

a. noph- Ø-ta
   high SE
   'Something) is high.'

b. noph-i- nun-ta
   high CAUS SE
   'Something) heightens something.'

The verb conjugation noph-i-nun-ta 'heighten something' starts before percolation as (20):

---

6. Are these inflectional features unmarked or are they marked by [-]? We take the former position as Lieber (1989:102) does with the Russian diminutive -ushka. A decision either way will not result in an empirical difference in a head analysis (see below). This is not true of the subcategory features of inflectional suffixes. See below.

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The values for subcategory features of the derivational suffix \(-i\) supersede values for the same features on the verb stem, as predicted by Lieber’s (p.133) observation that morphosyntactic features are additive in inflectional word formation but, in derivational word formation, the values for morphosyntactic features of outer morphemes supersede those of inner morphemes. The \textit{noph-i-} is suffixed by a proper SE, which has the following subcategorization frame:

\(\begin{align*}
(23) \text{Plain Level Speech Statement SE} \\
a. & \quad \text{-}0\text{-ta} /[-P] \\
b. & \quad \text{-nun-}ta / [+P]
\end{align*}\)
(24)
a. Mek nun-ta
   eat SE
   '(Somebody) eats.'

b. Mek-ess-ød-ta
   eat PAST SE
   '(Somebody) ate.'

(24b) starts out before percolation as illustrated in (25):

(25)

Which of these is the head? In Lieber (1989), the inflectional affix -ess is not considered to be the morphological head because inflectional affixes are not considered to have full categorial signatures. In that analysis, the verb stem mek- is the head. HP, then, applies to the verb stem, deriving (26) below:

(26)

For the mother node to have the proper semantic content and to be suffixed by the proper SE in (23), BUP has to apply, propagating the values of the nonhead to the categorial signature percolated from the head, as the arrows show in (27) below:
It is crucial here that Lieber's theory cannot achieve the propagation of the subcategory features of the past tense suffix -ess. Values for features of an inflectional suffix are supposed to percolate by BUP, defined as (8.(3b)) and repeated below:

\[(8.(3b))\text{ Back Up Percolation}\]

If the node dominating the head remains unmarked for a given feature after Head Percolation, then a value for that feature is percolated from an immediately dominated nonhead branch marked for that feature.

The node dominating the head mek- and -ess in (27) remains unmarked for the feature PAST and the value \([+]\) for PAST percolates from the immediately dominated nonhead branch of -ess. The node, however, does not remain unmarked for the subcategory features since it already bears the values \([+P,-D]\). The values \([-P,-D]\) for the subcategory features on the past tense suffix -ess cannot percolate from the immediately dominated nonhead branch.

The branching node dominating both mek- and -ess therefore remains \([+P,-D]\). Lieber's (1989) theory thus would derive the incorrect form:
(28) *mek-ess-nun-ta

How can we prevent derivation of this incorrect form? We need to make the branching node bear the values [-P,-D] of the past tense suffix. One possibility is to represent the category features on the stem as unmarked, just as the inflectional features are:

(29)

```
[ V  
  P, D
HON
PAST 
V/PR ]
```

Now, (24b) will start out before percolation as illustrated in (30):

(30)

```
mek- ess  \(\emptyset\)-ta
```

HP then applies to the verb stem and derives (31) below:

(31)

```
[ V 
  P, D
PAST ]
```

Now, BUP applies and percolates the values of the nonhead to the categorial signature percolated from the head as shown in (32) below:
The correct SE can now be selected. A serious problem here, however, is that when an inflectional suffix is not attached as in (33) below, the [-] value will be filled in by default (p. 117): ⁹

The verb stem -mek is now marked [-P,-D], which selects the wrong SE, as in (34):

---

⁸. Recall that inflectional affixes are optional.

⁹. Lieber’s (p.117) default system is:

...that the negative value of each feature is the default value and that only positive values of features are represented underlingly; as a consequence the features with negative values...will only be supplied at the end of a derivation by default rules.
It is therefore impossible to represent the subcategory features of verb stems as unmarked.

A second possibility is to extend Lieber's (1989:134) move to give inflectional affixes, like lexical roots, stems, and derivational affixes, full categorial signatures and construe them as heads. As a head, the past tense suffix -ess will have the following categorial signature:

\[(35) \quad \text{ess} \quad [\text{V} \quad \text{Past Tense} \quad \text{PAST}] \quad \text{HON} \quad \text{+PAST} \quad \text{V/PR}] \]

In derivational affixation, which would now include inflectional affixation for Korean, HP propagates the whole categorial signature, causing the feature values of the affix to override those of the stem. For example, (24b) above starts out this way before percolation:

\[(36) \quad \text{mek-} \quad [\text{V} \quad \text{PAST}] \quad \text{ess} \quad [\text{V} \quad \text{SE}] \quad \text{PAST} \quad \text{+PAST}] \quad \text{PAST} \quad \text{V/PR}] \]
HP applies twice and derives:

\[
(37) \quad \begin{array}{c}
\begin{array}{c}
\text{V} \\
\text{P,-D} \\
\text{+PAS}
\end{array} \\
\begin{array}{c}
\text{V} \\
\text{P,-D} \\
\text{PAST}
\end{array}
\end{array}
\quad \begin{array}{c}
\begin{array}{c}
\text{V} \\
\text{P,-D} \\
\text{PAST}
\end{array} \\
\begin{array}{c}
\text{mek-} \\
\text{ess} \\
\text{ta}
\end{array}
\end{array}
\quad \begin{array}{c}
\begin{array}{c}
\text{V} \\
\text{P,-D} \\
\text{PAST}
\end{array} \\
\begin{array}{c}
\text{V} \\
\text{P,-D} \\
\text{+PAS}
\end{array}
\end{array}
\quad \begin{array}{c}
\text{SE}
\end{array}
\end{array}
\]

Now the mother node has the proper semantic content and the proper subcategory features to be subcategorized for by the correct SE in (23).

The Korean data, thus, force us to accept that inflectional affixes also possess full categorial signatures. If subcategory features in inflectional affixes supersede in the same way as those in derivational affixes, it is clear that Lieber's claim that inflectional affixes lack categorial signatures and are not morphological heads is untenable.

If this is correct, we do not need to distinguish inflectional affixes from derivational affixes with respect to percolation or to construe inflectional affixes as nonheads. Lieber's conclusion (8.2a) that "free morphemes and derivational affixes possess categorial signatures" becomes a truism.

Obviously, the strongest justification for our head analysis is internal; the Nonhead Analysis is empirically unworkable as we have seen. But there is also important theoretical support for the head analysis.
9.3 Theoretical Arguments for the Head Analysis

What we claim here, to recapitulate, is that the past tense suffix -ess, for example, must have a categorial signature analogous to (15) (although otherwise unmarked) in 9.1 above, repeated below as (38):

(38) Categorial signature for verbs in Korean:

\[
\begin{array}{c}
V \\
+P,+D \\
+HON \\
+PAST \\
+PAST \\
+V/C \\
(+)SE \\
\end{array}
\]

We assumed in 9.2 that the past tense suffix -ess was the head, having the following categorial signature (39):

(39) \((=\text{(18)})\)  

\[
\begin{array}{c}
\text{Past Tense} \\
\text{V} \\
-P,-D \\
HON \\
+PAST \\
+PAST \\
V/C \\
\end{array}
\]

Note that the past tense suffix is claimed to be a head and -ess have the category feature V.

Consider first the head status of -ess. A head analysis for inflectional affixes is not new. In all three theories discussed by Lieber (pp. 95-96), an inflectional affix is assumed to be a head. Lieber (1980) uses an implicit notion of 'head', which can be inferred from her percolation conventions (cf. Lieber (1980:49-54)); to her a head is the outermost affix morpheme at any point of
derivation. In (40) below, -ess is the head since it is the outermost affix morpheme at that point in the derivation:

(40)  
\[
\text{mek} \quad -\text{ess} \\
\text{eat} \\
[V] \quad [\text{PAST}]
\]

In Williams (1981) also, the rightmost element (cf. Right Hand Rule (RHR) (p.248)) is the head. The same concept is modified in DW (1987) to accommodate data from languages in which a stem is affixed by multiple suffixes, each bearing features (Cf. Selkirk (1982)). DW relativize the notion of head defining it as follows:

(41) (=DW (10)) Definition of "head_\text{F}" (read: head with respect to the feature F):

\[
\text{The head}_\text{F} \text{ of a word is the rightmost element of the word marked for the feature F.}
\]

In (40) above, -ess is the head_\text{PAST}; that is, it is the head with respect to the feature PAST since it is the rightmost element marked for the feature PAST.

In Selkirk's (1982) theory, -ess has to be assumed the head contra her conclusion (1982: 71 and 77) that inflectional affixes are nonheads since inflectional affixes tend not to be category-changing, a conclusion she identifies as "a universally attested fact".

Although -ess itself is not "category-changing", Korean inflectional affixes including -ess are subcategory-changing as we have demonstrated. For example, (40) above selects (42a) rather than (42b) as in (43):

\[\text{(42a) rather than (42b) as in (43):}\]

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In fact, Selkirk's "category-changing" is equivalent to "subcategory-changing" in the framework we adopt in this work, since the subcategories of processives and descriptives are equivalent to full categories of verbs and adjectives respectively in English and other languages and indeed, Korean linguists have called them verbs and adjectives.

Now let us turn to the justifications for the claim that -ess has the category feature V. We assumed without argument in 9.2 that the category feature was V. In Lieber (1989), the categorial signature for -ess has to have V, either marked or unmarked. If it lacked this feature, even if we construed -ess as the head, the node dominating mek- and -ess in (40) above could not be identified as a verb, and an illicit feature representation would result. (40) starts out before percolation as in (44) below:

(44)  

\[
\begin{array}{c}
\text{mek} \\
\text{V} \\
\text{PAST} \\
\text{etc.}
\end{array} \quad \begin{array}{c}
\text{-ess} \\
\text{[+PAST]} \\
\text{etc.}
\end{array}
\]
HP applies twice as in (45):

\[(45)\]

The node dominating \textit{mek-} and \textit{-ess} has no category feature and thus illicit. This is because, in Lieber (1989), the percolation allowed is only that of the total categorial signature (by HP) or that of a value (by BUP) for a feature that already exists in the categorial signature. The category feature \textit{V} therefore cannot percolate as is shown in (46) below:

\[(46)\]

According to the Lieber 1989 system, the category feature for \textit{-ess} can be either [+V, -N] or [uV, -N]\(^{10}\) as in (47) below:

\[(47)\]

\[a. \quad \text{mek-} \quad -\text{ess} \quad (SE)\]

\[+\text{P}, -\text{D} \quad -\text{P}, -\text{D}\]

\[+\text{PAST} \quad +\text{PAST}\]

\(^{10}\) For the unmarkedness of a value for a feature on an item, see Lieber (1989:102) and below. [-N] here is to exclude [+N], which cannot be a feature of \textit{V}.
b. mek- -ess (SE)

\[
\begin{array}{c|c|c}
+V,-N & uV,-N \\
+P,-D & -P,-D \\
\text{PAST} & +\text{PAST} \\
\end{array}
\]

It does not matter which empirically. In (47a), HP applied to -ess would propagate the category feature. In (47b), on the other hand, after HP has applied, BUP would fill in the value [+\] of the verb stem as in (48) below:

(48)

We will assume that -ess has the feature complex of [+V,-N] rather than [uV,-N], because [uV,-N] represents an odd feature complex compatible with both [+V,-N] and [-V,-N]. The feature complex of the node dominating mek- and -ess can never be [-V,-N], and [uV,-N] does not represent this fact.

There are other justifications for assigning to -ess the category feature V:

1. The verb is often defined as tense carrier. A more accurate definition in Korean would be to classify verbs as an element followed by and selecting an SE. SE is the only obligatory suffix and it is subcategorized for a verb. In these two aspects, verbs and inflectional affixes are identical. Affixes belong to the verb category in this new definition.
2. Although inflectional affixes differ from verbs in being unable to assign case or to have subcategorization frames, these differences do not rule out inflectional affixes having the category V any more than they rule out suffix phrases which unquestionably bear the category V\^11.

3. Affixes behave exactly like verbs in semantic selection. For example, -ul cwul al/molu-ta has two semantic interpretations: 'to know how to...' and 'to expect that...'. Of these two, the past tense suffix -ess chooses the latter, just as the verb iss- 'to have' does:

(49)

a. John-i swul -ul mek-ul cwul alta  
   SUBJ wine OBJ eat
   i. 'John knows how to drink.'
   ii. 'I think John drinks.'

b. John-i swul-ul mek-ess-ul cwul alta  
   SUBJ wine OBJ eat PAST
   'I think John has drunk.'

c. John-i ton -i iss-ul cwul alta  
   SUBJ money NOM have
   'I think John has money.'

4. Verb stems are bound on the right while affixes are bound\(^12\) on both sides. But this hardly justifies not assigning the category status of V to affixes; -i the

\(^{11}\) In English, we find that auxiliary verbs do not assign case but they are verbs.

\(^{12}\) Cf. DW (1987:27 footnote 2), which reads:

...our proposal gives no special status to affixes and is thus consonant with our general view (and that of Williams 1978) that affixes have no special properties (apart from having to be bound) that distinguish them from stems.
causative/passive suffix is bound on both sides, but it is generally construed as both a derivational affix and a head with a category feature V.

5. If the derivational suffix -i has the category features of V, there is no reason to deny the same category feature to other suffixes in the verb paradigm. In Chapter 6, we argued that the C/P suffix -i and other suffixes and the past tense suffix -ess exhibit the same properties in that both are construed as heads, both supersede the subcategory features of the inner suffix, and both select an SE which is posited as a syntactic constituent. This last similarity is particularly significant since it means that the selection of SE both by the 'derivational' suffix -i and other 'inflectional' suffixes is 'morphosyntactic'; percolation concerns only morphosyntactic features in the theoretical framework in which we are working.

6. This claim is consonant with Lieber's (1989) treatment of the Russian diminutive affix -ushka, which is treated as a head bearing the category feature of N\textsuperscript{13}. The morpheme -ushka is a transparent affix with respect to unmarked features. If there is reason to treat -ushka as having the category feature N, -ess has more convincing reasons to be treated in a parallel way; -ushka changes no

\textsuperscript{13} In the same framework, the prefix counter-, for example, would have the category feature unmarked and the category feature value N, V, or A would be supplied by BUP later.
morphosyntactic feature of the stem to which it is attached while -ess may change the morphosyntactic features of the item to which it is affixed. If morphosyntactic relevance is significant, as it is in Lieber (1989), the claim that -ess has the category feature V is well motivated.

7. The assignment of category features to affixes certainly has precedents in the literature. For example, Williams (1978a, 1981a) and DW (1987) propose that suffixes\textsuperscript{4} belong to the categories N, V, and A.

8. Historically, the past tense -ess and V/C -keyss are derived from the composite forms made of an infinitive suffix and the verb iss- and ke(?) + iss- (Cf. Martin 1954 and Chapter 2 of this study). If this is correct, and iss- is a head and a verb, it is reasonable to assume that the composite forms maintain these properties.

Moreover, under such an analysis percolation works empirically for Korean data.

We will now test the reasonableness of our claim, the head analysis for data from other languages.

9.4 Head Analysis of Yavapai Inflectional Affixes

This section is organized as follows: first, we review Lieber's arguments for opting for the nonhead analysis in Yavapai; second, we show that her claim that the nonhead

\textsuperscript{4} Note that DW (1987:25) claims that "the notion 'head of a word' allows for inflectional morphology to be reduced to derivational morphology."
analysis is less problematic than the head analysis is due to non-application of BUP for p/n features in the outer layer; third, we present arguments in support of the application of the BUP, which involves a) percolation of an overridden value and b) multiple marking; fourth, if the BUP is indeed allowed, there is no compelling reason to adopt the nonhead analysis in Yavapai; and finally, we propose that the head analysis be adopted in Yavapai too, since this proposal represents a generalization accounting for Korean and, as we will see in the next section, Latin data as well.

Recall that Lieber (p. 134) claims that inflection has to be distinguished from derivation. She bases her claim on the assertion that analysis in which inflectional affixes are assumed to have categorial signatures is more problematic than her own non-head analysis. In section 8.3.2, we tentatively agreed with Lieber that in the derivation of *?$n^-m^-a-ta:y$ (=Lieber (53)), the head analysis suffers the problems (54) - (56) repeated below as (51) - (53) respectively:

(51)
At best we would have to wait until after BUP has applied to check the subcategorization of Level III m-.

We will refer to (51) as delayed check-up. Even if we allowed this delayed check-up, Lieber claims:

(52)
There arises another problem.
She claims that the problem is:

(53) There is nothing at this point to prevent us from affixing the prefix ?n- to...the form m-@-ta:v.

We temporarily assumed that Lieber was right in concluding that, unlike derivational affixes, inflectional affixes are not heads with respect to percolation.

We will now show that Lieber’s claim (52) above that another problem arises in the head analysis is untenable; the problem arises because Lieber does not apply BUP for the p/n features in the outer layer. Recall that Lieber illustrates the problem (53) above in her (53), repeated as (54) below:

(54) (Lieber (53))

```
?n- 'me' +1
+II
pl
II
pl

m 'you(obj)' 'he' 'hit'

+I
II
pl

-1
-II
-pl

+I
II
pl
```

With respect to (54), Lieber (p.132) states:

?n- can attach to an m- initial form. Since its categorial signature is propagated, its [+I] feature automatically takes its place in the outer p/n layer.

---

15. I add the gloss for each element.

16. See 8.3.2 for percolation of features up to this stage.
in effect overriding the [+II] that was placed there by m-.

Lieber then assumes that the inner p/n layer is filled by BUP with the negative values in the next closest node. We show in (55) below what Lieber assumes BUP does to (54) above:

\[
\begin{array}{c}
\text{[+II]} \\
\text{pl} \\
\hline
\text{[II]} \\
\text{-II} \\
\text{-pl} \\
\hline
\text{[I]} \\
\text{pl} \\
\hline
\text{[+II]} \\
\text{-II} \\
\text{-pl} \\
\hline
\text{?n} \quad \text{m} \quad \emptyset \quad \text{ta:v}
\end{array}
\]

(55)

Lieber claims (p. 132):

(56)

a. The result is that the form ?n-m-Ø-ta:v ought to be able to mean 'he hit me', but indeed it cannot, and

b. If categorial signatures propagate from the p/n affixes in Yavapai, there is no way to rule out the illicit derivation (53) (=our (55)).

There is a crucial difference between her claims (53) and (56b). The difference is that (53) states that the process of affixing of ?n 'me', in (54), cannot be prevented: that is, the affixing takes place, while (56b) says that the illicit form ?n-m-Ø-ta:v, derived by the affixation of ?n in (54), is ruled lawful and cannot be (later) ruled out as unlawful. Obviously, these claims lead Lieber to conclude that, unlike derivational affixes, inflectional affixes are not heads with respect to percolation.
We will call into question Lieber's claim (56b) above and argue that there is indeed a way to rule out the derived form ʔn-m-ʔ-ta:v in (55). If the derived form ʔn-m-ʔ-ta:v can be ruled out (cf. (56b)), (56a) cannot stand either, i.e., the node dominating ʔn-m-ʔ-ta:v cannot mean 'he hit me' (see below). Once Lieber's claim (56b) is shown to be untenable, (52) above cannot be maintained and there does not arise another problem in the head analysis, and ultimately there is no compelling motivation to adopt the nonhead analysis in the first place. Lieber's claim (53) above that nothing prevents the prefix ʔn from affixing to the form m-ʔ-ta:v 'he hit you', in (54), is correct but this does not necessarily imply the correctness of her claims in (56b) above. Lieber's claim (56b) is correct only if percolation stopped after the BUP for the inner layer in (55) above, repeated below:

\[(55)\]
\[
\begin{array}{c}
\text{[+I]} \\
\text{[II]} \\
\text{[II]} \\
\text{[pl]} \\
\text{[pl]}
\end{array}
\Rightarrow \text{BUP}
\]
\[
\begin{array}{c}
\text{[+II]} \\
\text{[II]} \\
\text{[II]} \\
\text{[pl]} \\
\text{[pl]}
\end{array}
\]
\[
\begin{array}{c}
\text{ʔn} \\
\text{m} \\
\text{ʔ} \\
\text{ta:v}
\end{array}
\]

But why doesn't BUP apply in (55) to the outer layer after the BUP for the inner layer has applied? Why doesn't BUP fill in the [+] value of the outer layer feature [II] that was placed there by m-, into the unmarked [II] feature.
of the outer layer of the categorial signature just percolated, as in (57) below?

(57)

\[
\begin{array}{c}
\begin{bmatrix}
+I \\
+II \\
pl \\
-\text{II} \\
-\text{pl}
\end{bmatrix}
\end{array}
\]

Lieber's statement made with respect to (54) above, repeated below, is correct only at that point of the derivation; i.e., immediately after the categorial signature of \( ?n \)- has been propagated by HP:

\( ?n \)- can attach to an \( m \)- initial form. Since its categorial signature is propagated, its \([+I]\) feature automatically takes its place in the outer \( p/n \) layer, in effect overriding the \([+\text{II}]\) that was placed there by \( m \).

In Lieber's present theory, HP is followed by BUP according to her percolation convention (8.(3)). It is not clear, with respect to the outer layer in (54), why Lieber stops the percolation process after the HP which overrides \([+\text{II}]\) as in (54). For some unexplained reason she allows the values for features in the inner layer to percolate by BUP as in (55) but not for the outer layer as in (57). It is plausible to cite two differences between the BUP Lieber applies in (55) and the one that we argue should apply in (57). One is actually only an apparent\(^{17}\) difference: it

\[\text{---}^{17}\text{. See immediately below for my claim that this difference is only apparent and not real.}\]
appears that, in the percolation of 2n- in (54), the outer layer features are overridden but not the inner layer features. The second is that the BUP Lieber applies fills in the layer which is not already marked, whereas the BUP we argue should apply fills in the layer already marked with the value [+] for the feature [I] as in (57): i.e., ours is in effect a multiple marking of features.

Our move in (57), then, could be regarded as different from Lieber's (55) in that ours, in (57), involves 1) percolation of an overridden value [+] of the feature [II] and 2) a multiple marking in the outer layer. Both are allowed for in Lieber (1989). We will first discuss the percolation of an overridden value of a feature. Lieber in her definition of BUP (8.1.(3b)) repeated below, says nothing about the percolation of an overridden value of a feature:

(8.(3b)) (=Lieber's (26b) Back Up Percolation
If the node dominating the head remains unmarked for a given feature after Head Percolation, then a value for that feature is percolated from an immediately dominated nonhead branch marked for that feature. Back Up Percolation propagates only values for unmarked features and is strictly local.

In fact, this convention allows (55) above, in which the inner p/n layer is filled by BUP with the negative values [-I,-II,-pl] in the next closest node. These negative values are in effect overridden values themselves because, in (54), HP propagated the whole categorial signature of 2n 'me', causing its feature values to override
the entire mother node for \textit{m-Ø-taːv} 'he hit you'. This HP overrides both the features in the inner as well as the outer layers of \textit{m-Ø-taːv}. Lieber, in the statement above regarding the percolation in (55), considers that only the feature [+I] borne by \textit{ʔn} "automatically takes its place in the outer p/n layer, in effect overriding the [+II] that was placed there by \textit{m-}". However, the inner layer features [I,II], though unmarked, override those of \textit{m-Ø-taːv} 'he hit you'. Thus, there is no difference in the fact that overridden values are involved in both BUP's, one that Lieber applies and one that we argue should apply.

The second difference is multiple marking, in particular, of the same kind of features. This difference should not prompt the BUP Lieber applies, as in (55), while not the one we argue should apply, as in (57). One example in which Lieber herself allows for the multiple marking is in the derivation of *ʔn-m-Ø-taːv itself in the nonhead analysis. She allows for percolation of a feature of "ʔn .. into... the outer layer to which the feature [+II] from \textit{m-} has already been percolated" in the derivation of *ʔn-m-Ø-taːv (cf. (8.3.2.(23)), repeated below as (58):

\begin{equation}
(58)
\end{equation}
Recall that Lieber (p.132) rules out this affixation because, under the nonhead analysis, if the [+\] value of the feature [I] of ?n is propagated to the outer layer of m-?ta:v, which already has the feature [+II], the feature complex [+I,+II] would be created and this feature combination is not allowed in Yavapai.

Clearly, Lieber does not rule out this affixation of a person affix ?n- to the composite form of m-?ta:v on the grounds that this composite form already has a person affix m- bearing the person feature [+II]. Instead, she rules the affixation out because [+I,+II] is not a possible feature combination in Yavapai. Note crucially that multiple marking is allowed, and that the [+\] value can be propagated to the outer layer. This outer layer already has the feature [+II] from m- and has the features [uI,+II].

Both (58) and (57) involve multiple marking. What differences between (58) and (57) prompt Lieber to apply BUP in (58) but not in (57)? Two obvious differences we note between these two, with respect to the operation of BUP, are:

(59)

a. The place to which a value for a feature is percolated is different; in (58) the value [+\] for the feature [I] (=?n) is added to the node which has the value [+\] for the feature [II] (=m) already and in (57), the reverse is true; that is, the value [+\] of the feature [II] is added to node which has the value [+\] for the feature [I]; and

b. The place from which a value for a feature is percolated is different; in (58), it is percolated from a node dominating [+I] exclusively and, in (57), from a
node dominating a categorial signature which includes [+II].

Are these differences significant in Lieber? We fail to see any relevance which would prompt the BUP in (58) and not in (57). The first difference (59a) appears to be related to subcategorization frames. Subcategorization frames, however, are defined in terms of linear sister constituents or features as in (8.(49)) repeated below:

(8.(49))

Level II  ø  -I  v[ _ v:I]
-III

Level III  m- [+II]  v[ _ v[[-I]]
  ?n- [+I]  v[ _ v[ m

The subcategorization frames are not defined in terms of their co-features, which are vertically aligned. In terms of linear sister features, in both percolations, the value added is to a feature in the outer layer followed by the same inner layer features [-I,-II,-pl].

The second difference, (59b) above, has to do with where a value is percolated from: whether it is from a node with a single feature or from a node with complex features. In both (58) and (57), the percolation involved is BUP which is defined as (8.(3b)), repeated below:

---

18. Only lexical entries relevant to categorization frames are listed.
(8.3b)) (=Lieber's (26b) Back Up Percolation

If the node dominating the head remains unmarked for a given feature after Head Percolation, then a value for that feature is percolated from an immediately dominated nonhead branch marked for that feature. Back Up Percolation propagates only values for unmarked features and is strictly local.

There is no restriction which would allow one and not the other on the basis of the complexity of the nonhead branch.

The last clause '(BUP) ...is strictly local' in BUP (8.1.3b) above makes us suspect if (57) violates it and (58) does not. This restriction is paraphrased (p. 122) as:

...values for morphosyntactic features are filled in at the ...level or stratum .... for a particular feature which have come into play on that level or stratum.

This is to ensure propagation of subject P/N marking and that of the object on their respective levels or strata. In both (58) and (57) the percolation of the [+ ] value is not only within the same level but also within the same outer layer, which encodes the subject of the verb.

There is yet another possibility which would allow (58) but not (57). It is related to the default value filling convention. In Lieber, if the default value [-] in (57) is filled in before the [+ ] value for the [II] that is percolated, BUP is preempted. This is because BUP fills in only unmarked values. This possibility, however, has to be ruled out; in both (58) and (57) the affixes involved belong to Level III and default values are filled in at the end of Level III (cf. Lieber 1989:134).
In general, exclusion of a multiple marking of the same kind of feature, for example p/n features, cannot be justified since it will unduly restrict a theory and cannot account for languages in which such a multiple marking is needed. Consider a hypothetical (but familiar) case—a language which has two we's; one for [+I,+pl] 'exclusive) we' and the other for [+I,+II] 'inclusive) we'. Assume further that [+I] and [+II] are separately represented as in the case of English I and you, although otherwise marked by affixes. Presumably, after the affix for [+I] has been attached to a verb, another affix bearing the feature [+II] will have to be attached to generate the inclusive we. This order of affixation could be reversed; [+II] feature is first affixed and then [+I] attached later. This suggests that a multiple marking of the same kind of features has to be allowed in a theory.

Lieber (1989) provides an example in which a BUP analogous to the one we are arguing for in (57) is applied; it is in her analysis of the Latin pluperfect paradigm. The BUP she applies involves both 1) percolation of an overridden value of a feature and 2) a multiple marking; the percolation is into a layer which already bears a value for the same kind of feature. It starts out as shown in (60) below:
Lieber states that if the percolation (61) below occurred, this would render (60) ill-formed as follows:

(61) (=Lieber (14))

Lieber claims that, in a theory which assumes that diacritic features percolate, the following percolations would take place in (61):

In (14) (=61 above), the features [+T, -D] percolate to the node immediately dominating amav. [+T] then percolates from era to the node dominating it by Head Percolation. Since this node is unmarked for the feature [D], [D] then percolates from the lower node by Back Up percolation.

Whether or not diacritic features percolate is not our immediate concern here. We need to determine whether percolation of an overridden value of a feature is permitted and whether a multiple marking of the same kind of features is allowed. We will follow the percolation that Lieber assumes for (61) step by step and show that Lieber allows
for both of these in her theory. The first step is that the features [+T, -D] of amav percolate to the node immediately dominating it:

(62)

\[
\begin{array}{c}
V \\
+T \\
-\ D
\end{array}
\]

amav \ 
\begin{array}{c}
+T \\
-\ D
\end{array}

\begin{array}{c}
\text{era} \\
+T
\end{array}

\begin{array}{c}
\text{amav} \\
\text{era}
\end{array}

\begin{array}{c}
\text{V} \\
-\ m/-s/-t/\ldots
\end{array}

The second step is that the feature [+T] of era percolates to the node dominating it by Head Percolation as follows:

(63)

\[
\begin{array}{c}
V \\
+T \\
-\ D
\end{array}
\]

\begin{array}{c}
\text{amav} \\
\text{era} \\
[+T]
\end{array}

\begin{array}{c}
\text{V} \\
-\ m/-s/-t/\ldots
\end{array}

The third step is that [D] percolates by Back Up Percolation, from the lower node since this node is unmarked for the feature [D], as in:

(64)

\[
\begin{array}{c}
V \\
+T \\
-\ D
\end{array}
\]

\begin{array}{c}
\text{amav} \\
\text{era}
\end{array}

\begin{array}{c}
\text{V} \\
-\ m/-s/-t/\ldots
\end{array}
This last percolation clearly shows that multiple marking of the same kind of features is allowed for in Lieber's theory\textsuperscript{19}. In addition, in this percolation, [D] comes from the feature overridden by the categorial signature of era by HP.

The move we argue for in (57) above seems quite legitimate in Lieber (1989). If so, why didn't Lieber apply the BUP which fills in the [+] value of the feature [II] in the immediately dominated nonhead branch in (57)? There is no way to avoid applying BUP in Lieber's theory which would effect the feature value percolation as in (57), repeated below:

\begin{equation}
(57)
\begin{array}{c}
{\text{?n}} \\
\text{BUP}
\end{array}
\begin{array}{c}
\begin{array}{c}
+I \\
II \\
pl
\end{array}
\end{array}
\begin{array}{c}
\begin{array}{c}
-I \\
-II \\
-pl
\end{array}
\end{array}
\begin{array}{c}
\begin{array}{c}
+I \\
II \\
pl
\end{array}
\end{array}
\begin{array}{c}
\begin{array}{c}
-I \\
-II \\
-pl
\end{array}
\end{array}
\begin{array}{c}
\begin{array}{c}
\text{m} \\
\emptyset
\end{array}
\end{array}
\begin{array}{c}
\text{ta:v}
\end{array}
\end{array}
\end{equation}

This BUP creates the same impossible feature combination of [+I, +II] which prompted Lieber to assume the nonhead analysis.

We can, then, safely conclude that Lieber's claim (56b) above that "there is no way to rule out the illicit derivation" of ?n-m-Ø-ta:v does not necessarily follow from

\textsuperscript{19}. Although we argued in the previous section (5) that [D] cannot be percolated.
the claim (53) that "there is nothing at this point to prevent us from affixing the prefix ?n to...the form m-∅-taːv". If our interpretation of Lieber (1989) is correct, that is, if multiple marking of p/n is allowed, the only possible difference between the nonhead analysis and head analysis would be that, in the nonhead analysis, as in (58) repeated below:

\[(58)\]

\[
\begin{array}{c}
\text{BUP} \\
\text{[+I]}
\end{array}
\begin{array}{c}
\text{?n} \\
\text{[+I]}
\end{array}
\begin{array}{c}
\text{m-∅-taːv} \\
\text{[+II]}
\end{array}
\begin{array}{c}
\text{pl} \\
\text{[-II]}
\end{array}
\begin{array}{c}
\text{I} \\
\text{[-II]}
\end{array}
\begin{array}{c}
\text{+II} \\
\text{[-II]}
\end{array}
\begin{array}{c}
\text{pl} \\
\text{[-II]}
\end{array}
\]

the BUP of inflectional feature of ?n- finds itself instantly, so to speak, creating the impossible combination of [+I,+II] and rules that the affixation of ?n- to m-∅-taːv is not legitimate ('instant' check-up of well-formedness). On the other hand, in the head analysis, the categorial signature of ?n- 'blindly' propagates via HP as in (54) repeated below:
(54) (Lieber (53))

\[
\begin{array}{c}
+I \\
+II \\
\text{pl}
\end{array}
\quad
\begin{array}{c}
-I \\
-\text{II} \\
\text{pl}
\end{array}
\]

Only after two more operations have taken place will the HP find itself creating the impossible feature combination \([+I,+\text{II}]\). One operation is what Lieber assumes: i.e., the inner p/n layer is filled by BUP with the negative values in the next closest node. This is indicated in (55) repeated below:

\[
\begin{array}{c}
+I \\
+II \\
\text{pl}
\end{array}
\quad
\begin{array}{c}
-I \\
-\text{II} \\
\text{pl}
\end{array}
\]

About the other, Lieber is silent; we argue that it has to take place as in (57), repeated below:

\[
\begin{array}{c}
+I \\
+II \\
\text{pl}
\end{array}
\quad
\begin{array}{c}
-I \\
-\text{II} \\
\text{pl}
\end{array}
\]

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This creates the impossible feature combination [+I,+II].
This percolation, in addition, generates a semantic content
different from that which Lieber claims for (56a), repeated
below:

(56a)
The form ?n-m-∅-ta:v ought to be able to mean ‘he hit
me’ as shown by the feature representation in the
branching node in (55) but ?n-m-∅-ta:v cannot

The node dominating ?n- and m-∅-ta:v does not mean ‘he hit
me’. It would mean ‘He hit us(inclusive),’ an impossible
meaning combination in Yavapai (but possible and familiar in
other languages, see above for an argument for multiple
marking) and ?n-m-∅-ta:v cannot mean this. On both
accounts, (57) has to be ruled out as ill-formed. By the
time this impossible feature and meaning combination are
detected (delayed check-up), as Lieber claims, the affix ?n-
has already been attached and the ill-formed derivation
already created. But a delayed check-up system would detect
both the impossible combination of features [+I,+II] and the
meaning, and rule cut the ill-formed derivation.

Some might argue that the percolation that we assume
creates the impossible feature combination [+I,+II] and
meaning content as in (57) above; it would not apply, so
percolation would stop there, yielding the exact situation
(55) above, that which Lieber assumes. If this is correct,
Lieber is correct in her claim that the form ?n-m-∅-ta:v
has been created and the meaning is ‘he hits me’ and
therefore it is an ‘illicit’ derivation. There is, however,
no way to avoid the percolation we argue should apply. Lieber's definition of percolation conventions (8.(3)) requires this. In the analogous situation of (58), Lieber claims that ?n-'s feature "would have to add" in the outer layer to which the feature [+II] from m- has already been percolated.

This delayed check-up mechanism is, in fact, evoked in Lieber (1989) itself. One example is the pluperfect paradigm in Latin, which was discussed above. Our concern here is to establish the time at which we find out that the HP of [+T] should not have been applied in the first place: is it when HP applied or is it after a subsequent BUP had been applied (= 'delayed' check-up)? Of the percolations Lieber assumes, we will scrutinize the HP which propagates [+T], and the subsequent BUP which percolates [D]. As shown in (63), repeated below, HP percolates [+T] from era to the node dominating it:

(63)

Next, BUP propagates [D] from the lower node since this node is unmarked for the feature [D] as in (64) above and repeated below:
She states that if these percolations take place, only the incorrect P/N II suffixes -i/-isti/... can be attached as in (64) because the correct P/N suffixes -m/-g/-t/... attach only to [+T,(+D)].

Note here that only when BUP has applied and [D] percolated that does become clear that the HP which percolated [+T] should not have applied. This is because it creates a node into which BUP eventually allows the feature [D] to percolate and yield a feature complex selecting incorrect P/N II suffixes. We see that Lieber believes it legitimate to check the well-formedness of a derivation by the delayed mechanism.

We adopt the head analysis despite the fact that it operates with a delayed check-up system. This delayed check-up system would, of course, change HP from a process that applies unconditionally with an instant check-up system to one subject to a delayed check-up of well-formedness when subsequent BUP(s) have already applied. There is no compelling reason to rule out this delayed check-up of well-formedness. Lieber noted to this effect, as we pointed out in (51) above, repeated below:
At best we would have to wait until after BUP has applied to check the subcategorization of Level III m-. In conclusion, it is clear that Lieber's claim that inflectional affixes lack complete categorial status but contribute individual features to the categorial signature percolated from the head cannot be maintained for Korean. It is also clear that this claim is not compelling even for Yavapai. We will demonstrate in the following section that the head analysis accounts for Lieber's Latin data.

9.5 Head Analysis of Latin Inflectional Affixes

We have shown that the percolation analysis of diacritic features is vindicated in Lieber's (1980) theory, contra her conclusion. If we adopt the head analysis, the same is true of her 1989 system. The only crucial example which supports her conclusion that diacritic features do not percolate concerns diacritic features in Latin verb morphology.

Her example is the pluperfect paradigm, which starts out as shown in (65) below:

(65) (=Lieber (13))

\[
\begin{array}{c}
amav \quad \text{era} \quad -m/-s/-t/... \\
\quad [+T] \quad [+T] \quad V \\
\quad [-D] \\
\end{array}
\]
Let's examine how the head analysis supports the percolation analysis of diacritic features in Latin verb paradigms. In the head analysis, the stem and suffix in (65) would have the following categorial signatures:

\[(66)\]
\[
\begin{array}{ccc}
\text{amav} & \text{era} & \text{P/N suffixes} \\
\end{array}
\]

The categorial signature of amav percolates to the node dominating it via HP as in (67) below:

\[(67)\]
\[
\begin{array}{ccc}
\text{amav} & \text{era} & \text{P/N suffixes} \\
\end{array}
\]

The categorial signature of the inflectional suffix -era containing the diacritic feature [+T] then percolates to the node dominating it by HP as follows:

\[(68)\]

20. We will not be concerned with exactly what features are to be contained in the categorial signature of inflectional suffixes in Latin.
Percolation stops here and, since P/N I suffixes attach to [+T,(+D)] constituents and the node dominating -era is [+T], the correct P/N suffixes -m/-s/-t/... attach as follows:

(69)

The head analysis yields the correct selection of the P/N suffixes and the percolation analysis of diacritic features is vindicated in Lieber's 1989 theory as well.

In both Lieber (1980) and (1989), the percolation analysis of diacritic features is thus well motivated and Lieber's claim that diacritic features do not percolate is unfounded. There is no reason to distinguish diacritic features from morphosyntactic features with respect to percolation. Her conclusion that categorial signatures include only category and morphosyntactic features cannot be supported.

9.6 Summary for Chapter 8 and 9

Lieber's major contribution is in making explicit the notions of the categorial signature, of value percolation as opposed to feature percolation, and of transparent elements.
However, we have questioned the following Lieber's conclusions in (8 (2)):

(8 (2))

(a) free morphemes and derivational affixes possess categorial signatures;
(b) categorial signatures contain only category and morphosyntactic features;
(ci) lexical entries may contain diacritics...but these do not percolate; and
(e) inflectional affixes contribute individual features to the categorial signature percolated from the head, but they do not themselves possess complete categorial signatures.

Specifically, we have argued that (8.(2ci)) is not tenable and that (8.(2b)) is unnecessary because there is no reason to exclude diacritic features from the categorial signature as far as feature percolation is concerned. We have also argued that the head analysis is well motivated for both Korean and Latin and that (8.(2e)) cannot be maintained for these languages. There are no grounds to claim that the nonhead analysis is any less problematic than the head analysis in Yavapai. If we are right, (8.(2e)) is not a compelling conclusion in Yavapai. Therefore, the head analysis is to be opted for since it represents an important generalization with respect to feature percolation and it accounts for Korean and Latin data as well as for the Yavapai verb morphology. Consequently, (8.(2a)) becomes a truism.
Chapter 10  SUMMARY

10.1 Proposals

The purpose of this study has been twofold: one is to present a systematic, comprehensive, and explanatorily adequate analysis of Korean verb paradigms, and the other is to propose, on the grounds of this analysis, a theory of feature percolation. Our proposals are summarized as follows:

10.1.1 For Korean Linguistics

a. The criteria to classify Korean verb stems, suffixes, and suffix phrases include plain level question endings in addition to plain level statement endings.

b. Verb stems fall into four classes: processive, descriptive, hybrid, and transparent.

c. The verb -iss is essentially two verbs—one processive and the other hybrid.

d. Verb inflectional suffixes and suffix phrases fall into the same four subcategories.

e. Verb inflectional suffixes should be construed as heads with respect to selection of sentence endings.

f. The four subcategories of processive, descriptive, hybrid, and transparent are in fact complexes of
two binary valued features \([+P]\) and \([+D]\): processes are designated \([-D,+P]\), descriptives \([+D,-P]\), hybrids \([-D,-P]\), and transparents \([uD,uP]\).

\(g\). Korean verb inflectional suffixes bear subcategory features in addition to inflectional features. All are multiply marked.

\(h\). As features of a suffix percolate, inflectional features accumulate; however, subcategory features of an outer suffix supersede those of an inner suffix.

10.1.2 For Feature Percolation in General

\(a\). Inflectional suffixes should be analyzed as heads with full categorial signatures.

\(b\). There is no need for a distinction among inflectional affixes, derivational affixes, and free morphemes with respect to feature percolation.

\(c\). Diacritic features percolate.

\(d\). Diacritic features should be included in the categorial signature.

10.2 Residue

There are some residual matters not addressed here. These include the following:
a. A three-way analysis of the so-called existential verbs into iss₁ - 'stay', iss₂ - 'have', and iss₃ - 'is' seems well motivated.

b. In Chapter 4, for the sequence of -ess-ess, we adopted the duplicating analysis of -ess + -ess. Our proposal of hierarchical structure for inflectional suffixes appears to provide further support for the analysis.

c. We need a full survey of the membership of each subcategory of suffix phrases in Chapter 4.

d. The subcategories to which suffix phrases may be affixed need careful examination.

e. The slot for the retrospective -te in the verb paradigm needs to be established.

f. In the binary feature analysis of the subcategories, in Chapter 5, we placed the processive feature before the descriptive one as in [+P,+D] without supporting argument: a closer investigation of the data is necessary to determine whether the feature [D] has to be the first member in the representation.

g. The sentence ending is a syntactic suffix and a head with respect to properties other than subcategory features: i.e., it completes the sentence and enables the sentence to participate in other syntactic constructions.
h. In Chapter 9, we did not determine the complete categorial signature for Korean verbs: case marking, for example, has to be included. A further study is warranted.

10.3 Conclusion

In this study, we have presented a systematic, comprehensive, and, we hope, explanatorily adequate analysis of Korean verb paradigms, one which has not been attempted thus far. The results of our analysis have provided a wealth of data to evaluate existing theories of feature percolation and to suggest a new theory of feature percolation. We proposed that inflectional affixes be construed as heads in Lieber's (1989) framework. In the theory proposed, all the relevant conclusions in Lieber's 1989 work required modification. We found that there is no need to make a distinction among inflectional affixes, derivational affixes, and free morphemes with respect to feature percolation. Our proposal accounts not only for the Korean data, but, with a delayed 'check-up' system, for the percolation of morphosyntactic features in Lieber's own data from Yavapai. In addition, this proposal vindicates the percolation analysis of diacritic features in Lieber's data from Latin, thus showing that there is no distinction between morphosyntactic and diacritic features as far as percolation is concerned. Our proposal that inflectional
affixes be analyzed as heads represents a generalization of feature percolation in inflectional word formation for Korean, Yavapai, and Latin, one that may apply to all languages.


Seng, Kwang Soo. 1976. "Concaetongsa 'issta'-ey tayhan Cayko." (Revisit to Existential Verb 'issta'). Papers on Korean Language Paper in Commemoration of Dr. Pok Soo Kang's 60th Birthday.


