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EMBEDDING TRANSFORMATIONS IN KOREAN SYNTAX

by

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A THESIS

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EDMONTON, ALBERTA

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Embedding Transformations in Korean Syntax", submitted by Eung-Do Cook in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

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ABSTRACT

The purpose of the thesis is to investigate the grammatical processes involved in the noun phrase construction and the verb phrase construction of the Korean language. The study has revealed that there are three predominant embedding processes, namely, (1) left-branching, (2) right-branching, and (3) self-embedding. The noun phrase expansion is attributed to the two processes (1) and (2), and the verb phrase expansion to the process (3).

The grammatical rules concerning these embedding processes are formulated within the framework of a transformational generative grammar proposed by Chomsky (1957, 1965), with some revisions (as discussed in Chapter II), and the discussion of the grammatical rules is based on the limited data covered by a partial grammar of Korean (as discussed in Chapter III). Each rule of the embedding transformation is examined in detail with respect to constraints and generative power in Chapters IV and V.

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I wish to express my sincerest gratitude to Dr. Gary Prideaux for his valuable comments addressed both to the first and second drafts of this thesis. His criticisms and suggestions have greatly improved the discussion of major topics in the thesis and prompted the completion of the work on time. I am grateful to Dr. George Waldo, Dr. James Anderson, Dr. Fred Lukoff and Dr. Eugene Dorfman for their comments which have helped improve the final form of the thesis. I am greatly indebted to Professor C.I.J.M. Stuart and wish to express my appreciation for his kind assistance without which I would not have been able to complete the work on schedule. I wish also to thank Dr. Ernest Reinhold and Dr. William Klatte for their constant help during the three years of my residence at the University of Alberta. I wish to express my gratitude to the Government of Alberta and to the Izaak Walton Killam Foundation for the fellowships which supported me during the past two years. Finally, I wish to express my gratitude to Mrs. Helga Radvanyi for her kind clerical assistance and to my wife, Myung Sook, and my parents for their encouragement and patience which sustained me during the five years of my graduate studies both in this country and in the United States.

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EMBEDDING TRANSFORMATIONS IN KOREAN SYNTAX

CHAPTER I

INTRODUCTION

1.1 Grammatical studies of Korean. There are not many grammatical works of Korean although the language has a long history of written records of its own. Few scholars of the western world are aware of the fact that the Korean writing system, "the world's best alphabet!" (Vos, 1963), which consisted originally of twenty-eight vowel and consonant symbols, was invented as early as 1444 (by King Sejong of the Yi dynasty).

Among the grammars by the native grammarians, the most comprehensive, and probably the most authoritative among its kind, is Chŏ's uli malpon, "Our Grammar" (1961). The voluminous work, which has undergone several revisions, consists of nearly a thousand pages, and the greater part of it is devoted to phonology and morphology, although it includes a chapter on syntax which contains some valuable data.

Korean was not an exception to those professional linguists whose major concern in their analytical work had been phonology and morphology up until the inception of the transformational generative approach to syntax. It is not surprising at all, therefore, to find that Ramstedt's A Korean Grammar (1939), which is probably the first professional account of Korean

grammar by a nonnative linguist, provides only four pages, out of a total of nearly two hundred pages, for "structure of the sentence".

Among structural grammars of the Korean language, three works are worthy of mention here. Two of these, namely, Spoken Korean by Lukoff (1945) and Introduction to Spoken Korean by Clark (1948-49) are textbooks based on structural analyses designed to teach nonnative speakers. Martin's monograph, Korean Morphophonemics (1951), is the most comprehensive scholarly investigation of its kind known so far.

As regards the transformational generative approach to Korean grammar, there are only a few theses written during the past couple of years. Song's Ph.D. dissertation at Indiana University, "Some Transformational Rules in Korean" (1967), is the first transformational generative grammar of Korean of substantial value. The two chapters worthy of note here are Chapter III, "Negativization", and Chapter IV, "Transformations". In the latter, Song attempted to present a formal analysis (in many cases, a restatement in terms of transformations) of part of the verb morphology which had been one of the major concerns of earlier grammarians, especially of prestructural (traditional) grammarians. Song's important contribution, however, to the understanding of Korean grammar is found in Chapter III, where he presented an insightful observation on negation, although it is not quite clear how the rules concerning negation are organized with respect to the total grammar he

outlined.

Another doctoral dissertation which is said to have been completed at the University of Pennsylvania is Maeng Sung Lee's "Nominalizations in Korean". It is unfortunate, however, that this work has not been made available for reference.

Finally, an M.A. thesis of particular value is "An Analysis of True Contraction and Quasi-Contraction of Quotative Verb Forms in Korean" by Nam (1967), a student of Professor Lukoff at the University of Washington. Although the presentation of his sample grammar is not as formal as is desired, Nam's observation on the limited problem is to the point, and his presentation of the data is well organized.

1.2 Purpose. One of the most important features of transformational generative grammar that Chomsky has proposed is that the grammatical rules must be recursive in order to simplify the description of infinite sentences. Chomsky (1956) shows, with illustrative examples from artificial languages as well as from a natural language (i.e. English), how sentences are recursively embedded within sentences and how they are interdependent.

There are, in general, three types of embedding processes observed in natural languages. They are, namely, (i) left-branching, (ii) right-branching, and (iii) self-embedding as illustrated by the following English sentences.

(1) (i) Fred's father's friends' house is big.

(ii) This is the dog that killed the rat that ate the fish.

(iii) The rat that the dog killed ate the fish.

The purpose of the present study is to formulate some predominant rules of grammatical transformations which will account for those three types of embedding processes in Korean syntax. It will be seen that processes (i) and (ii) are involved in the noun phrase expansion discussed in Chapter IV, and process (iii) in the verb phrase expansion discussed in Chapter V.

1.3 Partial grammar of Korean. In order to provide an organized body of materials and basic syntactic principles of Korean that are necessary for the discussion to follow in the subsequent chapters, some rules of a partial grammar of Korean (PGK) are formulated and appended for reference. The PGK will generate most strings (but not the final shapes of sentences) of basic sentence types of Korean although it is not powerful enough to account for many other sentence types, particularly those involving adverbs, adverbial phrases, numerals, and counters.

Although it is not an immediate concern here to justify the PGK, a few remarks in defense of the rules in the grammar are in order. The inclusion or exclusion of certain optional categories in the categorial rules and the introduction of certain features are guided by the necessity for and relevance to various transformations studied in this work. For instance,

the directional phrase and the instrumental phrase are both optional categories in the constituent structure, but the PGK includes only the latter because it is more relevant to the discussion developed in Chapter IV than the former which behaves like the locational phrase. In fact, the inclusion of these optional categories in the rule C2, namely Neg, Tim, Loc, and Ins, is justified insofar as they are relevant to the discussion of the nominalization and adnominalization transformations in Chapter IV. However, the discussion of these optional categories is not carried out any further. The most obscure fact concerning these optional categories (of adverbial function) is their presence in the embedded S. Consequently, little consideration is given to these categories while formulating most of the transformational rules.

Since the syntactic component is the major concern in this study, the phonological component is not included in the PGK, although some of the postcyclic rules may be considered as phonological rules. It is, therefore, clear that the strings generated by the rules of the PGK stand for sentences at the point where phonological rules are to operate. Further details concerning the base component of the PGK will be presented in Chapter II.

The transformational component consists of three sets of rules of different nature: (1) the precyclic rules, (2) the cyclic rules, and (3) the postcyclic rules. The domain of the precyclic rules falls always within a pair of the sentence

boundary markers(#), and each of these rules operates on any sentence structure which meets the conditions specified in the structural description of the rule, i.e. it does not matter whether it operates on the matrix S first or on the constituent S first.

The domain of the cyclic rules, on the other hand, falls within a structure which contains an embedded S, and each rule <u>always</u> operates on the innermost S and its matrix S. Since every cyclic rule deletes the internal sentence boundary marker, the structure upon which the rule repeats the second cycle happens to be always the innermost S and its matrix S. Consider the hypothetical cyclic rule (2) and the P-markers in (3).

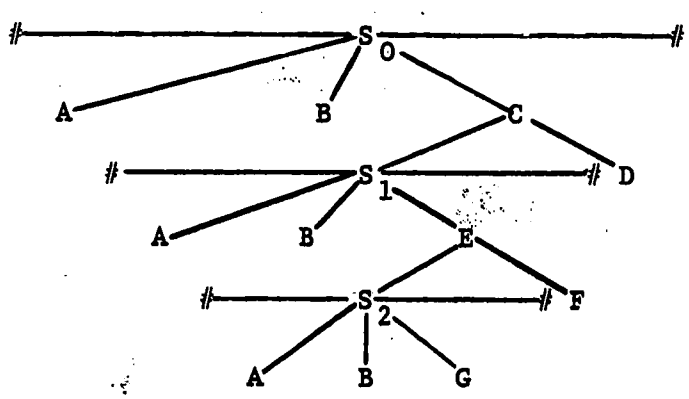
(2) A deletion

SD: X, #, A, X, #, A, B, X, #, X

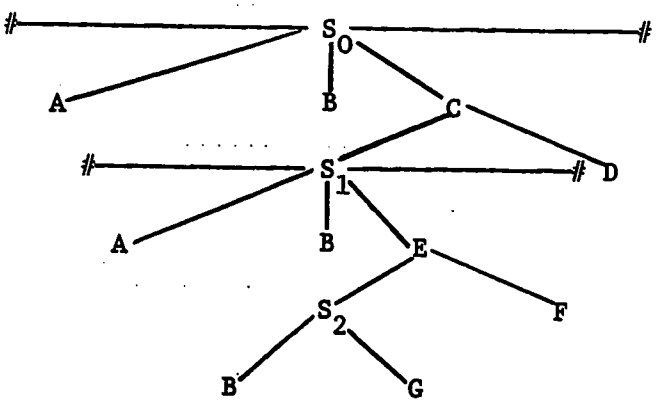
1 2 3 4 5 6 7 8 9 10

SC: 5, 6, 9 → null

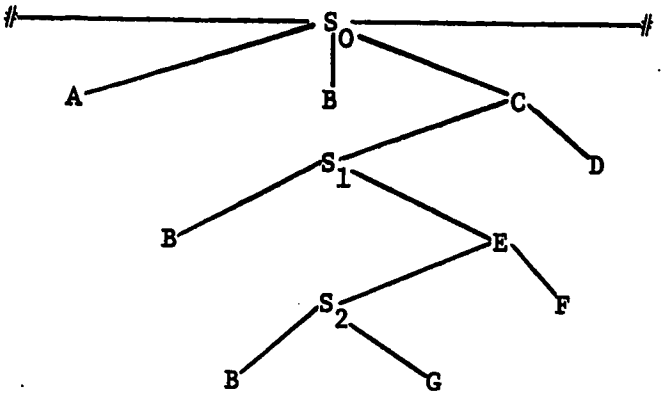
(3) (i)



(3) (ii)



(iii)



In (i), S_2 is the innermost S whose matrix S is S_1. The rule (2) operates on the innermost S_2 and its matrix S_1, yielding the derived P-marker (ii). Since the internal sentence boundary marker in each side of the embedded S is erased, the innermost S of the derived P-marker (ii) is S_1 and its matrix S is S_0. Consequently, the structure where the rule (2) repeats the cycle a second time is again the innermost S and its matrix S. The P-marker (iii) is derived after the operation of the rule (2) twice. At this point, the cyclic operation of the rule (2) terminates since the derived structure represented by the

P-marker (iii) no longer meets the conditions specified in the structural description of the rule (2).

After the operation of all the cyclic rules in the grammar, no grammatical string may contain the sentence boundary within itself. In other words, those strings which contain any sentence boundary marker within themselves, are considered ungrammatical, i.e. are filtered out. This means that the domain of the postcyclic rules again falls within a pair of the sentence boundary markers (as in the case of the precylic rules). However, the operation of a postcyclic rule is different from that of a precyclic rule in that the former, but not the latter, may repeat its operation even within the same pair of the sentence boundary markers where the structure contains two or more substructures that may satisfy the conditions specified in the postcyclic rule. For example, the postcyclic rule which inserts the particle ka must operate twice even in a simple sentence like (4) which contains two nouns followed by the same particle ka.

(4) kŭ i -ka moksa-ka ani i -ta

[Dem N]$_{NP}$[[N]$_{NP}$ Neg Cop Aux]$_{VP}$

that person minister not is

"That person is not a minister."

The three sets of rules, namely precyclic rules, cyclic rules, and postcyclic rules, operate one after another in that

order. That is, the order among these three sets must be strictly observed. However, the rules within each set are only partially ordered in that there are certain rules that must follow or precede immediately certain other rules, while there are certain rules that must follow or precede certain other rules, but not necessarily immediately. Also there are rules that are mutually exclusive in operation. These different types of ordering are marked by the following convention: the sequential order of those transformational rules (both base transformations and grammatical transformations) marked by the arabic numerals are partially ordered (the order may or may not be significant), those marked by the small alphabet letters are strictly ordered, and those marked by the small Roman numerals are mutually exclusive (the order is not relevant).

1.4 Transcription and cited forms. The lexical entries and the cited forms in this study are represented by a system which conforms by and large to the conventional spelling system of Korean whose alphabet symbols are replaced by the Roman alphabet symbols.

In citing examples, both nominal and verbal suffixes are set apart from the stem by a hyphen with or without a space (e.g. salam -i "man"). This device is merely to indicate that the form preceded (or followed) by a hyphen may be different from the base form having undergone a morphophonemic change. This information is to help readers, especially

those who do not have native command of Korean, in identifying the form marked as such with the gloss or the categorial label, since no morphophonemic information is provided for each cited example. For example, i and ka are allomorphs of the same nominal suffix, the former occurring after a stem-final consonant, the latter a stem-final vowel (e.g. salam-i "man" vs. namu-ka "tree"). As the spelling of the cited form represents only one level of phonological interpretation of the form, the reader may not be able to obtain all the morphophonemic information (which is, in general, irrelevant to the point at issue), but he would not wonder why some different forms (at that level) preceded (or followed) by a hyphen have the same gloss or categorial label.

The morphemes cited in this study have usually one or two allomorphs. If the morpheme, cited in isolation, has two allomorphs and their phonological shapes are entirely different from each other, both allomorphs are cited between a slant line (e.g. ka/i) for the first time, and either one is cited from the second time on. If, on the other hand, the two allomorphs are only partially different (e.g. lŭl vs. ŭl), they are cited with the different part in parentheses (e.g. (l)ŭl) for the first time, and the identical part or the shorter allomorph (e.g. ŭl) is cited from the second time on. For the forms cited in context (i.e. in phrases or sentences), proper allomorphs are chosen.

The following vowel chart (5) will provide some clue as to the phonetic values of the symbols used for vowels.

(5)

	Front		Back	
	UR	R	UR	R
High	i	ɨ	ʉ	u
Mid	e	ɘ	ɤ	o
Low	æ		a	

UR = Unrounded

R = Rounded

Geminate-like vowels are used for long vowels. Among consonant symbols, geminate-like consonants are used for the tense series.

Examples are given a particular labelled bracket analysis where necessary to facilitate the illustration. For example, the sentence (6) may be analyzed in many different ways including the three (a), (b), and (c). The choice of a particular analysis is governed by the point to be illustrated in each case.

(6) salam-i ka -n-ta

man go

"A man goes".

(a) NP VP

(b) NP MV Aux

(c) NP $[V]_{MV}$ Aux

1.5 Notational conventions. Most of the notational conventions used in this study are widely accepted ones. However, a few of them which seem rather new or misleading are explained as follows.

(i) The subscript node to the right of a pair of square brackets indicates dominance. For example, $[D, N]_{NP}$ means that D and N are dominated by NP. Furthermore, if both sides of the arrow have the same dominance notation (e.g. $1, [2, 3, 4]_S \rightarrow 1, [2, 4]_S$), this means that the constituent structure of the output is the same as that of the input except the element(s) deleted or added. For details, see the discussion of the rule (39) in 4.4.

(ii) In the structural description (SD) of transformational rules, all variables are represented by X. Two or more X's in the same SD are not necessarily identical unless so specified by a condition.

(iii) An arrow (→) is used for both the "rewrite" and the "replace" (transformational) rules as the distinction is self-evident.

(iv) All the transformational rules in the PGK are obligatory unless marked "OP".

(v) The feature or features that represent the same complex symbol are put in a pair of angle brackets, while the features that represent different complex symbols are put in different pairs of angle brackets. For example, each of

the three <+An>, $\langle \begin{smallmatrix} +An \\ +Hum \end{smallmatrix} \rangle$, <+An, +Hum> represents one complex symbol, while < +An , -An > or $\langle \begin{smallmatrix} +An \\ -An \end{smallmatrix} \rangle$ represents two complex symbols each that are mutually exclusive, and so forth.

1.6 Abbreviations. The abbreviations used in this work include the following:

A	Aspect
Act	Action
Aj	Adjective
An	Animate
Aux	Auxiliary
BP	Body-part
Con	Concrete
Cond	Condition
Cop	Copula
Cnt	Countable
CS	Complex Symbol
D	Declarative
d1	Demonstrative$_1$
d2	Demonstrative$_2$
d3	Demonstrative$_3$
Dem	Demonstrative
Ex	Existential
Fact	Factive
Hbl	Humble
Hon	Honorific

Hum	Human
I	Imperative
Ins	Instrumental
Loc	Locational
M	Modal
MD	Mood
MV	Main Verb
N	Noun
Neg	Negative
Ng1	Negative$_1$
Ng2	Negative$_2$
Nom	Nominalizer
NP	Noun Phrase
1P	1st Person
2P	2nd Person
Pol	Polite
Pst	Past
PP	Prepast
Q	Question/Imperative
S	Sentence
SC	Structural Change
SD	Structural Description
Stat	Stative
T	Tense
Tim	Time

TM	Tense-Modal
V	Verb
VP	Verb Phrase

CHAPTER II

THE BASE RULES

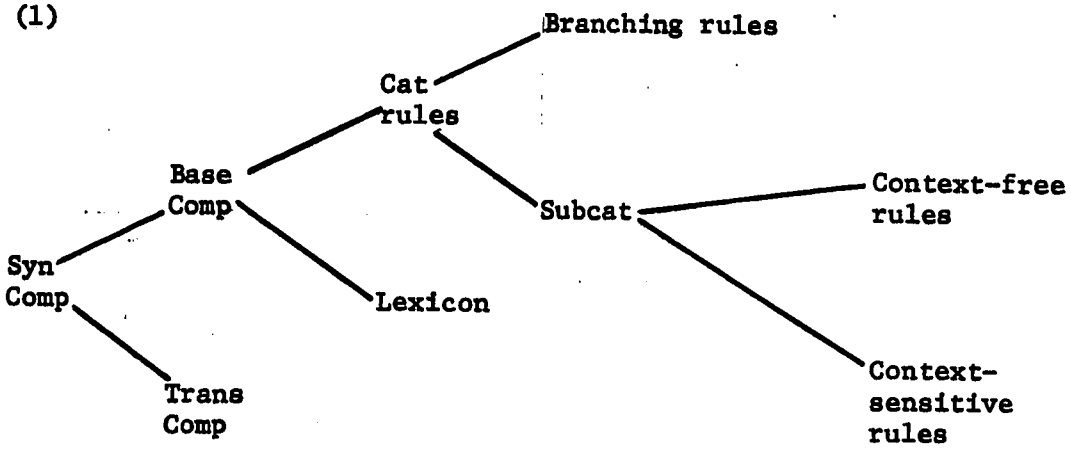
2.1 Introduction. Although the PGK is formulated within the framework of transformational generative grammar as is proposed by Chomsky (1965), an attempt is made to improve the model where difficulties are evident. Some of the modifications included in the PGK are due to insightful observations and criticisms which have already been made public, and others are due to the present study on particular syntactic properties of Korean, which might, of course, shed some significant light on the search for universal syntactic properties and on a model to accommodate them. In order to facilitate the discussion to follow, it seems necessary to present a summary of Chomsky's revised model of grammar.

2.2 Revised model. The grammatical model consists of three components: the central syntactic component plus two interpretative components, phonological and semantic.

The syntactic component consists, in turn, of two subcomponents: the base component and the transformational component. The base component consists of a set of categorization rules and a lexicon. The categorization rules include a set of branching rules (e.g. S→NP ^ VP), a set of context-free subcategorization rules which introduce inherent features (e.g. <+N> → <±Con>), and two kinds of context-sensitive sub-

categorization rules (e.g. N→CS, +N →CS, <+V> →CS) which introduce strict subcategorization features and selectional features (in the case of <+V>) into the matrices of complex symbols. A tree configuration of those rules as shown in (1) will present an illustration of the syntactic component summarized above.

(1)



The branching rules are context-free rewriting rules which introduce syntactic categories and define their grammatical relationships in the deep structure. The terminal categories introduced by terminating the branching rules belong either to a lexical category or to a grammatical category (formative). The context-free subcategorization rules like <+Cnt> → <±An> introduce inherent features into the matrix of the complex symbol. The context-sensitive strict subcategorization rules specify the immediate contextual feature of a given category. For instance, an English verb which takes a direct object noun phrase will be provided with the feature <+__NP>, rendering the traditional

notion of "transitivity", and a proper noun like Mary, which does not take a determiner, with the feature <+__>, and so on. Another context-sensitive subcategorization rule introduces the selectional feature that determines the inherent feature make-up of the subject noun and of the direct object noun (in English or in other languages where the relevant structure is similar) for a given verb to select.[1] For example, the verb smile may co-occur with a noun like man whose complex symbol matrix contains <+Hum> among others, whereas the same verb may not co-occur with such a noun as stone whose complex symbol matrix does not carry the inherent feature <+Hum>. After the operation of these four types of rules, the preterminal string is derived, upon which the lexical insertion rule operates.

The lexicon, which used to be considered as the lowest level categories introduced by constituent structure rules, is now viewed as an unordered set of lexical items. Each lexical item is specified with (i) a phonological feature matrix, (ii) a syntactic feature matrix, and (iii) a semantic feature matrix, plus any idiosyncratic feature or features of that particular entry. The lexical items are inserted into a preterminal string by the lexical insertion rule which is a special kind of transformation.

---

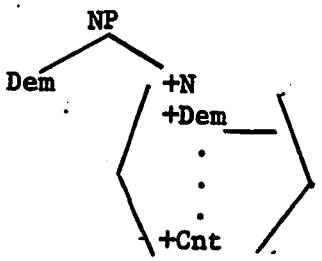
1 Discussions of selectional restrictions involving other nominal categories (e.g. indirect object noun, instrumental noun, etc.) will be developed in 2.4.

The introduction of syntactic features and the concept of complex symbol were motivated by the fact that many syntactically relevant features intersect, posing problems difficult to solve otherwise. With regards to the discussions to be developed, there are two other major aspects of the revision proposed by Chomsky (1965) that should be briefly mentioned here. One is the recursive S permitted in the branching rules, which eliminates generalized transformations and the problem of ordering transformational rules, while raising the controversial question of the "filtering" function of transformations. Another is the introduction of "dummy" categories like Q(uestion), I(mperative), Pass(ive), and so forth into the deep structure, whose function is to trigger certain obligatory transformations and to provide the string with proper semantic interpretation.

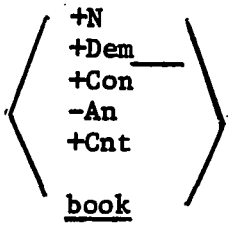
2.3 Further revisions. In the grammatical model so far discussed, the preterminal string consists of matrices of complex symbols and grammatical formatives including dummy elements. It was pointed out that each lexical item is specified with a syntactic feature matrix, which is, in fact, identical to the complex symbol introduced by the subcategorization rules. The lexical insertion rule operates on the preterminal string where the set of syntactic features contained in the lexical item

is "not distinct from"[2] those contained in the complex symbol of the preterminal string. For an illustration, consider the simplified subtree (2) and the lexical item (3).

(2)



(3)



Since (2) is not distinct from (3), the lexical item book may be inserted into the complex symbol dominated by NP. (Of course, this is an oversimplified procedure to give only relevant information at this point.)

Recall that those syntactic features contained in the complex symbol dominated by NP in (2) are introduced by subcategorization rules. Matthews (1967) and McCawley (1967) object that it is redundant to introduce the same information twice, once by subcategorization rules and again by the lexical insertion rule.

---

2 Chomsky defines that two segments X and Y are distinct in case one of them is specified positively for a certain feature F while the other is negatively specified for the same feature (1965: 81). However, Prideaux finds it convenient to redefine that two segments are not distinct if one of them is specified with F while the other is not specified at all for the feature F (1966: 47). In this study, the latter definition is adopted for reasons which will become apparent in the following sections.

It is now apparent that the strict subcategorization rule and the selectional rule can be removed from the grammar because the information provided by those rules can be obtained directly from the full P-marker. Also, it is clear that the context-free subcategorization rules may be better regarded as lexical redundancy rules rather than as subcategorization rules. This means that the grammar will exclude all subcategorization rules from the categorial component. In fact, Chomsky discussed this possibility as an alternative proposal (1965: 120-3), and Rosenbaum and Lochak do away with such subcategorization rules in their core grammar of English (1966).

In the PGK, however, some subcategorization rules, namely the rules which subcategorize the grammatical category Mood, remain as part of the categorial component. This and other revisions in the grammatical model will be discussed in detail in the following section.

2.4 Base rules of PGK. The base component of the grammar presented in this study consists of (A) a set of categorial rules including (a) branching rules and (b) grammatical feature rules, (B) a lexicon including (a) two sets of lexical feature rules and (b) a list of lexical entries, and (C) a set of base transformation rules. Some discussions are developed in this section in defence of this revision of the grammatical model.

2.41 Categorization and contextual features. The categorial component of the PGK consists of ten branching rules

and three grammatical feature rules. The terminal categories introduced by these branching rules are two lexical categories, namely, N and V, and eleven grammatical categories. The grammatical categories include Cop, A, MD, three subcategories of Dem, namely, d_1, d_2, d_3, three subcategories of TM, namely, Pst, PP, M, and two subcategories of Neg, namely Ng_1, Ng_2. The primary function of these terminal categories and other intervening non-terminal categories introduced by the branching rules is to define the basic grammatical relations in the deep structure.[3]

All the lexical categories are converted into matrices of complex symbols by means of the base transformation rules (see following subsections); while no grammatical category except MD is further analyzed in terms of features, all grammatical categories will be given phonological shapes afterwards. The only grammatical category which is further analyzed by means of the grammatical feature rules is MD as will be discussed in detail in 2.46. This does not mean that no other grammatical category may be subcategorized in terms of features. In fact, Dem is a probable candidate for a feature analysis although any further analysis of the category is beyond the scope of the PGK.

Notice that all the categorial rules are context-free because the contextual features, that is, the information concerning the co-occurrence relations is placed in the lexicon. This means that

---

3 Fillmore questions the validity of such relational (functional) notion as "subject", "object", etc. (1966, 1967), but such an argument is not further studied in this work.

the lexicon plays a more significant role than in earlier transformational grammars.

A question arises immediately as to what Chomsky calls the strict subcategorization feature because the category V is subcategorized not only in terms of the category or categories immediately dominated by the same node that dominates V itself (e.g. in the PGK, NP or S dominated by MV), but also in terms of the other categories dominated by a higher node (e.g. in the PGK, Tim, Ins, etc. dominated by VP). In other words, if the co-occurrence relation between the verb and the object is specified (transitive vs. intransitive), the same relation between the verb and the directional phrase, instrumental phrase, etc. should also be specified independently. For an illustration, examine the categorial rules 2 and 3 of the PGK quoted here as (4) and (5) respectively.

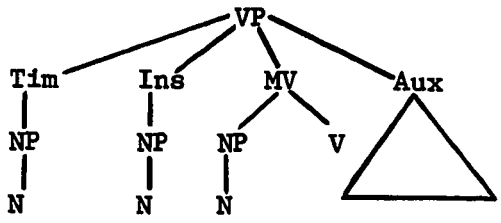
(4) $VP \rightarrow (Neg)(Tim)(Loc) \left\{ \begin{matrix} (Ins)\ MV \\ (NP)\ Cop \end{matrix} \right\} Aux$

(5) $MV \rightarrow (NP)\ (S)\ V$

Certain verbs may occur alone, while others may co-occur with any one or any combination of the two preceding categories, namely, NP and S. At the same time, certain verbs may or may not co-occur with any one or any combination of those higher level categories, namely, Neg, Tim, Loc, and Ins. For example, the verb <u>chuimha</u> "take office" may co-occur with an optional complement S (i.e. <+(S)__>), and at the same time it may co-occur with any one or any combination of Neg, Tim, and Loc freely, but it may not co-occur with Ins.

To accommodate the two different types of co-occurrence restrictions, two types of contextual features are specified in the lexicon. One may be called the strict contextual feature (local) and the other nonstrict contextual feature (nonlocal). For example, consider the verb kkæ, "break". This verb requires an object NP, while it may co-occur optionally with any one or any combination of the four categories, namely, Neg, Tim, Loc, and Ins. Suppose the subtree (6i) is derived by terminating the operation of categorial rules.

(6) (i)



The lexical item kkæ is specified with the features shown in (6ii), among others.

(6) (ii)

$$\left\langle \begin{array}{c} +V \\ \vdots \\ +NP\_\_ \\ +(Neg)(Tim)(Loc)(Ins)\_\_Aux \end{array} \right\rangle$$

Notice that the lexical item (6ii) fits into the frame provided by the tree (6i) because the item (6ii) carries both the strict contextual feature <+NP__> and the nonstrict contextual feature

<+(Neg)(Tim)(Loc)(Ins)__Aux>. These features, in fact, define the domain of the transformation when the lexical insertion rule operates on the preterminal string.[4]

The specification of the contextual feature for the category N does not involve the nonlocal features. In other words, the subcategorization of the noun category in terms of context is strictly local and within the domain of NP. For example, the noun chæk, "book", carries the local contextual feature <+(Dem)__> and <+__(S)>, collapsed as <+(Dem)__(S)>, which is defined under the domain of NP.

There will be no further question as to the contextual feature(s) of N if it is dominated by the subject NP (directly dominated by S). But what about the restrictions if N is developed from other intervening nodes such as VP, Tim, Ins. etc.? That is, how can one indicate the fact that the noun chæk, "book", may occur as an instrumental noun dominated by Ins or a locational noun dominated by Loc, but never as a time noun? However, what is involved here is not the contextual feature but the selectional feature, which will be discussed in 2.45.

2.42 Selectional features. The specification of the selectional feature is motivated by the fact that the sentences in (7)

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4 Of course, one might argue that the distinction between the two different contextual features will disappear if the categorial rules 2 and 3 of the PGK are collapsed, (see Appendix). But this will be beside the point since the distinction is made here on the grounds that the two rewriting rules are independently motivated.

are "grammatical" or "acceptable" while those in (8) are not.

(7) (i) That man laughed.

(ii) That man ate rice.

(iii) That man broke the window with a hammer.

(8) (i) That bird laughed.

(ii) That man ate clothes.

(iii) That man broke the window with love.

Many questions will arise, however, concerning the specification of the selectional feature. Most of them will stem from the difficulty of defining the concept of "grammaticality" and "the degree of grammaticality", on the one hand and from the difficulty of drawing a clearcut line between the territory of syntax and that of semantics, on the other, provided that the two are autonomous. With many questions unresolved, an attempt is made in this section to clarify some of the apparent issues concerning the selectional feature.

Chomsky (1965) discusses the selectional restrictions between the subject noun and the predicate verb and between the predicate verb and the direct object noun. These selectional restrictions explain why (7i) and (7ii) are fully grammatical while (8i) and (8ii) are not. Selectional restriction, however, is observed also between the predicate verb and the noun which is not the subject or the direct object as shown by (7iii) and (8iii).

In the following, only three different cases of selectional restrictions will be examined:

(i) between the predicate verb and the subject noun;

(ii) between the verb and the direct object noun; and

(iii) between the verb and the instrumental noun.

One of the critical comments offered by Matthews is that "Chomsky only discusses the case of Subject-Verb and Verb-Object co-occurrence" (1967:131). Although it is true that those cases are not the only cases relevant to selectional restrictions, they are quite different from other cases, say, of Verb-Instrumental noun co-occurrence. That is, the selectional restriction imposed on Subject-Verb and Verb-Object is of a much more inseparable nature (and it is much more difficult to give an account of it) than that imposed on Verb-Instrumental noun or Verb-Locational noun.

The difficulty of accounting for the selectional restriction between the subject and the verb or between the verb and the object is seen in the sentences in (9) and (10). Consider again (8ii): That man ate clothes. This is perfectly grammatical in some sense. Compare it with the corresponding negatives and imperatives in (9).

(9) (i) Men cannot eat clothes.

(ii) Men don't eat clothes.

(iii) Don't eat clothes.

(iv) Eat clothes!

(10) (i) Men cannot drink clothes.

(ii) Men don't drink clothes.

(iii) Don't drink clothes.

(iv) Drink clothes!

Those in (9) are clearly grammatical while those in (10) are not so clear, especially (10iii) and (10iv). Even if the grammaticality is granted on (8ii) on the basis of the grammaticality of those in (9), an extra binary feature (e.g. <±Liquid>) must be introduced in order to provide adequate selectional features for eat and for drink.

Many languages have covert terms corresponding to overt terms. For example, swallow, an English verb, is an overt term in that its object selection is not so much restricted (e.g. I swallowed meat, I swallowed water, etc.) as that of its covert counterparts eat or drink (e.g. I ate meat, I drank water; *I ate water, *I drank meat, etc.) The English verb wear is an overt term in the sense that it can be used in such sentences as those in (11).

(11) (i) I wear shoes.

(ii) I wear a hat.

(iii) I wear a tie.

(iv) I wear gloves.

On the other hand, Korean has four different covert terms corresponding to wear in the four sentences above. The verb sin requires a

noun which is footwear, the verb ssŭ requires a noun which is headwear, and so on. If these Verb-Object restrictions are violated, the resultant strings will be clearly ungrammatical.

What is implied by each of these covert terms is the reference to the noun subclass with which it is coupled (a sort of dependency into which linguistic redundancy is built). An extreme example is found in Athapaskan languages where a number of "classificatory verbs" are developed. Each of these classificatory verb stems assigns certain qualities (gender) such as "long" vs. "short", or "animate" vs. "inanimate" to the noun with which it is associated. In other words, two different verb stems are used in such expressions as "There lies a long object" and "There lies a round object".

These preceding data provide clear evidence for the claim that the verb is more closely tied up with the subject or with the object noun than with nouns of adverbial function. These data also justify Chomsky's treatment of the selectional feature, which accounts for the cases of Subject-Verb and of Verb-Object. This is the reason why, in this study, the selectional feature governing the subject and the object is assigned to the complex symbol matrix of the V category while the feature assignment rule (22) is formulated to introduce proper inherent features for the nouns other than the subject and object (see 2.45).

The specification of the selectional features in the lexicon of the PGK, however, is only exemplified. A binary feature like

<+Liquid> is not introduced into the category of N to distinguish the selectional restriction of mŏk, "eat", from that of masi, "drink". One reason is that it is not clear how many of such features are needed to account for the selectional features of hundreds of verbs. Furthermore, even if a given number of such features could be introduced, the inclusion of such features can hardly be justified otherwise (e.g. by transformations). Therefore, in this study, no extra features are introduced only to account for the selectional restrictions; instead, all the selectional restrictions are specified using only those inherent features provided by the redundancy rules of the category N. Thus, the specification of the selectional features is correct only as far as those inherent features go.

The selectional feature provides a frame, as the contextual feature does, in which a lexical entry of the category V may be introduced. For example, a feature like <+<+Hum>__Aux> constitutes a frame for an intransitive verb which takes a human noun for the subject (e.g. us "laugh"). Similarly, a feature like <+<+An> < -An>__Aux> constitutes a frame for a transitive verb which takes an animate noun and an inanimate noun for the subject and for the object respectively (e.g. kkæ "break"). Since the selectional feature specifies the restrictions only between the verb and the subject and between the verb and the object, the leftmost feature (or the only feature in the case of an intransitive verb) in the feature notation is interpreted as the distinctive feature of the subject noun, and the second

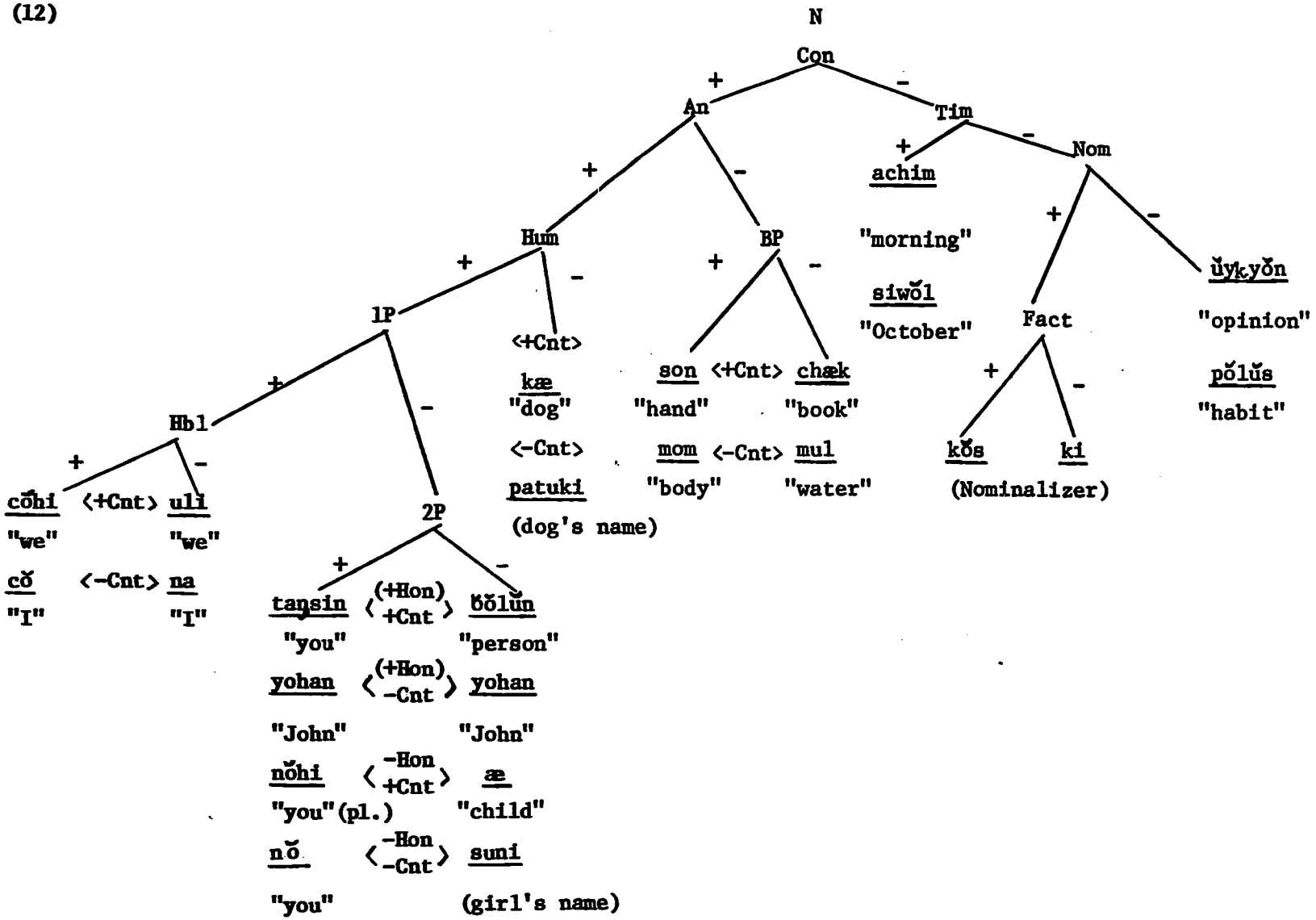
feature as that of the object noun, the variables preceding and following the feature or features being filled by convention (thus, not specified in the notation).

To sum up, the selection of the subject and the object is governed by the verb, hence the selectional feature is specified with each lexical entry of the category V, whereas the selection of an adverbial noun is governed by the higher node Tim, Loc, or Ins as the case may be (this claim is further substantiated in 2.45).

2.43 Lexicon. The lexicon consists of two parts: (i) a list of lexical entries, and (ii) two sets of feature rules which introduce redundant inherent features of the two lexical categories, N and V.

"The characteristics of inherent features are not well understood at present and it is difficult to justify particular classifications" (Rosenbaum and Lochak, 1966:11). However, the notion of syntactic feature renders the best solution so far to cross-classification problems. And the hierarchical arrangements of the categories N and V make the specification of the lexicon much simpler. For example, the noun like chæk "book" is specified in the lexicon with the features <+Cnt, -BP>, which are distinctive (nonredundant); then the rest of the features, namely, <-An, +Con> are provided by the redundancy rule so that the noun chæk is distinguished from mul, "water", by one feature <-Cnt>, from son, "hand", by another feature <+BP>,

(12)


N
Con
+
-
An
Tim
+
+
-
-
Hum
BP
achim
"morning"
+
+
-
-
1P
<+Cnt>
son <+Cnt> chæk
siwŏl
"October"
Fact
ŭykyŏn
"opinion"
+
-
+
-
Hbl
kæ
"dog"
"hand"
"book"
pŏlŭs
"habit"
+
-
<-Cnt>
mom <-Cnt> mul
kŏs
ki
2P
"body"
"water"
(Nominalizer)
patuki
(dog's name)
cŏhi <+Cnt> uli
"we"
"we"
+
-
cŏ <-Cnt> na
"I"
"I"
tansin (+Hon +Cnt) ŏŏlŭn
"you"
"person"
yohan (+Hon -Cnt) yohan
"John"
"John"
nŏhi (-Hon +Cnt) æ
"you"(pl.)
"child"
nŏ (-Hon -Cnt) suni
"you"
(girl's name)

from mom, "body", by two features <+BP, -Cnt>, and so forth. For example, see the hierarchic configuration of the category N shown in (12).

To sum up, the features that constitute the complex symbol matrix of each entry for the category N include (i) nonredundant lexical ("inherent") features (e.g. <+An>), (ii) a contextual feature (e.g. <+Dem__>); for the category V, (i) nonredundant lexical features, (ii) two contextual features (e.g. <+NP__>, <+(Tim)(Loc)(Ins)__Aux>), and (iii) a selectional feature (e.g. <+<+An><+Con>__Aux>) as illustrated by the examples in (13).

(13) (i) < +N, +Cnt, -BP, +(Dem)__(S) > chæk "book"

(ii) < +V, -Stat, +Act, +NP__, +(Neg)(Tim)(Loc)
(Ins)__Aux, +<+An><-An>__Aux> kkæ "break"

When each lexical item is introduced into a preterminal string, all redundant features which are not specified in the entry are filled in by the feature redundancy rule formulated here following Prideaux's Convention 3 (1966:118) as follows:

> If <β F> is specified in a lexical entry Q or in a transformational rule R, and if there is only one rule <αG> → <βF> in the feature rules, then <αG> is also specified in Q or in R.

By this rule, the entry (13i) acquires the redundant features <-An, +Con>, and the entry (13ii) the redundant features <-Ex, -Aj>.

2.44 Lexical insertion rule. Since the syntactic features which constitute the complex symbol matrices are not developed by the subcategorization rules for reasons of redundancy, the lexical insertion rule such as formulated by Chomsky is no longer applicable to the grammatical model where complex symbols are introduced from the lexicon by the lexical insertion rule. For further details, consider Chomsky's lexical insertion rule, which states

> If Q is a complex symbol of a particular string and (D, C) is a lexical entry where C is not distinct from Q, then Q can be replaced by D (1965:84).

Notice that what is inserted to the preterminal string is only D which is a phonological feature matrix because the matrix of syntactic features is already present in the preterminal string.

Rosenbaum and Lochak, who introduce the syntactic feature matrix by means of the lexical "embedding" rule, state the rule as follows:

> Complex symbols are introduced into the phrase structure by means of a lexical embedding rule of the form A → CS where A is an N, V, ADJ, or M and CS is a complex symbol in the lexicon (1966: 13-4).

This lexical embedding rule is "legal" if it meets the two conditions:

(i) The complex symbol CS introduced under the domain of some terminal symbol D contains some syntactic feature <+F> such that F = D and,

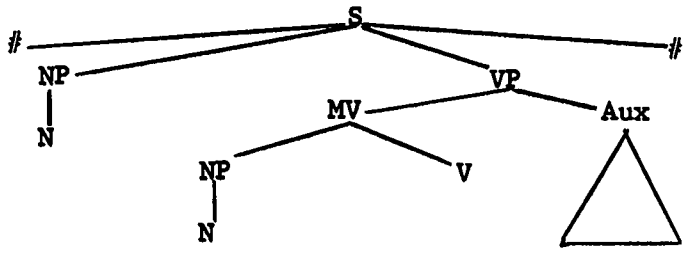
(ii) the P-marker in which the CS is introduced falls under the domain specified by any one strict subcategorizational feature and by any selectional subcategorization feature positively marked in the CS (1966:14).

The condition (i) merely states that any lexical item that belongs to a particular syntactic category (e.g. N) can replace any terminal node which is identical to that category (N), and so forth. The condition (ii), on the other hand, specifies the environment in which a lexical item may be placed, i.e. the condition specifies a proper frame for a lexical item.

Notice that since the selectional feature refers to the features of the subject noun and/or the direct object noun, the order of insertion is implicit in the condition. That is, the lexical embedding rule operates on the category N (of the subject and of the object) before it operates on the category V. This order has a rather significant import with respect to a further revision of the lexical insertion rule and to the formulation of the "base transformation" rules of the PGK.

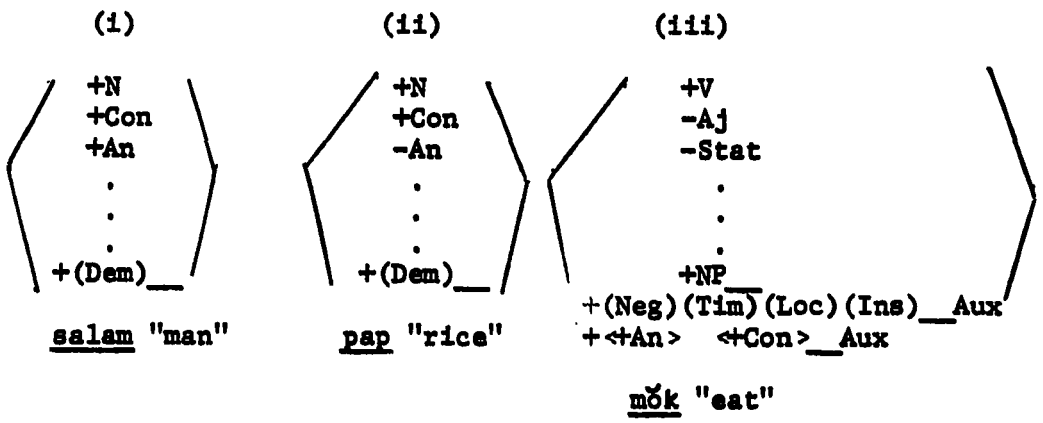
Since the implicit order in Chomsky's lexical insertion rule is identical to that in Rosenbaum and Lochak's lexical embedding rule, further references will be made to the latter version of the rule. To see how the rule works in the process of derivation, examine the P-markers in the following.

(14)



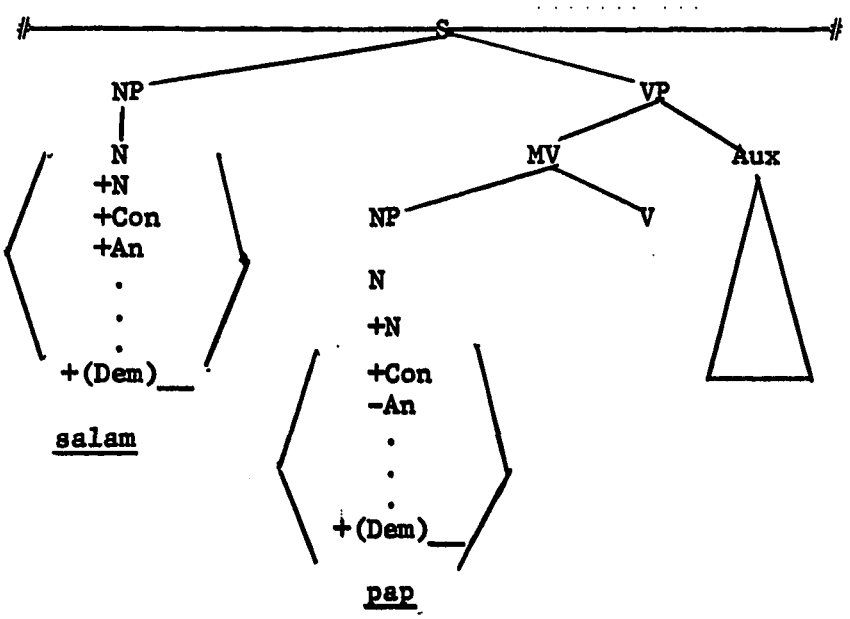
Suppose that the above P-marker is developed by the categorial rules (constituent structure rules), and suppose, further, that the three lexical items in (15) are available now.

(15)



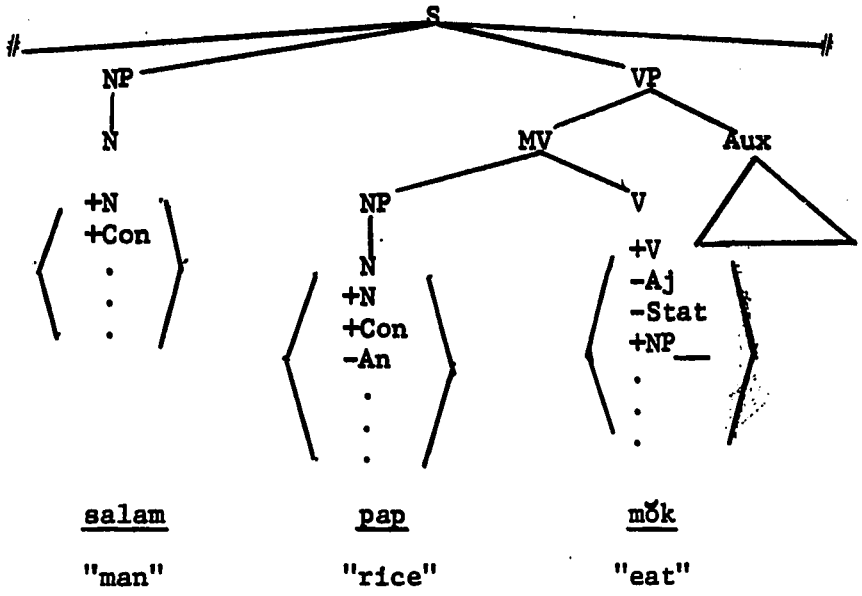
Notice that two lexical items above contain the features < +N > and <+(Dem)__> and that the structure of the P-marker (14) "falls under the domain" specified by the feature <+(Dem)__> . This means that the condition (i) and the first half of the condition (ii) of the lexical embedding rule are met. Therefore, the lexical embedding takes place introducing the two complex symbols into the preterminal string as shown in the P-marker (16). The lexical item (iii) mŏk may be introduced into the structure (16) since it contains the feature <+V>, meeting the condition (i), and the structure (16) "falls under the domain" specified by not only the two contextual features <+NP__> and <+(Neg)(Tim)(Loc)(Ins)__Aux>, but also the selectional feature <+<+An> < +Con>__Aux>, satisfying the condition (ii). Notice that the structure (14) does not fall under the domain

(16)



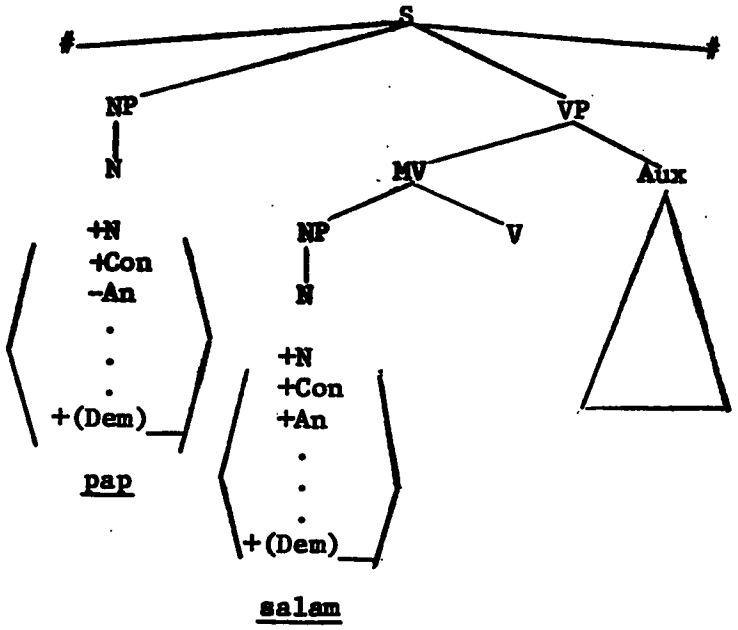
specified by the selectional feature <+<+An> <+Con>__Aux>. Hence, the order of lexical embedding is clearly indicated. With the insertion of the lexical item mŏk, the P-marker (17) is developed, which underlies a grammatical sentence corresponding to such an English sentence as: a man eats rice.

(17)



So far the lexical embedding rule has worked without any problem. However, consider again the P-marker (16), where the lexical item (15i) is inserted for the subject N and (15ii) for the object N of the structure (14). Suppose, however, that the order is reversed, so that the former is inserted for the object N and the latter for the subject N. Then, the P-marker (18), which corresponds to (16) will be derived.

(18)



The chances of obtaining the P-marker (16) are equal to the chances of obtaining the P-marker (18) because both of the lexical items in (15) contain the features <+N> and <+(Dem)__>, equally satisfying the conditions (i) and (ii) of the lexical embedding rule as it operates on the P-marker (14).

A clear problem at this point is that there is no lexical item

of the category V that fits the frame in (18). In other words, there is no lexical item with the selectional feature <+<-An> <+An>__Aux>[5] under whose domain the P-marker (18) may fall. As long as nouns are developed independently of the verb or of the other noun, many such P-markers as (18) which do not represent any grammatical string will be derived. Or, put differently, many derivations will be blocked even before the operation of the lexical insertion rule is completed. It is, of course, feasible that such an incomplete structure as (18) may be eliminated from the grammatical strings by extending the function of the so-called "filtering" device. However ingenious the filtering device may be, it certainly is not elegant if the grammar should put out many structures like (18) which do not represent any grammatical string (see Matthews, 1967: 137-41).

A similar problem is encountered when the lexical insertion rule operates on various other nouns which are not the subject or the object. Consider the sub-tree (19).

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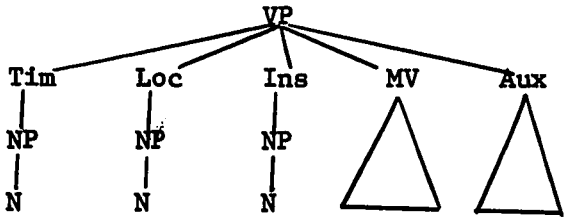
5 One might argue that there are verbs which carry the selectional feature (a) <+<-An> <+An>__Aux> on the basis that there are sentences equivalent to English, (b) the ball hits the boy where the apparent subject and object are an inanimate noun and an animate noun respectively. But if the selectional feature (a) is specified with such a verb as hit, the grammar will generate a great number of ungrammatical sentences along with grammatical ones. Furthermore, the sentence (b) cannot constitute a counter-example if it is derived, as Hall (1965) and Fillmore (1966) suggest, from an underlying sentence like (c) somebody hits the boy with the ball via a grammatical transformation which replaces the subject NP with the instrumental NP. In short, the real issue concerning the selectional restriction is the question of "grammaticality", and the term "grammaticality" is used in a technical sense. For further discussion, see Chomsky (1961), especially Section 5.

(19)



In the framework of Chomsky's model, the features which make up the complex symbol of the three N's in (19) are introduced by a set of context-free subcategorization rules. Similarly, in Rosenbaum and Lochak's grammar, the complex symbols for the three N's are introduced, without any contextual constraints beyond the node NP, by the lexical embedding rule. This means that N is freely developed no matter what node the NP is dominated by. Consequently, the N dominated by Tim through NP could be developed into an abstract noun, a human noun, etc. or the N dominated by Loc through NP could be developed into a time noun, an abstract noun, and so on.

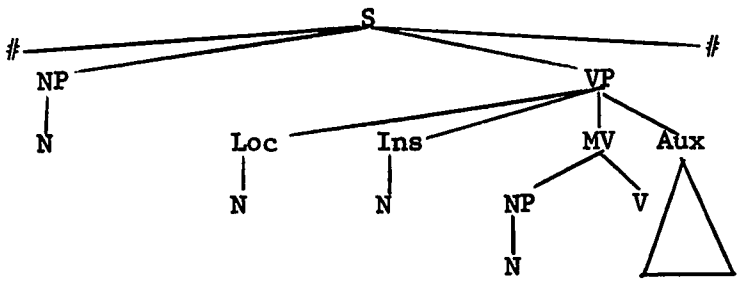
This apparently undesirable result is due to the fact that even if the lexical insertion rule is considered as a "transformation", the power of the transformation is limited (local); i.e. it has now power to analyze the structure beyond the immediately dominating node. To cope with this problem involved in nouns of adverbial function and in Japanese verbs of "aspectual" function, Prideaux (1966) adopts a convention called the "next-higher node convention". By this convention, N acquires the feature <+Loc> under the domination of Loc, and so on (of course,

the subcategorization rules introduce these inherent features). What the convention does, in fact, is add transformational power to look back beyond the immediately dominating node, which is lacking in the lexical insertion rule.

Therefore, it is clear that the problems involved in the two versions of the lexical insertion rule (by Chomsky and by Rosenbaum and Lochak) indicate a further revision. To give one solution to the problems, a set of ordered rules called the "base transformations" are formulated in the PGK to replace the lexical insertion rule.

2.45 Base transformations(I). To avoid such an incomplete structure like (18), a set of ordered rules called the "base transformations" will be applied to the preterminal string derived by terminating the operation of the categorial rules. The first rule to be applied is the revised version of the lexical insertion rule followed by the two other base transformation rules that determine the subclass membership of each N in the preterminal string. For an illustration, suppose that the preterminal string (20) is derived by the application of the categorial rules.

(20)



Upon the above preterminal string operates the first base transformation (21), introducing a complex symbol under the domination of the node V.

(21) BT 1. Lexical insertion (i)

V → CS

The conditions to be met by this rule can be stated, revising the conditions (i) and (ii) set by Rosenbaum and Lochak, as follows:

(i) the complex symbol CS introduced under the domain of the terminal symbol V contains the syntactic feature <+V>, and

(ii) the P-marker in which the CS is introduced falls under the domain specified by the two contextual features (local and nonlocal) positively marked in the CS.

Now suppose that the lexical item (22), which is similar to (15iii), is available when the rule (21) operates on the preterminal string (20).

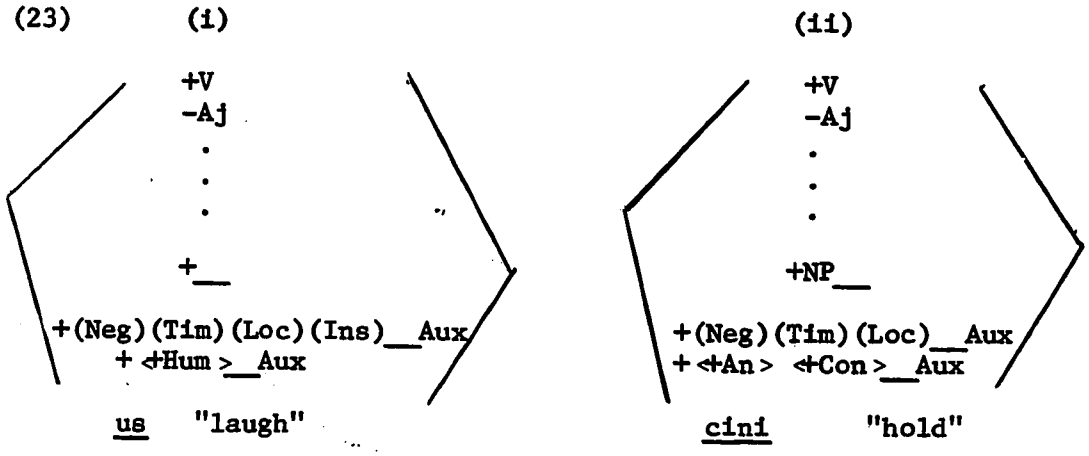
(22)

⟨ +V
-Aj
-Stat
.
.
.
+NP__
+(Neg)(Tim)(Loc)(Ins)__Aux
+ <+Hum> <+Con>__Aux
tɐɐli "hit" ⟩

What the rule (21) does is provide a matrix slot and make part of the P-marker available for information retrieval when the lexical item is brought into the string. Notice that the rule (21) is not contingent upon the selectional feature, but only upon the categorial feature <+V> and the two contextual features (local and nonlocal). The rule (21) operates upon the structure (20) introducing the lexical item (22) into the phrase structure since the lexical item (22) contains the feature <+V>, meeting the condition (i) of the rule, and the local contextual feature <+NP__> and the nonlocal contextual feature <+(Neg)(Tim)(Loc)(Ins)__Aux>, both of which jointly specify the domain under which the P-marker (2) falls; hence the condition (ii) of the rule (21) is met.

Now consider the other two lexical items in (23) with respect to the P-marker (20).

(23)

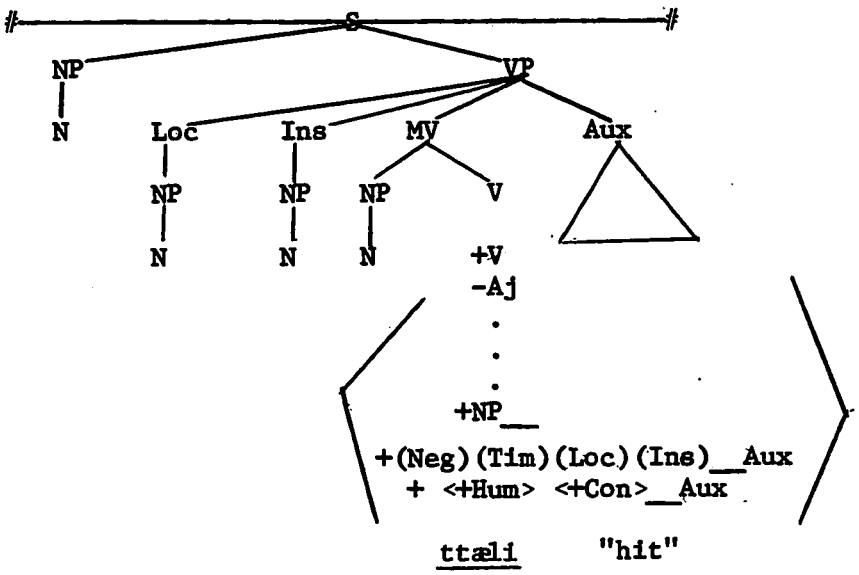


The complex symbol matrix of the lexical item (i) above satisfies the condition (i) of the rule (21), but fails to satisfy the condition

(ii) because the local contextual feature <+__> of the lexical item does not fit the frame provided by the structure (20). Similarly, the lexical item (ii) also fails to satisfy the condition (ii) of the rule (21) because the nonlocal contextual feature <+(Neg)(Tim)(Loc)__Aux> of the lexical item does not, although the local contextual feature <+NP__> does, fit the frame provided by the P-marker (20).

Since the lexical item (22) carries the syntactic features that meet the conditions specified in the rule (21) with respect to the phrase structure (20), the rule (21) operates upon the P-marker (20), yielding the new P-marker (24).

(24)



Upon the above P-marker, the second and the third base transformation rules operate to determine the selectional restrictions.

(25) BT 2. Selectional feature assignment (i)

SD: X, #, (Dem), N, X, [(Dem), (N), X, <α A> (<βB>)__Aux]$_{MV}$, X
1 2 3 4 5 6 7 8 9 10

where A or B is any feature of N.

SC: 4 → $\overset{4}{<\alpha A>}$; (7 → $\overset{7}{<\beta B>}$)

(26) BT 3. Selectional feature assignment (ii)

SD: X, (Dem), N, X
1 2 3 4

(i) Cond: [2, 3]$_{Tim}$

SC: 3 → $\overset{3}{<+Tim>}$

(ii) Cond: [2, 3]$_{Loc}$

SC: 3 → $\overset{3}{<+Con>}$

(iii) Cond: [2, 3]$_{Ins}$

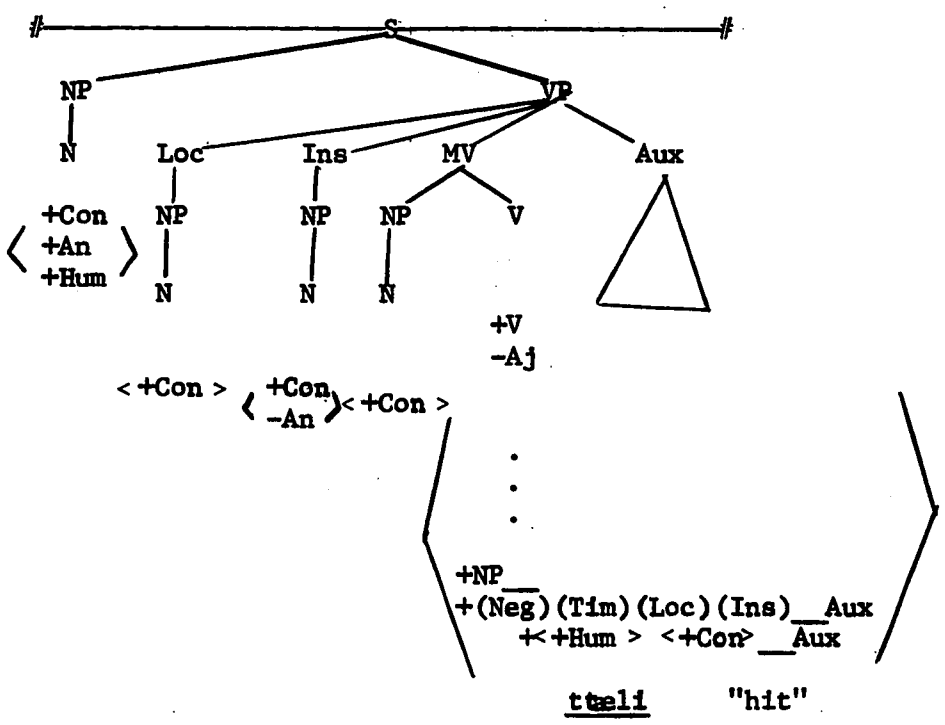
SC: 3 → $\overset{3}{<-An>}$

The rule (25) determines the selection of the subject noun and the object noun as governed by the selectional feature specified in the complex symbol of each lexical item of the category V. Notice in the P-marker (24) that the complex symbol of the category V contains the selectional feature <+<+Hum><+Con>__Aux>. At this point, it must be noted that all the feature transformation rules like the above (25) and (26) are substitution rules. In other words, what is assigned by the rule is not only the particular (distinctive) feature specified in the rule, but also the features which are redundant (nondistinctive) from the particular feature. This

means that not only the distinctive feature <+Hum> but also the redundant features (i.e. <+An, +Con>) are assigned to the subject N of the structure (24) when the rule (25) operates.

The rule (26) determines the selection of nouns of adverbial function as governed by the higher node Tim, Loc, or Ins as the case may be. Notice again in the P-marker (24) that there are two N's, one dominated by Loc, the other by Ins. The former will be assigned the feature <+Con> and the latter the feature <-An> and its redundant feature <+Con> by the rule (26). The total effect of the two rules is better illustrated by the P-marker (27).

(27)



As has been pointed out, the subject noun and the object noun maintain a dependency relationship with the verb with which they may co-occur. But other nouns such as of time, location, or instrument, do not seem to maintain this close-knit relationship with any particular verb. This observation is further supported by the fact, among others, that those adverbial phrases that dominate an NP are optional elements in almost all types of sentences. It is also observed, however, that there are certain restrictions as to the occurrence of nouns under the domination of such nodes as Tim, Loc, or Ins as expressed by the generalization made in the rule (26).

The most strict restriction is laid on the nouns that can occur under the domination of Tim because there is a class of nouns that carry the feature <+Tim> which can never occur under the domination of Loc or Ins although they may occur in the subject or in the object position. On the other hand, there is no special class of nouns that occur exclusively under the domination of Loc or Ins. As expressed by the rule, any noun with the feature <+Con> may occur as a location noun with or without (although there are some restrictions not relevant to the present issue) certain nouns that are equivalent to English phrases like "in front of" and "on top of". All nouns which carry the feature <-An> may also occur as an instrument noun, although they may not occur as a time noun because they carry the feature <-Tim> (see feature rules in Appendix).

In Korean, the dependency between the verb and the subject is further supported by what is called "honorific speech" and between the subject and the object by what is called "humble speech". Although this study does not include a comprehensive analysis of these particular aspects of the language, some major principles should be discussed in order to justify the ordered rules of base transformations.

To express the "relationship" (for want of a better term, "relationship" is used here to cover "attitude" or "mood" of the speaker, or the "situation" where the speech action takes place, etc.) between the speaker and the person spoken to and between the speaker and the person spoken of, the grammar makes available three types of expression. One is honorific speech where the person spoken of (who may be identical to the person spoken to) is honored. Another is humble speech where the speaker expresses deference towards the other person. The other is the "speech levels" by which the relationship between the speaker and the person spoken to is expressed. There are more than half a dozen such levels that express the degree of politeness or friendliness, etc. In this study, however, only two levels, namely, "polite" and "blunt" are considered.

In honorific speech, the predicate verb (or adjective) takes an affix (ŭ)si only if the subject noun of the sentence carries the feature <+Hon>. For example, if a noun like na, "I", (<+1P, -Hon>) or nŏ, "you" (<+2P, -Hon>) is chosen for the subject, the predicate verb does not take the affix si, whereas if the noun

like apŏci, "father", is chosen, the verb may or may not take the affix. Notice that the sentence (28) is as grammatical as (29) although the latter is more acceptable (polite) in normal situations than the former.[6]

(28) apŏci -ka o-n-ta
father come
"Father comes."

(29) apŏci -ka o-si-n-ta

The difference between the two sentences above is that the former does not contain the suffix si while the latter does. An immediate question is: Is the suffix si optional where the subject noun carries the feature <+Hon>? Or, is the suffix obligatory where the subject noun carries the feature <+Hon> and do some nouns like apŏci carry the feature <+Hon> optionally? An answer "yes" to the latter question seems to offer a simple solution at the moment, and the feature <+Hon> is optionally specified in the complex symbol of the noun like apŏci. Accordingly, if the noun contains the feature <+Hon>, the verb takes the affix obligatorily. This fact can be accounted for by a precyclic rule like (30).

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6 What is involved here is the distinction between the rule of grammar and the rule of usage. In normal situations, one is expected to use honorific speech when he is talking of his own father, hence (29) is more "acceptable" (i.e. agrees with the rule of usage). On the other hand, (28) is perfectly grammatical although the speaker may be considered impolite. However, a string like nŏ-ka o-si-n-ta, "you come", is ungrammatical because the noun nŏ carries the feature <-Hon> while the verb o takes the affix si.

(30) GT2. Honorific affix insertion

SD: X, #,(Dem),<+Hon>, X, $\{^{Cop}_{V}\}$, (TM) A, X

1 2 3 4 5 6 7 8

SC: 7 → si^7

The rule above must be precyclic because many cyclic rules delete the subject noun (index 4).

In humble speech where a noun with the feature <+Hbl> occurs in the subject position, no noun with the feature <+2P, -Hon> may occur in the object position. For example, if the pronoun cŏ(<+1P, +Hbl>) is chosen as the subject of a sentence where an object is required, a pronoun like nŏ (<+2P, -Hon>) may not occur as the object. In other words, the choice of the subject noun and the object noun is not free and independent.

What is implied by the above observation is that there must be an order in the introduction of the complex symbol matrices for the category N, which further supports the formulation of the base transformation rules.

One way to account for the dependency between the subject noun and the object noun is to introduce first the complex symbol matrix for the subject noun and put restrictions for the selection of the object noun before the complex symbol matrix for the latter is introduced. To ensure that the subject noun be developed before the object noun, a rule like (31) may be applied, as the next step of derivation, upon the P-marker (27).

(31) $\begin{matrix} N \\ <\alpha\ A> \end{matrix} \rightarrow CS$

Cond: (i) N is not dominated by Tim, Loc, Ins, or MV;

(ii) the complex symbol to be introduced contains the feature <+N> and does not contain the feature $<\overline{\alpha}A>$;

(iii) the P-marker upon which the rule is to operate falls under the domain specified by the contextual feature positively marked in the CS.

The condition (i) merely states that the rule operates on the subject N. Now consider the two lexical items in (32) with respect to the P-marker (27), where the derivation is to be resumed.

(32) (i)

$\left\langle \begin{matrix} +N \\ +Con \\ +An \\ +Hum \\ -1P \\ +2P \\ -Hon \\ -Cnt \\ +\_\_ \end{matrix} \right\rangle$

nŏ "you" (sg)

(ii)

$\left\langle \begin{matrix} +N \\ +Con \\ -An \\ -BP \\ +Cnt \\ +(Dem)\_\_ \end{matrix} \right\rangle$

chæk "book"

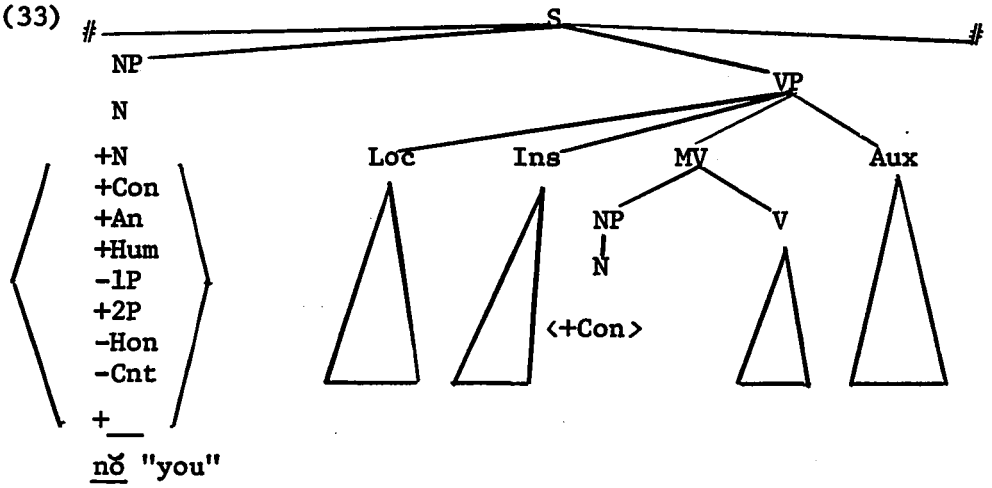
As mentioned in the footnote 2 regarding the "distinctiveness criterion" and as indicated in the condition (ii) of the rule (31), any lexical item which carries the feature <+N> and "is not distinct from" the feature $<\alpha A>$ (i.e. does not carry the feature $<\overline{\alpha}A>$) may be introduced for the subject noun by the rule (31), provided that

the other two conditions (i) and (iii) are met simultaneously.

Notice that the subject N of (27) satisfies the condition (i) of the rule (31), and the lexical item nŏ (32i) satisfies the condition (ii) as no feature contained in its complex symbol matrix has an opposite specification with respect to the feature <α A >(i.e. any feature already introduced under the subject N of the P-marker (27)). And the contextual feature< +__>, contained in the complex symbol matrix of (32i) satisfies the condition (iii) of the rule (31) with respect to the structure (27). The lexical item chæk (32ii), on the other hand, fails to satisfy the condition (ii) because its complex symbol matrix contains the feature <-An> which is distinct from the feature <+An>.

With the introduction of the lexical item (32i) into the P-marker (27), the new P-marker (33) is derived. Notice that the feature rule (31) is a substitution rule, as has already been pointed out, and that the complex symbol matrix of the lexical item (32i) has replaced all the features previously introduced under the subject N of the structure (27).

(33)



As the subject noun is fully developed now, the next step in the derivation is to restrict further the choice of the object noun as shown by the following two rules.

(34) BT 4 (bi) Object noun selection (i)

SD: X, #, (Dem), $\langle {}^{+2P}_{-Hon} \rangle$, X, $[(Dem), N, V]_{MV}$, X

1 2 3 4 5 6 7 8

SC: 7 → $\left\{ \begin{array}{l} \overset{7}{<-Hbl>} \\ \overset{7}{<-1P>} \\ \overset{7}{<-Hum>} \\ \overset{7}{<-An>} \end{array} \right\}$

(35) BT 4 (bii) Object noun selection (ii)

SD: X, #, (Dem) $\langle$+Hbl$\rangle$, X, $[(Dem), N, V]_{MV}$, X

1 2 3 4 5 6 7 8 9

SC: 7 → $\left\{ \begin{array}{l} \overset{7}{<+Hbl>} \\ \overset{7}{<-2P>} \\ \overset{7}{<+2P, \ +Hon>} \\ \overset{7}{<-Hum>} \\ \overset{7}{<-An>} \end{array} \right\}$

These two rules are essentially the same in that they prevent the co-occurrence of "contradicting" terms in the same sentence as illustrated by the grammatical strings in (36) and the ungrammatical strings in (37).

(36) (i) ne -ka na -lŭl ttæli-n-ta

<+2P, -Hon> <+1P, -Hbl> V

you I hit

"You hit me."

(ii) næ -ka nŏ -lŭl ttæli-n-ta

<+1P, -Hbl> <+2P, -Hon> V

I you hit

"I hit you."

(37) (i) *ce -ka nŏ -lŭl ttæli-n-ta

<+1P, +Hbl> <+2P, -Hon> V

(ii) *ne -ka cŏ -lŭl ttæli-n-ta

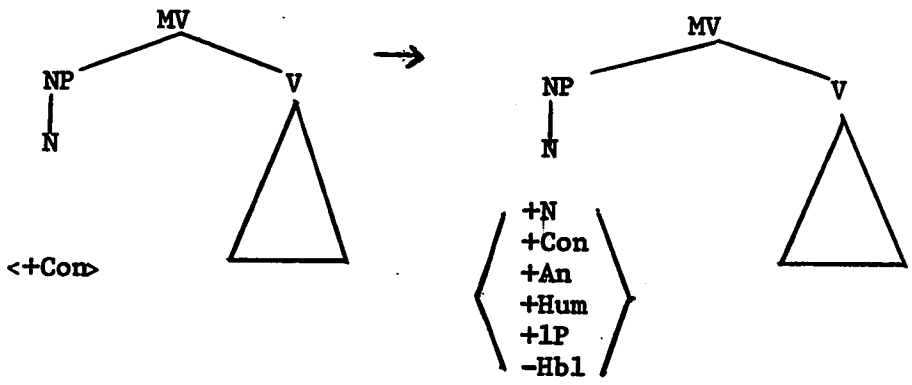
<+2P, -Hon> <+1P, +Hbl> V

If the subject noun carries the feature <+Hbl>, the object noun may be any noun except the ones which carry the features <+2P, -Hon>. The rule (34) makes this generalization. Similarly, if the subject noun carries the features <+2P, -Hon>, the object noun may be any noun except those which carry the feature <+Hbl>. The rule (35) makes this generalization. If these "agreements" are violated, the resultant strings will be ungrammatical. It may be said, therefore, that the terms nŏ, "you", (<+2P, -Hon>) and cŏ, "I", (<+1P, +Hbl>) contradict, while nŏ, "you", (<+2P, -Hbl>) and na, "I", (< +1P, -Hbl>) contrast in a given sentence.

Returning to the P-marker (33) now, notice that the complex symbol matrix of the subject noun contains the two features

<+2P, -Hon> which are identical to the two features specified in the structural index 4 of the rule (34). This means that the total structure represented by the P-marker (33) is available for the rule (34). The following subtrees show the effect of the rule (34).

(38) (i) (ii)



It is clear now the next step of derivation is to introduce the lexical item for the remaining N's in the tree. Two alternative solutions are available in this connection. One is to formulate another rule like (31) and place it after the rule (35). The other is to revise the rule (31) so that it may be applicable to all N's in the tree. Obviously, the second alternative is preferable and possible because the only restriction to be observed in introducing lexical items for the category N is that the lexical item for the subject N be introduced first.

First of all, to make the rule (31) applicable to all N's in the tree, the condition (i) is removed. Second, since the

rules (34) and (35) are contingent upon the result of the rule (31), these two rules are arranged as subrules of the same rule as shown in (39).

(39) BT 4. Lexical insertion (ii)

(a) $N \rightarrow CS$ / $\langle \alpha\ A \rangle$

Cond: (i) the complex symbol to be introduced contains the feature <+N> and does not contain the feature <-αA>;

(ii) the P-marker upon which the rule is to operate falls under the domain specified by the contextual feature positively specified in the CS.

(b) (i) Same as (34)

(ii) Same as (35)

Since the operation of (b) is contingent upon the operation of (a) on the subject N, (a) and (b) must be ordered within the rule (39). Furthermore, it must be ensured that the rule (39) operate on the subject N first. Therefore, a convention regarding the operation of the rule (39) as a whole must be adopted, which may be stated as follows:

(40) The rule must operate first on the left-most subtree dominated by an NP within a pair of sentence boundary markers.

Such a convention as (4) is necessary for a grammar of Korean in order to account for the selectional restriction between the subject noun and the object noun as shown by the two rules (34) and (35). However, such a convention and the two rules which constitute (b) of (39) are not necessary in many other languages where no such restriction is observed. This means that a rule like (39a) is much more general than those that constitute (39b).

Two more rules to be mentioned before closing this section concern speech levels. As has already been pointed out, the speech level (e.g. "polite" <+Pol>, "blunt" <-Pol>) associated with the category MD expresses the "relationship" between the speaker and the person spoken to. There are two cases where the two rules (41) and (42) must operate to adjust "contradiction". One is the case where a second-person noun carries the feature <α Hon> while the category MD must carry the feature <α Pol>. If this agreement is violated, a string with clearly contradicting speech levels will be derived. This matter is adjusted by the following rule.

(41) BT 5. Speech-level adjustment

SD: X, #, X, $\langle \overset{+2P}{\alpha Hon} \rangle$, X, <-α Pol>, X

1 2 3 4 5 6 7

SC: 6 → <α Pol>

Another case needing adjustment is that where the first-person noun carries the feature <+Hbl> indicating that an honored second-person

is present. So, if cǒ, "I", (<+1P, +Hbl>) is present in the sentence, the category MD should take the "polite" level. The following rule operates on a string where this "agreement" is violated.

(42) BT 5. Speech-level adjustment

(ii) SD: X, #, X, <+Hbl>, X, <-Pol>, X

1 2 3 4 5 6

SC: 6 → <+Pol>

2.46 Base transformations (II). Another set of base transformation rules to be discussed in what follows concerns the category MD, which is the only grammatical category that has been given a feature analysis. It will be seen why the feature analysis of this category is highly motivated.

In earlier treatments of transformational grammar, some English sentences related by means of an optional singulary transformation maintain the same meaning as in an active-passive pair, whereas others do not maintain the same meaning as in a declarative-interrogative pair. Katz and Postal (1964) contend this fact is theoretically unsatisfactory, and argue that singulary transformations do not affect meaning. This and other syntactic evidence has led them to postulate optional dummy elements like Q(uestion) and I(mperative), which trigger certain obligatory transformations if chosen in the deep structure, and provide proper semantic interpretations. In support of this argument, Katz and

Postal refer to the earlier works by Lees (1960) and Klima (1964) who introduced the morpheme Neg(ative) on "purely syntactic grounds" without reference to meaning (1964: 74). They further state:

> Thus it can be stated in the theory of linguistic descriptions that the 'similarity' underlying intuitions of syntactic relatedness among sets of sentences must be based either on identity of underlying structures or on the presence of universal morphemes, like Q, wh, Negative, etc. Such markers then serve to characterize the range of elementary sentence types in natural language (118-9).

Apparently adopting this suggestion but with unsatisfactory results, Song formulates the two initial constituent structure rules of his Korean grammar as follows:

(43) (i) $S \rightarrow S_{nu}$ (K)

(ii) $K \rightarrow$ {Q, A, P, I}

"The second rule above lists different types of sentences, namely Question, Apperceptive, Propositive, Imperative" (1967: 133).

If the optional element K is not chosen, the structure will contain only S_{nu} (sentence nucleus). But what Song considers to be S_{nu} is, in fact, another type of sentence. This is apparent in the following statement on the same page:

> When the symbol Q, which signals Question, is added to Mood (i.e. Declarative), it transforms the latter to an Interrogative Mood and converts the sentence from a statement to a Question.

An immediate question is: Why should both Mood and K, which are essentially the same, be postulated? If Mood is developed into {Q, A, P, I}, exactly the same result will be obtained without an extra category K. Another arbitrary decision made here (although

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An immediate question is: Why should both Mood and K, which are essentially the same, be postulated? If Mood is developed into {Q, A, P, I}, exactly the same result will be obtained without an extra category K. Another arbitrary decision made here (although

a minor point) is the selection of Statement as S_{nu}; any sentence type (e.g. Question, Imperative, etc.) may be chosen as S_{nu}, if one is to be chosen at all (although there might be some intuitive grounds implicit in kernel sentences).

In languages like Korean and Japanese, where each sentence type is clearly marked by overt morphemes, there is no need to postulate an optional dummy element. In these languages, it is much simpler and intuitively correct to consider that every sentence ends in a certain mood marker (e.g. marker for Question, marker for Statement, etc.) which is obligatory, not optional, although the choice of a particular sentence type is optional.

Above all, what motivates a feature analysis of the grammatical category Mood is the fact that a sentence type like Imperative requires a second-person noun only for the subject, and a non-stative verb[7] only for the predicate. In earlier grammars where Question, Command, and so on are derived by singulary transformations from a kernel sentence, usually Statement, there is no such problem as subject selection for Command because Command is derived from a string where a second-person noun is the subject, and so on. The problem, on the other hand, in an analysis where such dummies as Q, I, etc. are chosen in the deep structure (by branching rules) regardless of the subcategory of the subject noun or of the predicate verb (or adjective), is that many ungrammatical structures

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7 The observation on the contrast between the "stative" and the "nonstative" verbs (and adjectives) is due to Lakoff (1966).

like those in (44) will be derived.

(44) (i) N ^ V ^ I <-2P> *(he) go !

(ii) N ^ V ^ I <+Stat> *(You) doubt !

(iii) N ^ Cop ^ V ^ I <+Aj, +Stat> *(You) be sleepy !

Of course, there is a handy device, namely the "filtering" device which uses any undeleted dummy as a marker for blocking the whole derivation. However handy it may be, the very device has been a target of severe criticism as pointed out earlier in this chapter. Although there has not been any suggestion that could eliminate the device entirely from the grammar, it is clear that a grammar without such a device is, everything else being equal, far more elegant than one with such a device.

The four sentence types of Korean that are considered in connection with the grammatical category MD are Declarative (D), Interrogative (Q), Imperative (I), and Propositive (P). The sentence type "Apperceptive" is excluded for simplicity of presentation without any different effects on the essential points of the analysis. The three grammatical feature rules quoted in (45) introduce necessary features for the subcategorization of MD in the PGK.

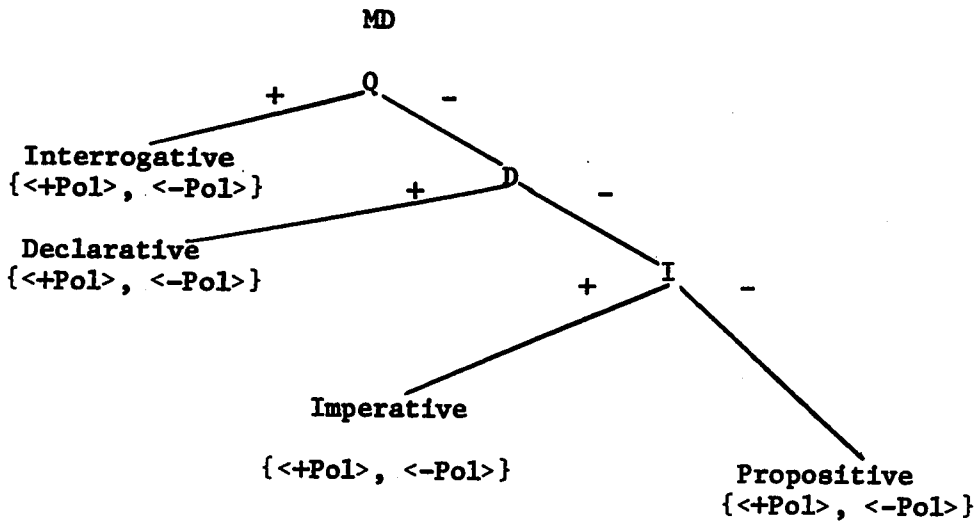
(45) (i) GF 1. MD → $\langle \underline{\pm}Q \; \underline{\pm}Pol \rangle$

(ii) GF 2. <-Q > → $<\underline{+}D>$

(iii) GF 3. <-D > → $<\underline{+}I>$

The subcategorization of MD in terms of these features shown above can be represented by a tree diagram configuration as shown in (46).

(46)



Since the feature rules in (45) and the preceding categorial rules in the grammar are all context-free, the string at the point where the lexical items are introduced will contain those ungrammatical strings which contain a stative verb (<+Stat>) with the imperative mood (<+I>), a third person subject noun with the propositive or the imperative mood (<-I>), and so on. However, such ungrammatical strings can be easily eliminated by a few rules of base transformation which are called "Mood Adjustment". To illustrate the point, one such rule will be discussed in detail.

(47) BT 6. Mood adjustment

(i) SD: X, #, X, $\{^{\langle +Stat\rangle}_{Cop}\}$, X, <-D>, X

1 2 3 4 5 6

SC: 6 → <+D>

Now consider the effect of the rule (47). The complex symbols in (48) are those which are distinguished by the particular (distinctive) feature <-D> from all other complex symbols introduced by the feature rules in (45).

(48) (i) Imperative (ii) Propositve

(a) $\langle$ -Q, -D, +I, +Pol $\rangle$ (b) $\langle$ -Q, -D, +I, -Pol $\rangle$

(a) $\langle$ -Q, -D, -I, +Pol $\rangle$ (b) $\langle$ -Q, -D, -I, -Pol $\rangle$

The two sets of complex symbols above, which are distinguished by the feature <-D>, are replaced by the complex symbol distinguished by the feature <+D>, which sets happen to be those in (49).

(49) Declarative

(a) $\langle$ -Q, +D, +Pol $\rangle$ (b) $\langle$ -Q, +D, -Pol $\rangle$

Suppose, on the other hand, that the rule (47) is to affect only an individual feature or features. The output of the rule, then, will include those complex symbols in (50), which are neither intro-

duced by the feature rules in (45), nor represent any subcategories of the grammatical category MD.

(50) $\left\langle \begin{matrix} * \\ -Q \\ +D \\ +I \\ +Pol \end{matrix} \right\rangle$ $\left\langle \begin{matrix} * \\ -Q \\ +D \\ -I \\ -Pol \end{matrix} \right\rangle$

It must be clear that the rule (47) correctly accounts for the fact that the stative verb, the stative adjective, or the copula verb may not co-occur with the imperative or the propositive mood. The grammar needs a few more rules (as formulated in the PGK) of the same nature to account for the similar facts, but it is not necessary to discuss them all here since the principle involved is the same. Incidentally, the complex symbols which represent subcategories of MD will be assigned proper phonological shapes after all grammatical transformations have operated.

In conclusion, it is obvious that the same analysis as sketched above may be applied to English, if the grammar is to correctly account for the co-occurrence relationships without relying on the "filtering" device, although such English sentence types as corresponding to Korean Declarative, Imperative, etc. do not have as clear phonological shapes as their Korean counterparts. If so, such elements as Q and I, that Katz and Postal regard as "optional" categories, are not, in fact, optional in the deep structure; rather, they are subcategories of an obligatory category which corresponds to MD of Korean. Probably this is a viable

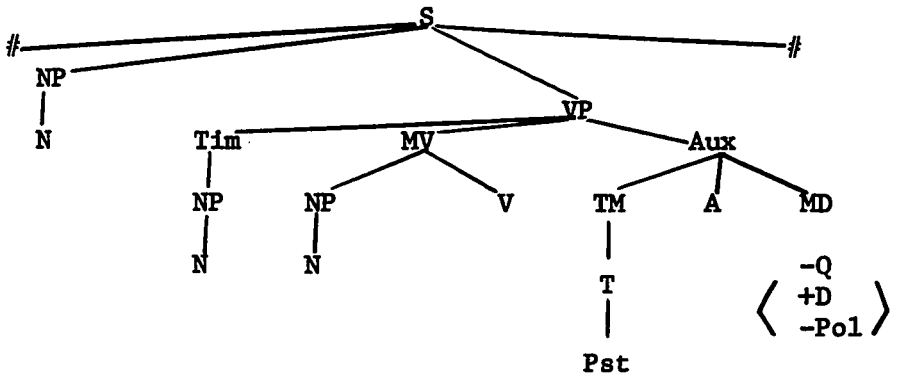
candidate for a universal category, which is an obligatory element in all languages although the superficial manifestation of the category may vary from language to language.

2.5 Summary. The step-by-step derivational procedure of the sentence (51) will present an illustrative summary of the preceding discussion concerning the base component of the PGK.

(51) ne -ka ŏce na-lŭl ttæli-ŏss-ta
you yesterday I hit
"You hit me yesterday."

Step 1: Derivation of preterminal string. The preterminal string represented by the P-marker (52i) is derived by applying categorial rules 1 to 8 and the grammatical feature rules (see PGK).

(52) (i)



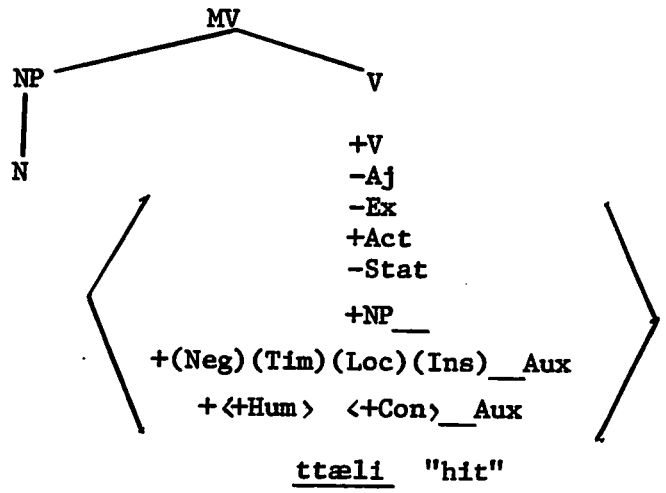
Step 2: Lexical insertion for V. By the rule BT 1 of the PGK, a complex symbol is introduced under the node V. Two sub-steps are involved before the application of the rule: (i) choosing

of a lexical item that contains the feature <+V>, and (ii) filling in of all the redundant features by applying the redundancy rule. For example, the lexical item ttæli "hit" is specified with the non-redundant features in the lexicon as follows:

$$\left\langle \begin{array}{c} +V,\ +Act,\ -Stat \\ +NP\_\_,\ +(Neg)(Tim)(Loc)(Ins)\_\_Aux \\ +\ \langle +Hum\rangle\ \langle +Con\rangle\_\_Aux \end{array} \right\rangle$$

The two redundant features <-Ex, -Aj> are filled in by the redundancy rule for the category V. Since the two contextual features in the complex symbol matrix of the lexical item ttæli satisfy the conditions of the rule BT 1 with respect to the frame provided by the tree (52i), the lexical item is introduced into the phrase structure, yielding a new P-marker, of which the relevant subtree is shown in (52ii).

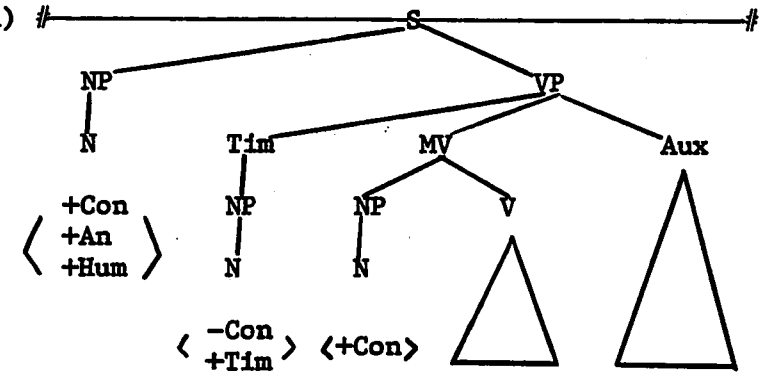
(52) (ii)



Step 3: Selectional feature assignment. By the rule BT 2, the subject N is assigned the features distinguished by <+Hum>, and

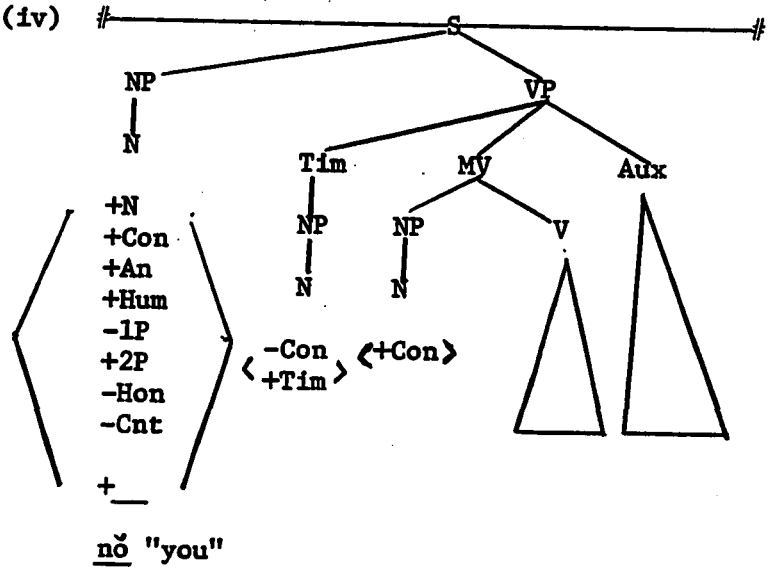
the object N the feature distinguished by <+Con>. Similarly, by the rule BT 3, the N dominated by Tim is assigned the features distinguished by < +Tim >. The total effects of these two rules are illustrated by the following P-marker.

(52) (iii)



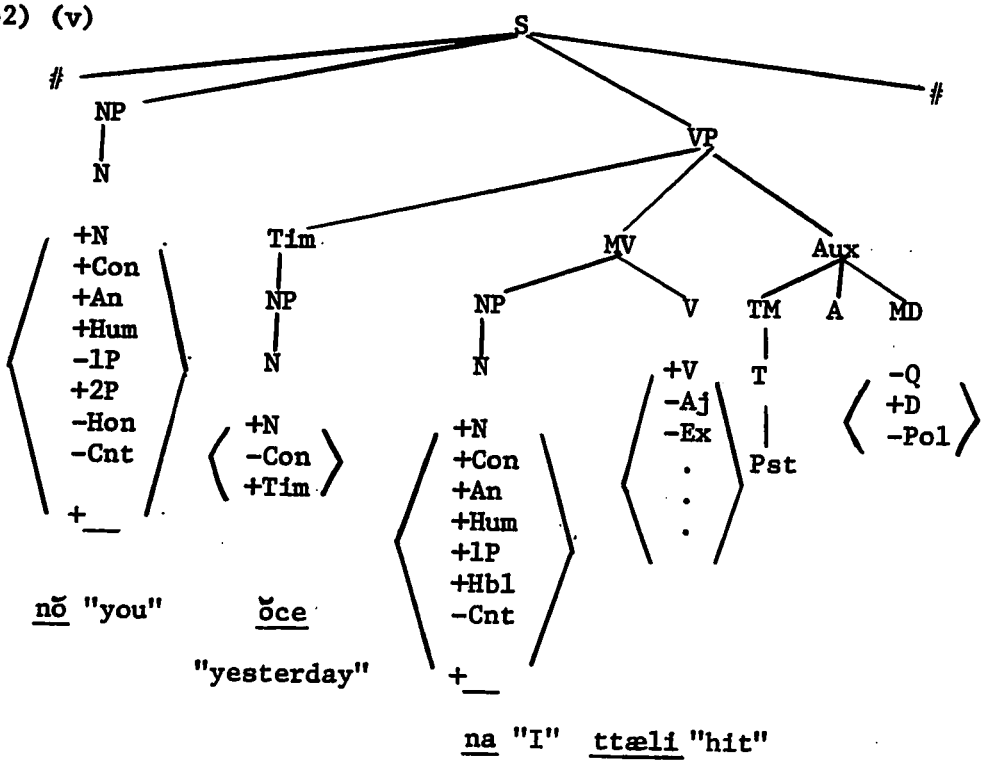
Step 4: Lexical insertion for N. Lexical items for all N's are introduced by the rule BT 4. As the convention states, the rule operates on the subject NP first. Here again, as in the case of the category V (see Step 2), a lexical item which contains the feature <+N >is chosen from the lexicon and all the redundant features are filled in. The rule BT 4 has two parts, (a) and (b). Suppose that by the rule BT 4 (a) the lexical item nŏ, "you", is introduced for the subject N as shown in the P-marker (52iv). Notice that the structure is analyzable in terms of the structural description of the rule BT 4 (bi). Accordingly, the feature <+Con> under the object N is replaced by a bundle of features distinguished by the feature <-Hbl> before a lexical item is introduced. Then, the rule BT 4 (a) operates again introducing

(52) (iv)



lexical items for both the object N and the N dominated by Tim, thus yielding the new P-marker (52v).

(52) (v)



At this point, no more base transformation rules are applicable to the structure. The next step is to apply grammatical transformation rules. But this particular structure does not undergo any grammatical transformations except a few postcyclic rules. The nominal particles ka and lŭl are introduced by postcyclic rules. The category A is deleted by another postcyclic rule. The tense category Pst is realized phonologically as ŏss, and the complex symbol of Mpod as ta. Finally, a morphophonemic rule converts nŏ, "you", to ne preceding the particle ka. Thus, the derivation of the sentence (51) is completed.

CHAPTER III

CONSTITUENT STRUCTURES

3.1 Introduction. In order to present justification of the categorial rules as well as to introduce primary linguistic data for the discussions on transformations in the following chapters, some interesting categorial rules of the PGK will be considered in this chapter.

The discussion of the verbal affix, which is called Aux as it is comparable to auxiliaries of many well-known languages, will be more or less extensive, while the discussions of complex sentence structures will be quite brief as they are preliminary to what will be taken up in detail in the subsequent chapters.

3.2 Categorization of Aux. The category Aux, as analyzed by the categorial rules 6 to 8 of the PGK, includes Tense-Modal (TM), Aspect (A), and Mood (MD). The categorial rules are quoted here as (1) for quick reference.

(1) (i) C6. Aux → (TM) MD

(ii) C7. TM → (T) (M)

(iii) C8. T → Pst (PP)

In the analysis given above, the category TM is optional. If the category is chosen, however, and if it is developed into the tense category (T), the tense may be developed as the simple past (Pst) or Pst plus the prepast (PP). The category PP is never chosen without Pst as shown by the rule (iii). In an alternative analysis, the category TM might be better considered

obligatory categories. Consequently, a subcategory of T, namely "zero" (unmarked) must be postulated for the nonpast tense in contrast to the past tense which is marked. However, the same argument (i.e. postulation of "zero" subcategory) does not seem to hold for M. This alternative analysis seems preferable for the treatment of co-occurrence restrictions between T and time adverbials, which is beyond the scope of the present study.

Six different structures will be generated depending on the choice of the elements dominated by Aux as illustrated by the following chart.

(2)

	Pst	PP	M	A	MD
I				X	X
II			X	X	X
III	X			X	X
IV	X		X	X	X
V	X	X		X	X
VI	X	X	X	X	X

X = chosen

To facilitate further discussion, two terms will be used. One will be called the "finite verb ending" which is the Aux structure of a simple sentence (which does not contain an embedded S) or of the matrix S of any complex sentence. The other will be called the "modifier verb ending" which is the Aux structure of an S embedded into an NP whose function is to modify the N that co-occurs with the S (see 4.4).

The six Aux structures shown in (2) are all finite verb endings. As described in Chapter II, MD is further analyzed to specify the four different types of sentences, namely, Interrogative (<+Q>), Declarative (<+D>), Imperative (<+I>), and Propositive (<-I>). Examples of these four types of sentences which have the Aux structure I of (2) are given in (3).

(3) (i) cŏ salam-i ka -nŭn -ya
Dem N V A <+Q>
that man go
"Does that man go?"

(ii) cŏ salam-i ka -n -ta
A <+D>
"That man goes."

(iii) (nŏ-ka) ka -la
you go <+I>
"(You) go!"

(iv) (nŏ -to) ka -ca
you too go <-I>
"(You) go (with me)." (Let's go!)

Each of the above sentences may take six different Aux structures as illustrated by the examples in (4).

(4) (i) cŏ salam-i ka -nŭn -ya

Dem N V A MD

that man go

"Does that man go?"

(ii) cŏ salam-i ka -kess -nŭn -ya

V M A MD

"Would that man go?"

(iii) cŏ salam-i ka -ss -nŭn -ya

V Pst A MD

"Did that man go?"

(iv) cŏ salam-i ka -ss -kess -nŭn -ya

V Pst M A MD

"Would that man have gone?"

(v) cŏ salam-i ka -ss -ŏss -nŭn -ya

V Pst PP A MD

"Has that man gone (there once)?"

(vi) cŏ salam-i ka -ss -ŏss -kess -nŭn -ya[1]

V Pst PP M A MD

"Would that man have gone (there once)?"

---

1 As seen in these examples, the function and meaning of kess (M) is difficult to define. That is why this element has received various treatments. For example, Martin (1954) treats it as a subclass of tense, "Future", and Park (1960) as "Presumptive tense suffix". The element kess expresses the volition or will of the speaker if the speaker and the subject of the sentence are the same, or the speaker's presumption if the subject of the sentence is other than the speaker. On this ground, it is treated as a modal in this study.

(5) Aux structures for mok, "eat"

Finite V ending / S types		(I) A MD	(II) M A MD	(III) Pst A MD	(IV) Pst M A MD	(V) Pst PP A MD	(VI) Pst PP M A MD
<+Q>	<-Pol>	nŭn ya	kess nŭn ya	ŏss nŭn ya	ŏss kess nŭn ya	ŏss ŏss nŭn ya	ŏss ŏss kess nŭn ya
	<+Pol>	sŭp- ni kka	sŭp- kess ni kka	sŭp- ŏss ni kka	sŭp- ŏss kess ni kka	sŭp- ŏss ŏss ni kka	sŭp- ŏss ŏss kess ni kka
<+D>	<-Pol>	nŭn ta	kess ta	ŏss ta	ŏss kess ta	ŏss ŏss ta	ŏss ŏss kess ta
	<+Pol>	sup- ni ta	sŭp- kess ni ta	sŭp- ŏss ni ta	sŭp- ŏss kess ni ta	sŭp- ŏss ŏss ni ta	sŭp- ŏss ŏss kess ni ta
<+I>	<-Pol>	- ŏla					
	<+Pol>	ŭsi yo					
<-I>	<-Pol>	- ca					
	<+Pol>	ŭp- si ta					
Modifier V ending		nŭn	ŭl	ŭn	ŏss ŭl	-	ŏss ŏss ŭl

Since all the six Aux structures of (2) may take either <+Q> or <+D> in MD, twelve (6 x 2 = 12) different finite verb endings will be obtained. Besides, the MD of the Aux structure I (where no TM is chosen) may contain either <+I> or <-I>, so two more finite verb endings will be added, bringing the total to fourteen. Furthermore, since all the fourteen finite verb endings must take either <-Pol> or <+Pol> (the two speech levels), a total of twenty-eight different finite verb endings will be obtained for one typical verb. One can imagine, therefore, how many different endings a verb may take if all the six or more speech levels are involved. The chart (5) on the preceding page will give a summary of what has been discussed in this paragraph.

As shown clearly in (5), the imperative and the propositive do not take the Aux structures II to VI, i.e. the category TM is not chosen for the two particular sentence types (a fact which seems universal in grammar). Since, however, the categorial rules quoted in (1) would allow TM to be chosen regardless of sentence type, allowing all Aux structures for imperative and propositive, the grammar proposed so far needs limitation by an obligatory rule like (6) which deletes the category TM.

(6) GT 11 TM deletion

(i) SD: X, TM, A, <-D>, X

1 2 3 4 5

SC: 2 → null

It is also observed that the category A is deleted in several definable environments, one of which is shown in the following rule.

(7) GT 12. Aspect deletion

(i) SD: X, TM, A, $\langle {+D \atop -Pol} \rangle$, X

1 2 3 4 5

SC: 3 → null

When the category A remains undeleted, it is realized phonologically in various forms such as sŭpni, pni, or n, among others, depending on the environment, as shown in the following examples.

(8) (i) ka-pni-ta

V A MD

$\langle {+D \atop +Pol} \rangle$

{he, she, etc.} goes.

(ii) ka-n-ta

V A MD

$\langle {+D \atop -Pol} \rangle$

{he, she, etc.} goes.

Since these different phonological shapes are predictable phonologically or syntactically, there will be no problem in formulating proper rules to account for the facts.

For the discussion to follow, consider the corresponding forms between the finite verb ending and the modifier verb ending (see 4.4 Adnominalization for some details of the modifier verb ending) as shown between the pair (a) and (b) in the following examples.

(9)

	(a)	
(i)	salam-i ka -n -ta	ka -nŭn salam
	man go	go man
	"A man goes."	"A man who goes"
(ii)	salam-i ka -kess-ta	ka -l salam
	"A man would go."	"A man who would go"
(iii)	salam-i ka -ss -ta	ka -n salam
	"A man went."	"A man who went"
(iv)	salam-i ka-ss-kess-ta	ka -ss -ŭl salam
	"A man would have gone."	"A man who would have gone"
(v)	salam-i ka -ss-ŏss-ta	(?) -
	"A man has gone (there once)."	
(vi)	salam-i ka-ss-ŏss-kess-ta	ka -ss-ŏss-ŭl salam
	"A man would have gone (there once)."	"A man who would have gone (there once)."

In (9), compare the Aux structure of (a) with the corresponding Aux structure of (b). It is apparent that the category MD is absent from all the Aux structures of (b), which are modifier verb endings. This fact can be easily accounted for by a deletion transformation. Notice those elements underlined in (9). The problem is how to account for the category TM which is chosen in the Aux structures II to VI. There is no problem in the Aux structure I where the category A remains whereas the category TM is not chosen; the phonological difference of A between (a) and (b) (n vs. nŭn) can be easily stated by a morphophonemic rule.

In the Aux structures II to VI, the element kess corresponds to (ŭ)l always, and (a/ŏ)ss to (ŭ)n if it is the only element developed from TM. In other words, kess and ss (if not chosen with M) occur in the finite verb ending while l and n occur in the modifier verb ending; they are mutually exclusive. This observation leads to an analysis where kess and l are two different realizations in the surface structures of the same category M; similarly, ss and n are of the same category Pst.

Apparent counter-examples to the above argument may be those listed in (10).

(10) (i) cŏ salam-i ka-l -kka
Dem N V M <+Q, -Pol>
that man go
"Would that man go?"

(ii) ne-ka ka -l-nŭn -ya
N V M A <+Q, -Pol>
"Will you go?"

Contrary to what has been observed in (9), the element l appears as an element of the finite verb ending in (10). However, what seem to be finite verb endings in (10) are, in fact, nonfinite verb endings because (10i) and (10ii) are, as contracted forms, readily identified with the full forms (11i) and (11ii) respectively.

(11) (i) cŏ salam-i ka-l kŏs i -n -ka

[[Dem N VP]$_S$ N]$_{NP}$ Cop A MD

that man go fact is

"Is it a fact that that man will go?"

(ii) ne -ka ka -l -l -ya -ko ha -nŭn-ya[2]

N [V M A ? ?]$_S$ V A MD

you go do

"Are you going to go?"

If the above observation is correct, the phonological rules which assign proper morphophonemic shapes of the grammatical categories M and Pst can be formulated as follows (with details omitted):

(12) (i) $M \rightarrow \{ \begin{matrix} kess / \_\_ MD \\ l \quad \text{elsewhere} \end{matrix} \}$

(ii) $Pst \rightarrow \{ \begin{matrix} n / \_\_ NP \\ ss \quad \text{elsewhere} \end{matrix} \}$

As shown in (9), there is a hole in the paradigm. That is, there is no modifier verb ending (b) corresponding to the finite verb ending V (a). Therefore, if no restriction is given, the grammar will generate such an ungrammatical string as the following:

*ka -ss -ŏss salam

V Pst PP N

There seems to be no plausible solution to this problem at the moment although several ad hoc measures may be taken for the time

2 The grammatical structure of this sentence is not yet well understood, nor is the nature of the elements ya and ko. It is clear, however, that an S is embedded.

being. One such measure is to include a transformation rule like (13), placed preceding a phonological rule like (12), which deletes PP of the nonfinite verb ending.

(13) GT 13. PP deletion

SD:	X,	Pst,	PP,	(Dem)N,	X
	1	2	3	4	5
SC:	3	→	null		

What should be emphasized in this analysis of the Aux structure is the treatment of the categories M and Pst. It has been claimed in this analysis that both kess and 1 of the surface structures represent the same category, namely M in the deep structure; similarly, both ss and n refer back to the same category Pst in the deep structure. In previous analyses of a nontransformational nature, all these four morphs are recognized as independent categories under various names. For example, Martin (1954) treats kess as "Future Tense" and 1 as "prospective Aspect". Lukoff (1945) treats ss as "Past" and n as "Past Participle".

What is implied, therefore, in the present analysis is the "relation" between the tense and the aspect. It is true that ss, as an element of the finite verb ending, makes reference to the sequence of time, while the element n, as an element of the nonfinite verb ending, makes reference to the state of an event

regardless of time sequence. Therefore, the former could very well be named as "Past Tense" and the latter as "Complete Aspect". With this difference between the "grammatical meanings of the two elements, one might argue against the analysis where the two are considered as the same category, namely Pst. Such an argument, however, will be readily rejected on the grounds that the finite verb ending where ss appears and the modifier verb ending where n appears, are syntactically related in terms of "adnominalization" (see Chapter IV), and that since the two forms are mutually exclusive, their difference of meaning is predictable - "tense" in the finite verb ending and "aspect" in the modifier verb ending. The same argument holds true for the two elements kess and l which are considered as allomorphs of the same morpheme M.

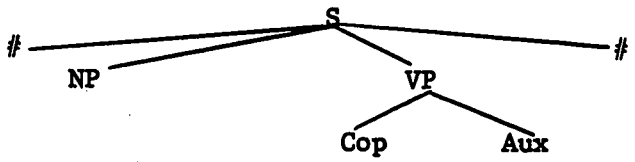
3.3 Copula sentence. The categorial rule 2 of the PGK is quoted here as (14) in order to discuss the structure of copula sentences.

(14) C 2. $VP \rightarrow (Neg)\ (Tim)\ (Loc)\ \left\{ \begin{matrix} (Ins)\ MV \\ (NP)\ Cop \end{matrix} \right\}\ Aux$

Notice that an NP is introduced as an optional element preceding Cop. This means that the categorial rules 1 and 2 of the PGK define deep structures including (15) and (16).

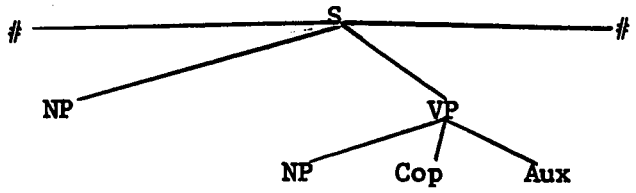
(15) (i) [NP [Cop Aux]]

(ii)



(16) (i) [NP [NP Cop Aux]]

(ii)



The recognition of the structures (15) and (16) can be justified by the sentences in (17) and (18) respectively.

(17) (i) salam i -ta
NP Cop Aux
man is
" It, that, etc. is a man."

(ii) chæk i -ta
" It, this, etc. is a book."

(18) (i) næ -ka cuin i -ta
NP NP Cop Aux
I owner is
"I am the owner."

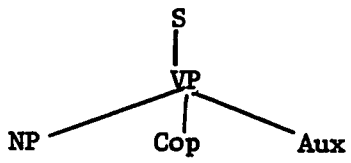
(18) (ii) i kŏs -i chæk i -ta

this thing book is

"This is a book."

A question will arise as to the validity of maintaining these two different deep structures, however, since it is conceivable that the structure (15) may be derived from the structure (16) by deleting the subject NP; optional deletion of the subject NP is well-known in Korean and Japanese although it is not always clear what the constraints governing the deletion are (see below for the discussion on "recoverability"). If the argument is correct, the P-marker for those sentences in (17) may be represented as follows.

(19)



However, not all the strings which receive the structural description shown in (16) may undergo the deletion transformation. Chomsky argues that

> a transformation can delete an element only if the element is the designated representative of the category [which may be realized as <u>it</u>, <u>somebody</u>, a dummy, etc.], or if the structural condition that defines this transformation states that the deleted element is structurally identical to another element of the transformed string (1964: 41).

In other words, nonrecoverable deletion is not allowed as a general constraint on the deletion transformation. This constraint is required for a unique semantic interpretation for the transformed string.

One obvious advantage of the above analysis is that the grammar can account for the data both in (17) and in (18) with one and the same deep structure (16), the grammatical difference and relation between the sentences in (17) and (18) being explained by a transformation like (20).

(20) Subject NP deletion

SD: X, #, △, ka, X, NP, Cop, X
1 2 3 4 5 6 7

SC: 3, 4 → null

One obvious disadvantage, on the other hand, is the introduction of the dummy element. It is not clear how the occurrence of the dummy element can be restricted in the copula sentences. Even if it can be done somehow, the selectional rule will be much complicated. If no selectional restriction is imposed on the occurrence of the dummy, many strings like those in (21) will be derived.

(21) (i) △ -ka △ i -ta

(ii) salam -i △ i -ta

Since these strings do not meet the structural description of (20), the dummy element is not deleted. Here again, it is necessary to introduce the filtering device to get rid of the many ungrammatical strings that contain undeletable dummies.

If the analysis sketched above is adopted, the NP dominated by VP should be introduced as an obligatory element; thus, the categorial rule 2 of the PGK should be modified as (22).

(22) $VP \rightarrow (Neg)\ (Tim)\ (Loc)\ \left\{ \begin{matrix} (Ins)\ MV \\ NP\ \hat{}\ Cop \end{matrix} \right\}\ Aux$

This analysis is what has been generally recognized (implicitly if not explicitly) regarding the structure of copula sentences. In the following, however, an alternative analysis will be examined with evidence that requires the recognition of (15) as a deep structure.

To develop an argument for this alternative analysis, some data are presented in the following.

(23) (i) cŏ salam-i ka -l kŏs i -ta

[[Dem N V M]$_S$ N]$_{NP}$ Cop Aux

that man go fact is

"It is a fact that that man will go."

(He will go.)

(23) (ii) cŏ salam-i ka -n kŏs i -ta

[[Dem N V Pst]$_S$ N]$_{NP}$ Cop Aux

that man go fact is

"It is a fact that that man went."

(He went.)

(24) (i) cŏ salam-i ka -l salam i -ta

[Dem N]$_{NP}$[[[V M]$_S$ N]$_{NP}$ Cop Aux]$_{VP}$

that man go man is

"That man is the man who will go."

(ii) cŏ salam-i ka -n salam i -ta

[Dem N]$_{NP}$[[[V Pst]$_S$ N]$_{NP}$ Cop Aux]$_{VP}$

that man go man is

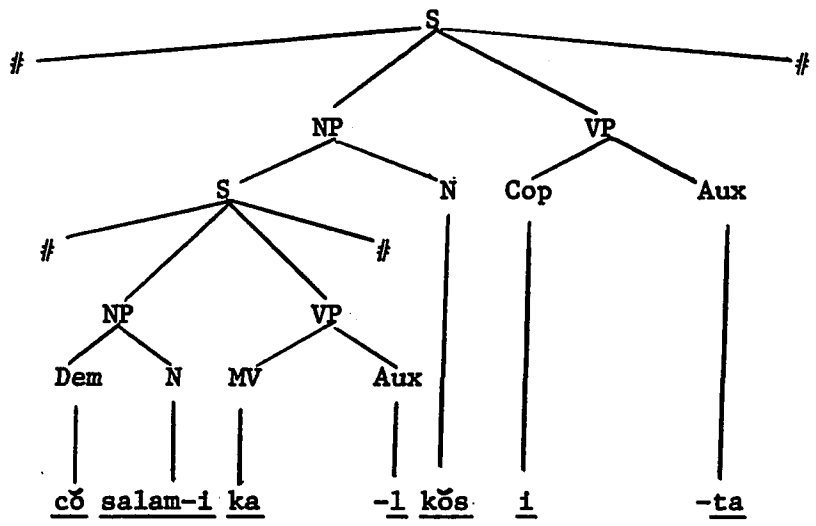
"That man is the man who went."

The surface structures of the sentences in (23) and of those in (24) are identical in that both consist of the same categorial elements shown in the following:

$$\text{Dem}\hat{}\text{N}\text{-}\underline{\text{i}}\hat{}\text{V}\ \begin{Bmatrix}\text{M}\\ \text{Pst}\end{Bmatrix}\ \text{N}\hat{}\text{Cop}\hat{}\text{Aux}$$

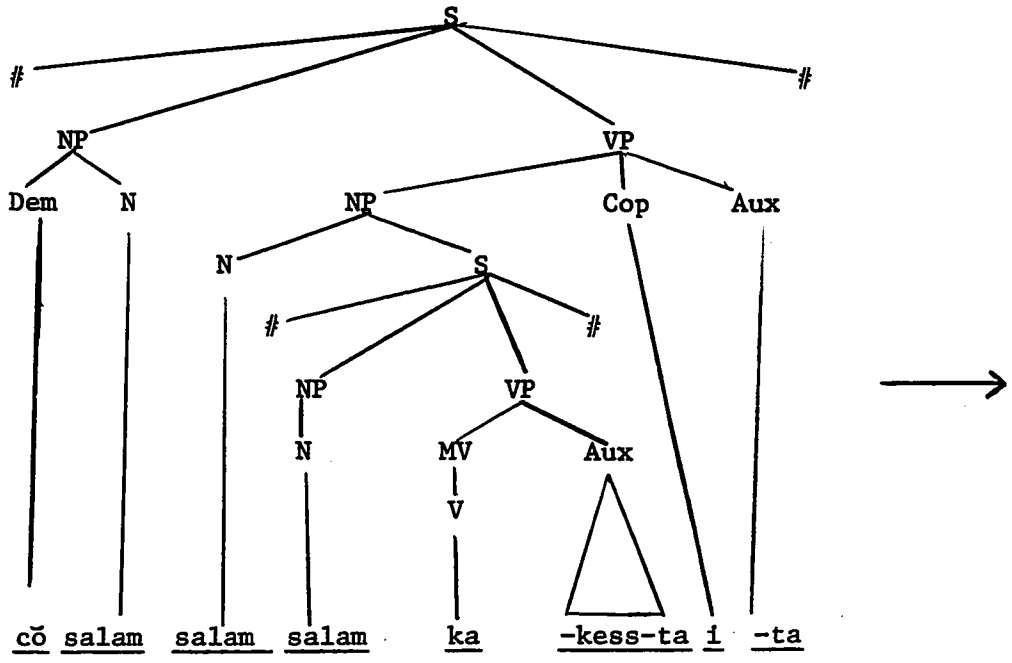
However, the structure underlying the sentences in (23) and those in (24) are different as they are understood differently as illustrated by the labelled brackets and by the simplified P-markers (25) and (26).

(25)

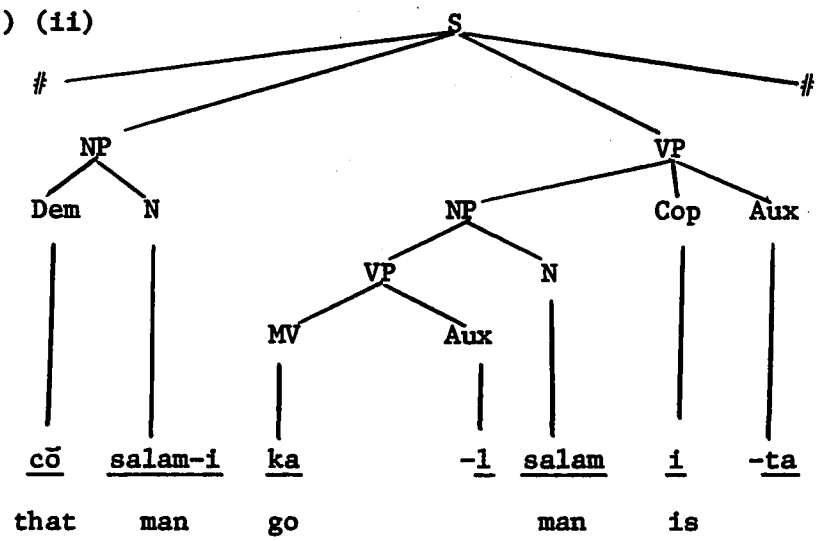


"It is a fact that that man will go."

(26) (i)



(26) (ii)



"That is the man who will go."

Notice that the P-markers (25) and (26) are identical to (15ii) and (16ii) respectively if the embedded S is excluded. In the case of (25), an S is embedded to the left of N and then nominalized (a factive nominalization). In the case of (26), an S is embedded to the right of the second N and then ad-nominalized. The underlying structure (26i) is transformed to (26ii) where the NP of the embedded S is erased by the NP of the matrix S (under the identity condition), and the VP of the embedded S is transposed to the left of the N of the matrix S. Further details of these two transformations will be discussed in Chapter IV.

The point argued here is that the structure (15) should be recognized as a deep structure; otherwise, there will be no way to account for the difference between (25) and (26). This claim is further supported by the fact that in Korean there are

two types of sentence to express exactly the same fact. One may be called the "verbal sentence" and the other the "nominal sentence".

3.4 Verbal S vs. Nominal S. Any sentence whose VP contains a V can be nominalized by converting the whole sentence into a copula sentence. The sentence whose VP contains a V is called here the "verbal S" and the corresponding copula sentence the "nominal S". Compare those sentences in (27) with those in (28).

(27) (i) cŏ salam-i ka -n -ta
Dem N V A MD
that man go
"That man goes."

(ii) cŏ salam-i ka -ss -ta
V Pst MD
"That man went."

(iii) cŏ salam-i ka -kess -ta
V M MD
"That man would (will) go."

(28) (i) cŏ salam-i ka-nŭn kŏs i -ta
[Dem N V A]$_S$ N]$_{NP}$[Cop Aux]$_{VP}$
that man go fact is
"It is a fact that that man goes."

(28) (ii) cŏ salam-i ka-n kŏs i -ta

V Pst

"It is a fact that that man went."

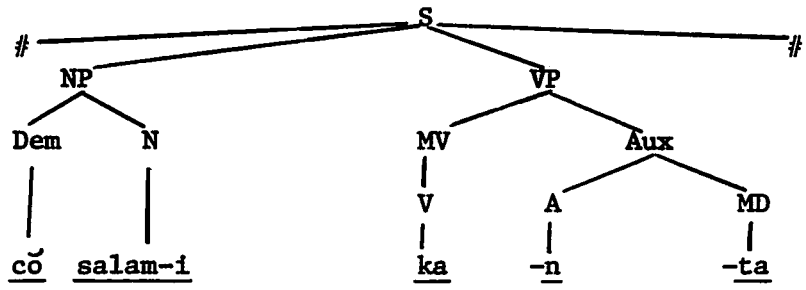
(iii) cŏ salam-i ka-l kŏs i -ta

V M

"It is a fact that that man would go."

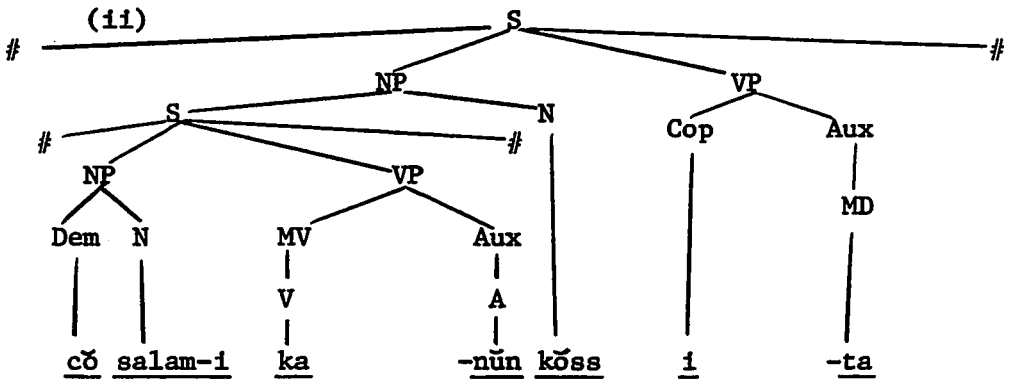
Notice that each verbal S in (27) has its corresponding nominal S in (28). The structural difference between a pair of corresponding verbal S and nominal S is shown by the following P-markers in (29) (which are somewhat simplified, keeping only relevant information).

(29) (i)



"That man goes."

(ii)



"It is a fact that that man goes."

Notice that the whole sentence (29i) is identical to the constituent S of (29ii) except that MD is deleted from the constituent S. Also notice that the constituent structure (excluding the embedded S) of (29ii) is identical to that of (15). Therefore, the constituent structure of the nominal S is equal to that of the copula sentence (15): NP^Cop^Aux.

One of the characteristics of the nominal S is that all the tense-modal distinction is made in the VP of the constituent S, while the VP of the matrix S does not contain the category TM. This fact is illustrated by the following examples.

(30) (i) cŏ salam-i ka-l kŏs i -ta

[Dem N V M]$_S$ N]$_{NP}$ [Cop MD]$_{VP}$

that man go fact is

"It is a fact that that man will go."

(ii) *cŏ salam-i ka-l kŏs i -kess -ta

[Cop M MD]$_{VP}$

(iii) *cŏ salam-i ka-l kŏs i ŏss -ta

[Cop Pst MD]$_{VP}$

(iv) *cŏ salam-i ka-l kŏs i ŏss-ŏss -ta

[Cop Pst PP MD]$_{VP}$

(31) (i) cŏ salam-i ka-l salam i -ta

[Dem N]$_{NP}$ [[[V M]$_S$ N]$_{NP}$ Cop MD]$_{VP}$

that man go man is

"That man is the man who will go."

(31) (ii) cŏ salam-i ka-l salam i -kess -ta

[[[V M]$_S$ N]$_{NP}$Cop M MD]$_{VP}$

"That man would be the man who will go."

(iii) cŏ salam-i ka-l salam i -ŏss -ta

[[[V M]$_S$ N]$_{NP}$Cop Pst MD]$_{VP}$

"That man was the man who was to go."

(iv) cŏ salam-i ka-l salam i ŏss-ŏss -ta

[[[V M]$_S$ N]$_{NP}$Cop Pst PP MD]$_{VP}$

"That man had been the man who was to go."

In (30), only (i) is grammatical while (ii), (iii), and (iv) are ungrammatical because the VP of the matrix S of the latter three contains the category TM (kess, oss, etc.). On the other hand, all strings in (31) are grammatical where TM is allowed both in the embedded and the matrix sentences. In other words, the data in (30) and (31) demonstrate that the Cop of a verbal S may, but the Cop of a nominal S may not, co-occur with any element of TM.

It should be noted here that the constituent structure of the nominal S (strings in (30)) is identical to the copula sentence structure (15), while the constituent structure of the verbal S (strings in (31)) is identical to the copula sentence structure (16). This means that the internal structures of (15) and (16) are so different that it is impossible to derive the former from the latter by simply deleting the subject NP.

Another piece of evidence that supports the distinction between the verbal S and the nominal S, which in turn will prove the difference between (15) and (16) in the deep structure, is found in the following data.

(32) (i) pap-i mŏk -ki sŭup -ta

$[[[[NP\ V]_{MV}]_{VP}]_S\ N]_{NP}\ [MV\ [MD]_{Aux}]_{VP}$

rice eat easy

"It is easy to eat rice." (Rice is easy to eat.)

(ii) pap-i mŏk -ki sŭw -ŏss -ta

$[MV\ [Pst\ MD]_{Aux}]_{VP}$

"It was easy to eat rice." (Rice was easy to eat.)

(iii) *pap-i mŏk-ŏss -ki sŭup -ta

$[[[[NP\ V]_{MV}Aux]_{VP}]_S\ N]_{NP}\ [MV\ [MD]_{Aux}]_{VP}$

(iv) *pap-i mŏk -ŏss -ki sŭw -ŏss -ta

$[MV\ [Pst\ MD]_{Aux}]_{VP}$

(33) (i) salam-i ka -ki sŭup -ta

$[[NP\ [MV]_{VP}]_S\ N]_{NP}[\ MV\ MD]_{VP}$

man go Nom likely

"It is likely that a man will go."

(ii) salam-i ka -ss -ki sŭup -ta

$[[NP\ [MV[Pst]_{Aux}]_{VP}]_S N]_{NP}$

"It is likely that a man went."

(33) (iii) *salam-i ka -ki sŭw -ŏss -ta

[MV [Pst MD]$_{Aux}$]$_{VP}$

(iv) *salam-i ka -ss -ki sŭw-ŏss-ta

[[NP [MV [Pst]$_{AUX}$]$_{VP}$]$_{S}$ N]$_{NP}$

The difference between (32) and (33) is that in the former the category TM is allowed in the VP of the matrix S but not in the VP of the constituent S, whereas in the latter, the reverse is true, i.e. TM is allowed in the VP of the constituent S but not in the VP of the matrix S. The strings (32iii) and (32iv) are ungrammatical because the VP of the constituent S contains Pst (a subcategory of TM), and the strings (33iii) and (33iv) are ungrammatical because the VP of the matrix S contains Pst. The strings in both (31) and (32) are verbal S's, but they are different in that TM is allowed in VP's of both the matrix and of the constituent S's in the former, whereas it is allowed only in the VP of the matrix S in the latter. However, these two types of verbal S's are different from the two types of nominal S's (30) and (33) in that the latter do not allow TM in the VP of the matrix S while the former do.

Incidentally, notice the behavior of sŭu(p). The syntactic behavior of this word in the nominal S is quite distinct from that in the verbal S although it is usually considered one and the same word.

Two different structures for the nominal S have been examined so far, the constituent structures being (I) NP^Cop^Aux and

(II) NP^sUup^Aux. Each nominal S of the type (I) has its verbal counterpart. On the other hand, there is no verbal counterpart in the case of (II).

What has been argued in the preceding discussion is that the structure (15) is different basically from the structure (16), i.e. the former cannot be derived from the latter by deleting an NP. Two obvious reasons are as follows. If (15) is to be derived from (16) by deleting an NP on some identity condition (which is difficult to maintain), it is not clear which NP is to be deleted. Is the subject NP deleted, or is the predicate NP deleted? Furthermore, since the Aux structure (especially when TM is involved) of the nominal S, whose constituent structure is identical to (15), is different from that of the verbal S, whose constituent structure is identical to (16), the difference between (15) and (16) cannot be accounted for by simply deleting an NP, nor can the different Aux structures be related in terms of transformation. It seems, therefore, reasonable to treat (15) and (16) as two deep structures until further evidence turns up to relate them in terms of a grammatical transformation.

3.5 Simple sentence vs. complex sentence. By definition, the complex sentence is a sentence which contains within its domain one or more sentences whereas the simple sentence does not contain any sentence within itself. To explain the constituent structures of various simple and complex sentence structures generated by the PGK, the categorial rules 3 and 5 are quoted here as (34).

(34) (i) MV → (NP) (S) V

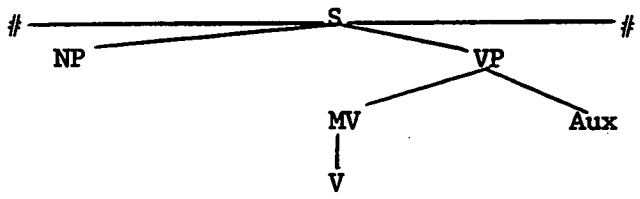
(ii) NP → (S) (Dem) N (S)

Simple sentences include the two types of copula sentences discussed in 3.4. The copula sentences may not contain an embedded S in the VP, but they may become complex sentences by embedding one or more S's in the NP. One of such embedding processes has already been discussed in connection with the nominal S.

Two other simple sentence structures defined by the categorial rule (34i) are as follows:

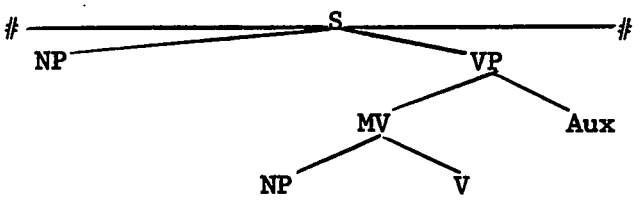
(35) (i) [NP [V Aux]]

(ii)



(36) (i) [NP [[NP V] Aux]]

(ii)



The V of (35) may be either an adjective (<+Aj>) or a verb (<-Aj>). An alternative analysis, where the adjective is considered as a major category (Aj) on a par with V, will include a third structure: [NP [Aj Aux]]. Structural grammarians of Korean, including Lukoff, Martin, and Park, treated both the verb and the adjective as one major category, and a distinction between them is made by labelling the former as "action verb" and the latter as "descriptive verb". Song follows the same analysis. The argument for such an analysis is primarily based on the m o r p h o l o g i c a l rather than any other part of the syntax. That is, the morphological structures of verbs and adjectives are so similar that it is simpler to treat them as one and the same category. Although the argument is quite appealing, there is considerable evidence from elsewhere in the syntax to suggest an alternative analysis where Aj is recognized as a major category. For instance, no adjective may co-occur with the category Ins, and many adjectives may not co-occur with the category Loc. It is not easy, therefore, to choose one analysis against the other at this stage. Accordingly, no specific effort is made to defend the alternative taken in the PGK.[3]

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3 Lakoff and Postal argue for the alternative where the two are treated as one major category (Lakoff, 1965). Prideaux also argues for the same alternative in his Japanese grammar (1966).

The V of the structure (36) is obviously a transitive verb, and the NP preceding the verb is the object of the verb. The PGK does not generate a structure where an indirect object noun is included as an obligatory constituent along with a direct object noun. Although it is quite conceivable that such a structure may turn out to be recognized, it is very difficult to justify it within the scope of the present analysis. Consider the following English sentences.

(37) (i) He left the money to me.

(ii) He left me the money.

(38) (i) He deposited the money to his account.

(ii) *He deposited his account the money.

The grammatical relation between (37i) and (37ii) is clear, but the same relation does not hold between (38i) and (38ii). This means that the underlying structure of (37) is different from that of (38). That is, the constituent to me in (37i) is different from to his account in (38i) in that the former holds the "indirect object" relation to the verb, but the latter does not. It is reasonable, therefore, to set up two different underlying structures to account for the difference. Now consider similar Korean sentences in (39).

(39) (i) kŭ -ka na -eke ton-ŭl makki-ŏss-ta
he I to money leave
"He left the money to me."

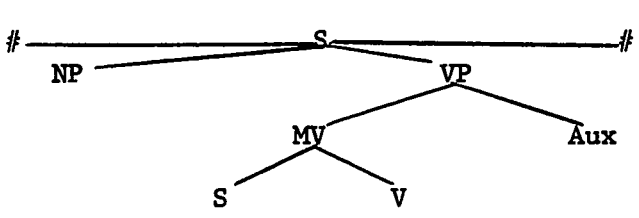
(ii) kŭ -ka ŭnhæŋ-e[4] ton-ŭl ipkumha-yŏss-ta
he bank to money deposit
"He deposited the money in the bank."

The syntactic behavior of (39i) which contains the constituent na-eke "to me" and that of (39ii) which contains the constituent ŭnhæŋ-e "in/to the bank" are exactly the same. There is no reason to set up different structures to account for the data. The constituents na-eke and ŭnhæŋ-e hold the same grammatical relationship to the verb, whatever the relationship may be. Therefore the PGK does not include a structure with an indirect object although further investigation might be able to justify such a structure.

Complex sentence structures that involve an embedded S in VP are of the two types:

(40) (i) [NP [[S V] Aux]]

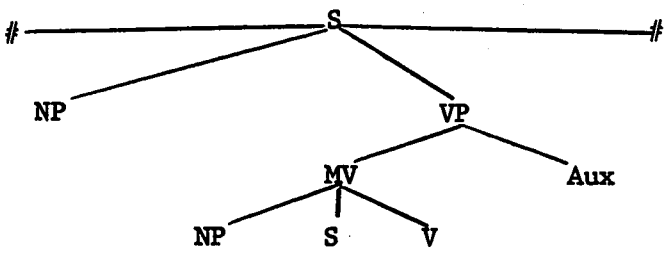
(ii)



4 eke and e are allomorphs of the same morpheme; the former occurs after an animate noun, the latter after an inanimate noun.

(41) (i) [NP [[NP S V] Aux]]

(ii)



The structure (40) is recognized as a deep structure in order to account for such data as in (42).

(42) (i) sŏnsæŋ-i ca -ko iss -ta

NP [[V]$_S$ V]$_{MV}$Aux

teacher sleep is

"The teacher is sleeping."

(ii) sŏnsæŋ-i ca po -n -ta

[[V]$_S$ V]$_{MV}$ Aux

teacher sleep see/try

"The teacher tries sleeping."

(iii) sŏnsæŋ-i sul-ŭl coh-a ha -n -ta

NP [[NP +Aj]$_S$ V]$_{MV}$ Aux

teacher wine fond do/feel

"The teacher likes wine."

(iv) sŏnsæŋ-i haksæŋ-eke chæk-ŭl ilk -ke ha -n-ta

NP [[NP NP V]$_S$ V]$_{MV}$Aux

teacher student book read do/make

"The teacher makes the student read the book."

(42) (v) sŏnsæŋ-i ca-ko siph-ŏ ha -n-ta

NP [[[[[V]$_S$ V]$_{MV}$]$_{VP}$]$_S$ V]$_{MV}$Aux

teacher sleep desirable feel

"The teacher wants to sleep."

The first two sentences above are similar in that both have a verb ca "sleep" and another verb stem. Those verbs underlined have often been treated as "auxiliaries" in structural grammars. The two sentences (iii) and (iv) are similar in that both contain the verb ha. The syntactic property of this particular verb is discussed in detail in Chapter V. The last sentence is similar both to (i) and (ii), and (iii) and (iv) as it contains the verb ca "sleep" and the verb ha "do/make". However, all the five sentences are analyzable in terms of the constituent structures shown in (40).

One of the serious difficulties in treating the second verb stem as an "auxiliary" is the lack of generative power to account for such a sentence as (43) where two or more such "auxiliaries" co-occur.

(43) næ-ka pap-ŭl mŏk-ŏ cu-ŏ po-ko siph-ŏ ha-n-ta

NP [NP V V V V V Aux]$_{VP}$

I rice eat give see wish do

(give = render the service of; see = try; do = feel)

"I wish I could try eating the rice (for someone)."

Suppose that mŏk "eat" is the main verb and the rest of the verb stems, namely, cu, po, siph, and ha are auxiliaries. It will be extremely difficult, if not impossible, to define the relationship between the "main" verb and the "auxiliaries". Is each one of these "auxiliaries" related independently to the main verb? Are these somehow amalgamated before being related to the main verb? The following parsing procedure (44) shows the difficulty involved in the taxonomic approach to the problem.

(44) næ-ka pap-ŭl mŏk-ŏ cu-ŏ po-ko siph-ŏ ha -n-ta

1 NP	VP				
2	NP	MV			Aux
3		V	Ax		
4 a) ?			Ax_1	Ax_2	
b) ?			Ax_1	Ax_2	
c) ?			etc.		

In the fourth step of parsing, it is impossible to decide which analysis is correct. As it is impossible to give a unique analysis, so is it impossible to define a unique grammatical relationship between the constituents. This taxonomic approach, furthermore, presents a semantic problem. Consider the sentence (45), which is exactly the same as (43) except the order of the two "auxiliaries" is changed.

(45) næ-ka pap-ŭl mŏk-ŏ po-a cu-ko siph-ŏ ha-n-ta

The meaning of (45) is by and large the same as that of (43). However, an inquisitive native speaker will notice the subtle difference in meaning between the two sentences. And there is no syntactic means to account for the subtle difference of meaning in the taxonomic analysis, whereas there is a syntactic means to account for the fact in the transformational analysis presented in this study.

In order to present a solution to the problem and to give a unique analysis to the sentences in (42), the structure illustrated in (40) is considered to be the deep structure underlying all the sentences in (42). In this analysis, what has been called "auxiliary" is treated as a VP (Aux deleted) of a full sentence. Thus, contrary to the taxonomic analysis, the outside verb stem ("auxiliary") is the VP of the matrix S, and the inside verb stem ("main verb") is the VP of the constituent S. This self-embedding process is better illustrated by (46).

(46) [næ-ka $[[[[$pap-ŭl mŏk-ŏ$]_{S_4}$ po-a$]_{S_3}$ cu-ko$]_{S_2}$ siph-ŏ$]_{S_1}$ ha-n-ta$]_{S_0}$

Notice that all NP's (subject) except that of S_0 are deleted. The functional relationship among the sentences are clear: S_4 is the complement of the verb of S_3, the sum of S_4 and S_3 is, in turn, the complement of S_2, and so on. Further details will be discussed in Chapter V.

There are only a few subclasses of verbs and only one type of structure for the embedded S (namely, the copula sentence) that

may fit the structure illustrated in (41). Accordingly, there is no need for a preliminary discussion on the constituent structure (41) in this chapter.

The categorial rule quoted as (34ii) defines three types of complex NP structures (Dem is excluded for the sake of simplicity).

(47) (i) S^N

(ii) N^S

(iii) S^N^S

The NP structure with an embedded S to the left of N (left-branching) underlies various surface structures that have undergone factive nominalizations. The structure with an embedded S to the right of N (right-branching) undergoes the adnominalization. In the surface structure, however, the right-branching S changes the position with N, so that the two surface structures (47i) and (47ii) are alike. The similarity in the surface structures and the difference in the deep structures of the two are illustrated by the following strings.

(48) (i) ttŏna -l kŏhŏk

[[V M]$_S$ N]$_{NP}$

leave plan "a plan to leave"

(ii) *kŏhŏk-i ttŏna -kess-ta

[NP V M]$_S$

plan leave *"A plan will leave."

(49) (i) ttŏna-l salam

[[V M]$_S$ N]$_{NP}$

leave man "a man who will leave"

(ii) salam-i ttŏna-kess-ta

[NP V M MD]$_S$

man leave "A man will leave."

The grammatical relationship between the pair in (49) is clear in that (ii) is embedded in (i). However, the same relationship does not hold between the pair in (48). This is one of the reasons that the two underlying structures (47i) and (47ii) must be recognized.

The structure (47iii) involves both the right-branching S and the left-branching S. Consider the following string.

(50) (i) ttŏna-l kantanha-n kŏhŏk

[[V M]$_S$ [V A]$_S$ N]$_{NP}$

leave simple plan

"a simple plan to leave...."

The string (50i) minus the constituent <u>kantanha-n</u> equals the string (48i); another S is embedded into (48i). The second S in the surface structure (50i) comes from the S embedded to the right of N in the deep structure because the following is a grammatical string (see (49)).

(50) (ii) kŏhŏk-i kantanha-ta

$[_{NP}$ V MD$]_S$

plan simple

"The plan is simple."

Further details concerning the grammatical processes of those complex NP structures, especially the difference between right-branching and left-branching, will be discussed in the chapter immediately following.

3.6 Negation. Before this chapter is closed, a brief discussion on negation will be presented because one of the negative sentence constructions involves an embedding transformation.[5] The structures of negative sentences defined by the categorial rules (plus the Neg placement rule) can be summarized as follows:

(51) (i) (a) NP^ Neg^Cop^ Aux

(b) NP^ NP^ Neg^ Cop^Aux

(ii) (a) NP^ Neg^ V^Aux

(b) NP^ NP^ Neg^ V^Aux

The category Neg has two subcategories, namely Ng1 (an(i) "not") and Ng2 (mot "cannot"). The negation of copula sentences (51i)

5 Song presented the most extensive and insightful study on negation in Korean in his dissertation. Many of his observations are incorporated in the following discussion.

is distinguished from the negation of noncopula sentences (51ii) by the obvious fact that the former may take only Ng1 while the latter make take either Ng1 or Ng2 freely, as seen in the following examples.

(52) (i) cŏ salam-i sŏŋsæn-i an i -ta
NP NP Ng1 Cop Aux
that man teacher not is
"That man is not a teacher."
(ii) *cŏ salam-i sŏnsæŋ-i mot i -ta
Ng2 Cop Aux

(53) (i) sŏnsæŋ-i ani ka -n-ta
NP Ng1 V Aux
teacher not go
"The teacher does not go."
(ii) sŏnsæŋ-i mot ka -n-ta
Ng2
"The teacher cannot go."

However, the foregoing statement cannot be maintained if the V in (51ii) is taken to be an adjective. Consider the counter-examples in the following:

(54) (i) sŏnsæŋ-i ani miup -ta

NP Ng1 <+Aj> Aux

teacher not ugly

"The teacher is not ugly."

(ii) *sŏnsæŋ-i mot miup -ta

Ng2

(55) (i) *sŏnsæŋ-i ani alŭmtaup -ta

NP Ng1 <+Aj> Aux

teacher not beautiful

(ii) sŏnsæŋ-i alŭmtaup -ci ani ha -ta

NP [[<+Aj>]$_S$ N]$_{NP}$Ng1 V Aux

teacher beautiful Nom not do/is

"The teacher is not beautiful".

(iii) sŏnsæŋ-i alŭmtaup -ci mot ha -ta

Ng2

"The teacher is not beautiful."

(56) (i) sŏnsæŋ-i ka -ci ani ha -n-ta

NP [[<-Aj>]$_S$ N]$_{NP}$ Ng1 V Aux

teacher go Nom not do

"The teacher does not go."

(ii) sŏnsæŋ-i ka -ci mot ha -n-ta

Ng2

"The teacher cannot go."

The above data are presented to prove that (1) Ng2 cannot precede an adjective as shown by (54ii), (2) even Ng1 cannot precede an adjective which has more than two syllables as shown by (55i), and (3) both Ng1 and Ng2 are freely used to negate any noncopula sentence without restrictions in a complex construction as shown by (55ii), (55iii), (56i) and (56ii). In short, irregularity is involved with sentences whose predicate V is an adjective. This irregularity is eliminated by restricting the occurrence of Neg (in the lexicon); i.e. Neg may co-occur only with verbs. An immediate question will be: How can a sentence with an adjective predicate be negated? The answer lies in the nominalization transformation as indicated by the labelled bracket analyses of those strings in (55) and (56). Further details will be presented in 4.3.

Now the following generalizations can be made concerning the negative sentence constructions in Korean. There are two different underlying structures for negation: one is called "simple negation" and the other "complex negation". Only simple negation is possible for any copula sentence which is not a nominal S, only complex negation is possible for any sentence with an adjective predicate, and both simple and complex negations are possible for any sentence with a verb predicate.

CHAPTER IV

EMBEDDING PROCESSES IN THE NOUN PHRASE

4.1. Left-branching vs. right-branching. In 3.5, a preliminary discussion concerning left-branching and right-branching was presented as a partial defence of C5 of the PGK. The embedding process which involves a left-branching S undergoes one of the nominalization transformations, whereas the embedding process which involves a right-branching S undergoes what is called the adnominalization transformation. These two types of process will be discussed in detail in this chapter. These two embedding processes are different from the self-embedding process in the verb phrase, which will be discussed in the following chapter.

Two grammatical processes, namely, the factive nominalization and the adnominalization, are required in order to explain the ambiguity involved in a sentence like the following.

(1) sŏnsæŋ-i mŏk-nŭn kŏs-i coh -ta
[[NP VP]$_S$ N]$_{NP}$ V Aux

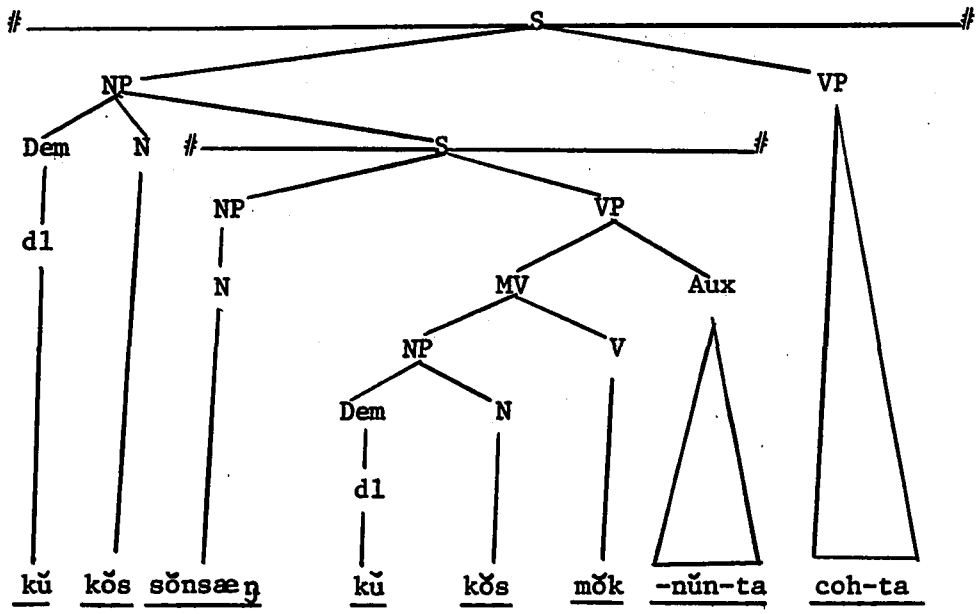
teacher eat thing/fact good

(i) "The thing that the teacher eats is good."

(ii) "The fact that the teacher eats is good."

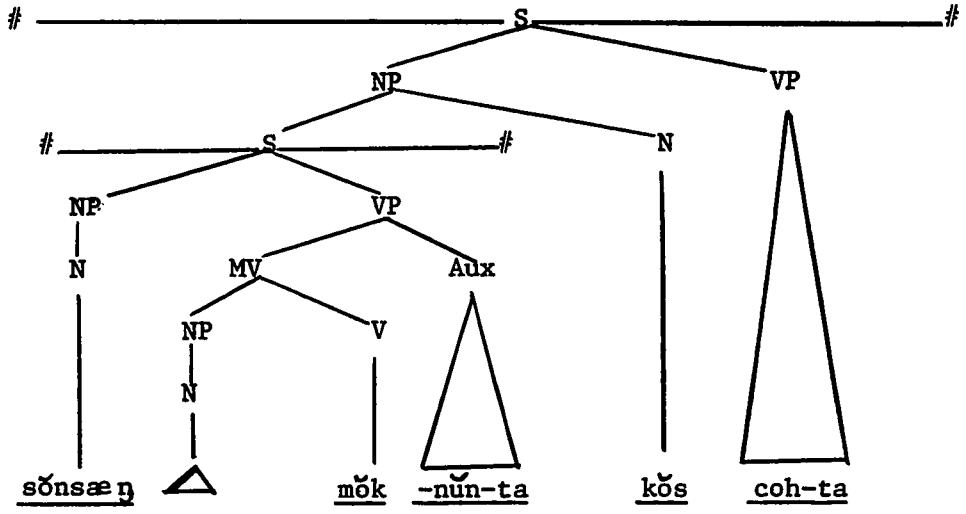
The underlying P-markers (2i) and (2ii) correspond to the interpretations (1i) and (1ii) respectively.

(2) (i)



"The thing that the teacher eats is good."

(ii)



"The fact that the teacher eats (something) is good."

The structure (2i) contains a right-branching S, and undergoes the adnominalization transformation by which the embedded S and the

flanking N change positions (with proper deletions which will be discussed in the following selction). The structure (2ii), on the other hand, contains a left-branching S, and undergoes the factive nominalization deleting several elements. Another rule, whose nature is not clear at the moment, deletes the object NP of the constituent S, which is a dummy.[1] Hence, the derived strings of (2i) and (2ii) are identical as seen in (1).

Notice the two different syntactic properties of the noun kŏs. It is a common noun ("thing") in (2i), but it is an abstract noun ("fact" or "nominalizer") in (2ii). Because of these two different syntactic properties, the lexicon contains the following two separate entries although they may be intuitively felt to be the same word.

(3) (i) kŏs $\langle \begin{matrix} -BP, +Cnt \\ +Dem\_\_(S) \end{matrix} \rangle$ (<-An, +Con>)

(ii) kŏs $\langle +\{\begin{matrix} Dem \\ S \end{matrix}\}\_\_ \rangle$ (<+Nom, -Tim, -Con>)

(In the parentheses are redundant features.) The two lexical items (3i) and (3ii) are similar in that they are not free forms, requiring a demonstrative (or an S in the case of the latter). On the other hand, they are quite different in that the former, like any other ordinary countable noun, may have a right-branching S or/and the plural morpheme tŭl, whereas the latter may not. Therefore, the sentence (4) is not ambiguous, the morpheme in question being a countable noun, and the whole string undergoing the adnominalization transformation.

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1 For deletion of dummy, see pp 83-5.

(4) sŏnsæŋ-i mŏk-nŭn kŏs tŭl -i coh -ta
[[NP VP]$_S$ N Pl]$_{NP}$ V Aux
teacher eat things good
"Those things that the teacher eats are good."

The ambiguity of the sentence (1) is mainly due to the deletion of NP: In the deep structure (2i), the constituent S contains an object NP, which is deleted when the whole structure undergoes the adnominalization. The constituent S of the deep structure (2ii) also contains an object NP which is a dummy and is deleted. Therefore, two other unambiguous cases besides (4), are those illustrated by the strings in (5), where (i) the object NP remains undeleted in the derived string, and (ii) the predicate verb of the string is an intransitive verb, so that the deletion of NP is irrelevant to the string.

(5) (i) sŏnsæŋ-i pap-ŭl mŏk-nŭn kŏs-i coh-ta
[[NP NP V Aux]$_S$ N]$_{NP}$ VP
teacher rice eat fact good
"The fact that the teacher eats rice is good."

(ii) sŏnsæŋ-i kŏt-nŭn kŏs-i coh-ta
[[NP V Aux]$_S$ N]$_{NP}$ VP
teacher walk fact good
"The fact that the teacher walks is good."

The constituent S of (5i) contains a transitive verb mŏk "eat" and an object NP pap-ŭl "rice" which remains undeleted. The constituent S of (5ii) contains an intransitive verb, whose structural analysis does not meet the structural description of the transformation which deletes the object NP. Therefore, each of these sentences receives only one interpretation, the morpheme kŏs being identified as (3ii).

A further difference between the structures of (2i) and (2ii) is observed in the restrictions on the Aux of the constituent S. The underlying structure of the sentence in (6) contains a right-branching S, and that of those in (7) a left-branching S.

(6) (i) sŏnsæŋ-i mŏk-nŭn kŏs-i coh -ta
[NP V [A]$_{Aux}$]$_S$

"The thing that the teacher <u>eats</u> is good."

(ii) sŏnsæŋ-i mŏk-ŭn kŏs-i coh -ta
V [Pst]$_{Aux}$

"The thing that the teacher <u>ate</u> is good."

(iii) sŏnsæŋ-i mŏk-ŭl kŏs-i coh -ta
V [M]$_{Aux}$

"The thing that the teacher <u>will eat</u> is good."

(7) (i) sŏnsæŋ-i o -nŭn kŏs-i coh -ta
[NP V [A]$_{Aux}$]$_S$

teacher come fact good

"The fact that the teacher comes is good."

(ii) *sŏnsæŋ-i o -n kŏs-i coh-ta
V [Pst]$_{Aux}$

(iii) *sŏnsæŋ-i o -l kŏs-i coh-ta
V [M]$_{Aux}$

It is clear that the Aux of the constituent S of (6) may include A, Pst, or M, but that of (7) may include only A. In other words, the Aux structures I, II, and III (see chart (5) of Chapter III) are allowed for the right-branching S, whereas only the Aux structure I is allowed for the left-branching S.

Since the Aux structure types II to VI are developed by choosing the category TM, it may be said alternately that the Aux of the left-branching S in (2ii) does not contain the category TM. This statement, however, is true of sentences of the "verbal S" type only. Sentences of the "nominal S type are under different restrictions which are very complicated with respect to TM. Some discussion concerning this problem is developed in the following section.

4.2. Factive and nonfactive nominalization. The two types of nominalizations that are investigated in this section are the "factive nominalization" which involves an embedded S to the left of the noun kŏs "fact" and the "nonfactive nominalization" which involves an embedded S to the left of ki (nominalizer). The two factive nominalization rules are formulated, one for sentences of the verbal S type, the other for those of the nominal S type.

(8) GT 7. Factive nominalization

(i) SD: X, #, X, (TM), A, MD, #, kŏs, X, $\{^{MV}_{NP\hat{}Cop}\}$, X
1 2 3 4 5 6 7 8 9 10 11

SC: 2, (4), 6, 7 null

(ii) SD: X, #, X, MD, #, kŏs, Cop, (TM), A, MD, #, X
1 2 3 4 5 6 7 8 9 10 11 12

Cond: 12 = null

SC: 2, 4, 5, (8) → null

Compare the two rules. They delete the same categories and symbols, the only difference being that the former deletes the TM of the constituent S, while the latter the same of the matrix

S.[2] This difference is due to the fact that the former operates on the structures underlying the verbal S type and the latter on the structures underlying the nominal S type. As discussed in 3.4, the tense-mode distinction is made in the matrix S in the verbal S type, while the same is made in the constituent S in the nominal S type.

An even more significant difference between the two rules, which is again due to the two different S types, is that the former may repeat the cycle more than once, but the latter operates only once. This means that the nominal S contains within itself an embedded S, but the whole sentence itself may not be embedded into another sentence. The condition imposed on the structural index 12 of (18ii) clearly indicates this fact.

The factive nominalization, especially (8i) is partly responsible for what is known as "double" or "multiple" subject constructions. Notice how the sentences are expanded in (9).

(9) (i) sŏnsaeŋ-i kŏt-nŭn-ta
[NP VP]$_S$

teacher walk

"The teacher walks."

(ii) sŏnsæŋ-i kŏt-nŭn kŏs-i ppalŭ-ta
[[[NP VP]$_S$ N]$_{NP}$ VP]$_S$

fact/way fast

"The way the teacher walks is fast."

---

2 The nominal S type needs further adjustment with respect to TM. For example, in a literary style, it is possible that only M (but not T) of the matrix S is deleted. Any further detail, however, is beyond the scope of the present analysis.

(iii) sŏnsæŋ-i kŏt-nŭn kŏs-i ppalŭn-n kŏs-i punmyŏnha-ta
[[[[[NP VP]$_S$ N]$_{NP}$ VP]$_S$ N]$_{NP}$ VP]$_S$
obvious

"It is obvious that the way the teacher walks is fast."

The embedding processes involved in those sentences above is unbounded theoretically. The postnominal particle i (alternately with ka) has often been called the "subject marker" although the grammatical function implied in this term is debatable.[3] In the sentences in (9), each NP is followed by the particle i. The left-most NP is the subject NP of the innermost S, and the right-most NP is the subject NP of the outermost S (matrix S). This recursive embedding process is illustrated by the P-markers in (10).

---

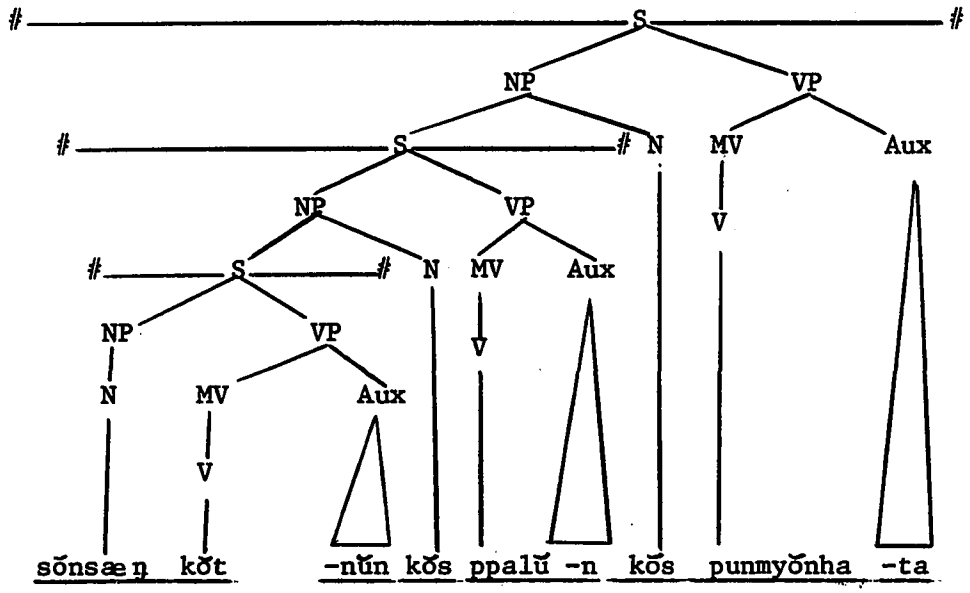
3 Notice the underlined particles in the following sentences:

(i) cŏ salam-i sŏnsæŋ-i an i -ta
NP [NP Neg Cop Aux]$_{VP}$
that man teacher not is
"That man is not a teacher."

(ii) pap-i mŏk ki-ka coh-ta
NP [[[V]$_S$ N]$_{NP}$ V Aux]$_{VP}$
rice eat Nom good
"Rice is good to eat."

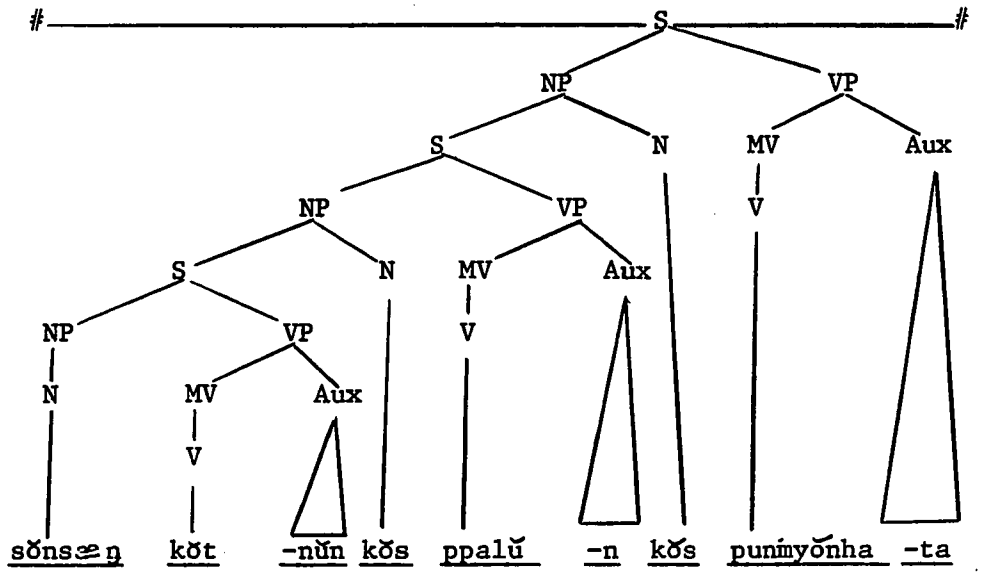
The first i in both sentences may be said to play the function of "subject marker" but the second i in (i) and ka in (ii) may not. Obviously, the second NP in (i) followed by i is not the subject of the sentence; neither is the second NP in (ii). The second NP in (ii), in fact, is a transform of an NP followed by e in the deep structure, which is an adverbial phrase. This observation also supports an analysis where such a particle is not introduced by a categorial rule (in the deep structure), but simply inserted by post-cyclic transformational rules.

(10) (i)



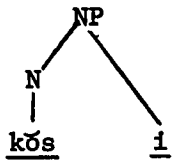
The structure above is analyzable in terms of the SD of (8i), so that the factive nominalization transformation repeats two cycles (as there are two embedded S's), thus, yielding the following P-marker.

(ii)



The postnominal particle i is inserted under each NP of the above P-marker, as shown by the subtree (10iii), by a postcyclic rule like (11).

(10) (iii)



(11) GT 14. Postnominal particle insertion

(i) SD: X, (Dem) N, VP, X
1 2 3 4

SC: 2 → 2^ka

By a phonological rule, ka is converted to i in the environment where the preceding noun ends in a checked syllable as in all cases in the derived P-marker (10ii).

To return to the issue concerning the "multiple subject", each NP marked by the particle i has its own predicate VP in the deep structure, and the subject of the whole sentence is the highest NP dominated directly by the highest node S.

The nonfactive nominalization is similar to the factive nominalization in that it also requires two rules, one for the structure of the verbal S type and the other the nominal S type, for similar reasons. A greater difference is found in the distribution of the NP which contains an embedded S. Although the present study is very limited, a statement can be made as to the distribution of the NP headed by the nominalizer ki. It may occur (i) as an adverbial phrase (see footnote 3), (ii) as an

object phrase of the verbal S type, and (iii) as a subject phrase of the nominal S type whose MV is sïup "likely" (see 3.4 for two types of the nominal S structure). Since various adverbial constructions are excluded from the present study, only the latter two cases are considered in connection with the nonfactive nominalization.

The two rules (i) and (ii) of (12) correspond to (i) and (ii) of (8) respectively. The two different conditions are due to the peculiar character of the verb ha "do" which requires the identity condition.

(12) GT 8. Nonfactive nominalization

(i) SD: X, #, NP, X, #, NP, X, Aux, #, ki, X, V, X
1 2 3 4 5 6 7 8 9 10 11 12 13

Cond: [12 = ha; 3 = 6 / 12 ≠ ha]

SC: [5, 6, 8, 9 / 5, 8, 9] → null

(ii) SD: X, #, X, (T), (M), A, MD, #, ki, sïup, (TM), X, #, X
1 2 3 4 5 6 7 8 9 10 11 12 13 14

Cond: 14 = null

SC: 2, (5), 6, 7, 8, (11) → null

Recall that in the factive nominalization, the category A of the constituent S remains undeleted, but in (12i) all the subcategories of Aux (TM, A, MD) are deleted as illustrated by the examples in

(13). If the V of the matrix S is ha, the identity condition is required and the subject NP of the constituent S is erased by the subject NP of the matrix S as in (13i). If the V of the matrix S is other than ha, the identity condition is irrelevant as in (13iv) where the subject NP of the constituent S remains. Notice that the subject NP of the matrix S and that of the constituent S are not identical in (13iv). However, the grammar may generate a string like (14i) where the two NP's in question are identical. In this case, the subject NP of the constituent S is "reflexivised" as in (14ii).

(13) (i) sŏnsæŋ-i kŏt ki-lŭl ha -n-ta
NP [[[V]$_S$ N]$_{NP}$ V]$_{MV}$ Aux
teacher walk Nom do

"The teacher walks."

(ii) *sŏnsæŋ-i kŏt-nŭn ki-lŭl ha -n-ta
[V A]$_S$

(iii) *sŏnsæŋ-i kŏl-ŏss ki-lŭl ha -n-ta
[V Pst]$_S$

(iv) sŏnsæŋ-i næ-ka kŏt ki-lŭl pala -n-ta
NP [[[NP VP]$_S$ N]$_{NP}$ Aux
teacher I walk Nom hope

"The teacher hopes that I walk."

(14) (i) sŏnsæŋ-i sŏnsæŋ-i kŏt ki-lŭl pala -n-ta
NP [[[NP VP]$_S$ N]$_{NP}$ V]$_{MV}$ Aux
teacher teacher walk hope

(ii) sŏnsæŋ-i casiŋ-i kŏt ki-lŭl pala -n-ta
oneself

"The teacher hopes that he (himself) will walk."

Recall again that in (8ii) the categories T, M, and A are all allowed in the constituent S, but only T is allowed in (12ii) as shown by the examples in (15).

(15) (i) sŏnsaeŋ-i kŏt ki-ka sŭup-ta
[[NP VP]$_S$ N]$_{NP}$ VP
teacher walk likely

"It is likely that the teacher will walk."

(ii) sŏnsaeŋ-i kŏl-ŏss ki-ka sŭup-ta
[V Pst]$_{VP}$

"It is likely that the teacher walked."

(iii) *sŏnsaeŋ-i kŏt-nŭn ki-ka sŭup-ta
[V A]$_{VP}$

(iv) *sŏnsaeŋ-i kŏl-ŭl ki-ka sŭup-ta
[V M]$_{VP}$

At this point, it must be stated clearly that there is a serious problem regarding the selectional restrictions. That is, the selectional feature as it is formulated and understood does not provide a proper means to account for the selectional restrictions between the NP headed by ki and verbs. Compare the sentence (13iv) with those in (16).

(16) (i) *sŏnsæŋ-i næ-ka kippŭ ki-lŭl kwŏnha-n-ta
teacher I happy Nom advise

(ii) *sŏnsæŋ-i næ-ka kippŭ ki-lŭl sŏtulŭn-n-ta
hurry

The constituent structures underlying (13iv) and (16) are the same: each has a subject NP, a transitive verb, and an objcet NP.

The three verbs carry exactly the same contextual features: all three are transitive verbs, and may choose a human noun as the subject and an abstract noun as the object. And yet, only (13iv) is grammatical, but those in (16) are not. Those strings in (16) are not grammatical because the constituent S of the NP headed by ki (object) contains an adjective, not a verb. Notice, however, that any NP headed by ki is undoubtedly an abstract NP (comparable to abstract N) no matter what the MV of constituent S may contain, and that (13iv) will still be grammatical even if the V of the constituent S is replaced by an adjective like kippŭ "happy". Therefore, it is clear that there is no way, in the grammatical framework outlined in Chapter II, to account for the restriction between the category V of the constituent S of an NP (which is the object in the examples cited) and the predicate verb. McCawley observes a similar case where the selectional restriction is relevant not to the (head) noun but to the noun phrase as a whole, and makes a proposal that

> the selectional features of verbs and adjectives refer to semantic features of noun phrases rather than to syntactic features of nouns and that to determine whether a noun phrase meets the selectional restrictions of a verb, it is necessary to run it through the projection rules of the semantic component (1966:29).

Although it is not clear if the restriction should be handled by the semantic component as McCawley suggests (some counter-arguments are developed in Chapter V), there seems to be no plausible syntactic means to solve the problem.

Returning to the rule (12ii), the verb sïup, as a predicate verb of the nominal S, is semantically and syntactically different from the verb sïup, as a predicate verb of the verbal S. Semantically, sïup means "likely" in a sentence of the nominal S type, and "easy" in a sentence of the verbal S type. Syntactically, it must take an NP headed by ki as the subject in the former case, but there is no such a restriction in the latter. The verb po is another case in point. Notice the three different meanings of the word in the following sentences.

(17) (i) sŏnsaeŋ-i chæk-ŭl po-n-ta
teacher book see

"The teacher sees the book."

(ii) sŏnsaeŋ-i chæk-ŭl ilk-ŏ po -n-ta
read try

"The teacher tries reading the book."

(iii) sŏnsaeŋ-i chæk-ŭl ilk-nŭn-ka po-ta
read seem

"It seems that the teacher reads the book."

The first two sentences are of the verbal S type and the last one is of the nominal S type, the distinction being made by the embedding possibility (only the sentences of the verbal S type may be embedded) and by the difference in the Aux structures.

4.3 Negation as a nominalization process. In the preliminary discussion on negation presented in 3.6, it was pointed out that there are two underlying structures for negation: "the simple negation" and "the complex negation". It was also

mentioned that only the complex negation is possible where V is an adjective, and both simple and complex negations are possible where V is a verb. An attempt is made, in the following discussion, to explain how these two underlying structures are different, why the complex negation is basically identical to a complex sentence structure, namely the structure whose object NP undergoing the nonfactive nominalization. Consider the sentences in (18).

(18) (i) sŏnsæŋ-i pap-ŭl mŏk -nŭn-ta
NP [NP V]$_{MV}$ Aux
teacher rice eat
"The teacher eats rice."

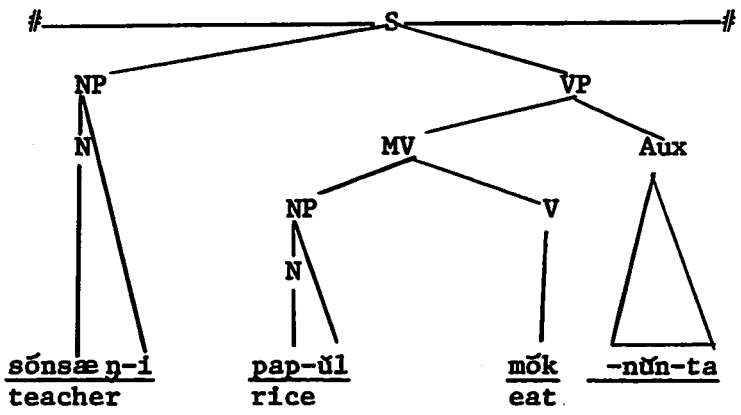
(ii) sŏnsæŋ-i pap-ŭl mŏk ki-lŭl ha -n-ta[4]
NP [[[NP VP]$_S$ N]$_{NP}$ V]$_{MV}$ Aux
teacher rice eat Nom do
"The teacher does eat rice."

The sentences above are two different ways of saying the same thing although the second is often used for different emphases by replacing the second (l)ŭl with such particles as to, ya, etc. What should be noted in these sentences is that any simple sentence (except copula sentences) like (18i) has a counterpart like (18ii), which is a complex sentence as illustrated by the following P-markers which represent the sentences in (18).

---

4 Song points out (18ii) might sound unnatural to many native speakers, but it will be readily accepted if the second ŭl is replaced by such particles as to and ya. It sounds less unnatural, too, if the first ŭl is deleted, or an adverb like cal "well" is added before ha. It is not clear why, but the point is (18ii) is considered grammatical on such grounds.

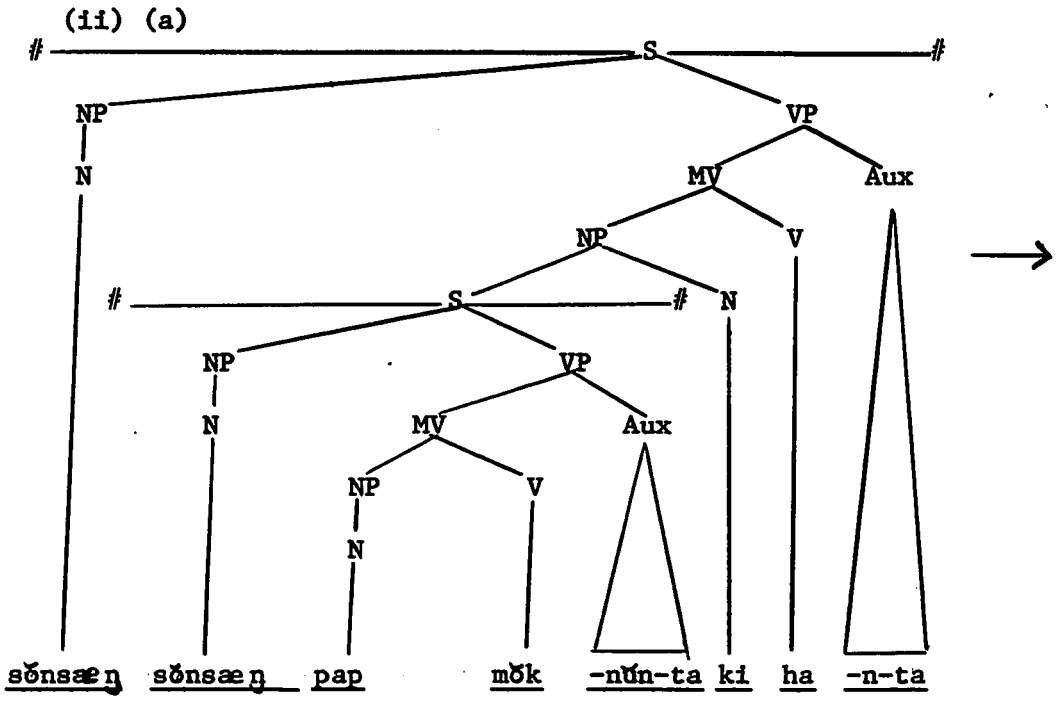
(19) (i)



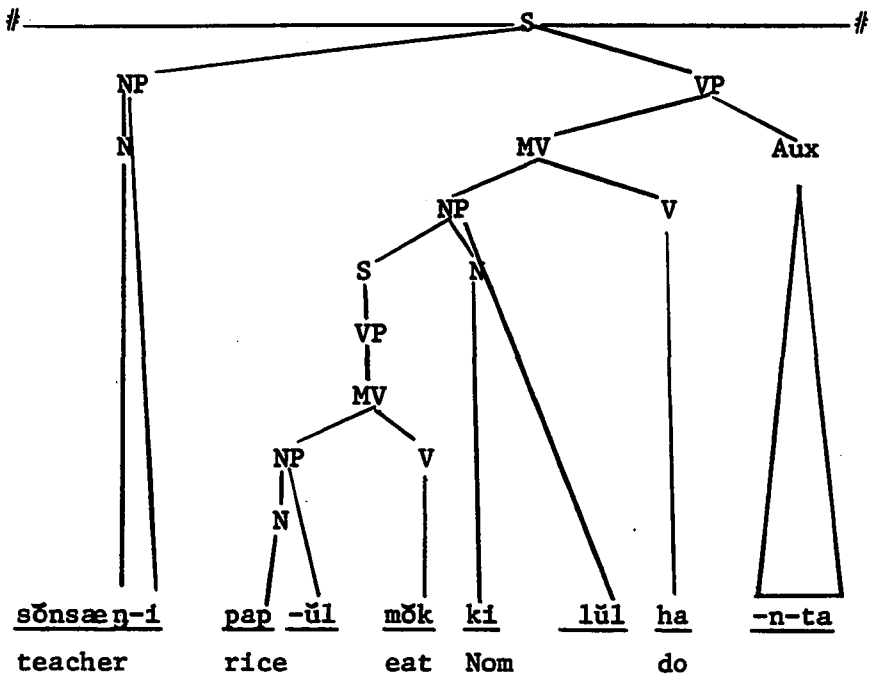
"The teacher eats rice."

(The postnominal particle ŭl is inserted as i is by a postcyclic rule.)

(ii) (a)



(19) (ii) (b)



"The teacher does eat rice."

(The nonbranching nodes S and VP in the derived P-marker (19iib) are deleted by a meta-rule which will be discussed in connection with the P-markers in (22) and (23).)

What is claimed in this discussion is that the two underlying structures of the simple negation and the complex negation correspond to the structures (19i) and (19ii) respectively. The only difference between the negation structures and the nonnegation structures is that the negation structures contain the category Neg while the nonnegation structures do not. Compare the sentences in (18) with those in (20).

(20) (i) sŏnsæŋ-i pap-ŭl ani mŏk -nŭn-ta
NP [NP Neg V]$_{MV}$ Aux
teacher rice not eat

"The teacher does not eat rice."

(ii) sŏnsæŋ-i pap-ŭl mŏk ci-lŭl ani ha -n-ta
NP [[[NP V]$_S$ N]$_{NP}$ Neg V]$_{MV}$ Aux
teacher rice eat Nom not do

"The teacher does not eat rice."

The sentences (18i) and (20i) are identical except the latter contains the category Neg. When the pair (18ii) and (20ii), complex structures, are compared, a further difference is noticed; i.e. the latter contains the element ci corresponding to ki. This difference, however, is considered to be superficial since ki and ci are mutually exclusive, the latter occurring only preceding the category Neg (with a particle in between).[5]

Once the identity between ki and ci is established, it is reasonable to recognize the complex negation as a nominalization process. For an illustration, consider the derivational procedure of the sentence (21), which contains two Neg elements, as illustrated by the P-markers in (22).

(21) sŏnsæŋ-i ka ci-lŭl ani ha ci-lŭl mot ha-n-ta
N V Ng1 V Ng2 V Aux
teacher go not cannot do

"It is impossible for the teacher not to go."

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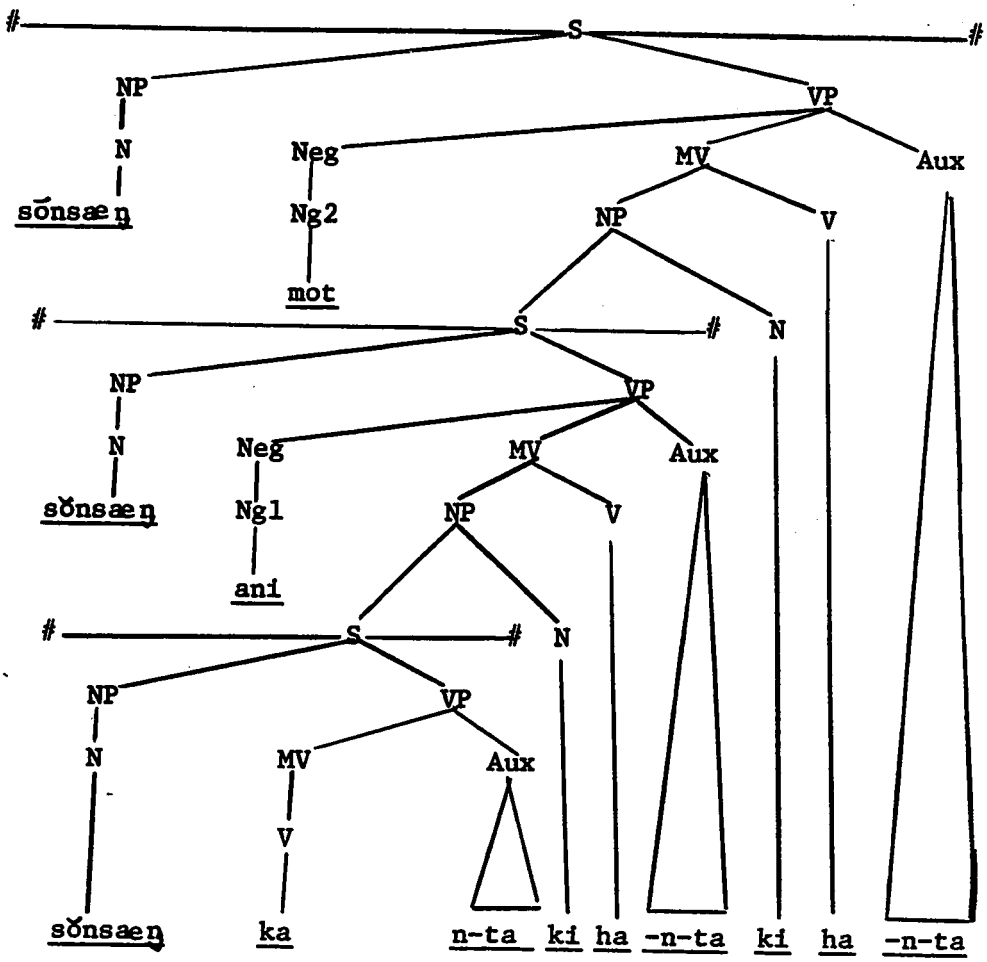
5 This observation was first made by Song (1967: 63).

(22) (i)



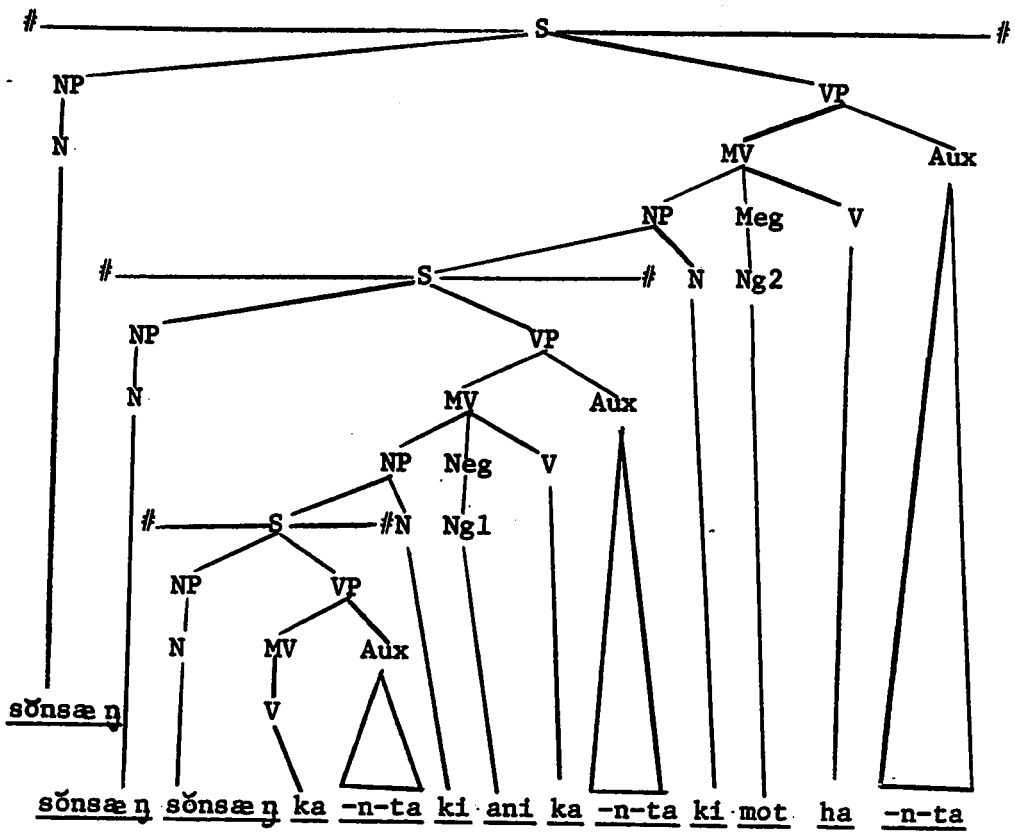
The above P-marker is obtained by applying the base rules. Upon this P-marker operates the "Neg placement" rule (precyclic), and the P-marker (22ii) is derived.

GT 1. Neg placement

SD: X, [Neg, X, V, Aux]$_{VP}$, X
1 2 3 4 5 6

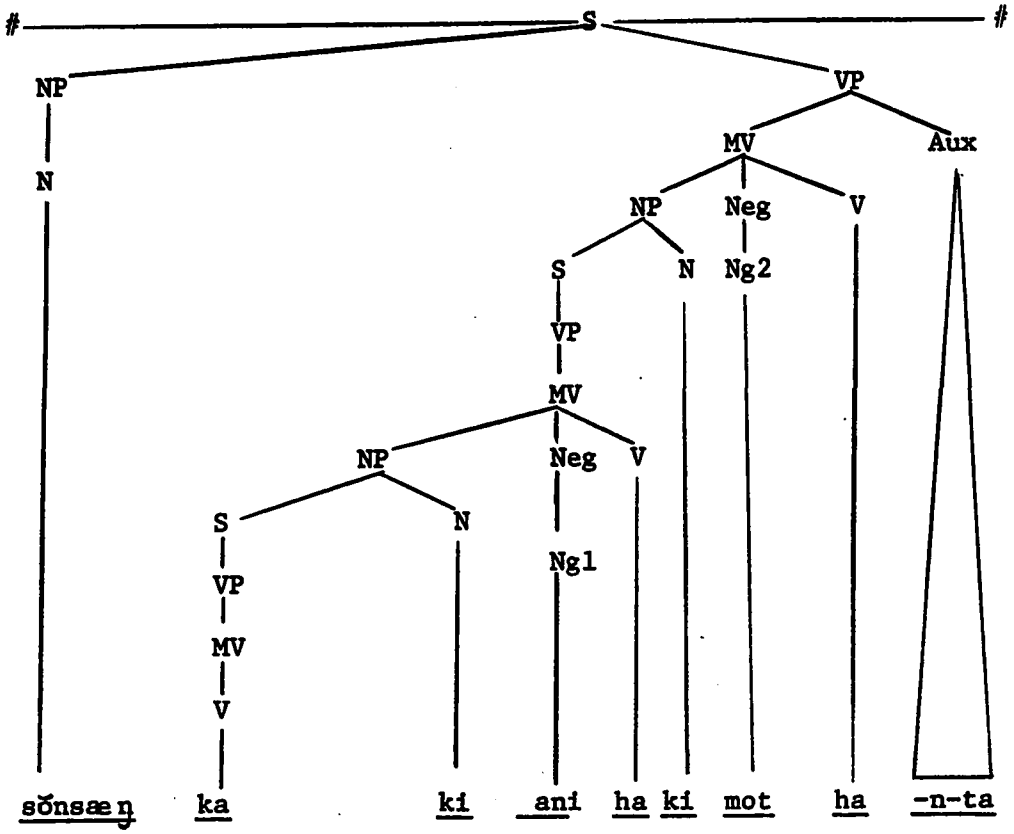
SC: 4 → 2^4; 2 → null

(22) (ii)



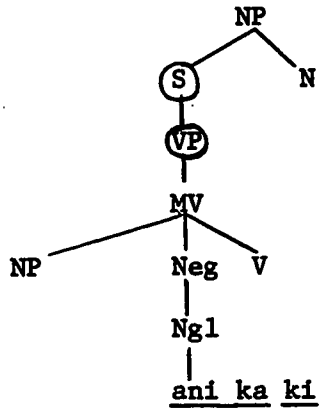
The next applicable rule is the nonfactive nominalization transformation (cyclic). Since the P-marker contains two embedded S's and since the derived P-marker after the first cycle still meets the SD specified in the rule (12i), the transformation repeats the same cycle twice, and the P-marker (22iii) is derived. Then the postnominal particles i (ka) and (l)ŭl are inserted, and the nominalizer ki is converted into ci; thus, the sentence (21) is generated.

(22) (iii)



Notice the nodes encircled in the following subtree.

(23)



Observing the embedded node S which does not branch, Ross points out that

> it certainly seems counter-intuitive to claim that the whole string his yellow cat caterwauls incessantly is a sentence and also that the words his [from e.g. he has something] and yellow [from e.g. something is yellow] are sentences (1966:2).

To remedy this inadequacy, Ross proposes a meta-rule as follows:

(24) Delete any embedded node S which does not branch (i.e., which directly dominates only NP or VP) (2).

This rule has no fixed position in the total grammar; but it must be applied whenever there is an embedded node S that does not branch in a derivation. In supporting his proposal, Ross further argues by use of English and Latin examples that there is a structural difference between a tree containing an embedded S which does not branch and one which does branch.

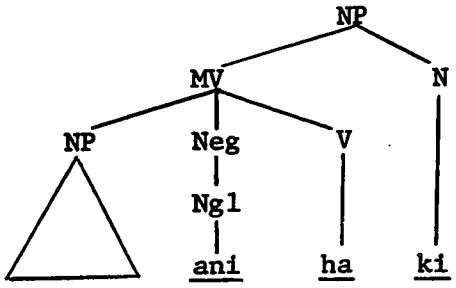
Ross's argument concerns only the node S (probably because his discussion is based on limited sample rules). However, the same holds for the other intermediate nodes that do not branch (e.g. VP in the case of the present study). In other words, it is counterintuitive to say that ka "go" is an S just as much as sŏŋsæŋ-i ka-n-ta "Teacher goes." is an S, or to say that ka is a VP just as much as ka-n-ta is a VP, in the derived P-marker. Furthermore, what is obtained from the derived P-marker is the information concerning constituency relations (e.g. IC structure) in the surface structure but not in the deep structure. The non-branching nodes (this term will be defined just below (25)) which remain in the derived tree do not play any function, i.e. they do not provide information concerning the deep structure, nor do they define constituency relations of the surface

structure. Then, it is clear that such nonbranching nodes have no place in the derived P-marker. Therefore, the meta-rule is revised as in (25) in order to make it applicable to the PGK (and possibly for other grammars).

(25) Delete any intermediate nonbranching node.

The term "nonbranching node" should be understood as a node which does not branch in the derived P-marker but <u>does</u> branch in the deep structure. Thus, the rule (25) does not apply to such a node as Neg, which never branches in the deep structure, or to MV, which may or may not branch. The justification is clear, but further reasons will be given in 4.4 in connection with the adnominalization transformation. As the rule deletes only an "intermediate" node, it does not apply to the initial symbol (S) or to a terminal symbol under which a complex symbol (e.g. of phonological and/or syntactic features) is introduced. The operation of this meta-rule on the subtree (23) yields the following new P-marker.

(26)



To resume the main issue, another bit of evidence that supports the claim that the structure of the complex negation is identical to the structure of an NP which has undergone the

nonfactive nominalzation is obtained from the negative imperative and negative propositive sentences.

(27) (i) (ne-ka) ka ci-lŭl maal -la
NP [[V]$_S$ N]$_{NP}$ V $\langle$ -D / +I $\rangle$

you go Nom do not

"Don't (you) go!"

(ii) *(ne-ka) {ani / mot} ka -la
NP Neg V $\langle$ -D / +I $\rangle$

(28) (i) (uli-ka) ka ci-lŭl maal -ca
NP [[V]$_S$ N]$_{NP}$ V $\langle$ -D / -I $\rangle$

we go Nom do not

"Let's not go!"

(ii) *(uli-ka {ani / mot} ka -ca
NP Neg V $\langle$ -D / -I $\rangle$

Notice that the simple negation, (27ii) and (28ii), which correspond to the complex negation (27i) and (28i), are not grammatical.[6] This means that only the complex negation is possible for the imperative and the propositive sentences. The word maal "do not" occurs only in a negative command or in a negative proposal (except in an embedded S of a few complex structures which are not covered in this study). The grammatical sentences (27i) and

6 Since these ungrammatical strings becomes grammatical if the feature <-D> is converted to <+D>, occurrences of such strings are blocked by a base transformation rule.

(28i) have exactly the same deep structure which undergoes the nonfactive nominalization. These sentences are generated via the nonfactive nominalization (12i) and the following postcyclic rule which replaces Neg^ha with maal.

(29) GT 10. Imperative-propositive Neg replacement

SD: X, ki, Neg, ha, X, <-D> , X
1 2 3 4 5 5 6

SC: 3, 4 → maal

Other postcyclic rules will introduce postnominal particles and convert ki to ci before the derivation terminates.

In the lexicon, Neg is restricted to co-occur with verbs only. This means that the simple negation is impossible for a sentence where V is an adjective. This restriction is imposed in order to simplify the irregular co-occurrence restriction between the category Neg and the adjective. Irregularity is observed where Ng2 (mot) never precedes any adjective, and Ng1 may precede only those adjectives which have three or fewer syllables. However, any adjective may be negated by placing an S whose predicate V is an adjective as the constituent S of the object NP of the transitive verb ha which freely co-occurs with either Ng1 or Ng2. This fact is illustrated by the examples in (30) and (31).

(30) (i) sŏnsæŋ-i ani khŭ -ta
NP Ng1 <+Aj>
teacher not big
"The teacher is not big."

(30) (ii) *sŏnsæŋ-i mot khŭ -ta
Ng2 <+Aj>

(iii) *sŏnsæŋ-i ani alŭmtaup-ta
Ng1 <+Aj>

The string (ii) is ungrammatical because Ng2 precedes the adjective khŭ "big". The string (iii) is ungrammatical because the adjective alŭmtaup "beautiful" consists of four syllables.

(31) (i) sŏnsæŋ-i khŭ ci-ka ani ha -ta
NP $[[[V]_S$ N $]_{NP}$ Ng1 $V]_{MV}$ Aux

teacher big Nom not do/be

"The teacher is not big."

(ii) sŏnsæŋ-i khŭ ci-ka mot ha -ta
Ng2

'The teacher is not big."

(iii) sŏnsæŋi alŭmtaup ci-ka ani ha -ta
NP $[[[$ <+Aj> $]$ N $]_{NP}$Ng1 $V]_{MV}$Aux

teacher beautiful Nom not do/be

"The teacher is not beautiful."

(iv) sŏnsæŋ-i alŭmtaup ci-ka mot ha -ta
Ng2

" The teacher is not beautiful."

All the strings in (31) are grammatical. If the complex structure is used, there is no restriction as to the choice of Ng1 or Ng2 or to the number of syllables of the adjective negated.

Since the deep structure generates only those in (31), there must be a means to generate the grammatical string (30i). This can

be done by means of an optional transformation like the following:

(32) GT 9. Neg shifting (OP)

SD: X, ⟨+Aj⟩ , ki, Ngl, ha, X
1 2 3 4 5 6

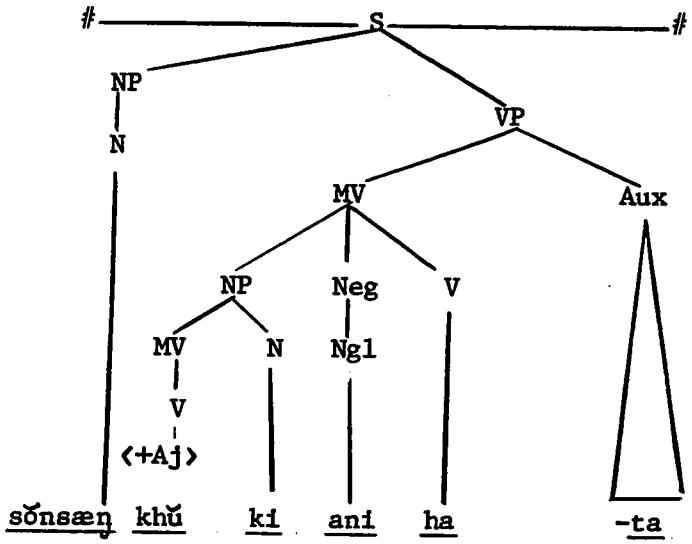
Cond: 2 = (C)Vw(C)(C)(Vw)(C)(C)(Vw)(C)(C)

where C = any consonant; Vw = any vowel

SC: 5 → 2; 2, 3 → null

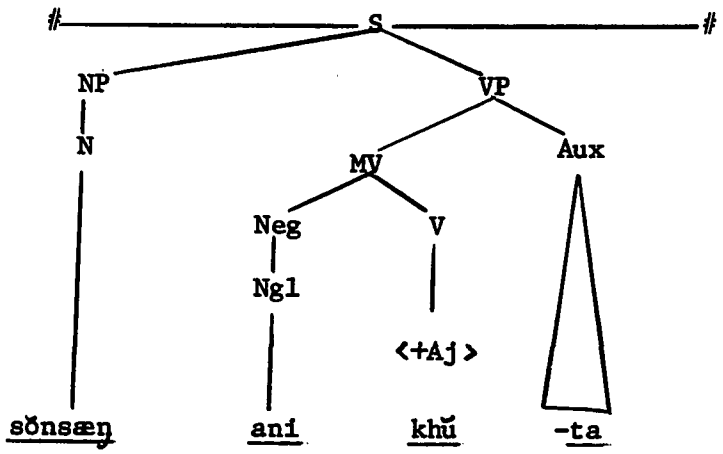
This rule generates a sentence like (30i) from a structure as in (31i). The P-marker (33i), which has undergone the Neg placement rule (precyclic), the nonfactive nominalization (cyclic as illustrated in (22)), and the meta-rule (25), represents the surface structure of the sentence (31i), from which the sentence (30i) may be derived by applying the rule (32).

(33) (i)



If the optional rule (32) operates on the above P-marker, the following P-marker will be derived.

(ii)



The above P-marker represents the surface structure of the sentence (30i). The derivation of (30i) will be terminated when the particle is predicted in and other necessary adjustments are made (e.g. deletion of A in Aux).

In the sentence (31i) it is further observed that the post-nominal ka ("subject marker") instead of ŭl ("object marker") is predicted in after ci (see the sentence (20ii)). However, this difference does not create any problem because it is predictable. That is, if the MV of the constituent S of the object NP dominates an adjective, ka will be predicted in; if, on the other hand, the MV dominates a verb, ŭl will be predicted in. Incidentally, this is further evidence for the argument that the particle ka and ŭl are not functional markers as they are often so labelled (see footnote 3).

4.4 Adnominalization. In 4.1, a brief discussion was presented to clarify a certain ambiguity in terms of two different underlying structures, one involving the left-branching S, which undergoes the factive nominalization, and the other involving the

right-branching S, which undergoes adnominalization. The former process has been discussed in the preceding sections, and the latter is the concern of this section. The following discussion will provide further evidence that supports a distinction between the left-branching process and the right-branching process. Also, it will be claimed that the surface structure derived by the adnominalization process (which involves the right-branching S) is a "mirror image" of the underlying structure.

Consider the NP's in the following sentence.

(34) sŏnsæŋ-i achim-e kyoosil-esŏ ŭyca-lo

NP [NP]$_{Tim}$ [NP]$_{Loc}$ [NP]$_{Ins}$

teacher morning-in classroom-in chair-with

yuli-lŭl kkæ -ŏss-ta

[NP V]$_{MV}$ Aux

glass break

"The teacher broke the glass with the chair in the classroom this morning."

The sentence above contains the maximum number of NP's the PGK can possibly generate without embedding. That is, all the optional categories in C2 are chosen, each of which is developed into an NP by C4, as well as the obligatory subject NP and the optional object NP.

Each of these NP's can be the <u>head</u> of which the rest of the sentence becomes the <u>modifier</u> in the endocentric type of construction

as the whole sentence undergoes the grammatical transformation that is under discussion as illustrated by the nominalized strings in the following.

(35) (i) achim-e kyoosil-esŏ ŭyca-lo yuli-lŭl kkæ

[NP]$_{Tim}$[NP]$_{Loc}$[NP]$_{Ins}$ NP V

morning-in classroom-in chair-with glass break

-n sŏnsæŋ

Pst NP

teacher

"The teacher who broke the glass with the chair in the classroom this morning."

(ii) sŏnsæŋ-i kyoosil-esŏ ŭyca-lo yuli-lŭl kkæ -n achim

"The morning that the teacher broke the glass with the chair in the classroom."

(iii) sŏnsæŋ-i achim-e ŭyca-lo yuli-lŭl kkæ n kyoosil

"The classroom in which the teacher broke the glass with the chair this morning."

(iv) sŏnsæŋ-i achim-e kyoosil-esŏ yuli-lŭl kkæ -n ŭyca

"The chair with which the teacher broke the glass in the classroom this morning."

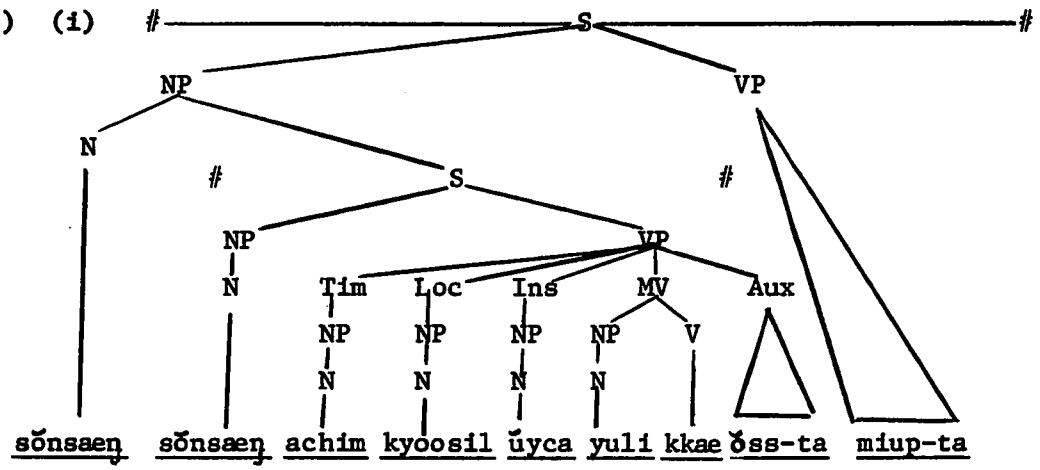
(v) sŏnsæŋ-i achim-e kyoosil-esŏ ŭyca-lo kkæ -n yuli

"The glass that the teacher broke with the chair in the classroom this morning."

Undoubtedly, all the above five noun phrases are derived from the sentence (34). Notice that an NP of any function (e.g. subject, object, instrument, etc.) can become the head modified by the rest of the sentence as clearly illustrated by the five strings in (35). Incidentally, notice that it is difficult to say whether the meanings of the underlying string (34) and of the derived string (35) are the same or not although their grammatical relationship is beyond any doubt. This fact illustrates that meaning cannot be used as a definite criterion in defining grammatical relations.

The grammatical process outlined above will be further discussed to illustrate how it operates in embedding. In the P-marker (36i), the sentence (34) is embedded as a right-branching S in order to modify the subject noun of the matrix S.

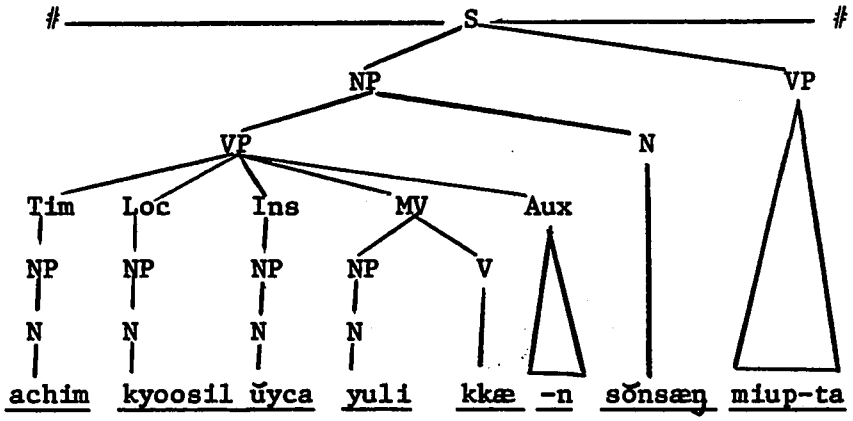
(36) (i)



Since the subject N of the matrix S and the subject N of the constituent S are identical, the former becomes the head and the latter is deleted,

while the rest of the constituent S (with other deletions to be discussed later) becomes the modifier. Notice also that the head N which is the subject N of the matrix S and the remaining part of the constituent S permute in the derived P-marker.

(ii)



This derived P-marker represents the structure of the sentence (37) at the point where the postnominal particles are yet to be introduced.

(37) achim-e kyoosil-esŏ ŭyca-lo yuli-lŭl kkæ

[[Tim Loc Ins [NP V]$_{MV}$

morning-in classroom-in chair-with glass break

-n sŏnsæŋ-i miup -ta

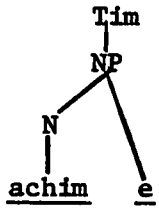
Aux]$_{S}$ N]$_{NP}$ VP

teacher ugly is

"The teacher who broke the glass with the chair in the classroom this morning is ugly."

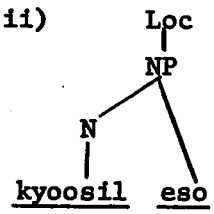
Notice in the derived P-marker (36ii) that the embedded node S which does not branch has been deleted by the meta-rule (25). However, the P-marker still contains such nonbranching nodes as Tim, Loc, NP, etc. These nodes are not erased because they never branch or may not branch in the deep structure, i.e. an NP alone is a Tim, an N alone is an NP just as a Dem and an N is an NP, etc. There is another reason why such nonbranching nodes should remain in the derived P-marker: the transformation which introduces the postnominal particles e, esŏ, and (ŭ)lo is triggered by the nodes Tim, Loc, and Ins respectively, and these particles are attached to the node NP as illustrated by the subtrees in (38).

(38) (i)



"in the morning"

(ii)



"in the classroom"

The elementary transformations that are used in the adnominalization rule, which operates on the structures like (36i), are the deletion and the permutation as shown in the following rule.

(39) GT6. Adnominalization

SD: X, (Dem)N, $[\#, X, [(X), (Dem)N]_{NP}, X, \{{}^{Cop}_{V}\}, (\underline{si}), (TM), A, MD, \#]_S, X$

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Cond: 2 = 6

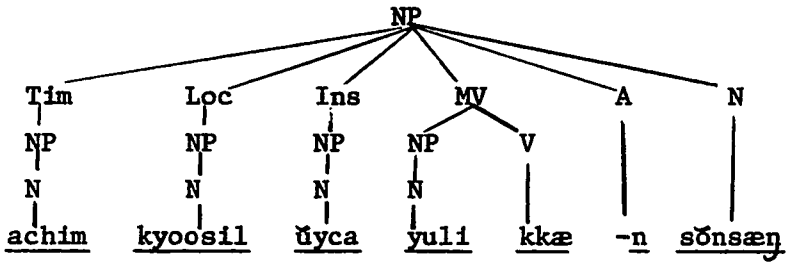
SC: 2, $[3-13]_S \rightarrow [4, 7, 8, (9), (10), 11]_S$, (5), 2

The identity condition obtains between the NP (index 2) of the matrix S and an NP of any function of the constituent S (index 6). The index 5 is not applicable to the first cycle; it will be made clear shortly why it is necessary in the SD. The deleted elements are the NP which is identical to the NP of the matrix S, the sentence boundary marker (indices 3, 13), and the MD of the constituent S. Then, the whole structure of the embedded S, except the deleted items, is moved to the left of the (Dem)N of the matrix S as illustrated by the P-markers in (36). The SD of the rule (39) states simultaneously the two elementary transformations. Besides, the convention associated with the subscript node (the dominating node S in the case of (39)) makes it possible for the output structure to keep the same constituent structure as that of the input except the elements deleted. To clarify the point, suppose the SD of (39) is written as follows without the subscript convention.

SC: 2 - 13 → 4, 7, 8, (9), (10), 11, (5), 2

This SD also states the two elementary transformations simultaneously. However, the effect of this rule is different from that of (39). If the above rule operates on the P-marker (36i), a derived P-marker with the following subtree will be derived.

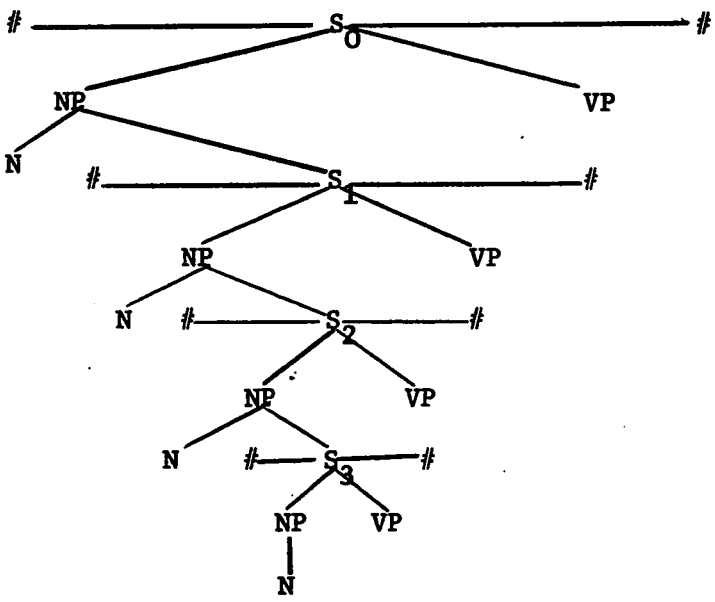
(40)



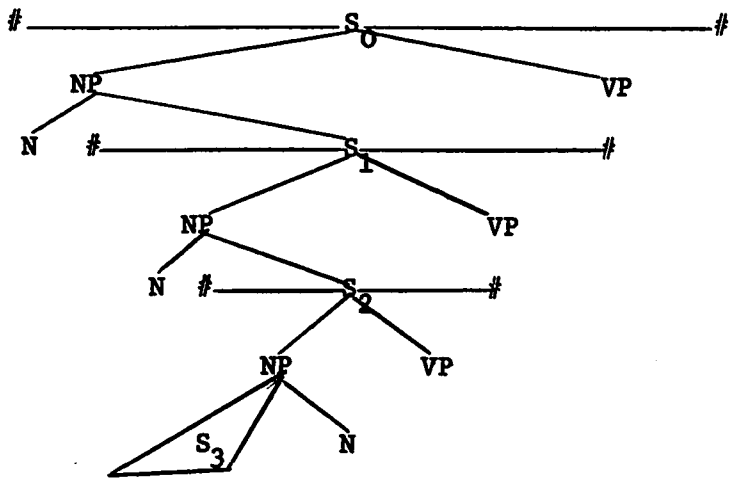
Clearly, the constituency relations represented by the above subtree are counter-intuitive as the nodes VP and Aux are lost. If the convention associated with the subscript is not adopted, there is no way to maintain the same constituency relations as in the deep structure: various ad hoc trees similar to the one shown above (40) will be derived depending on what NP satisfies the identity condition.

The principle involved in the cyclic operation of the adnominalization process will be better illustrated by the simplified P-markers in (41) where it is assumed that the identity condition obtains between the subject NP's of the matrix S and of the constituent S.

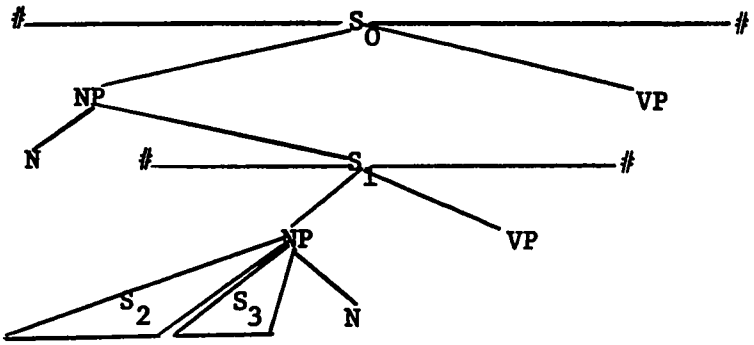
(41) (i)



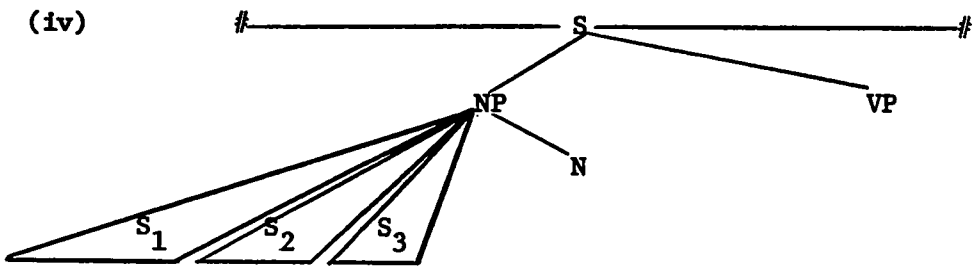
(41) (ii)



(iii)



(iv)



The adnominalization rule operates on the P-marker (41i). After the first cycle, the innermost S_3 is transposed to the left of the N of S_2 as shown in the P-marker (41ii). The index 5 of the SD in the rule (39) ensures that the rule operates cyclically. Notice that the derived P-marker still meets the SD of (39) despite the fact that the

NP contains an S to the left and that the next higher S is transposed to the left of the S which has already been transposed by the earlier cycle. Therefore, the index 5 is nonnull in the structure where the rule (39) repeats the second cycle and on.

When the initial P-marker (i) and the final P-marker of (41) are compared, it is clear that the innermost S_3, which is farthest from the N of the matrix S in the deep structure (i), i.e. dominated by the highest NP indirectly through more intervening nodes than either S_2 or S_1, is placed nearest to the N in the derived structure (iv). In other words, the derived structure is a kind of "mirror image" of the deep structure. This process is able to account for the endocentric construction of a derived string like (42) which receives two different interpretations.

(42) nappŭ -n haksæŋ-ŭl ani kalŭchi-nŭn sŏnsæŋ

V A N Ngl V A N

bad student not teach teacher

(i) nappŭ-n haksæŋ-ŭl ani kalŭchi-nŭn sŏnsæŋ

[[S_1 [S_2]] N]$_{NP}$

"the bad teacher who does not teach students"

(ii) nappŭ-n haksæŋ-ŭl ani kalŭchi-nŭn sŏnsæŋ

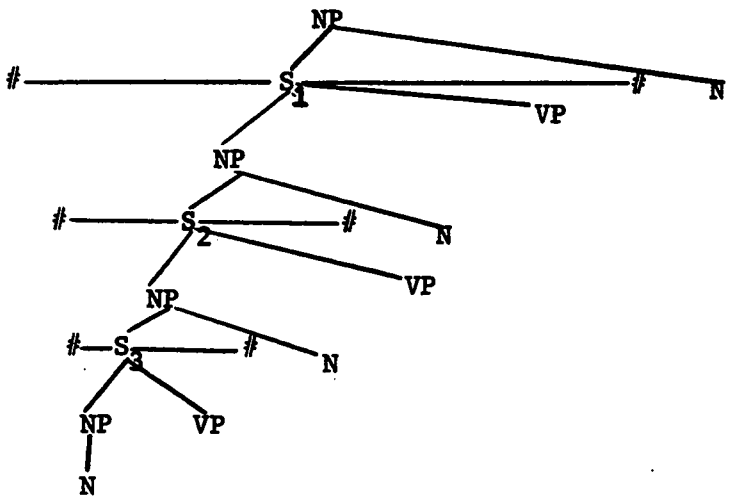
[[[S_1 N]$_{NP}$ VP]$_{S_1}$ N]$_{NP}$

"the teacher who does not teach bad students"

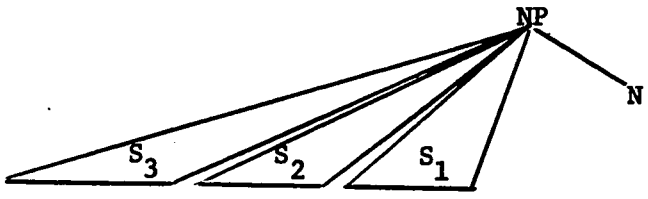
It is clear that in (42i) the constituent nappŭ-n modifies the phrase headed by the noun sŏnsæŋ "teacher", but in (42ii), the same constituent modifies only the immediately following noun haksæŋ "student". This endocentricity is correctly maintained only if the derived structure is a mirror image of the deep structure which has the right-branching S.

The reason why the left-branching embedding is not able to maintain the endocentricity is well illustrated by the simplified P-markers in (43).

(43) (i)



(ii)



Notice the inadequacy, in the derived structure (ii), that the innermost S_3 is placed in the outermost position and the outermost

S_1 in the innermost position. This inadequacy is easily overlooked where only one S is embedded to the left of N for adnominalization. No such difficulty as shown above will arise when only one is embedded, but the difficulty becomes obvious as soon as two or more S's are embedded as shown in (43).

4.5 Special NP construction. C5 of the PGK develops an NP which contains a left-branching S, a right-branching S, or both. The two types of NP construction, one with a right-branching S, the other with a left-branching S, have been the concern of the preceding sections. The third type of NP construction which contains two S's, one each side, is the concern of this section. The aim of this section, however, is not to present a grammatical rule to generate this special type of NP construction, but to present some arguments for the constituent structures of the third type of NP in an effort to justify the base rule C5.

Compare the strings in (44) with those in (45). Although the superficial structures of (44i) and (45i) are the same, their deep structures are quite different.

(44) (i) haksaeŋ-ŭl kalŭchi-l coh-ŭn sŏnsaeŋ

[[NP V M]$_{S_1}$ [V A]$_{S_2}$ N]$_{NP}$

student teach good teacher

"a good teacher who will teach student"

(ii) sŏnsæŋ-i haksæŋ-ŭl kalŭchi-kess-ta

NP NP V M MD

"A teacher will teach students."

(iii) sŏnsæŋ-i coh -ta

NP VP Aux

teacher good

"A teacher is good."

(45) (i) haksæŋ-ŭl kalŭchi-l coh-ŭn köhök

[[NP V M]$_S$[V A]$_S$ N]$_{NP}$

student teach good plan

"a good plan to teach students"

(ii) köhök-i coh -ta

NP V Aux

plan good

"A plan is good."

(iii) *köhök-i haksæŋ-ŭl kalŭchi-kess-ta

NP NP V M MD

*"A plan will teach students."

In the surface structures, the only difference between (44i) and (45i) is that the head noun of the former is a human noun sŏnsæŋ "teacher" and that of the latter is a nonhuman noun köhök "plan". However, their deep structures reveal much more different constituent structures as illustrated by the related strings (ii) and (iii) in each case. In (44), both (ii) and

(iii) are grammatical and are constituent S's of (i). In (45), on the other hand, only (ii) is grammatical. In (44), both (i) and (ii) are right-branching S's and become modifiers of the noun sŏnsæŋ by undergoing the adnominalization transformation. In (45), the constituent coh-ŭn 'is good" comes from (ii) which is a right-branching S, but the remaining part of the string (45) haksæŋ-ŭl kalŭchi-l "to teach students", does not come from a right-branching S as the string (ii) is ungrammatical.

Recall that in the adnominalization transformation, the identity condition must obtain between one of the (Dem) N's of the constituent S and the (Dem)N of the dominating NP, but this identity condition is not required in any nominalization transformation which involves a left-branching S. Now it is reasonable to conjecture that the unaccounted part of the string (45i) comes from a left-branching S whose subject NP is deleted for reasons not relevant to the present issue. This hypothesis is confirmed by the fact that if a human noun is added to the left of (44i), the resultant string becomes ungrammatical, but the same change to the string (45i) brings an entirely different result, as shown by the following strings.

(46) (i) *uli-ka haksæŋ-ŭl kalŭchi-l coh-ŭn sŏnsæŋ

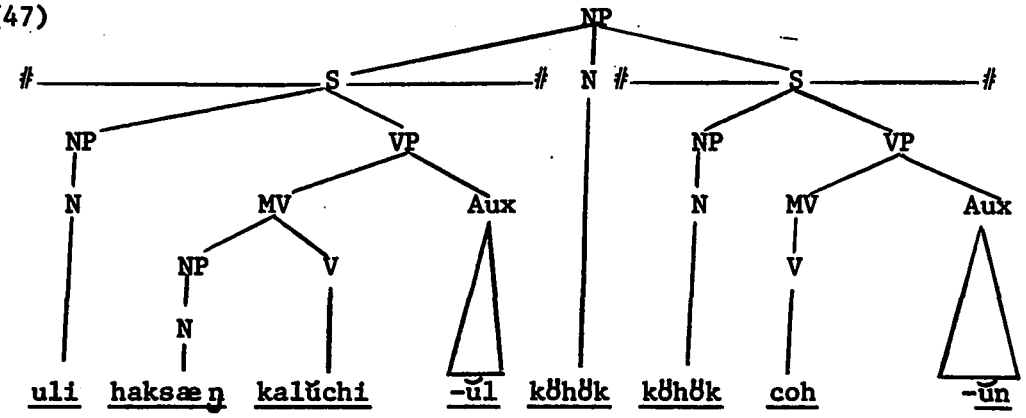
(ii) uli-ka haksæŋ-ŭl kalŭchi-l coh-ŭn kŏhŏk

"A good plan for us to teach students"

The string (45i) and the above string (46ii) are identical except that in the latter the subject NP of the left-branching S is not

deleted. Then, it is clear that the third type of NP has an underlying structure represented by a P-marker like the following.

(47)



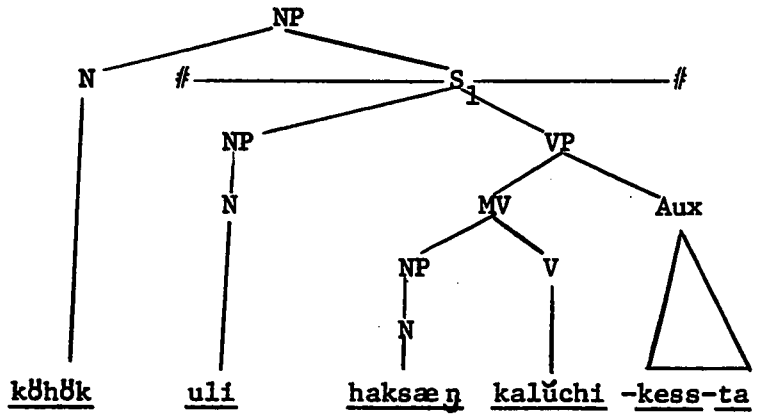
"A good plan for us to teach students"

The right-branching S undergoes the adnominalization transformation and the left-branching S undergoes a nominalization transformation which is, in principle, the same as either the factive or the nonfactive nominalization (the details are not clear at the moment). In the derived string, the left-branching S keeps the same position while the right-branching S is transposed to the left of N dominated directly by the highest node NP. Therefore, the derived string is exactly like one whose deep structure contains two embedded right-branching S's like (44i). One might think it feasible to derive the string (45i) through the adnominalization process by embedding both sentences to the right of the N (and abandoning the identity condition). This possibility is readily checked below. Since the sentence

uli-ka haksæŋ-ŭl kalŭchi-kess ta
we student teach
"We will teach students."

is placed at the leftmost position in the derived string (46ii), it must be embedded first (S_1) as in (48).

(48)



The next step is to embed the S_2:

kŏhŏk-i coh -ta
plan good is
"A plan is good."

Since the S_2 modifies the noun kŏhŏk "plan", it must be embedded in such a way as to be dominated by the noun kŏhŏk in (48). But, clearly, there is no way to do so. It is impossible to embed an S under the node N. This means that the adnominalization process does not work if the identity condition is abandoned. This is strong evidence that nouns like kŏhŏk "plan", phopu "aspiration", kkum "dream", etc. may occur in a special NP construction which has both a left-branching S and a right-branching S.

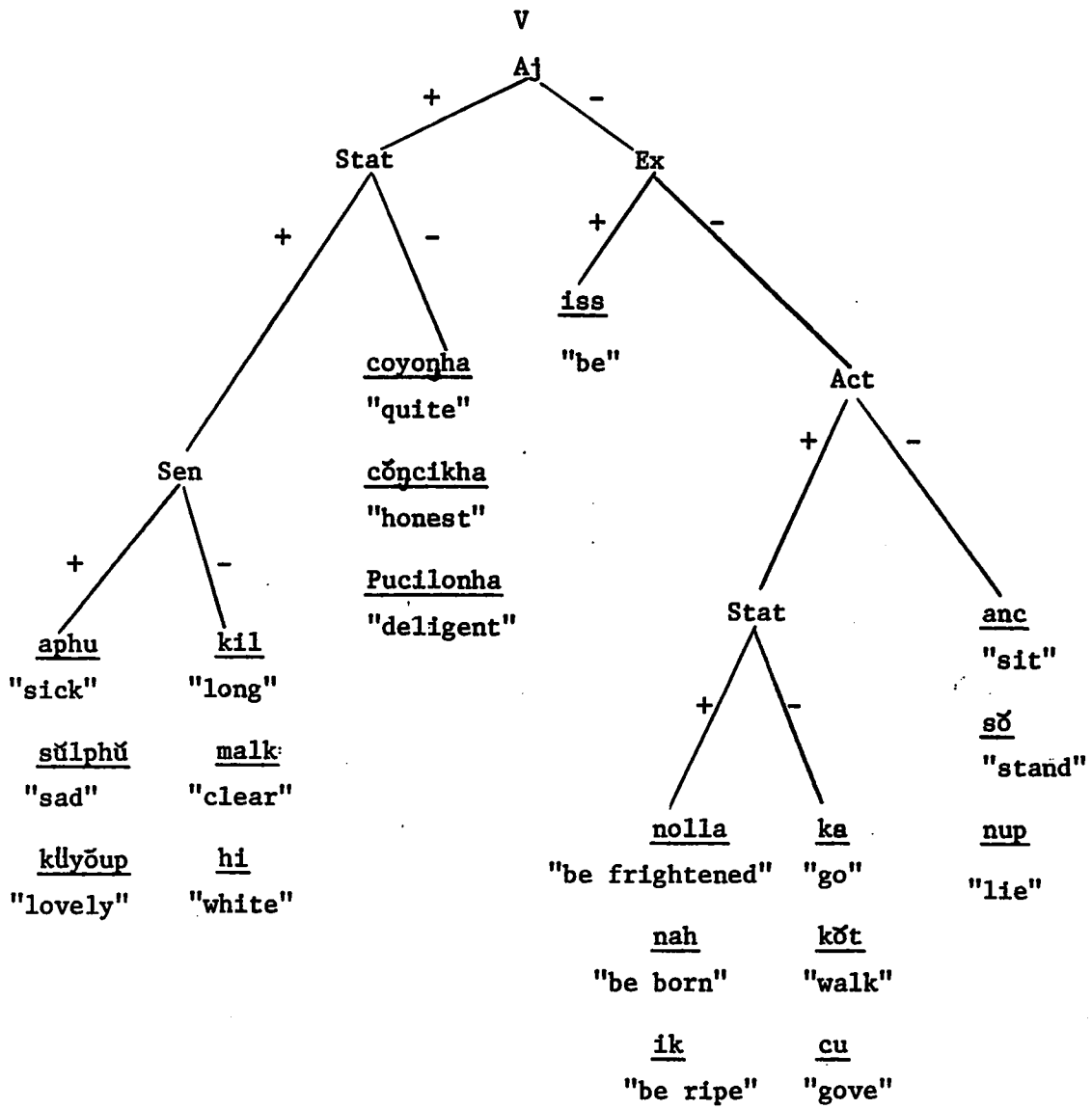
CHAPTER V

EMBEDDING PROCESSES IN THE VERB PHRASE

5.1 Introduction. The embedding transformations discussed in the preceding chapter in connection with the noun phrase expansion involve either or both left-branching and right-branching. Quite distinct from the above processes is self-embedding, which is investigated in this chapter in connection with the verb phrase expansion. The grammatical function of the self-embedding S is different from either of the branching S's in that the latter are "modifiers" of some sort and the former is a "complement", which may be defined under the domination of NP and MV respectively. The aim of this chapter is to examine what solutions may be offered by the process known as "self-embedding" to the problems in the analysis of various VP constructions.

The feature rules of the PGK, which introduce the "inherent" features of V are certainly not complete in any sense, but they include those features which are most relevant to the discussion developed in this work. How the category V is subcategorized in terms of features is better illustrated by the hierarchic representation of the lexical items belonging to the category V in the branching diagram (1) on the following page.

Some of the binary features such as <±Stat> and <±Aj> have already been justified directly or indirectly in the preceding chapters. Further justification of some of the features will be presented along with a discussion of the embedding transfor-


V
Aj
+
-
Stat
Ex
+
-
+
-
Sen
coyonha
"quite"
iss
"be"
Act
+
-
+
-
+
-
aphu
"sick"
kil
"long"
cŏncikha
"honest"
Pucilonha
"deligent"
Stat
anc
"sit"
+
-
sŏ
"stand"
sŭlphŭ
"sad"
malk
"clear"
nolla
"be frightened"
ka
"go"
nup
"lie"
kŭyŏup
"lovely"
hi
"white"
nah
"be born"
kŏt
"walk"
ik
"be ripe"
cu
"gove"

mations which may be called "complementation" in contradistinction to "nominalization" and "adnominalization".

5.2 Copula sentence as complement. There are a small number of verbs which must, and a large number of verbs which may, co-occur with a self-embedding S, which is a copula sentence, under the domination of the node MV. For example, an intransitive verb like chŭimha "take office" may,[1] or a transitive verb like sam "take/regard" must co-occur with a self-embedding S. Consider the grammatical and ungrammatical strings in (2) and (3).

(2) (i) kŭ salam-i kyoocaŋ-ŭlo chŭimha -n-ta
NP [[NP]$_S$ V]$_{MV}$ Aux
that man principal take office
"That man takes office as principal."

(ii) kŭ salam-i chŭimha -n-ta
NP MV Aux
"That man takes office."

(3) (i) sŏnsæŋ-i kŭ æ-lŭl atŭl-lo sam -ass-ta
NP [[NP NP]$_S$ V]$_{MV}$ Aux
teacher that child son take
"The teacher took the child as his son."
(The teacher adopted the child.)

(ii) *sŏnsæŋ-i kŭ æ-lŭl sam -ass-ta
NP [NP V]$_{MV}$ Aux

The sentence embedded in (2i) is:

kŭ salam-i kyoocaŋ i -ta
NP NP Cop Aux
"That man is a principal."

---

1 The verb tŭ "become" is an intransitive verb which must co-occur with a self-embedding S. But this verb is treated independebtly in 5.4 due to its apparently unique syntactic behavior.

whose subject NP, which is deleted in the derived string (2i), is identical to the subject NP of the matrix S. The sentence embedded in (3i) is:

kŭ æ -ka	atŭl	i	-ta
NP	NP	Cop	Aux
that child	son	is	

"That child is (his) son."

whose subject NP, which is deleted in the derived string (3i), is identical to the object NP, but not to the subject NP, of the matrix S. The constituent structures of (2i) and (3i), therefore, correspond to (40) and (41) of 3.5 respectively.

The transformational rule that accounts for the data discussed above is formulated as follows.

(4) GT 3. Complementation of verb (I)

SD: X, NP, X, #, NP, X, NP, Cop, Aux, #, V, X
1 2 3 4 5 6 7 8 9 10 11 12

Cond: 2 ≠ $[NP]_{\{Tim, Loc, Ins\}}$; 2 = 5;

11 does not contain <+Sen>

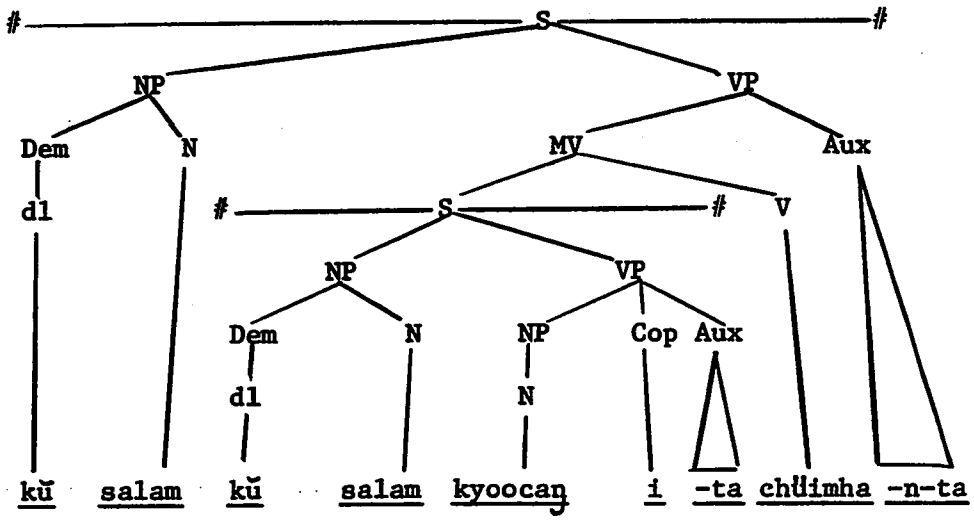
SC: 4, 5, 8, 9, 10 → null

The NP of the matrix S (index 2), which is relevant to the identity condition is either the subject NP or the object NP, but not any NP of adverbial function; thus the first condition is specified. Notice the third condition, imposed on the index 11. A class of verbs which carries the feature <+Sen> is tentatively called the "sense verb", which includes such verbs as sæŋkakha "think" and mit "believe". These verbs may also co-occur with a self-embedding S, which is a copula sentence, although their syntactic

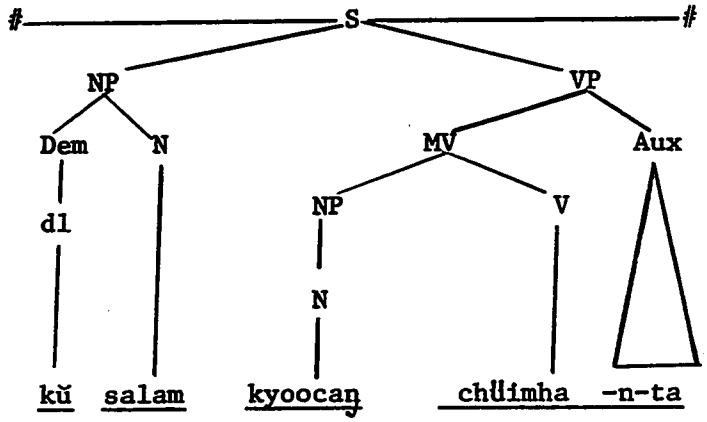
behavior is quite distinct from that of non-sense verbs; thus, the third condition is required. The rule concerning the sense verb will be discussed in 5.5.

The P-markers in (5) illustrates how the rule (4) operates in generating the sentence (2i).

(5) (i)



(ii)

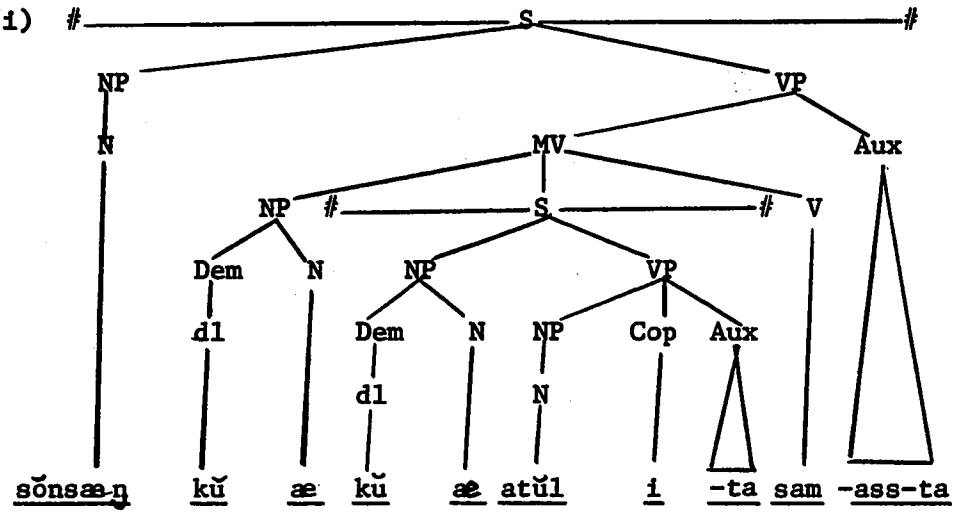


Notice that the derived P-marker (ii) is exactly like a P-marker of a sentence whose MV is a transitive verb preceded by an NP (object). This similarity, however, does not create any problem in predicting in proper postnominal particles because the complex

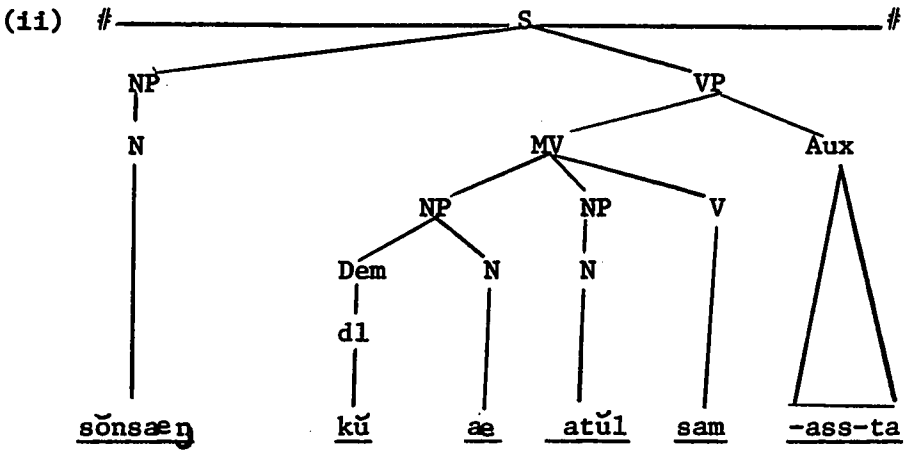
symbol matrix of the verb makes necessary distinctions. For example, in the above P-marker, the verb chüimha contains the feature <+__>, which distinguishes the verb from all transitive verbs. This means that the NP preceding the verb dominated by the node MV must take the particle (ŭ)lo instead of (l)ŭl.

The derivational procedure of the sentence (3i), which includes the application of the rule (4), is illustrated by the P-markers in (6).

(6) (i)



(ii)



Notice in the derived P-marker (6ii) that the node MV dominates two NP's. Here again, there is no problem in predicting in proper particles: the first NP, which is the subject NP of the verb, will take the particle ŭl, and the second NP, which comes from the embedded S, will take lo.

5.3 Complementation of ha "do/make". In this section, the two important rules of the verb ha will be investigated: one, as the noncausative verb, in connection with the so-called "sense adjective", and the other, as the causative verb, in connection with all other adjectives and verbs.

In particular, the selectional restrictions of the sense adjectives will be examined in detail in order to show how significant a role the selectional feature may play in uncovering the underlying regularity.

5.31 Sense adjective and noncausative role of ha. A class of adjectives whose complex symbol matrix includes the feature <+Sen> is called the "sense adjective" (see the diagram (1)). The behavior of the sense adjective which is distinct from that of the non-sense adjective is observed in the following examples.

(7) (i) kohyaŋ-i alŭmtaup -ta
NP [<-Sen> Aux]$_{VP}$

hometown beautiful

"(My) hometown is beautiful."

(ii) kohyaŋ-i kŭliup -ta
NP [<+Sen> Aux]$_{VP}$

hometown longing for

"I am homesick."

In (i), the NP kohyaŋ "hometown" is the subject and the predicate VP contains a non-sense adjective, alŭmtaup "beautiful". In (ii), on the other hand, it is difficult to determine the function of the same NP, apparently in the same position, and of the VP which contains a sense adjective, kŭliup "longing for". As the gloss indicates, the subject NP is deleted in (ii). This fact is proved by the evidence that an NP such as na "I" followed by the particle ka may not be added to the left of the sentence (i), whereas the same NP may be added to (ii) without changing the meaning as shown in (8).

(8) (i) *næ-ka kohyaŋ-i alŭmtaup-ta

(ii) næ-ka kohyaŋ-i kŭliup-ta

"I am homesick."

Furthermore, the addition of the NP næ-ka to the sentence (7ii) makes the resultant sentence (8ii) more optimal in the sense that the latter is not ambiguous while the former is. This means that the sentence (7ii) is derivable from (8ii) by deleting the subject NP. Then, it is conceivable that the underlying structure contains two NP's, one of which being the subject and the other still to be accounted for. If the VP contains a verb, the NP in question, i.e. the second NP kohyaŋ "hometown" in (8ii) is undoubtedly the object. But this possibility is immediately rejected since kŭliup is not a verb, but an adjective (as proved by its morphological behavior). The only remaining possibility is to define the function of the second NP as the "complement" of the adjective.

If this hypothesis is correct, the constituent structure of the underlying structure may be represented as (9).

(9) $[\ NP\ \ [[\ NP\ \langle +Aj \rangle\ ]_{MV}\ \ Aux]_{VP}\ ]_{S}$

Notice that this constituent structure is similar to the one whose MV contains a transitive verb. The fact that the second NP is an essential constituent of the MV is clear because whatever the functional relationship it may have to the category V it may <u>not</u> be deleted as shown by the grammatical and ungrammatical strings in the following.

(10) (i)

næ -ka	kohyaŋ-i		kŭliup -ta
NP_1	NP_2		<+Sen> Aux
I	hometown		longing for

"I am homesick."

(ii)

*næ -ka		kŭliup	-ta
NP_1		<+Sen>	Aux

Recall that NP_1 may be deleted as in the case of (7ii). It seems reasonable then, at this point, to suppose a structure like (9) to be the deep structure, the function of the second NP being defined as the "object" if the MV contains a transitive verb and as the "complement" if the MV contains an adjective. This analysis seems symmetrical (since both verbs and adjectives may co-occur with an NP under the domination of MV); however, the symmetry may be gained only at the expense of complexity. That is, the recognition of (9) as a deep structure with the functional relationship as defined as above means that the adjective too

(not only the verb) must be specified in terms of the "strict subcategorization feature" and an NP too (not only S) may be defined as a "complement". Further inadequacies will become apparent as an alternative analysis is presented in the following discussion.

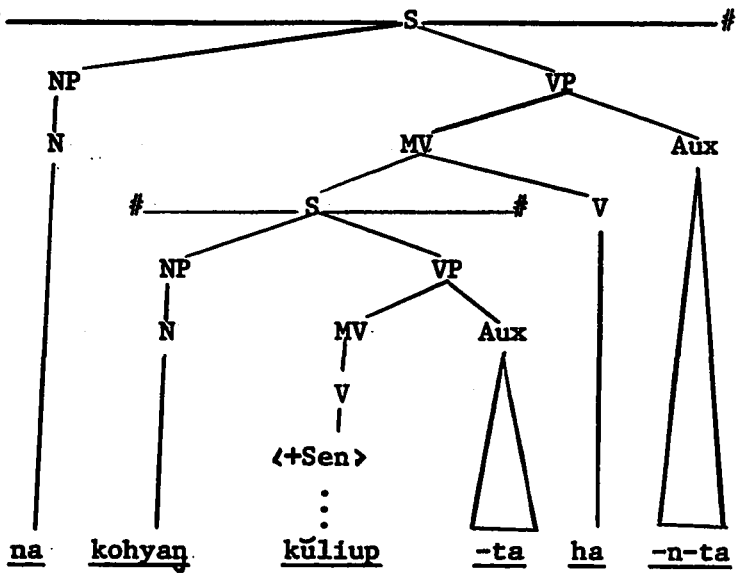
A further distinction between the two sentences in (7) is observed in that the former (7i) may not be embedded as a complement of the verb ha, whereas the latter may be as illustrated by the strings in (11).

(11) (i) *næ -ka kohyaŋ-ŭl alŭmtaw-ŏ ha-n-ta

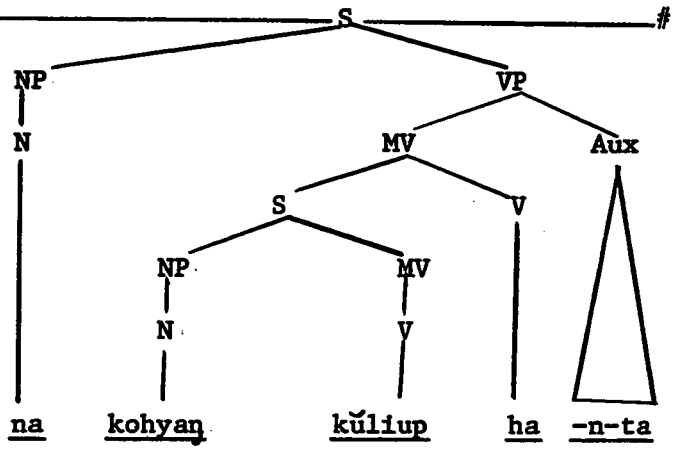
(ii) næ -ka kohyaŋ-ŭl kŭliw-ŏ ha-n-ta
NP [NP VP]$_S$ VP
I hometown longing for do/feel
"I am homesick."

The ungrammaticality of the string (i) above is due to the fact that the adjective alŭmtaup "beautiful" is a non-sense adjective. It is clear, to state the conclusion first, that the string (11ii) underlies the string (8ii) which, in turn, underlies the string (7ii). In this analysis, the second NP kohyaŋ "hometown" is not a complement but the subject of an embedded S. The following P-markers in (12) illustrate the generative procedures and interrelationship among those three strings. The P-marker (12i) is the deep structure from which is derived the surface structure of the sentence (11ii) represented by the P-marker (12ii).

(12) (i)



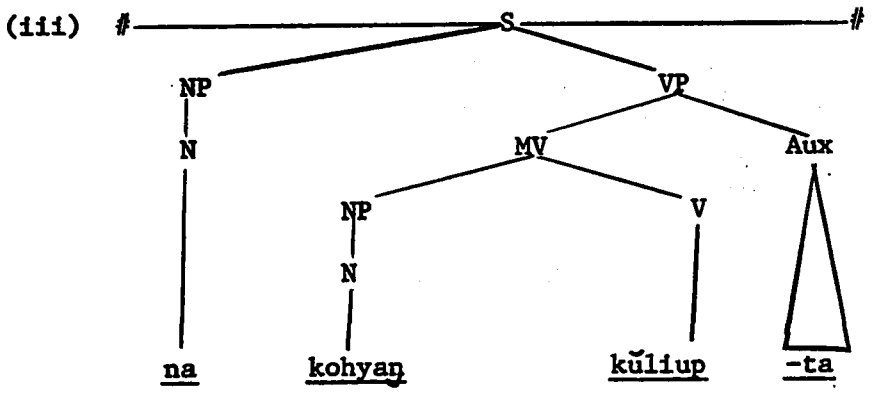
(ii)



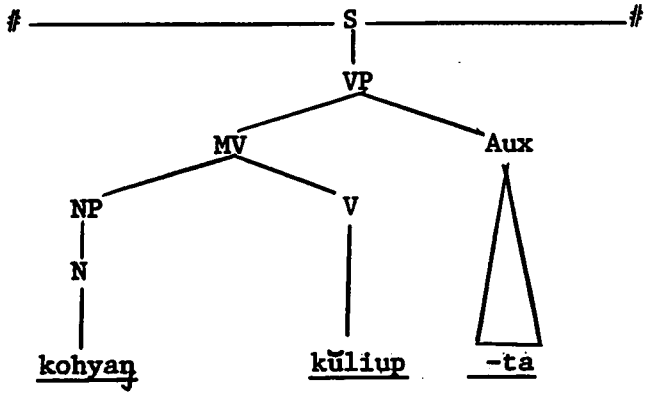
The structure (ii) above may undergo an optional transformation, yielding the P-marker (12iii) which represents the sentence (8ii), or it may undergo other obligatory rules which introduce particles and adjust phonological shapes to terminate the derivation of the sentence (11ii). Consider the two P-markers on the following page. The structure represented by (12iii) may also undergo an optional transformation to derive the sentence (7ii) which is represented by the P-marker (12iv), or it may finalize

the derivation of (8ii) by undergoing postcyclic rules.

(12) (iii)



(iv)



The transformational rules which account for the grammatical processes illustrated by the above P-markers will be formulated after further data are examined.

The analysis illustrated by the P-markers in (12) gives a clear account of the relationship among the sentences (11ii), (8ii), and (7ii). In this analysis, the functional relationship the "complement-of" may be defined only between an S and a V, but not between an NP and a V.

A further support for this analysis is provided by the following data. Compare the sentence (11ii) quoted again as (13i) with the sentence (13ii).

(13) (i) næ-ka kohyaŋ-ŭl kŭliw-ŏ ha -n-ta
I hometown longing for do/feel

"I am homesick."

(ii) sŏnsæŋ-i kohyaŋ-ŭl kŭliw-ŏ ha -n-ta

"The teacher is homesick."

The two sentences above are exactly the same except the first noun; na "I" in (i) and sŏnsæŋ "teacher" in (ii). They are equally acceptable and equally grammatical. Now make a similar comparison between the sentence (8ii) quoted as (14i) and the sentence (14ii).

(14) (i) næ-ka kohyaŋ-i kŭliup-ta

"I am homesick."

(ii) sŏnsæŋ-i kohyaŋ-i kŭliup-ta

"The teacher is homesick."

Again, the two sentences above are exactly the same except the first nouns. However, their degrees of acceptability (or of grammaticality) are not the same. The latter sentence is not as readily acceptable as the former one. Although it is not clear why, it is true that if the subject is other than the first person, the degree of acceptability seems to decrease. This does not happen, however, among sentences like those in (13). What is indicated by this fact is that the sentences like (13), where the verb ha remains undeleted, are more optimal than those in (14), i.e. readily elicited and accepted without reservation. This is another bit of evidence that the sentences in (13) underlies the sentences in (14).

The most decisive evidence of all that makes a clear distinction between the sense adjectives and the non-sense adjectives and that motivates the analysis presented above can be obtained from the distinct behavior of the two classes of adjectives in connection with the causative transformation which involves the verb ha "make".[2] Consider the following data.

(15) (i) sŏnsæŋ-i kohyaŋ-ŭl alŭmtaup-ke ha-n-ta
<-Sen>
NP [[NP VP]$_S$ V Aux]$_{VP}$
teacher hometown beautiful make
"The teacher makes (his) hometown beautiful."

(ii) *sŏnsæŋ-i na-lŭl kohyaŋ-i kŭliup-ke ha-n-ta
<+Sen>
NP [[[NP NP VP]$_S$]$_S$ V Aux]$_{VP}$

(iii) sŏnsæŋ-i næ-ka kohyaŋ-ŭl kŭliw-ŏ ha-ke ha-n-ta
<+Sen>
NP [[NP [NP VP]$_S$ VP]$_S$ V Aux]$_{VP}$
teacher I hometown longing for feel make
"The teacher makes me feel homesick."

One of the seemingly characteristic aspects of the causative transformation concerned here is that any sentence whose VP contains an MV (i.e. any sentence except a copula sentence) may be causativized by being embedded as the complement of the verb ha. However, this generalization cannot be maintained because of the apparent counterexample (ii) above, which is un-

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2 Notice the verb ha as a causative verb "make" and as a noncausative verb "feel" in (15iii). The noncausative ha is preceded by the particle ŏ and the causative ha by the particle ke.

grammatical. The following explanation concerning the ungrammaticality of (ii) will eventually give support to the analysis illustrated by the P-markers in (12).

Notice that the embedded sentences in (15i), (15ii), and (15iii) are (7i), (8ii), and (11ii) respectively. Among the three strings in (15), the second, where (8ii) is embedded, is ungrammatical. The ungrammaticality is certainly due to the embedded S because all the three strings in (15) have the same matrix S. Therefore, the ungrammaticality of the string (15ii) is due to whatever the difference may be between the string (8ii), which is embedded in the ungrammatical string (15ii), and the two strings (7i) and (11ii) which are embedded in the grammatical strings (15i) and (15iii) respectively. A noticeable difference is that (8ii) is a derived string, whereas (7i) and (11ii) are not. Recall that the string (8ii) is derived from the string (11ii) as shown by the P-markers in (12). What is deleted in (8ii) is the noncausative <u>ha</u>, which is dominated by the MV of the matrix S in the deep structure. What follows from this fact is that any sentence whose MV has undergone a certain deletion transformation may not be embedded for the causative transformation. Incidentally, this means that the causative transformation must be ordered to precede the transformation which deletes the noncausative <u>ha</u>. This fact, therefore, implies that the sentence whose MV contains a sense adjective must co-occur with the noncausative <u>ha</u> in the deep structure.

At this point, one might wonder how the causative ha is distinguished from the noncausative ha without any feature specification. The distinction is made by the particle ŏ and ke, on the surface level, as indicated by the footnote 2. In the deep structure, however, the distinction is made by the syntactic features contained in the category V which precedes ha. In other words, the verb ha following a sense adjective is the noncausative ha; otherwise, it is the causative ha. This means that the two functions are mutually exclusive. This fact will be made clearer when the actual rule is discussed later.

5.32 Superficial irregularity vs. underlying regularity. The behavior of sense adjectives displays a great deal of irregularity, so that it seems necessary to establish the following two subclasses.

(16)

(i)	(ii)
kŭyŏup "lovable"	sŭlphŭ "sad"
kŭliup "longing for"	aphŭ "painful"
silh "dislikable"	cŭlkŏup "joyful"
etc.	etc.

Some of the major differences in syntactic behavior of the two classes of sense adjectives are shown in the following data.

(17) (i) haksæŋ-i kŭyŏup-ta
student lovable
"The student is lovable."

(17) (ii) sŏnsæŋ-i haksæŋ-ŭl kŭyŏw-ŏ ha-n-ta
teacher student lovable feel
"The teacher loves the student."

(iii) *sŏnsæŋ-i kŭyŏw-ŏ ha-n-ta

(18) (i) haksæŋ-i sŭlphŭ -ta
student sad
"The student is sad."

(ii) *sŏnsaeŋ-i haksæŋ-ŭl sŭlph-ŏ ha-n-ta

(iii) haksæŋ-i sŭlph-ŏ ha-n-ta
student sad feel
"The student feels sad."

The subject NP's of (17i) and of (18i) are the same, and the two sentences are equally grammatical. These two sentences are embedded in (17ii) and (18ii) respectively. Notice the different results, however: (17ii) is grammatical, but (18ii) is not. The ungrammaticality of (18ii) is due to the embedded S, which is (18i). This point will be taken up again later.

Compare (17iii) and (18iii). In the latter, the subject NP of the constituent S is deleted, and the remaining string is still grammatical. In the former, on the other hand, the subject NP of the constituent S is deleted, and the remaining string is ungrammatical. At this point one might argue that the embedding process cannot be justified in (18). But this argument can be easily dismissed by the fact that both classes of the sense adjectives may choose an abstract noun (<-Con>) for the subject when embedded as shown in (19).

(19) (i) soňsæŋ-i haksæŋ-i us-nŭn kŏs-ŭl
<-Con>

NP [[[[NP VP]$_S$ N]$_{NP}$

teacher student laugh Nom

kdlyŏw-ŏ ha -n-ta

VP]$_S$ V]$_{MV}$ Aux

lovable feel

"The teacher loves the way the student laughs."

(ii) sŏnsæŋ-i haksæŋ-i ttŏna-nŭn kŏs-ŭl
<-Con>

NP [[[[NP VP]$_S$ N]$_{NP}$

teacher student leave Nom

sŭlph-ŏ ha -n-ta

VP]$_S$ V]$_{MV}$ Aux

sad feel

"The teacher feels sad about the student's leaving."

If the grammar is to account for the differences shown so far between the two classes of the sense adjectives, it must provide a binary feature (say, an arbitrary feature like <±Class ii>), which distinguishes the two subclasses from each other. Then, the structural descriptions for the grammatical transformation which accounts for the data in (17) and the one which accounts for the data in (18) will be properly stated. Now, the sentence (18iii) is derived from such a string as

(20) #sŏnsæŋ-i # sŏnsæŋ-i sŭlphŭ-ta # ha-n-ta #

by deleting the subject NP of the embedded S which is identical to

the subject NP of the matrix S (and by making further necessary adjustments, not relevant to the present issue). Notice that this identity condition (and the deletion transformation) is not relevant if the adjective of the embedded S belongs to the subclass (16i).

In order to generate the sentence (19ii), to cite another example, the structural description must state that the subject NP of the embedded S, whose MV contains an adjective of subclass (16ii), is an abstract noun. But such a condition is not necessary if the MV contains an adjective of the other subclass, namely (16i). It is needless to cite any further example since it is clear that the transformational rule which accounts for the data will be very much complicated with the additional arbitrary feature brought into the rule. Furthermore, it does not seem elegant to set up the two different subclasses where there is no inherent feature that is common to the lexical items which are classed together; and even with such a subclassification, many ungrammatical strings like (18ii) are still derived until they are filtered out. In short, the transformational rule which accounts for the data in (17), (18), and (19) must be formulated something like (21).

(21) Complementation of noncausative ha

SD: X, #, $[X,N]_{NP}$, X, #, $[X,N]_{NP}$, X, $\langle {}^{+Aj}_{+Sen} \rangle$, Aux, #, X, ha, X

1 2 3 4 5 6 7 8 9 10 11 12 13 14

(a) Cond: 3,4 = 7,8; 10 contains <+Class ii>

SC: 6, 7, 8, 11, 12 → null

(b) Cond: 8 contains <-Con> ; 10 contains <+Class ii>

SC: 6, 11, 12 → null

(c) Cond: 10 contains <-Class ii>

SC: Same as (b)

The subrule (a) is necessary to generate sentences like (18iii) on the one hand, and to filter out the ungrammatical strings like (18ii) on the other. The subrule (b) is to generate sentences like (19ii), and finally the subrule (c) is to generate sentences like (17ii) and (19i), and to block ungrammatical strings like (17iii). Neither (17i) nor (18i) is relevant to the transformation (21) since they are generated without undergoing the grammatical process in question.

However, the complicated analysis discussed so far and summarized in the rule (21) is, in fact, due to the very naive observation that the two sentences (17i) and (18i) have the same simple underlying structure which does not involve any embedding process. In other words, the sentence (18i) is a simple sentence like (17i), whose predicate adjective, which belongs to the subclass (16ii), may choose an animate noun for its subject as those adjectives which belong to the subclass (16i). However, a further examination of the data reveals that the adjectives which belong to (16ii) may not choose an <u>animate</u> noun for the subject in the deep structure, but they may choose a dummy, among others, which may be the sum of the features that are common to the nouns chosen by such adjectives or the word

muŏs "something". In other words, the selectional features assigned to the adjectives of (16ii) exclude <+<+an> __Aux> , but include < +△__Aux> . What follows from this observation is that the sentence (18i), which was regarded as a simple sentence, is in fact a complex sentence which must be generated through a transformation similar to (21).

It was pointed out that (17ii), which contains (17i), is grammatical, whereas (18ii), which contains (18i), is ungrammatical, and that the ungrammaticality of the string (18ii) is due to the structure of the embedded S (see (23i)). Now that the difference between the two embedded strings (17i) and (18i) has been revealed, a natural explanation for the ungrammaticality of the string (18ii) can be given: the string (18ii) is ungrammatical because its constituent S (18i) has a complex deep structure which has undergone a deletion transformation (the derivational procedure will be discussed following the presentation of the rule). Recall that the string (15ii) is ungrammatical for a similar reason, i.e. the constituent S has undergone a transformation which deleted the verb ha.[3]

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3 Notice incidentally that ha is a V and that the deleted element in the case of (18ii) is an N (although it is a dummy). What is deleted in both cases is a major category in the sense defined by Chomsky (1965: 74). This observation leads one to propose the hypothesis that a sentence, from which an obligatory element which is a major category has been deleted, may not be embedded; or, alternatively, that any transformation which deletes a major category, must be ordered to follow embedding transformations. Although this hypothesis needs further tests, it seems to be true in the case of the PGK.

The advantages of the alternative analysis sketched above are obvious: it eliminates the arbitrary subclassification of the sense adjectives as seen in (16), gives a natural explanation for the grammaticality of the string (18iii) and the ungrammaticality of the string (17iii), excludes ungrammatical strings like (18ii) from the beginning (not by filtering), and above all, leads to the formulation of the rule (22) which is much simpler and more elegant than the earlier rule (21).

(22) Complementation of noncausative ha

SD: X, #, NP, X, #, NP, X, $\langle {+Aj \atop +Sen} \rangle$, Aux, #, ha, X

1 2 3 4 5 6 7 8 9 10 11

Cond: $\begin{bmatrix} 6 = \{^{3}_{\Delta}\} \\ 6 \neq \Delta \end{bmatrix}^{4}$

SC: $\begin{bmatrix} 5, 6, 9, 10 \\ 5, 9, 10 \end{bmatrix}$ → null

The rule (22) correctly accounts for the data in (17) and (18) with the proper specification of the selectional feature in the lexicon. The derivational procedure of the sentence (18i), which has been one of the major concerns of the discussion, will illustrate

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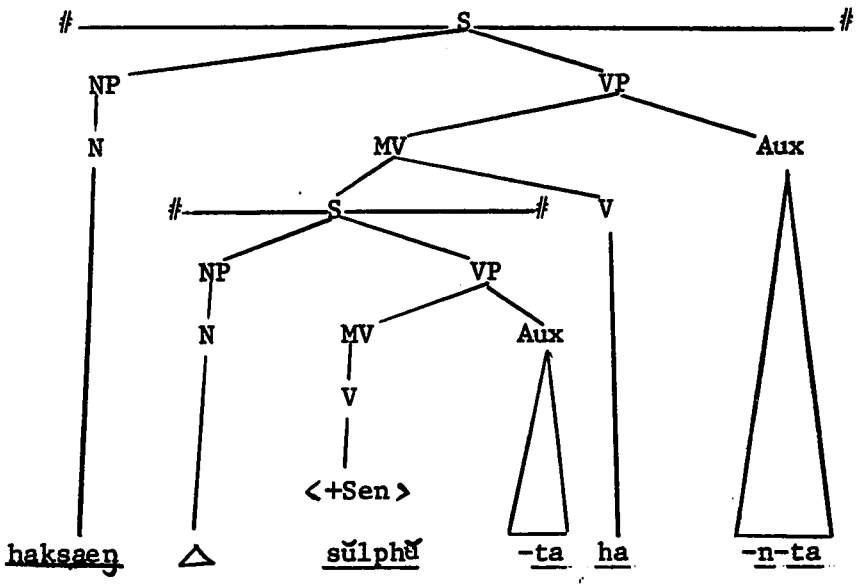
4 The condition 6 = 3 is due to the peculiar double subclass membership of siph (index 8); see 5.6.

how the rule (22) operates and how well it accounts for both classes of the sense adjectives.

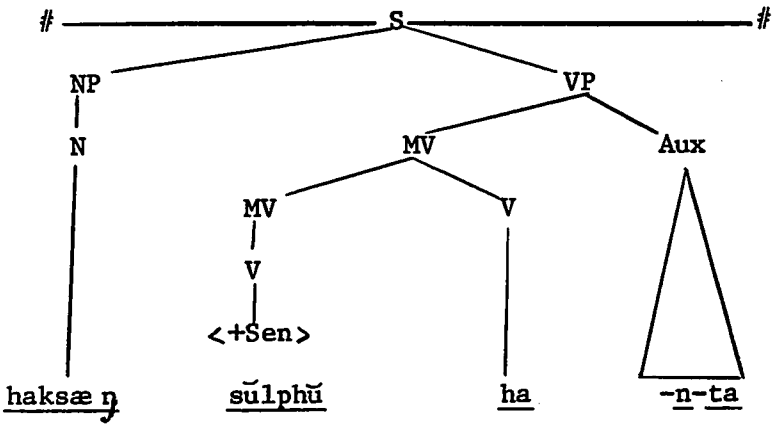
The following is the P-marker which represents the deep structure of the sentence (18i).

(23) (i)



The structure represented by the above P-marker is analyzable in terms of the SD of the rule (22). Accordingly, the transformation operates on the P-marker, yielding the derived P-marker (ii).

(ii)

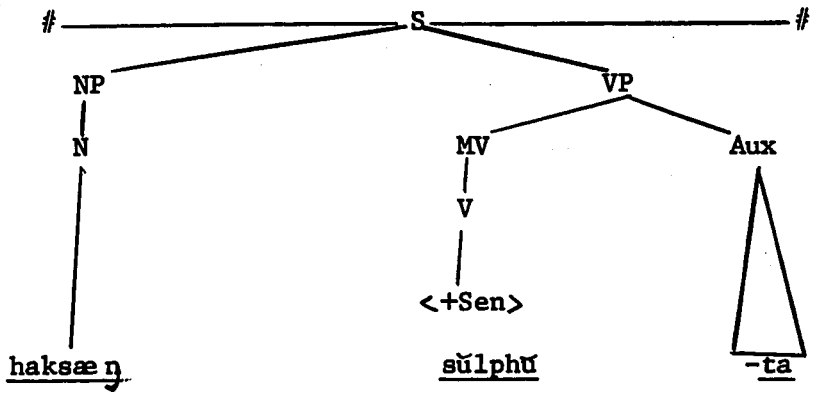


(Recall that the meta-rule which deletes intermediate nonbranching nodes has also operated before the above P-marker is derived.)

The P-marker (22ii) represents the structure which underlies the sentence (18iii) at the point where particles are to be introduced. As specified by the selectional feature in the lexicon, the sense adjectives of (16ii) only may choose a dummy for the subject. This means that such an ungrammatical string as (17iii) will never be derived because the sense adjectives of (16i) never carry the feature <+ __Aux >. If the subject NP of the constituent S in (23i) is not a dummy, the derived P-marker corresponding to (23ii) will represent a structure which underlies sentences like (17ii) or those in (19). Notice that such an ungrammatical string as (18ii) will never be derived due to the selectional restrictions imposed on the adjectives of (16ii). In short, reasonable accounts are given to the ungrammatical strings of both types (17iii) and (18ii), without referring to the filtering device, thanks to the selectional feature specification in the lexicon. This fact, incidentally, may support the argument that the selectional feature must be included in the syntactic component rather than in the semantic component.

In generating the sentence in question, (18i), the structure (23ii) undergoes an optional transformation which is identical to that which operated on the P-marker (12ii) to derive the P-marker (12iii). The effect of this optional transformational rule (24) is illustrated by the P-marker (23iii).

(23) (iii)



(24) GT5. ha deletion (OP)

SD: X, (NP)$\langle^{+Aj}_{+Sen}\rangle$, ha, X

1 2 3 4

SC: 3 → 2; 2 → null

The fact that the rule (24) applies equally to the two superficially different structures like (17ii), whose structure is equal to (12ii), and (18iii), whose structure is represented by (23ii), certainly implies that their deep structures are the same. And the fact that (18i) is derivable from (18iii), both of which have the same initial P-marker, means that (18i) is a complex sentence although its superficial structure is identical to that of the simple sentence (17i).

There is an obvious problem remaining to be solved in connection with the rule (24). Consider the two pairs of sentences in (25) and (26).

(25) (i) sŏnsæŋ-i son-ŭl silŏw-ŏ ha -n-ta

NP [[NP VP]$_S$ V]$_{MV}$ Aux

teacher hand cold feel

"The teacher feels (his) hand is cold."

(ii) sŏnsæŋ-i son-i silŏup-ta

(26) (i) sŏnsæŋ haksæŋ-ŭl kŭyŏw-ŏ ha -n-ta

NP [[NP VP]$_S$ V]$_{MV}$ Aux

teacher student lovable feel

"The teacher is fond of the student."

(ii) sŏnsæŋ-i haksæŋ-i kŭyŏup-ta

In both (25) and (26), the meanings of the string (i) and of (ii) are basically the same; the subtle difference is difficult to show by translation. According to the analysis presented above, the strings (i) and (ii) are related in that the latter is derivable from the former by a rule like (24). It must be pointed out, however, that (26ii) is not as readily acceptable as (25ii) is. This observation reveals two important facts: (a) as has already been pointed out, the string which contains the verb ha (i) is more optimal than the other (ii), indicating that (i) underlies (ii); (b) the deep structures underlying (25) and (26) are not identical. The difference between the two different underlying structures, i.e. the fact (26ii) is less acceptable than (25ii), may be accounted for only when the possessive construction is brought into the grammar.

The possessive construction, which is beyond the scope of the PGK, will uncover the difference between the subject NP of the constituent S of (25i), son "hand", and that of (26i), haksæŋ "student". The difference is that the former comes from the possessive NP sŏnsæŋ-ŭy son "teacher's hand", but the latter does not necessarily come from the possessive NP sŏnsæŋ-ŭy haksæŋ "teacher's student". Even if the latter does come from such an NP, the difference still exists between the two possessive NP's; the relationship between the possessor sŏnsæŋ and the possessed son may be described in terms of "inalienable possession" (see Fillmore: 1967), but the relationship between the possessor sŏnsæŋ and the possessed haksæŋ may not be so described because haksæŋ is not a noun of "inalienable possession".

It is clear, therefore, that the rule (24) operates freely if the subject NP of the constituent S is an NP which is a noun of inalienable possession. If, on the other hand, the subject NP of the constituent S is other than such a noun, the rule (24) seems to be constrained in a way which is not clear at the moment.

5.33 Causative role of ha. It has already been pointed out that the causative and the noncausative functions of the verb ha are mutually exclusive, and that the self-embedding S, which is the complement of ha, may be any sentence except the copula sentence. This means that if the MV of the constituent S contains

a sense adjective, the V of the matrix S, i.e. ha, obtains the noncausative function, and the whole string undergoes the grammatical transformation specified by the rule (22). If, on the other hand, the MV of the constituent S contains a non-sense adjective or any verb except the copula, the verb ha obtains the causative function. These two different functions are, therefore, predictable. The rule for the causative transformation can be formulated as follows.

(27) Complementation of causative ha

SD: X, #, NP, X, #, NP, X, V, Aux, #, ha, X

1 2 3 4 5 6 7 8 9 10 11 12

Cond: 8 does not contain $\langle {}^{+Aj}_{+Sen} \rangle$

SC: 5, 9, 10 → null

Compare the above rule with the rule (22) "Complementation of noncausative ha". It is apparent that (27) is identical to part of (22), i.e. the structural change "5, 9, 10 → null" applies to the structure whether or not the V of the constituent S (index 8) is a sense adjective, if the NP of the constituent S (index 6) is not a dummy. This means that the two rules may be collapsed into one as follows.

(28) GT 4 (i) Complementation of ha

SD: X, #, NP, X, #, NP, X, V, Aux, #, ha, X

1 2 3 4 5 6 7 8 9 10 11 12

Cond: $\begin{matrix} 6 = \left[\{ {}^{3}_{\Delta} \}; \text{ 8 contains } \langle {}^{+\text{ Aj}}_{+\text{ Sen}} \rangle \right] \\ 6 \neq \left[{}^{\Delta} \right] \end{matrix}$

SC: $\begin{bmatrix} 5, & 6, & 9, & 10 \\ 5, & & 9, & 10 \end{bmatrix}$ → null

As indicated in the footnote 2, the particles ŏ and ke precede, in the surface structure, the noncausative ha and the causative ha respectively. These particles are inserted by postcyclic rules just as the postnominal particles are.

The sentence (15iii) is generated by application of two cycles of the rule (28) as the verb ha occurs twice, as the noncausative ha and as the causative ha. Details concerning cyclic operation of the transformation (28) and other cyclic rules will be presented towards the end of this chapter.

5.4 Complementation of tŭ "become". One aspect of the syntactic behavior of the verb tŭ is comparable to that of the intransitive verbs which take a copula sentence as the complement (see rule (4) in 5.2) in that the self-embedding S of the verb tŭ may be a copula sentence where the same deletion transformation as specified in the rule (4) applies. Another aspect of it is comparable to the causative ha in that the MV of its self-embedding S may contain any non-sense adjective or any verb where the total structure undergoes a deletion transformation similar to that of (27). Compare the following sentence with (2i).

(29) kŭ salam-i kyoocŋ-i tŭ-n-ta

NP [[NP]$_S$ V]$_{MV}$

that man principal become

"That man becomes a principal."

The underlying structure of the above sentence is exactly like that of the sentence (2i), which contains the embedded S:

kŭ salam-i kyoocŋ-i -ta
that man principal is
"That man is a principal."

Incidentally, notice the particle i (alternative of ka), which precedes tŏ, and the particle (ŭ)lo, which precedes chŭimha "take office". This difference, however, does not create any problem as the particles are predictable and do not constitute any semantic difference.

Compare the causative sentence whose MV contains the verb ha (i) and the noncausative sentence whose MV contains the verb tŏ (ii) in (30).

(30) (i) sŏnsæŋ-i na-lŭl kŏt-ke ha -n-ta
NP [[NP VP]$_S$ V]$_{MV}$
teacher I walk make
"The teacher makes me walk."

(ii) næ-ka kŏt-ke tŏ -n-ta
NP [[VP]$_S$ V]$_{MV}$
I walk become
"I become able to walk."

Both sentences above have the same embedded S:

næ-ka kŏt-nŭn-ta
"I walk."

Notice, however, that the subject NP of the constituent S is deleted in (30ii), whereas it remains in (30i). The NP in question is always erased under the identity condition by the subject NP of the matrix S. This is the only difference between the rule concerning the causative ha and the rule concerning the verb tʊ̈. Notice, incidentally, that the particle ke precedes both ha and tʊ̈ in the surface structure. The following rule summarizes this discussion of the verb tʊ̈.

(31) GT4 (ii) Complementation of tʊ̈

SD: X, #, NP, X, #, NP, X, $\{^{NP}_{MV}\ Cop\}$ Aux, #, tʊ̈, X

1 2 3 4 5 6 7 8 9 10 11 12 13

Cond: 3 = 6

SC: 5, 6, 9, 10, 11 → null

Compare the above rule with (4) and (27). It is apparent that one part of (31) is identical to (4), another part to (27). This certainly implies that these rules are mutually exclusive (This point will be taken up in 5.7.).

5.5 Complementation of sense verbs. There are a number of verbs which are distinguished from all other verbs in that they may have a self-embedding S of any kind, i.e. the complement S may be any copula or noncopula sentence. These verbs, which carry the feature <+Sen> and are tentatively called the "sense verbs", include sæŋkakha "think" and saŋsaŋha "imagine", to name only two. Consider the embedded S's in the following sentences.

(32) (i) nae-ka sŏnsæŋ-i sinsa i-la ko sæŋkakha -n-ta

NP [[NP NP Cop]$_S$ <+Sen>]$_{MV}$Aux

I teacher gentleman is think

"I think the teacher is a gentleman."

(ii) nae-ka sŏnsæn-i khŭ-ta ko sæŋkakha -n-ta

NP [[NP <+Aj>]$_S$ <+Sen>]$_{MV}$ Aux

teacher big

"I think the teacher is big."

(iii) nae-ka sŏnsæŋ-i ka -ss-ta ko sæŋkakha -n-ta

NP [[NP <-Aj> Pst]$_S$ <+Sen>]$_{MV}$ Aux

teacher go

"I think the teacher went."

The first sentence in the above data contains a copula sentence, while the latter two contain a noncopula sentence each. Furthermore, there is no restriction between the Aux structures of the matrix S and the constituent S; nor is there any identity condition. Notice the category MD of the constituent S is not deleted in the following rule.

(33) GT4 (iii) Complementation of sense verbs

SD: X, #, NP, X, #, NP, X, $\langle \begin{smallmatrix} +D \\ -Pol \end{smallmatrix} \rangle$, #, $\langle \begin{smallmatrix} -Aj \\ +Sen \end{smallmatrix} \rangle$, X

1 2 3 4 5 6 7 8 9 10 11

SC: 5, 9 → null

The feature specification of the category MD (index 8) ensures that only the declarative sentence with the blunt speech level (<-Pol >) may be embedded. The feature specification in the index 10 distinguishes the sense verbs from non-sense verbs as well as from sense adjectives. The SC includes only the deletion transformation which erases the internal sentence boundary markers. The element ko, which may be called a "connective" or "quotative" particle, is inserted as other particles are.

The sentences generated through the transformation (33) will include ones like (34i) and (34ii). In these sentences, the subject nouns of the matrix S and of the constituent S are identical, followed by the same particle ka in the former and by the different particles nŭn and ka in the latter.

(34) (i) næ-ka næ-ka khŭ-ta ko sæŋkakha-n-ta
I I big think
"I think I am big."

(ii) na-nŭn næ-ka khŭ-ta ko sæŋkakha-n-ta
"I think I am big."

The sentences above mean the same as the glosses indicate although the sentence (i) is not likely to be used in a normal situation. What makes a difference between the two sentences is the particle nŭn. This particle is commonly known as the "topic marker" in contradistinction to the so-called "subject marker" ka. Although some functional differences (or rather differences in

usage) are noted[5], the subtle nature of the difference is anything but clear at the moment. Notice that either of the sentences in (35) may be used in place of those in (34).

(35) (i) nae-ka khŭ-ta ko saeŋkakha-n-ta
I big think
(a) "I think I, somebody, etc. am/is big."
(b) "{I, somebody, etc.} think(s) I am big."

(ii) nae-ka na casin-i khŭ-ta ko saeŋkakha-n-ta
self
"I think I (myself) am big."

As shown by the glosses, the sentence (35i) is ambiguous. The meaning (a) is obtained when the subject NP of the constituent S is deleted, and the meaning (b) is obtained when the subject NP of the matrix S is deleted. In the sentence (35ii), the word casin "self" is added to the subject N of the constituent S. The same word may also be added to the subject N of the matrix S. Also notice that all four sentences in (34) and (35) may mean essentially the same: "I think I am big." What is indicated by this observation is that the underlying string of the four sentences is (34i) where the subject NP's of the matrix S and of the constituent S are identical. To generate (34ii), ka of the subject NP of the matrix S is replaced by nŭn; to generate (35i), the subject NP of the matrix S or of the constituent S is deleted; and finally, to generate (35ii), the reflexive pronoun casin "self"

5 Martin notes "de-emphatic" and "contrastive" functions of the particle nŭn (1954: 32-34).

is attached to the subject noun of the constituent S. Although details of these transformations are still to be worked out, it is clear that such transformations are possible only if the subject NP's of the matrix S and of the constituent S are identical. This does not mean, however, that the identity condition must be specified in the rule (33) in order to generate such sentences as (34ii) and those in (35), but it does mean that such sentences are generated by later transformations (postcyclic rules) only after the rule (33) has operated. Therefore, those data in (34) and (35) do not constitute counter-examples; rather, they provide further evidence supporting the generality of the rule (33).

5.6 Complementation of mode-aspect verbs. There are several verbs traditionally known as "auxiliaries". These verbs include iss, siph, cu, po, and a few others. Some examples containing these verbs are presented in (42) of Chapter III. As "auxiliaries" each of these verbs carries a meaning somewhat different from the original meaning, except for siph, which is never used as a main verb in the traditional sense, or which never occurs without a self-embedding S in the sense used in the present analysis. For example, the verb iss, which means "to be" as a main verb, means "to continue to do something or to be in some state". The latter meaning is better expressed in terms of the "continuative aspect", with a contrast between the "lexical" meaning (as a main verb) and the "grammatical" meaning (as an auxiliary). The verb cu, which

means "to give" as a main verb, carries the meaning "to render a service for somebody" as an auxiliary, which may be better described in terms of the "benefactive mode". Although it is not easy to define the "auxiliary" meanings of all these verbs, it is clear that the verb iss carries a grammatical meaning of "aspect" and the rest of "mode" (the terms used as defined by Jakobson: 1957). Consider the following sentences.

(36) (i) sŏnsæŋ-i chæk-ŭl ilk ko iss -ta

NP [[NP V]$_S$ V]$_{MV}$ Aux

teacher book read is

"The teacher is reading a book."

(ii) sŏnsæŋ-i chæk-ŭl ilk ko siph-ŏ ha -n-ta

NP [[[NP V]$_S$ V]$_S$ V]$_{MV}$ Aux

teacher book read desirable feel

"The teacher wishes to read the book."

(iii) sŏnsæŋ-i chæk-ŭl ilk-ŏ po -n-ta

NP [[NP V]$_S$ V]$_{MV}$ Aux

teacher book read see/try

"The teacher tries reading the book."

(The teacher reads the book to examine it.)

In the sentence (i), the verb iss has to do not with the speaker's or the actor's state of mode, but with the state of the "narrated event". On the other hand, the verbs siph and po in (ii) and (iii) respectively make reference to the state of the speaker or the

actor (or both), but not to the state of the narrated event. Notice that the two glosses for the sentence (iii); neither of them gives any satisfactory meaning of the sentence due to the subtle import brought in by the verb po. Suppose the sentence (iii) contains cu in place of po. Then, the sentence would be translated as: "The teacher reads the book (for me, you, etc.)". Notice that the basic meaning carried by the constituent S which describes the narrated event is unchanged. The subtle difference, therefore, is not due to the narrated event (the event itself is the same), but to the speaker who narrates the same event one way or the other.

Based on the preceding observations, the verbs in question will be assigned the feature <+A> for iss and <+M> for the rest over and above the syntactic features contained in the corresponding "main" verbs (except the nonlocal contextual feature). The following are sample listings from the lexicon:

(37) (i) iss <+Ex, +A +S__ >

(ii) siph <+Aj, +Sen, +M +S__ >

(iii) cu <+Act, -Stat, +M +S__ >

As indicated by the contextual feature <+S__ >, these verbs are not treated as "auxiliaries" in this study; rather, they are treated as verbs which require a self-embedding S.

In 3.5, it is argued that they cannot be adequately treated as auxiliaries. To reiterate the three main points in the argument

against the traditional treatment of these verbs: (1) it cannot account for their recursive occurrence, (2) if the VP contains more than one such verb, it is difficult, if not impossible, to define the constituency, and (3) the treatment of the verbs in question on a par with other verbs which require a self-embedding S not only presents a solution to the problems (1) and (2), but also gives a unique solution in terms of "VP complementation" to all the self-embedding processes discussed in this chapter.

One of the characteristics of these mode-aspect verbs is that their self-embedding S may not be a copula sentence or any sentence whose MV is an adjective. In other words, only those sentences whose MV is a verb or an NP and a verb may be embedded. Consider the rule (38) concerning these mode-aspect verbs.

(38) GT 4 (iv) Complementation of mode-aspect verbs

SD: X, #, NP, X, #, NP, X, V, Aux, #, V, X

1 2 3 4 5 6 7 8 9 10 11 12

Cond: 3 = 6; 8 contains $\begin{bmatrix} \langle -Ex \rangle \\ \langle +Ex \rangle \end{bmatrix}$; 11 contains $\begin{bmatrix} \{ \langle +\ M \rangle \\ \langle +\ A \rangle \} \\ \langle +\ M \rangle \end{bmatrix}$

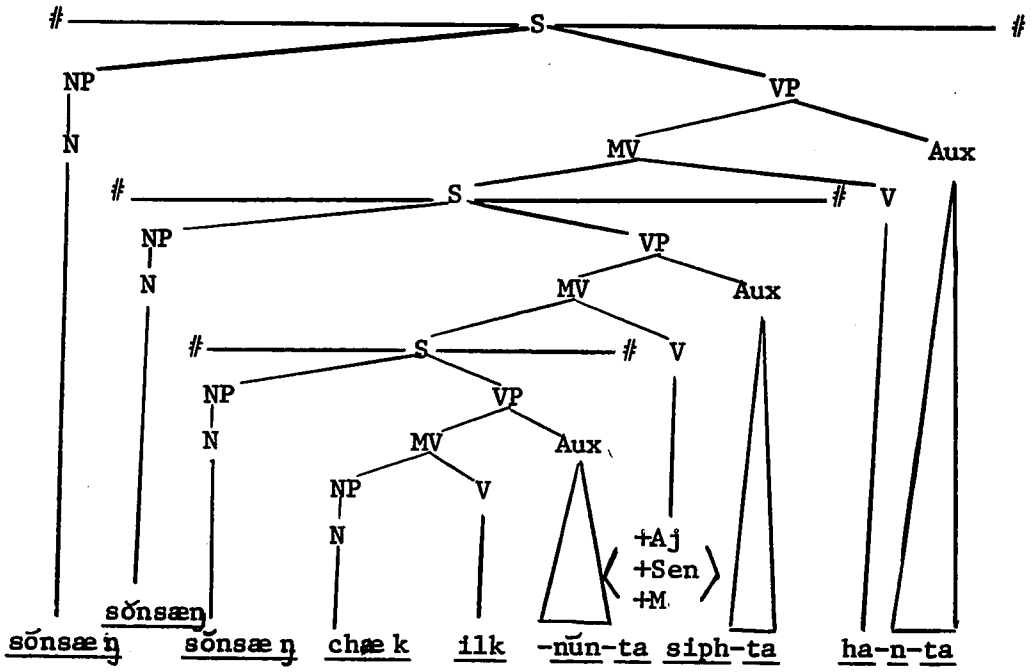
SC: 5, 6, 9, 10 → null

The subject NP of the matrix S erases the subject NP of the constituent S under the identity condition. The structural index 8, being specified as V, prevents any copula sentence from being embedded. The second and the third conditions with respect to the indices 8 and 11 respectively are further set to prevent any

sentence whose MV is an adjective, on the one hand, and, on the other, to allow sentences whose MV is iss <+Ex> only if the dominating MV contains a V which carries the feature <+M> (e.g. cu, po, etc.).

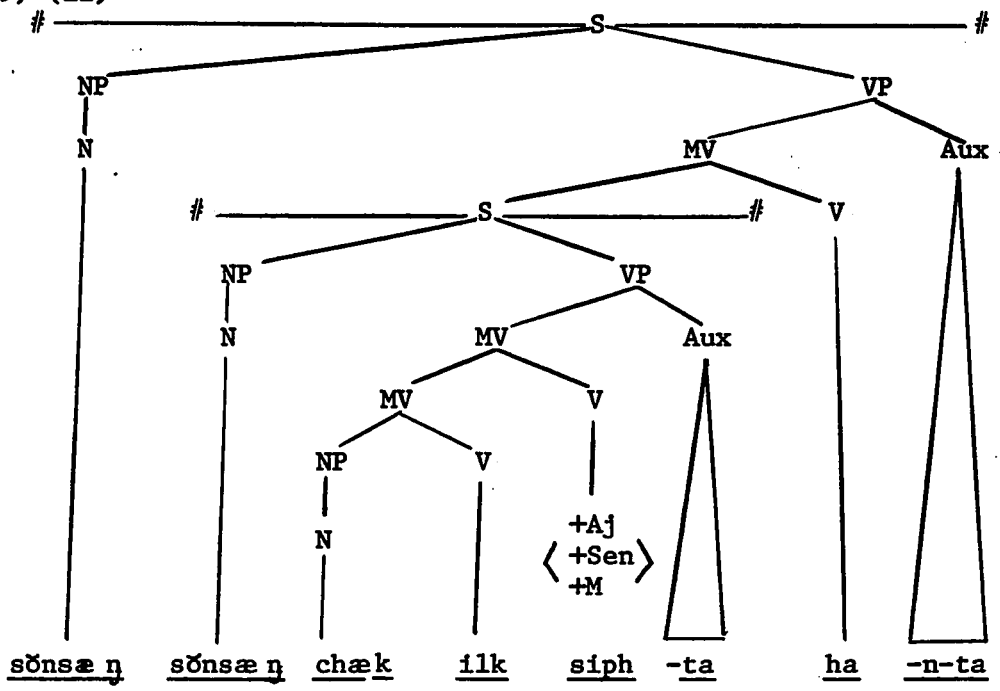
Notice the lexical item siph listed as (37ii). It carries the features < +Aj, +Sen, +M, +S__>. As it carries the features < +M, +S__>, it may appear as the structural index 11 of the rule (38). It may also appear as the index 8 of the rule (28) as it carries the features< +Aj, +Sen >. This means that the particular item siph has a membership of two subclasses as a mode verb and as a sense adjective. This fact is illustrated by the sentence (36ii) which is generated via the two transformations (38) and (28). The following P-markers illustrate the generation of the sentence (36ii), and at the same time show how the two transformational rules (38) and (28) operate.

(39) (i)



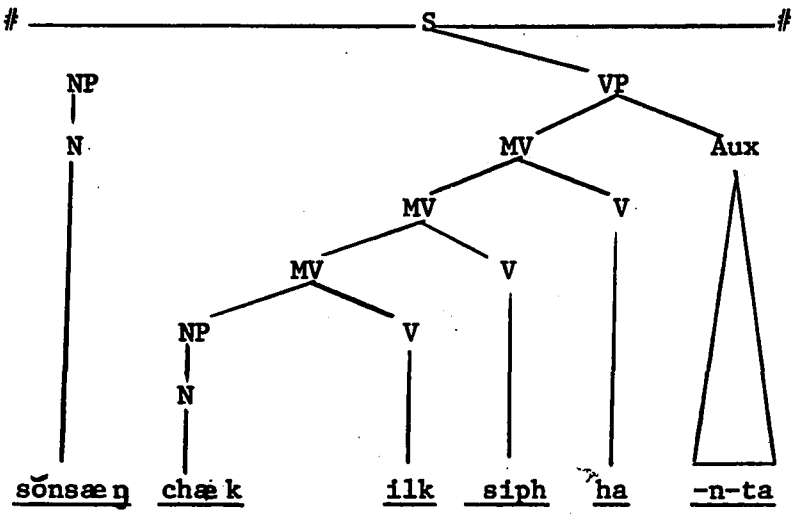
The innermost S and its matrix S in the above structure satisfy the conditions specified in the rule (38). Notice, in particular, that the V of the matrix S siph is a "mode verb" here. After the operation of the rule (38) on (39i), the following P-marker is derived.

(39) (ii)



The structure above now meets the conditions specified in the rule (28). Notice that the V of the constituent S siph is a sense adjective in the above structure. The nature of the double membership of the morpheme siph is clear now: it is a mode verb as the V of a matrix S, and it is a sense adjective as the V of a constituent S. After the operation of the rule (28) on the structure (39ii), the following P-marker is derived.

(39) (iii)



The derivation of the sentence (36ii) will be completed when particle insertion rules and phonological rules are further applied.

5.7 Cyclic operation and order of rules. The rules discussed so far in this chapter are essentially five, namely, (4), (28), (31), and (38). One might have noticed that the latter four rules are extremely similar to one another. In fact, there is at least one structure that may satisfy the conditions of the SD of all the four rules, if the V of the matrix S (e.g. ha, cu, tŏ, etc.) is not considered. What this fact implies is that these four rules are mutually exclusive. It is possible, therefore, to collapse these rules into a single rule although the outcome will be technically complex. The generative procedure of the sentence (40) will make this point clearer.

The rule (4) is distinguished from the rest by the fact that the SD specifies that the embedded S be a copula sentence. This specification is significant because it automatically sets the

order of the rule with respect to the other four rules. In other words, since the copula is never flanked by a self-embedding S, the constituent S which contains the copula is the innermost S. This means that the rule (4) must precede the other four rules.

The SD of the rule (28) specifies that the MV of the constituent S may be any adjective or any verb. As pointed out in 5.6, siph is the only sense adjective which is flanked by a self-embedding S. This means that the order of the rule is lexically determined: if the structure contains an S whose MV dominates a sense adjective other than siph or any verb which may not co-occur with a self-embedding S, the rule (28) operates prior to, if applicable, any one or all the other three rules. If, on the other hand, the MV dominates an S and the particular morpheme siph, or an S and a verb, the operation of the rule must follow any or all of those three rules, depending on the nature of the structure of the embedded S. Therefore, the order of the rule (28) depends on the lexical item which appears as the structural index 8 of (28). Now consider the derivational procedure of the sentence (40) below.

(40) na-nŭn kŭ-ka kyoocaŋ-i tŏ-n-ta ko

$S_0[S_1[S_2[S_3[$ NP $S_4[S_5[S_6[$ NP VP $]_{S_6}$ VP $]_{S_5}$

I he principal become

mit-ke ha ko siph-ŏ ha ko iss-ta

VP $]_{S_4}$ VP $]_{S_3}$ VP $]_{S_2}$ VP $]_{S_1}$ VP $]_{S_0}$

believe make desirable feel is

"I hope that I will make him believe that he will become a principal."

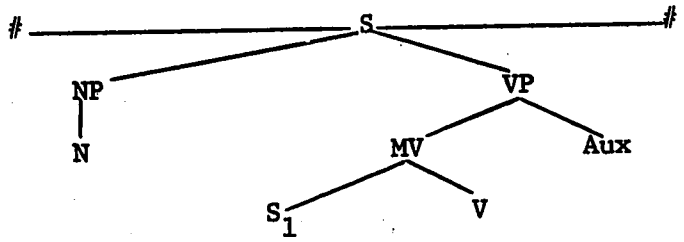
The innermost S_6 is a copula sentence: kŭ-ka kyoocaŋ i-ta "he is a principal" which is the complement of the verb tŏ "become" of the matrix S_5. Thus, the rule (31) operates first, the derived string being: kŭ-ka kyoocaŋ-i tŏ-n-ta "he becomes a principal", which in turn is the complement of the verb mit "believe" of the matrix S_4. The verb mit is a sense verb, and since the whole string up to the VP which contains this verb is analyzable in terms of the SD of the rule (33), the transformation (33) operates. The derived string at this point is: kŭ-ka kyoocaŋ-i tŏ-n-ta ko mit-nŭnta "he believes that he will become a principal", which is the complement of the verb ha of the matrix S_3. Next, the rule to be operated is (28), and the string to be derived is: na-nŭn kŭ-ka kyoocaŋ-i tŏ-n-ta ko mit-ke ha-n-ta "I make him believe that he will become a principal", which, in turn, is the complement of the matrix S_2. In short, the process continues until the outermost S_0 is fully accounted for. The transformational rules involved in generating the sentence (40) are as follows operated in that order"

(31)	-	(33)	-	(28)	-	(38)	-	(28)	-	(38)
S_6-S_5		S_5-S_4		S_4-S_3		S_3-S_2		S_2-S_1		S_1-S_0

Notice that the two rules (28) and (38) are repeated twice each. It is impossible to order these four rules with respect to one another because they are mutually exclusive.

The constituent structure of each S except the innermost S_6 in (40) may be most simply represented by the following P-marker.

(41)



Depending on the nature of the cateogry V and of the structure of S_1, the decision is made as to what rule of the four is to be applied. The order of the rules is determined, in each case, by the structure because the structure is analyzable in terms of the SD of only one rule out of the four rules at a time. Since the operation of one of the four rules may yield a structure which may be again analyzable in terms of the SD of one of these rules, the process may repeat cyclically as shown in the case of the sentence (40).

It has been shown that the self-embedding process provides a solution to the problem encountered in the traditional approach to the analysis of the verb phrase which involves what has been called "auxiliaries". The major advantage of the present analysis is that the mechanism provided by the self-embedding process automatically accounts for the repeated occurrence of the so-called "auxiliaries" and their grammatical relationship without setting up the arbitrary subclass "auxiliary".

Incidentally, the analysis presented in this chapter is further supported by the adnominalization transformation. In the sentence (40), there are three NP's, namely na-nŭn "I", kŭ-ka "he",

and kyoocaŋ-ŭlo "principal". Among these NP's, only the first one (na-nŭn) may become the head of an endocentric construction via the adnominalization transformation. What is implied by this fact is that the other NP's are not directly dominated by the matrix S or by the VP of the matrix S, but by the embedded S.

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APPENDIX

A PARTIAL GRAMMAR OF KOREAN

I. Base rules

A. (a) Categorial rules

C1. S → # NP VP #

C2. VP → (Neg) (Tim) (Loc) { (Ins) MV / (NP) Cop } Aux

C3. MV → (NP) (S) V

C4. { Tim / Loc / Ins } → NP

C5. NP → (S) (Dem) N (S)

C6. Aux → (TM) A^MD

C7. TM → (T) (M)

C8. T → Pst (PP)

C9. Neg → { Ng1 / Ng2 }

C10. Dem → { d1 / d2 / d3 }

(b) Grammatical feature rules

GF1. MD → ⟨ ±Q / ±Pol ⟩

GF2. <-Q> → <±D>

GF3. <-D> → <±I>

B. (a) Lexical feature rules

(i) LF1. N → ⟨ +N / ±Con ⟩

LF2. <-Con> → ±Tim

LF3. <-Tim> → <±Nom>

LF4. <+Nom> → <±Fact>

LF5. <+Con> → $\langle \begin{matrix} \pm Cnt \\ \pm An \end{matrix} \rangle$

LF6. <+An> → <±Hum>

LF7. <-An> → <±BP>

LF8 <+Him> → <±1P>

LF9. <-1P> → $\langle \begin{matrix} \pm 2P \\ \pm Hon \end{matrix} \rangle$

LF10. <+1P> → $\langle \begin{matrix} \pm Hbl \\ -Hon \end{matrix} \rangle$

(ii) LF11. V → $\langle \begin{matrix} +V \\ \pm Aj \end{matrix} \rangle$

LF12. <-Aj> → <±Ex>

LF13. <-Ex> → <±Act>

LF14. $\{ \begin{matrix} <+Act> \\ <+Aj> \end{matrix} \}$ → <±Stat>

LF15. $\langle \begin{matrix} +Aj \\ +Stat \end{matrix} \rangle$ → <±Sen>

(b) Sample lexical entries

1. <+N, +Tim>

(i) <+__(S)> achim "morning" siwŏl "October"

(ii) <+$\{ \begin{matrix} Dem \\ S \end{matrix} \}$__> cŏk "time" tonan "meanwhile"

2. <+N, +Fact>

<+$\{ \begin{matrix} Dem \\ S \end{matrix} \}$__> kŏs "fact/thing/way" (nominalizer)

3. <+N, -Fact>

<+S__> ki (nominalizer)

4. <+N, -Nom>

(i) <+(S) (Dem) __ (S)> yecŏŋ "plan"
sasil "fact"

(ii) <+(Dem)__ (S)>cŏŋsin "spirit"
ŭykyon "opinion" pŏlŭs "habit"

5. <+N, +BP, +(Dem) __(S)>

(i) <+Cnt> son "hand" pal "foot"

(ii) <-Cnt> mom "body" hŏli "waist"

6. <+N, -BP, +(Dem) __ (S)>

(i) <+Cnt> chæk "book" yŏnphil "pencil"

(ii) <-Cnt> mul "water" pap "cooked rice"

7. <-BP, +Cnt, +D __ (S)> kŏs "thing"

8. <+N, -BP, + __ (S)>

(i) <-Cnt> hankuk "Korea" sŏul "Seoul"

(ii) <+Cnt, (+Q__)> muŏs "what/anything"

9. < +N, -Hum>

(i) <+Cnt, +(Dem) __ (S)> kæ "dog"
talk "chicken"

(ii) < -Cnt, + __ (S) > patuki (a dog's name)

10. <+N, -1P, (+Hon) >

(i) <+Cnt, +(Dem) __ (S) > sŏnsæŋ "teacher"
puin "madam" kyosu "professor"

(ii) <-Cnt, + __ (S) > yohan "John"
malia "Mary"

11. <+N, -2P, +Cnt>

(i) <(+Hon), +Dem __ (S)> pun "person"
i "man"

(ii) <(+Hon), +(Dem) __ (S)> atŭl "son"

ttal "daughter" cokha "nephew/niece"

(iii) <-Hon, +(Dem) __ (S)> æ "child"

salam "man"

(iv) <(+Hon), (+Q),+ > nuku "who/somebody"

12. <+N, +2P, +__ (S)>

(i) <+Cnt, (+Hon)> tangsin "you" tæk "you"

(ii) <+Cnt, -Hon> nŏhi "you" (pl)

(iii) <-Cnt, -Hon> nŏ "you" (sg)

13. <+N, +1P, -Hon, +__(S)>

(i) <+Cnt, -Hbl> uli "we"

(ii) <-Cnt, -Hbl> na "I"

(iii) <-Cnt, +Hbl> cŏ "I"

(iv) <+Cnt, +Hbl> cŏhi "we"

14. <+V, _Ex,+___, +(Tim) (Loc) __Aux>

<+ k+N> __Aux> ŏps "not be"

15. <+__, +(Neg) (Tim) (Loc) ___Aux>

(i) <+V, +Ex>

(a) <+ <+N>__Aux> iss "be"

(b) <+ <+Hon> __Aux> kee "be"

(ii) <+V, -Act>

(a) <+ <+Con> __Aux> sŏ "stant

puth "stick"

(b) <+ <+Am>__Aux> anc "sit"

mŏmulŭ "stay"

(iii) <+V, +Act, +Stat>

(a) <+ <+Con>__Aux> ssŏk "get spoiled" sik "become cold" cŏc "become wet"

(b) <+ <+An>__Aux> nolla "become frightened" nah "be born"

(iv) <+V, +Act, -Stat>

(a) <+ <+Con>__Aux>umciki "move" tol "turn" kullŭ "roll"

(b) <+ <+An>__ Aux> o "come" kŏt "walk"

(c) <+ <+Hon>__Aux> ċumu "sleep"

16. <+V, +Act, -Stat, ±(Neg) (Tim)(Loc)(Ins)__Aux>

(i) <+NP__>

(a) <+ <+An> <+Con> __Aux> mul "bit" ttæli "hit" tachi "touch" po "see"

(b) <+<+An><-An>__Aux> kkae "break" pee "cut"

(c) <+ <+An> <+An> __Aux> nolli "make fun of" cap "butcher/kill"

(ii) <+NP(S)__>

(a) <+ <+An> <+Con>__Aux> pat "receive" cu "give" mok "eat"

(b) <+ <+Hum> <+Con>__Aux> ppop "select" ssŭ "use" sa "buy" phal "sell"

(c) <+ <+Hon> <+Con> __Aux> capsu "eat"

(d) <+ <+Hbl> <+Hon> __Aux> mosi "look after"

17. <+V, +Act, -Stat, +(Neg)(Tim)(Loc) __Aux >

(i) <+NP__, <+ <+An> <+An> __Aux >

nah "give birth to" ŏp "carry in the back"

(ii) <+NP(S)__, <+ <+An> <+N> __ Aux >

kac "have" cini "hold/keep"

(iii) <+NP S__,<+ <+Hum><+N>__ Aux>

sam "take as/regard" yŏki "conceive as"

18. <+V, +Aj, -Stat, +(Tim)(Loc) __Aux, +__>

(i) <+ <+Con>__Aux> coyŏŋha "quiet"

(ii) <+ <+Hum>__Aux> pucilŏŋha "diligent"

cŏŋcikha "honest" tamtæha "bold"

19. < +__, +(Tim)__ >

(i) <+V, -Sen>

(a) <+ <+N>__Aux> olh "right"

kŭlŭ "wrong"

(b) <+ <+Con>__Aux> Kil "long" ccalp "short"

(c) <+ <+An>__Aux> nŭlk "old"

(d) <+ <-An> __Aux> nalk "old"

(e) <+ <+Hum>__Aux> cŏlm "young"

(ii) <+V, +Sen, +Aj>

(a) <+ <+N>__Aux> coh "good/likable"

silh "dislakable"

(b) <+ <+Con>__Aux> pankaup "glad"

kŭliup "longing for" ippu "pretty"

(c) <+ <+An>__Aux > kŭyŏup "lovely"

(d) <+ {△ <+Fact>} __ Aux > cŭlkŏup

"joyful" sŭlphŭ "sad" kippŭ

"happy"

(e) <+ {△ <+BP>} __Aux > aphŭ "painful"

(f) <+ <+BP> __Aux > silŏup "cold"

20. <+V, +Act, -Stat, +(Neg)(Tim)(Loc)__Aux >

(i) <+Sen,+{NP S}__, + <+Hum> (<+N>) __Aux>

saŋkakha "think" samsanha "imagine'

(ii) <+ {NP S}__, + <+An> (<-Fact>) __Aux>

ha "do/make"

(iii) <+S__, + <+N>__Aux> tŭ "become"

21. <+S__, +__Aux>

(i) <+V, +Ex, +A +<+Con> __Aux>

iss "continue to do" (continuative)

(ii) <+V, +Sen, +Aj, +M + <+ An> __Aux>

siph "desirable" (desiderative)

(iii) <+V, +Act, -Stat, +M + <+An>__Aux>

cu "render the service of" (benefactive)

po "try" (attemptive)

tu "finish" (preparative)

C. Base transformation rules

BT1. Lexical insertion (i)

$V \rightarrow CS$

Cond: (i) the complex symbol CS introduced under the domain of the terminal symbol V contains the syntactic feature <+V> , and

(ii) the P-marker in which the CS is introduced falls under the domain specified by the two contextual features (local and nonlocal) positively marked in the CS.

BT2. Selectional feature assignment (i)

SD: $X, \#\ (Dem),\ N, X,\ [(Dem), N),\ X,\ <+\alpha\ A>(<\beta B>)\ \_\_\ Aux\ ]_{MV}, X$

1 2 3 4 5 6 7 8 9 10

SC: $4 \rightarrow <\overset{4}{\alpha}\ A>\ ;\quad (\ 7 \rightarrow <\overset{7}{\beta B}>\ )$

BT3. Selectional feature assignment (ii)

SD: X, (Dem), N, X

1 2 3 4

(i) Cond: $[2,3]_{Tim}$

SC: $3 \rightarrow \overset{3}{<+Tim>}$

(ii) Cond: $[2, 3]_{Loc}$

SC: $3 \rightarrow \overset{3}{<+Con>}$

(iii) Cond: $[2, 3]_{Ins}$

SC: $3 \rightarrow \overset{3}{<-An>}$

BT4. Lexical insertion (ii)[1]

(a) $N_{<\alpha A>} \rightarrow CS$

Cond: (i) the complex symbol to be introduced contains the feature <+N> and does not contain the feature <-αA>;

(ii) the P-marker upon which the rule is to operate falls under ithe domain specified by the contextual feature positively specified in the CS.

(b) Object noun selection

(i) SD: X, #, (Dem), $\langle {}^{+2P}_{-Hon} \rangle$, X, [(Dem), N, V]$_{MV}$, X
1 2 3 4 5 6 7 8 9

SC: 7 → $\left\{ \begin{array}{l} {}^{7}\text{-Hble} \\ \text{<-}{}^{7}\text{P>} \\ \text{<-}{}^{7}\text{Hum>} \\ \text{<-}{}^{7}\text{An>} \end{array} \right\}$

(ii) SD: X, #, (Dem), <+Hbl>, X, [(Dem), N, V]$_{MV}$, X
1 2 3 4 5 6 7 8 9

SC: 7 → $\left\{ \begin{array}{l} \text{<+}{}^{7}\text{Hbl>} \\ \text{<-}{}^{7}\text{2P>} \\ \text{<+2P, }{}^{7}\text{+Hon>} \\ \text{<-}{}^{7}\text{Hum>} \\ \text{<-}{}^{7}\text{An>} \end{array} \right\}$

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1 See the convention (40) of Chapter II for the operation of this rule.

BT5. Speech-level adjustment

(i) SD: X, #, X, $\langle {+2P \atop \alpha Hon} \rangle$, X, <-Pol>, X

1 2 3 4 5 6 7

SC: 6 → $\langle \alpha Pol \rangle$

(ii) SD: X, #, X, <+Hbl>, X, <-Pol>, X

1 2 3 4 5 6 7

SC: 6 → <+Pol>

BT6. Mood adjustment

(i) SD: X, #, X, $\{ {<+Stat> \atop Cop} \}$, X, <-D>, X

1 2 3 4 5 6 7

SC: 6 → <+D>

(ii) SD: X, #, (Dem), $\left\{ \langle {-Cnt \atop +1P} \rangle, {<-2P>} \right\}$, X, <-D>, X

1 2 3 4 5 6 7

SC: 6 → <+D>

(iii) SD: X, #, (Dem), $\langle {+Cnt \atop +1P} \rangle$, X, <+I>, X

1 2 3 4 5 6 7

SC: 6 → <-I>

(iv) SD: X, $[X, \langle {+N \atop +Q} \rangle, X, <-Q>]_S$, X

1 2 3 4 5 6

SC: 5 → <+Q>

(v) SD: X, #, (Dem), <+2P>, Neg, X, <-D>, X

1 2 3 4 5 6 7

SC: 7 → <+D>

II. Grammatical transformation rules

A. Precyclic rules

GT1. Neg placement

SD: X, [Neg, X, $\{\begin{smallmatrix}\text{Cop}\\ \text{V}\end{smallmatrix}\}$, Aux]$_{VP}$, X

1 2 3 4 5

SC: 4 → 2^4; 2 → null

GT2. Honorific suffix insertion

SD: X, #, (Dem), <+Hon>, X, $\{\begin{smallmatrix}\text{Cop}\\ \text{V}\end{smallmatrix}\}$, (TM) A, X

1 2 3 4 5 6 7 8

SC: 7 → si^7

B. Cyclic rules

GT3. Complementation of verb (I)

SD: X, NP, X, #, NP, X, NP, Cop, Aux, #, V, X

1 3 4 4 5 6 7 8 9 10 11 12

Cond: 2 ≠ [NP]$_{\{\text{Tim, Loc, Ins}\}}$; 2 = 5

SC: 4, 5, 8, 9, 10 → null

GT4. Complementation of verb (II)

(i) ha

SD: X, #, NP, X, #, NP, X, V, Aux, #, ha, X

1 2 3 4 5 6 7 8 9 10 11

Cond: $\begin{bmatrix} 6 = \{\overset{3}{\triangle}\}; \text{ 8 contains } \langle \begin{smallmatrix}+\text{Aj}\\ +\text{Sen}\end{smallmatrix} \rangle \\ 6 \neq \triangle \end{bmatrix}$

SC: $\begin{bmatrix} 5, 6, 9, 10 \\ 5, \quad 9, 10 \end{bmatrix}$ → null

(ii) tō

SD: X, #, NP, X, #, NP, X, $\{^{NP}_{MV}{}^{Cop}\}$, Aux, #, tō, X

1 2 3 4 5 6 7 8 9 10 11 12 13

Cond: 3 = 6

SC: 5, 6, 9, 10, 11 → null

(iii) sense verbs

SD: X, #, NP, X, #, NP, X, $\langle^{+D}_{-Pol}\rangle$, #, $\langle^{-Aj}_{+Sen}\rangle$, X

1 2 3 4 5 6 7 8 9 10 11

SC: 5, 9 → null

(iv) mode-aspect verbs

SD: X, #, NP, X, #, NP, X, V, Aux, #, V, X

1 2 3 4 5 6 7 8 9 10 11 12

Cond: 3 = 6; 8 contains $\begin{bmatrix}<-Ex>\\ \\ <+Ex>\end{bmatrix}$; 11 contains $\begin{bmatrix}\{^{<+M>}_{<+A>}\}\\ \\ <+M>\end{bmatrix}$

SC: 5, 6, 9, 10 → null

GT5. ha Deletion (OP)

SD: X, $[(NP)\langle^{+Aj}_{+Sen}\rangle$, ha$]_{MV}$, X

1 2 3 4

SC: 3 → 2; 2 → null

GT6. Adnominalization

SD: X, (Dem)N, [#, X, [(X), (Dem)N]$_{NP}$, X, $\{^{Cop}_{V}\}$, (si), (TM), A, MD, #]$_{S}$, X

1 2 3 4 5 6 7 8 9 10 11 12 13

Cond: 2 = 6

SC: 2, [3 - 13]$_S$ → [4,7,8,(9),(10), 11]$_S$, (5), 2

GT7. Factive nominalization

(i) SD: X,#,X,(TM), A,MD,#, kŏs, X, $\{^{MV}_{NP}, Cop\}$, X

1 2 3 4 5 6 7 8 9 10 11

SC: 2, (4), 6, 7 → null

(ii) SD: X,#,X,MD,#,kŏs, Cop, (TM), A, MD, #, X

1 2 3 4 5 6 7 8 9 10 11 12

Cond: 12 = null

SC: 2, 4, 5, (8) → null

GT8. Nonfactive nominalization

(i) SD: X, #, NP, X, #, NP, X, Aux, #, ki, X, V, X

1 2 3 4 5 6 7 8 9 10 11 12

Cond: $\begin{bmatrix} 12 = ha;\ 3 = 6 \\ 12 \neq ha \end{bmatrix}$

SC: $\begin{bmatrix} 5, 6, 8, 9 \\ 5, 8, 9 \end{bmatrix}$ → null

(ii) SD: X,#,X,(T), (M), A,MD,#,ki,sŭŭp,(TM),X,#,X

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Cond: 14 = null

SC: 2, (5), 6, 7, 8, 11 → null

C. Postcyclic rules

GT9. Neg shifting (OP)

SD: X, <+Aj> , ki, Ngl, ha, X

1 2 3 4 5 6

Cond: 2 = (C)Vw(C)(C)(Vw)(C)(C)(Vw)(C)(C)

where C = any consonant; Vw = any vowel

SC: 5 → 2; 2, 3 → null

GT10. Imperative-Propositive Neg replacement

SD: X, ki, Neg, ha, X, <-D >, X
1 2 3 4 5 6 7

SC: 3, 4 → maal

GT11. TM deletion

(i) SD: X, TM, A, <-D> , X
1 2 3 4 5

SC: 2 → null

(ii) SD: X, <+Aj> , (si), TM, A, (Dem) N, X
1 2 3 4 5 6 7

SC: 4 → null

(iii) SD: X, <+Aj> , N, (Neg), ha, (si), TM, A, (Dem) N, X
1 2 3 4 5 6 7 8 9 10 11

SC: 7 → null

GT12. Aspect deletion

(i) SD: X, TM, A, $\langle {}^{+D}_{-Pol} \rangle$, X
1 2 3 4 5

SC: 3 → null

(ii) SD: X, A, $\langle {}^{-D}_{-Pol} \rangle$, X
1 2 3 4

SC: 2 → null

(iii) SD: X, $\left\{ {}^{<+Aj>}_{<+Ex>}_{Cop} \right\}$, (si), (TM), A, $\langle {}^{+D}_{-Pol} \rangle$, X
1 2 3 4 5 6 7

SC: 5 → null

(iv) SD: X, <+Aj> , N, (Neg), ha, (si), (TM), A, $\langle {}^{+D}_{-Pol} \rangle$, X
1 2 3 4 5 6 7 8 9 10

SC: 8 → null

(v) SD: X, TM, A, (Dem) N, X
1 2 3 4 5

SD: 3 → null

GT13. PP deletion

SD: X, Pst, PP, (Dem) N, X
1 2 3 4 5

SC: 3 → null

GT14. Postnominal particle insertion

(i) SD: X, (Dem) N, VP, X
1 2 3 4

SC: 2 → 2^ka

(ii) SD: X, V, N, (Neg), ha, X
1 2 3 4 5 6

Cond: 2 contains [<+Aj> / <-Aj>]

SC: 3 → 3^[ka / ŭl]

(iii) SD: X, [(Dem) N, (Neg), V]$_{MV}$, X
1 2 3 4 5

SC: 2 → 2^ŭl

(iv) SD: X, (Dem) N, Neg, Cop, X
1 2 3 4 5 6

SC: 2 → 2^ka

(v) SD: X, [(Dem) N, (Neg), V]$_{MV}$, X
1 2 3 4

Cond: 4 [= tŭ / ≠ tŭ, contains <+__> / contains <+NP__>]

SC: 2 → 2^[ka / lo / ŭl]

(vi) SD: X, [(Dem) N, (Dem) N, (Neg), V]$_{MV}$, X
1 2 3 4 5 6

SC: 2 → 2^ŭl; 3 → 3^lo

(vii) SD: X, (Dem) N, X
1 2 3

Cond: $\begin{bmatrix} [2]_{Tim} \\ [2]_{Loc} \\ [2]_{Ins} \end{bmatrix}$

SC: 2 → 2^$\begin{bmatrix} e \\ esŏ \\ lo \end{bmatrix}$

GT15. Postverbal particle insertion

(i) SD: X, [X, V, V]$_{MV}$, X
1 2 3 4 5

(a) Cond: 3 contains$\begin{bmatrix} <+Aj> \\ <-Aj> \end{bmatrix}$; 4 $\begin{bmatrix} = ha \\ \neq ha; \text{ contains } <-Ex> \end{bmatrix}$

SC: 3 → 3^a/o[2]

(b) Cond: 3 contains< -Aj> ; 4 = ha

SC: 3 → 3^ke

(c) Cond: 4 contains $\{^{<+Aj>}_{<+Ex>}\}$

SC: 3 → 3^ko

(ii) SD: X, $\langle ^{+D}_{-Pol} \rangle$, $\langle ^{-Aj}_{+Sen} \rangle$, X
1 2 3 4

SC: 2 → 2^ko

GT16. Loc-particle change

SD: X, [X, N, esŏ, X, $\{^{<+Ex>}_{<-Act>}\}$, X]$_{VP}$, X
1 2 3 4 5 6 7 8

SC: 4 → e

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2 The choice of the proper allomorph will be decided by a vowel harmoney rule which is beyond the scope of the present study.

GT17. ki/ci alternation

SD: X, ki, Neg, X
1 2 3 4

SC: 2 → ci