TONE, SEGMENTS, AND THEIR INTERACTION IN NORTH KYUNGSANG KOREAN: A CORRESPONDENCE THEORETIC ACCOUNT

DISSERTATION

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By

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ABSTRACT

This thesis undertakes a correspondence theoretic investigation into tone, segments, and their interaction in North Kyungsang Korean (NK Korean). The analysis presented in this thesis places emphasis on the following theoretical issues: (i) a default H for tone, (ii) prosodic stem (P-stem) for tone and segments, and (iii) C-command for phrasing.

There are three tonal types of roots: (i) those with prelinked H, (ii) those with floating H, and (iii) those with no H. A default H is predictably assigned to the final syllable of a toneless root if it is heavy, or otherwise to the penultimate syllable. Recognition of this default H renders a convincing account of the following: (i) tone in loan words, (ii) a unique tone pattern in roots longer than three syllables, (iii) words exhibiting dual tone patterns, (iv) quantity-sensitivity in tone shift and assignment, and (v) asymmetry in the number of words for possible tone patterns.

A prosodic unit, P-stem, is recognized not only for NK Korean but also for all the other dialects of Korean which have either tone or a contrast in vowel length. A morphological stem (M-stem) corresponds to a prosodic stem (P-stem) unless a mismatch is compelled by other constraints. One mismatch between the right edges of an M-stem and a P-stem is driven by syllabification. If an M-stem ending with a consonant is followed by a vowel-initial suffix, the M-stem-final consonant is syllabified as the onset of the following syllable. Syllabification makes it impossible to segregate the M-stem syllabically. There is a tendency for the edge of a P-stem to be aligned with the edge of a syllable

(Downing 1994, 1996). Due to this tendency, the syllable constructed across an M-stem boundary is incorporated into the domain of a P-stem, resulting in a mismatch between the right edges of a P-stem and an M-stem. Recognition of this mismatch makes it possible to give a unified account of four seemingly-unrelated phenomena: (i) two different types of shortening (ch. 8), (ii) compensatory lengthening in monosyllabic roots (ch. 8), and (iii) blockage of rightward tone shift in the presence of a vowel-initial suffix (chs. 3 & 4).

The C-command constraint (defined based on Reinhart's 1981 definition) plays a major role in mapping morphosyntactic units to prosodic phrases (P-phrases) with focus or without focus. One-to-one correspondence is not found between syntactic phrases and P-phrases. Dealing with a wide range of syntactic configurations including recursion, embedding, and coordination, it is shown that the mapping, called phrasing, is regulated by a set of constraints. Compounds (composed of more than two words) and modified compounds are also organized into a number of P-phrases. Focus also affects phrasing of sentences. The constraint C-command has a focal role in the analysis of all these constructions with focus or without focus.

In contrast to the more usual practice of superimposing NK Korean tone on Seoul Korean segmental sequences, this thesis analyzes NK Korean tonology based solely on the NK Korean segmental system. There are some segmental changes not generally recorded accurately, and these changes have consequences for the tone system. Segmental changes and their interaction with tone, which were largely unstudied in previous works, are examined (chs. 8 & 9). Acoustic and phonological evidence which shows that NK Korean does not have phonological contour tones is also provided. Since this thesis is the first one to explain issues of NK Korean phonology in terms of Correspondence Theory (CT), it shows that CT can account well for these new data.

Dedicated to my parents Kim, Sulle and Kim, Jechoong

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PUBLICATIONS

Research Publication

1. *The Basic Meaning Analysis of English Modality and Modulation.* M.A. Thesis, Seoul National University. (1985)

2. *The Pitch-accent System of the North Kyungsang Dialect of Korean.* M.A. thesis, Brown University. (1991)

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8. "M-command in North Kyungsang Korean Phrasing" Mid-Continental Workshop on Phonology 2. (Presented but not published) (1996c)

FIELDS OF STUDY

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CHAPTER 1

INTRODUCTION

This thesis undertakes a correspondence theoretic investigation into tone, segments, and their interaction in North Kyungsang Korean (NK Korean). The analysis presented in this thesis places emphasis on the following theoretical issues: (i) a default H for tone, (ii) prosodic stem (P-stem) for tone and segments, and (iii) C-command for phrasing. Since this thesis is the first one to explain issues of NK Korean phonology in terms of Correspondence Theory (CT), it shows that CT can account well for these new data.

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is compelled by other constraints. One mismatch between the right edges of an M-stem and a P-stem is driven by syllabification. If an M-stem ending with a consonant is followed by a vowel-initial suffix, the M-stem-final consonant is syllabified as the onset of the following syllable. Syllabification makes it impossible to segregate the M-stem syllabically. There is a tendency for the edge of a P-stem to be aligned with the edge of a syllable (Downing 1994, 1996). Due to this tendency, the syllable constructed across an M-stem boundary is incorporated into the domain of a P-stem, resulting in a mismatch between the right edges of a P-stem and an M-stem. Recognition of this mismatch makes it possible to give a unified account of four seemingly-unrelated phenomena: (i) two different types of shortening (ch. 8), (ii) compensatory lengthening in monosyllabic roots (ch. 8), and (iii) blockage of rightward tone shift in the presence of a vowel-initial suffix (chs. 3 & 4).

The C-command constraint (defined based on Reinhart's 1981 definition) plays a major role in mapping morphosyntactic units to prosodic phrases (P-phrases) when focus is not given to any word in a P-phrase (ch. 5). One-to-one correspondence is not found between syntactic phrases and P-phrases. Dealing with a wide range of syntactic configurations including recursion, embedding, and coordination, it is shown that the mapping, called phrasing, is regulated by a set of constraints. The constraint C-command has a focal role in the analysis of all these constructions with focus or without focus.

Compounds (composed of more than two words) and modified compounds are also organized into a number of P-phrases (ch. 7). Phrasing of compounds is governed by the same set of constraints required for the phrasing in regular phrases. The constraint C-command plays a significant role in the analysis of compounds.

Focus also affects phrasing of sentences and it forces the C-command constraint to be violated in a certain environment (ch. 5). A focused word must initiate a P-phrase and be followed by a non-H-toned word. Membership in a P-phrase when a word is focused is partially determined by the phrasing that occurs in the corresponding unfocused sentences.

When a focused word is P-phrase-final in the corresponding sentence where it is unfocused, the focused word and the words in the following P-phrase form a single P-phrase. If the following P-phrase consists of three words, then the resulting focused P-phrase will end up with a four-word P-phrase. Incorporation of the words into a focused P-phrase is regulated by the constraint Ident-OO which requires a correspondence between a non-focused P-phrase and a focused P-phrase. Focus can be given to a word in compounds. Phrasing in focused compounds is explained by the same set of constraints required for the phrasing in regular focused phrases.

There are two ways of deciding which H is retained within a P-phrase (ch. 6). There is a strong tendency for a H to fall on the leftmost word within a P-phrase. This generalization is captured by the constraint Align PhraseL (AlignPL) which requires the left edge of a H-toned word to be aligned with the left edge of a P-phrase. There is another strong tendency to prohibit a H on a word-final light syllable. Due to this tendency, if a word which contains a prelinked H on a final syllable is followed by another word, the first word loses its prelinked H. This generalization will be captured by the constraint *WordFinalH (*WFH) which prohibits a H from falling on a word-final light syllable when the word is followed by another word. Tone doubling which occurs within a word also applies to an unfocused P-phrase.

Focus has two effects on tone in P-phrases (chs 6 & 7). The tendency which prohibits a H on a word-final light syllable is overridden by a stronger tendency. A focused word must have a H, and this generalization is expressed by the constraint *Toness Focused Word (*TFW). Due to this constraint, a H on a word-final light syllable is retained if the word is focused. A focused word must be followed by a toneless word. The principles which govern tone doubling are overridden by this principle, and thus tone doubling does not occur across a word boundary in a focused P-phrase.

In contrast to the more usual practice of superimposing NK Korean tone on Seoul Korean segmental sequences, this thesis analyzes NK Korean tonology based solely on the NK Korean segmental system. There are some segmental changes not generally recorded accurately, and these changes have consequences for the tone system. Segmental changes and their interaction with tone, which were largely unstudied in previous works, are examined (chs. 8 & 9).

In Chapter 2, three issues, which are required to help understand this thesis, are discussed. They are: (i) Introduction to Correspondence Theory (CT), (ii) Selected summary of previous studies on NK Korean tone, (iii) the segmental inventories of NK Korean, (iv) morphological and phonological structures of words, and (v) the concept of 'P-stem'.

Chapter 3, dealing with tone of NK Korean nouns, discusses three significant issues of the NK Korean tonology. Acoustic and phonological evidence which shows that NK Korean does not have phonological contour tones is provided in section 3.1:

(1.1) a. The tones in heavy syllables are not contrastive.
b. The F0 value on the initial H rises and that on the final H falls, whether the syllable is long or short.
c. The F0 value on the initial L-tone also rises and that on the final L-tone also falls.
d. The F0 value sharply rises and falls in the transition of one H-toned syllable to another H-toned syllable if a prosodic phrase boundary intervenes between the two H-toned syllables.
e. The F0 value never sharply rises and falls in the transition of one H-toned syllable to another H-toned syllable unless a prosodic phrase boundary intervenes between the two H-toned syllables.

The above issue is closely related to the issue of what the Tone Bearing Unit (TBU) is and how the tone pattern of the so-called Tone Doubling Class is accounted for. In section 3.2, it is argued that the TBU is the syllable in NK Korean. This syllabic TBU theory better explains the tone pattern of the Tone Doubling Class. In section 3.3, the concept of the Default H Class is refined based on Y.-H. Chung 1991a and N.-J. Kim

1991. It is argued that stems of this class having no H's in UR receive Hs in Gen. This proposal is supported by the fact that all words have one and only one H on the surface.

Chapter 4, dealing with tone in verbs, shows that the proposals made for nouns in Chapter 3 do not need to be revised to handle tone in verbs. However, tone doubling which occurs within a word is blocked when a verbal root is followed by a derivational suffix. This phenomenon is examined in section 4.3.2. Nine monosyllabic roots of this class show two different tone patterns according to the types of the following inflectional suffixes. Tones in these nine 'irregular' verbs is discussed in section 4.3.3.

Before discussing tone in phrases, the mapping, called phrasing, of syntactic phrases to P-phrases is investigated in Chapter 5. In section 5.1, it is shown that phrasing is important for tone in NK Korean, and one of the diagnostics of phrasing is that only one H can appear within a prosodic phrase. In sections 5.2.1–5, phrasing is considered when focus is not given to any word. Six constraints are required to map syntactic phrases to prosodic phrases, i.e., Parse-ω, Hierarchical Alignment at Phrase (HAϕ), Phrase Minimality (*{ω}), C-command (CC), *{XP^2}, and Align (ϕ, r; I, r). As mentioned above, the constraint C-command has a focal role. In section 5.2.6, phrasing is studied when focus is given to a word. Three constraints, which are additionally required, are AlignFocusL (AlignFL), Align (Focus, r: Non-prominent, l) (**W**ω), and Ident-OO. In section 5.2.7, it is illustrated that the domain of Stop Nasalization is also the P-phrase. Thus, this segmental phenomenon is used as another diagnostic of phrasing.

Tone in P-phrases will be studied in Chapter 6. All but three of the constraints for tone in phrases are the same as those that are needed for word internal tonology. The three additional constraints are the Obligatory Contour Principle (OCP), AlignPhraseL (AlignPL), and *Word-FinalH (*WFH). For the tone in focused P-phrases, the constraint *Toneless Focused Word (*TFW) is introduced in section 6.5.

The two issues, tone in compounds and phrasing of compounds, are investigated in Chapter 7. Three generalizations for the tone pattern in compounds are captured by Y.-H. Chung 1991a. First, Y.-H. Chung 1991a:223 argues that 'in a [lexical] compound X + Y, the tone of X is deleted'. This generalization is confirmed by this thesis, and is expressed as the constraint AlignCompoundR (AlignCR), which requires the right edge of a word which contains a H to be aligned with the right edge of a compound. Second, Y.-H. Chung 1991a:227 argues that in a [lexical] compound X + Y, a floating H in Y docks to the final mora of X. This generalization is also confirmed by this thesis and is expressed as the constraint *H-on-the-Sponsor, which prohibits an underlying H from parsing to any TBU within a sponsoring word. Finally, Y.-H. Chung 1991a:234–239 observes that two different types of compounds coexist and these two groups of compounds are classified as lexical vs. syntactic compounds. This observation is also confirmed by this thesis, and those two groups are named 'lexical' vs. 'non-lexical' compounds.

Based on Y.-H. Chung 1991a, three additional issues are studied in this chapter. In section 7.4, the question is raised of how these two groups (i.e., the first group of compounds which shows the Phrasal Tone System and the second group of compounds which exhibits the Compound Tone System) are distinguishable. It is shown that they are not entirely differentiated considering factors such as (i) underlying tonal specification, (ii) morphosyntactic structure of compounds, and (iii) etymological origin of stems. Therefore, one of these two groups should be listed in the lexicon. It is shown that the second group of compounds which undergoes the Compound Tone System is listed in the lexicon. In section 7.5, the question is raised of why for every lexical compound, there does not exist a corresponding non-lexical compound which shows the Phrasal Tone Pattern. The constraint Avoid Synonym is proposed, which requires the output of a non-lexical compounding not to be synonymous with an existing lexical compound. Finally, Y.-H. Chung 1991a deals with compounds which maximally consist of two stems.

However, in sections 7.6.1–3, it is shown that there is no limit on the length of non-lexical compounds. Since it is not possible to construct any compound which is very long as one P-phrase, phrasing, which was originally required for syntactic phrases, needs to be studied for non-lexical compounds. Phrasing in modified compounds is studied in section 7.6.4. Finally, in section 7.6.5, phrasing under focus is investigated. It was illustrated that these phrasings are explained by the same set of constraints, which were required in Chapter 5. In section 7.7, tone in focused P-phrases will be explained by the same principles, discussed in Chapter 5.

Segmental-prosodic changes that affect the TBU of this language based on the NK Korean segmental system are studied in Chapter 8. With recognition of a P-stem, a unified account of apparently-unrelated phenomena is made. Segmental-prosodic changes in certain verbs cause verbs to shift from one tone class to another depending on the nature of the segmental-prosodic modification. The interaction of tone with segments is examined in Chapter 9.

CHAPTER 2

THEORETICAL SURVEYS

In section 2.1, Optimality/Correspondence Theory, which is adopted in this thesis, is introduced. In section 2.2, previous studies on NK Korean tone are introduced. In section 2.3, the segmental inventories of NK Korean are discussed. In section 2.4, suffixes (nominal and verbal) and the morphological structures of words are studied. In section 2.5, after introducing the term 'P-stem', the phonological structure of words will be discussed.

2.1. Optimality/Correspondence Theory

2.1.1. Optimality Theory

Optimality Theory (OT) is a theory elaborated in Prince and Smolensky 1993, and McCarthy and Prince 1993a and 1993b. OT involves a radical departure from earlier models of phonological structure in that it does not posit a derivation based upon a series of ordered processes that convert an underlying input to a surface phonetic form. The correct, or optimal output is chosen by ranked constraints, which evaluate every possible parsing of the input. OT consists of two parts, Gen and H-eval. Gen contains information about the representational primitives and their universally irrevocable relations: for example, that the

node σ may dominate a node Onset or a node μ, but never *vice versa*. Gen generates a set of all the possible candidate outputs. H-eval contains a set of universal constraints and constraint rankings ranked on a language-particular basis. H-eval determines the relative harmony of the candidates, imposing an order on the entire set of candidate outputs. The output at the top of the harmonic order on the candidate set is chosen as an optimal form (Prince & Smolensky 1993:2–4). These processes can be schematically represented as:

(2.1) Structure of Optimality-theoretic Grammar

a. Gen ($Input_i$) $\Rightarrow$ {$Output_1$, $Output_2$, $Output_3$, ...}

b. H-eval ($Output_j$, $1 \leq j \leq \infty$) $\Rightarrow$ $Output_{real}$

The following comprise the core principles of Gen and H-eval:

(2.2) a. Containment — no element may be literally removed from the input form. The input is thus contained in every candidate form (McCarthy & Prince 1993a:20).
b. Violability — constraints are violable.
c. Ranking — constraints are ranked on a language-particular basis.

In OT, all operations in Gen are structure-building, not structure-changing. McCarthy & Prince 1993a state this as a principle called Containment. Due to this constraint, Gen cannot include the operations deletion and substitution. The input in OT is assumed to be an identifiable part of every candidate output (Prince & Smolensky 1993:212). This principle is problematic and thus this principle is no longer used in Correspondence Theory (McCarthy & Prince 1995).

Constraints do not represent absolute truths about optimal output candidates. Constraints are violable. Constraints are violated in OT due to the existence of other constraints which are more highly ranked. A candidate C_i is evaluated as more harmonic with respect to a constraint A than a candidate C_j when C_i incurs none or fewer violations of that constraint. Each violation of a given constraint is represented by an asterisk (*) in tableaux. In Tableau 2.1, the candidate C_i induces one less number of violation with

respect to the constraint A, and thus is selected as optimal. The optimal candidate is marked by the symbol finger (☞) in tableaux. The candidate C_j incurs one more violation of the constraint A, and thus it is ruled out. The fourth violation of the constraint A is critical, and so the exclamation mark (!) is placed to represent a critical violation of a certain constraint.

Tableau 2.1

Candidates	Constraint A
☞ C_i	***
C_j	****!

A less highly ranked constraint will be violated in order to better satisfy a more highly ranked constraints. In other words, given two ranked constraints A and B, such that A outranks B (represented by A >> B), a candidate C_i that fails B but passes A will be evaluated as more harmonic than a candidate C_j that violates constraint A, but passes B. If the constraint A outranks B (represented by A >> B), this ranking is represented by a thick line between the columns in tableaux. Since the candidate C_i violates the higher ranked constraint A, it is filtered out due to the violation of A, as the exclamation mark (!) indicates. Once a candidate is evaluated to be less harmonic than the other candidates, it is disqualified and the remaining cells in that candidate row are shaded. Even though the candidate C_i violates the lower ranked constraint B four times, it is selected as optimal. Violations of the constraint B is forced by the higher ranked constraint A.

Tableau 2.2

Candidates	Constraint A	Constraint B
☞ C_i		****
C_j	*!	

2.1.2. Problems with Containment Principle

In a derivational approach, any underlying representation can be deleted in the process of derivation. For instance, unsyllabifiable segments can be deleted. In Lardil, the stem-final C in (2.3a) is unsyllabifiable since Lardil has a restriction on the coda that 'a coda consonant can have only Coronal place or else no place specification of its own at all' (Prince & Smolensky 1993:101). The unsyllabifiable stem-final C is deleted. Word-final vowels must also be deleted in the nominative in Lardil, and thus the stem-final *i* is deleted in the nominative form in (2.3b).

(2.3)

a. C Loss from Stem

UR	Nominative	Nonfuture Accusative	Future Accusative	Gloss
ŋaluk	***ŋalu***	*ŋaluk-in*	*ŋaluk-uɻ*	story

(where ɻ is an apico-domal approximant)

b. V Loss from Stem

UR	Nominative	Nonfuture Accusative	Future Accusative	Gloss
yiliyili	***yiliyil***	*yiliyili-n*	*yiliyili-wuɻ*	oyster

Looking just at the surface forms like *ŋalu* and *yiliyil*, one could not tell the difference between a form in which a segment is deleted, and one in which it is absent underlyingly. Therefore, it can happen in derivational approaches that the underlying form is unidentifiable, just looking at the surface forms themselves. (However, there is another possibility open to us that the inputs are inferred deductively from the whole morphological paradigms, and this possibility will be discussed at the end of this section.)

However, it is crucial in OT that all operations in Gen be structure-building, not structure-changing. McCarthy & Prince 1993a state this as a principle called Containment.

(2.4) No element may be literally removed from the input form. The input is thus contained in every candidate form (McCarthy & Prince 1993a:20).

Prince & Smolensky 1993:212 argue that 'the input in OT is assumed to be an identifiable part of every candidate output'. In OT, the above stem-final segment is assumed not to be deleted but to remain unparsed in the output. They represent the outputs as *ŋalu<k>* and *yiliyil<i>*, where the unparsed segments are put in the angled brackets. Since only parsed material can be interpreted phonetically, the stem-final unparsed segments are not pronounced.

It is true that inputs like *ŋaluk* and *yiliyili* are identifiable in such outputs as *ŋalu<k>* and *yiliyil<i>*, since the stem-final segments remain in the outputs. Discussing lexicon optimization by the learner of grammars, they imply that recoverability obtained by maintaining the Containment Principle is significant since 'under exposure to phonetically interpreted grammatical outputs, the underlying inputs must be inferred' (Prince & Smolensky 1993:192). If language learners could infer the underlying inputs from considering the outputs themselves (without reference to the whole morphological paradigm where the alternation of a certain segment could be inferred deductively), the theory would be much better in the sense that it better reflects learnability of grammar.

However, Prince & Smolensky's proposal is problematic in that the outputs of H-eval themselves are very abstract and therefore that it is not always possible for language learners to correctly recognize the outputs. For instance, the outputs such as *ŋalu<k>* and *yiliyil<i>* contain stem-final unpronounceable segments that are put within the angled brackets. If the segments in brackets cannot be pronounced, then there is no way language learners can recognize the existence of those 'silent' segments. If language learners cannot correctly recognize those abstract outputs, it is meaningless even though we make a grammar where the inputs could be inferred from the 'unrecognizable' outputs.

Prince & Smolensky's proposal is also based on the questionable assumption that language learners infer the inputs from the outputs themselves. There is another possibility open to language learners. When language learners listen to the words like *ŋalu<k>* and

yiliyil<i>, they might conjecture that the inputs should be *ŋalu* and *yiliyil*, rather than *ŋaluk* and *yiliyili*. After considering all the relevant morphological paradigms like *ŋalu ~ ŋaluk-in ~ ŋaluk-uŋ*, they will notice the alternation in the stem-final segments, i.e., the zero form and the segment *k* or *i*. Then, they would deductively determine which forms are inputs. Thus, the Containment Principle is given up in Correspondence Theory (McCarthy & Prince 1995).

2.1.3. Correspondence Theory

Correspondence Theory (CT), which is a theory elaborated in McCarthy & Prince 1995, is set within Optimality Theory, and crucially depends upon three fundamental ideas of OT: parallelism of constraint satisfaction, ranking of constraints, and faithfulness between derivationally-related representations (McCarthy & Prince 1995:252). CT especially 'extends the reduplicative copying relation of McCarthy & Prince 1993a to the domain of input-output faithfulness, and indeed to any domain where identity relations are imposed on pairs of related representations' (McCarthy & Prince 1995:252). Benua 1995 extends the domain of faithfulness to Output-Output correspondence between words and truncated words in New York-Philadelphia English, Icelandic, and Tiberian Hebrew. Odden & Odden 1996 propose the constraint IDENT-OO, which regulates the relation between words in isolation and reduplicated words in Kihehe. In Chapter 5, the constraint Ident-OO, which explains the relation between non-focused prosodic phrases and focused prosodic phrases, will be proposed.

Correspondent identity/faithfulness is regulated by the families of faithfulness constraints in (2.5). All relate strings S_1 (base, input, etc.) to S_2 (reduplicant, output, etc.):

(2.5) a. MAX — Every element of S_1 has a correspondent in S_2.
b. DEP — Every element of S_2 has a correspondent in S_1.
c. IDENT (F)
Let α be a segment in S_1 and β be any correspondent of α in S_2. If α is [γF], then β is [γF]. (Correspondent elements are identical in feature F.)

Depending upon which correspondence relation they regulate, the various MAX constraints will prohibit phonological deletion. The various DEP constraints will prohibit phonological insertion. The IDENT constraints require that correspondent segments be featurally identical to one another. Unless these faithfulness constraints are dominated, these constraints will require complete featural and segmental identity between correspondent segments. As in OT, constraints are violable in CT. If one or more of these faithfulness constraints are dominated by other constraints, this constraint ranking will lead to featural and segmental disparity between S_1 and S_2.

2.2. Previous Studies on NK Korean Tone

NK Korean tone system has been studied by several Korean and foreign scholars such as Wung Huh (1954, 1985), Ki-Moon Lee (1972), Wan-Jin Kim (1973), Cha-Kyun Kim (1973, 1985a, 1985b, 1993), Yen-Chan Chung (1974), Hyo-Kun Moon (1974), Ramsey (1975), Sang-Ock Lee (1978), Kook Chung (1980), Gyung-Ran Kim (1988), Yung-Hee Chung (1991a) among others. Among these, six recent studies are introduced in this section.

2.2.1. Kook Chung (1980)

In this study, several insightful observations are made for NK Korean tonology. First, it is argued that every word should have at least one H (p. 116). Second, as opposed to the view that NK Korean has three different tones (Huh 1954, 1985 and C.-K. Kim 1985a, 1993), this study explicitly argues that only two-way distinctions are required for

NK Korean tonology. Presenting the results of phonetic measurements of tone and vowel duration, this study recognized that the F0 value in words of the Tone Doubling Class (e.g., *kəlíṁ* ‘painting') is relatively lower than that in words of the Prelinked H Class (e.g., *ka̲ṁani* 'straw rice-bag'). It is argued that although we can recognize three levels of pitch phonetically, we do not need all three in terms of phonological contrasts because it is only the relative pitch between a ‘higher’ one and a ‘lower’ one which counts as contrastive (p. 112). Finally, it is also argued that ‘H can be maintained over only two syllables at most’ (p. 116). These observations are confirmed by later studies such as Narahara (1985), G.-R. Kim (1988), Y.-H. Chung (1991a), N.-J. Kim (1991), and also in this thesis.

2.2.2. Narahara (1985)

One thing is worth noting in this study. Narahara (1985) rejects the position adopted by Goldsmith (1976) and Haraguchi (1977), among others, in which an accentual diacritic mark (*) is underlyingly specified on a particular syllable in accented words and phrases. Instead, Narahara (1985) followed the position adopted by Pulleyblank (1983), Clark (1983), and Archangeli and Pulleyblank (1983), in which the pitch-accent was represented by prelinking of tones. Hence, this study is the first, in which the concept of ‘prelinking’ of tones is introduced in the studies of NK Korean tone, as opposed to the accentual approaches taken by Hashimoto (1973).

2.2.3. Gyung-Ran Kim (1988)

This is the first extensive study of NK Korean tone, which is done within the framework of Autosegmental Phonology. Words and Affixes are divided into two tonal classes, that is, (i) prelinked H class, and (ii) floating H class. Surface tones are derived by the rules, which regulate the interaction of tone on stems and that on affixes. Focus in

this study is also given to phrase-level tonology as well as to word-level tonology. Applying the same rules, which were applied to word-level tonology, G.-R. Kim tries to explain tone in phrases. Before discussing phrase-level tonology, the domain of tone deletion rules is also defined in this study, which becomes a seminal study in explaining discrepancy between syntactic phrases to prosodic phrases. See section 5.3 for detailed discussions of G.-R. Kim's definition of the domain of tone deletion rules. The following generalizations, which were made by G.-R. Kim, are confirmed by this thesis.

(2.6) a. Every word must have one and only one H on the surface.
b. The TBU is the syllable.
c. The floating H class has a floating H in UR, and the floating H surfaces on the domain-initial two syllables.
d. Every phrase must have one and only one H on the surface.

2.2.4. Yung-Hee Chung (1991a)

Based on G.-R. Kim 1988, this study made a more extensive study on NK Korean tone within the framework of Autosegmental Phonology. The contribution of this study is two fold, empirical and theoretical. Empirically, this study made a more extensive account, including the following:

(2.7) a. deals with noun inflectional suffixes more extensively.
b. deals with extensive examples, where more than one suffix is combined with the preceding root or stem.
c. deals with compounds, which consist of two adjectives as well as two nouns.

Theoretically, this study made the following observations:

(2.8) a. The vowel /ɨ/ and /ə/ are merged into /ə/ in NK Korean.
b. Roots of the prelinked H Class, which was originally defined in G.-R. Kim 1988, are divided into two different tone classes, that is, (i) toneless class, and (ii) prelinked H class. Although the concept of toneless class is refined in this thesis, it is important to note that this study first recognized the existence of toneless class in NK Korean.
c. This study first recognized that the two different tone systems coexist in compounds. Hence, compounds are divided into two different groups, that is, (i) Lexical, and (ii) Syntactic. Regarding the tone in lexical compounds, this

study made three generalizations, and these generalizations are confirmed by this thesis. See section 7.7 for detailed discussions.

Besides these, this study made the following three observations. However, the first two observations are refuted in this thesis. See sections 3.1-2 for detailed discussions. The third observation is not refuted or confirmed in this thesis.

(2.9) a. Long vowels have contour tones.
b. The TBU is the mora in NK Korean.
c. Unbound tone spreading occurs across the word boundary.

2.2.5. No-Ju Kim (1991)

Based on G.-R. Kim 1988, this study tries to divide roots of the Prelinked H Class, which was originally defined in G.-R. Kim 1988, into two different tone classes, that is, (i) toneless class, and (ii) prelinked H class. Although the concept of a toneless class is refined in this thesis, it is important to note that this study also recognized the existence of toneless class in NK Korean. Ignoring roots which have a long vowel in the root-final syllable, this study argues that NK Korean has a class of roots where a H is predictably assigned to the penultimate syllable of a root. This idea is developed into the concept of the Default H Class, which is discussed in section 3.3 of this thesis.

2.2.6. Cha-Kyun Kim (1985a, 1993)

This study made a descriptive account of tone in NK Korean as well as that in South Kyungsang Korean and Hamkyung Korean. Describing a subtle difference in pitch, this study assumes a three-way tonal contrast in Kyungsang Korean, including M-tone. However, as pointed out in K. Chung (1980), the F0 value in words of the Tone Doubling Class (e.g., *kəlim* ‘painting') is predictably lower than that in words of the Prelinked H Class (e.g., *kam̀ani* 'straw rice-bag'). Although we can recognize three levels of pitch phonetically, we do not need all three because it is only the relative difference between

higher pitch and lower pitch that counts in phonology. Therefore, the three-way tonal contrast proposed in this study is not adopted in this thesis.

2.3. NK Korean Segmental Inventories

Following G.-R. Kim 1988 and Sohn 1987, Y.-H. Chung 1991a proposes the following six underlying vowels for NK Korean vowel inventory.

(2.10) Y.-H. Chung's NK Korean Vowel Inventory (Y.-H. Chung 1991a:6)

	[-back]	[+back]	
	[-round]	[-round]	[+round]
high	i		u
mid	e	ə	o
low		a	

Y.-H. Chung 1991a and B.-G. Lee 1993 observe that /e/ and /æ/ in Seoul Korean are neutralized into /e/ in NK Korean. Y.-S. Kim 1975, 1981 and Y.-H. Chung 1991a observe that /ɨ/ and /ə/ in Seoul Korean are neutralized into /ə/ in NK Korean.[1] This thesis confirms that these previous observations are correct. Following the previous observations (Y.-S. Kim 1975, 1981, Y.-H. Chung 1991a, and B.-G. Lee 1993), this paper proposes that /ɨ/ and /æ/ are missing in NK Korean. However, adopting the vowel inventory in (2.10), there is no way to group /e/, /o/ and /a/ as a natural class even though they behave as triggers for the ə/a alternation. Thus, the vowel inventory in (2.10) is newly interpreted as follows:

(2.11) NK Korean Vowel Inventory newly interpreted by this thesis

	[coronal]		[labial]
[-open]	i	ə	u
[+open]	e	a	o

[1] Y.-S. Kim 1975, 1981 made a detailed study on the vowels [ɨ] and [ə] in South Kyungsang Korean. Y.-S. Kim observed that [ɨ] and [ə] are not distinguishable in the northern and eastern parts of South Kyungsang area, and he argued that there would be no difference in segments between North Kyungsang and South Kyungsang Korean.

The vowel inventory in (2.11) is proposed making the following three assumptions:

(2.12) a. Only two height distinctions play a role in NK Korean, and
b. There are three-way contrast in backness, and
c. Clements & Hume's 1995 model of feature geometry is adopted.

First, there is no phonological evidence that NK Korean has three-way distinctions in vowel height. Assuming three-way distinctions in vowel height, we encounter problems in explaining the following. The following three suffixes exhibit the ə/a alternation. They are the imperative1, the infinitive, and the past. The suffix-initial vowel is realized as *ə* or *a* when it is preceded by the stem vowel /e/, /o/ or /a/, as indicated in (2.13):

(2.13) a. after /e/

peɾ-ə ~ peɾ-a	'to spit + Imperative1'
peɾ-ə-sə ~ peɾ-a-sə	'to spit + Infinitive + Connective1'
peɾ-ət-ta ~ peɾ-at-ta	'to spit + Past + Indicative'

b. after /a/

kaḿ-ə ~ kaḿ-a	'to wind + Imperative1'
kaḿ-ə-sə ~ kaḿ-a-sə	'to wind + Infinitive + Connective1'
kaḿ-ət-ta ~ kaḿ-at-ta	'to wind + Past + Indicative'

c. after /o/

noɾ-ə ~ noɾ-a	'to play + Imperative1'
noɾ-ə-sə ~ noɾ-a-sə	'to play + Infinitive + Connective1'
noɾ-ət-ta ~ noɾ-at-ta	'to play + Past + Indicative'

The stem-initial vowel is realized as *a* when it is preceded by the other three vowels /i, ə, u/, as shown in (2.14):

(2.14) a. after /i/

*miɾ-ə *miɾ-a*	'to push + Imperative1'
*miɾ-ə-sə *miɾ-a-sə*	'to push + Infinitive + Connective1'
*miɾ-ət-ta *miɾ-at-ta*	'to push + Past + Indicative'

b. after /ə/

*mək-ə *mək-a*	'to eat + Imperative1'
*mək-ə-sə *mək-a-sə*	'to eat + Infinitive + Connective1'
*mək-ət-ta *mək-at-ta*	'to eat + Past + Indicative'

c. after /u/

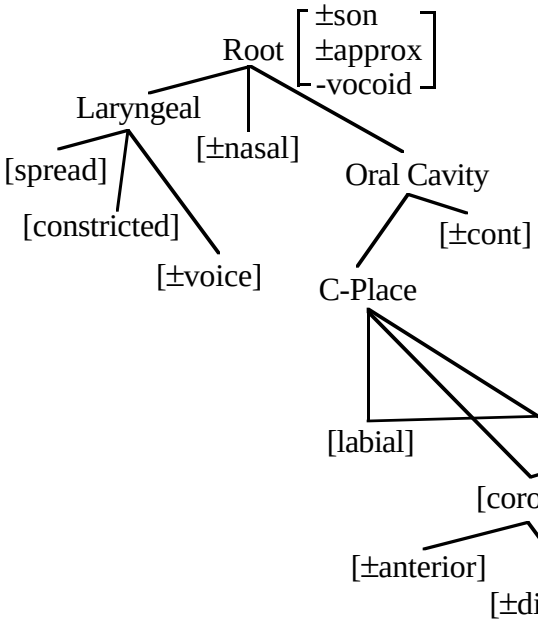
*uɾ-ə *uɾ-a*	'to cry + Imperative1'
*uɾ-ə-sə *uɾ-a-sə*	'to cry + Infinitive + Connective1'
*uɾ-ət-ta *uɾ-at-ta*	'to cry + Past + Indicative'

In (2.13) and (2.14), NK Korean vowels are divided into two natural classes, they are /e, a, o/ and /i, ə, u/. Assuming the inventory in (2.10), it is not possible to define these two natural classes. Assuming the new inventory in (2.11), the first group can be classified as [+open] vowels, and the second group as [-open] vowels.

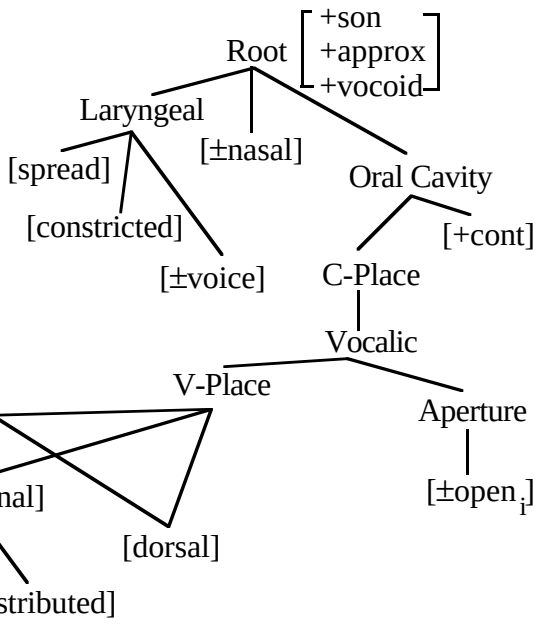
Second, all vowels are necessarily [+back] or [-back], given the standard SPE-type features. Thus, there is no way we can represent the three-way contrast in backness with the binary feature [±back]. However, if we follow Clements & Hume's 1995 model of feature geometry, we can represent a central vowel as a vowel which lacks [coronal] (describing front vowels) and [labial] (describing back vowels). Central vowels have no specification of V-Place features.

The Clements and Hume's 1995 model of feature geometry is given in (2.15). This model is based on two crucial assumptions. First, consonants and vowels share the same features, i.e., [labial], [coronal], and [dorsal]. Second, all occurrences of a given feature appear on the same tier, e.g., [labial] dominated by the C-Place Node and that dominated by the V-Place Node occur on the same tier.

(2.15) a. Consonants:



b. Vowels:



In the model given above, the back vowels are represented by the feature [labial]. The round back vowels can be represented by the combination of the features [labial] and [dorsal]. In NK Korean, all back vowels are round, and thus either of these features is predictable. In Chapter 8, it will be shown that the feature [labial] is crucially referred to. Thus, in the inventory in (2.11), only the feature [labial] is used for the back vowels.

NK Korean has the following eighteen consonantal segments excluding two glides, /y/ and /w/. In (2.16), Ch means aspirated segments, i.e., segments specified as [+spread glottis] and C' represents tensed segments, specified as [+constricted glottis].

(2.16) NK Korean Consonant Inventory

	[labial]	[coronal, +ant]	[coronal, -ant]	[dorsal]	[laryngeal]
Stops	p, ph, p'	t, th, t'		k, kh, k'	
Fricatives		s			h
Affricates			c, ch, c'		
Nasals	m	n		ŋ	
Liquids		l			

It has long been noted that the difference between vowels and glides is a difference of affiliation within the syllable, that is, vowels occur as syllabic peaks and glides occur in non-peak positions. In hierarchical representations of the syllable, the difference between a vowel and a glide corresponds to the subsyllabic constituent that dominates the vowel (Clements & Keyser 1983, Kaye & Lowenstamm 1984, and Levin 1985). In Moraic Phonology (Hyman 1985, McCarthy & Prince 1986, Hayes 1989, and Rosenthall 1994), which is adopted in this thesis, the difference between a vowel and a glide corresponds to association to a mora. A glide is a vocoid linked directly to the syllable node, whereas a vowel is a vocoid linked to a mora.

2.4. Suffixes and Morphological Structure of Words[2]

2.4.1. Verbal Suffixes

Verbal suffixes are divided into two types: (i) Derivational and (ii) Inflectional. NK Korean has two derivational suffixes, i.e., the causative suffix and the passive suffix. The causative suffix shows eleven variants on the surface, as shown below:

(2.17) Eleven Variants of the Causative Suffix

a.	*-i*	*mək-i-ta*	'to eat + Causative + Indi.'
b.	*-ii*	*mək-ií-ta*	'to eat + Causative + Indi.'
c.	*-li*	*aɭ-li-ta*	'to know + Causative + Indi.'
d.	*-lii*	*al-lií-ta*	'to know + Causative + Indi.'
e.	*-hi*	*iṕ-hi-ta*	'to dress + Causative + Indi.'
f.	*-hii*	*ip-hií-ta*	'to dress + Causative + Indi.'
g.	*-ki*	*naḿ-ki-ta*	'to remain + Causative + Indi.'
h.	*-kii*	*nam-kií-ta*	'to remain + Causative + Indi.'
i.	*-u*	*k'e-́u-ta*	'to wake up + Causative + Indi.'
j.	*-huu*	*mac-huú-ta*	'to hit (the mark) + Causative + Indi.'
k.	*-kuu*	*il-kuú-ta*	'to rise + Causative + Indi.'

The passive suffix shows five variants on the surface, as shown in (2.18):

(2.18) Six Variants of the Passive Suffix

b.	*-ii*	*cʰi-ií-ta*	'to run over + Passive + Indi.'
c.	*-lii*	*tʻəl-lií-ta*	'to hear + Passive + Indi.'
d.	*-hii*	*tat-hií-ta*	'to close + Passive + Indi.'
e.	*-kii*	*c'it-kií-ta*	'to tear + Passive + Indi.'
f.	*-kʰii*	*tʻolli-kʰií-ta*	'to raise + Passive + Indi.'

Vowel length sometimes varies like *-li* in *aɭ-li-ta* 'to know + Causative + Indi.' and *-lii* in *al-lií-ta* 'to know + Causative + Indi.'. The difference in quantity is partially predictable. For example, the *(C)i ~ (C)ii* forms of the causative suffix freely vary between

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[2] The following abbreviations are used throughout this thesis.

Adver = Adversative	Caus = Causative	Con = Conditional	Conce = Concessive
Connec1 = Connective1	Connec2 = Connective2	Effec1 = Effective1	Effec2 = Effective2
Hon = Honorific	Imp1 = Imperative1	Imp2 = Imperative2	Imp3 = Imperative3
Ind = Indicative	Inf = Infinitive	Interro = Interrogative	Obj = Objective
Pass = Passive	Pol = Politeness	Proj = Projective	Propo = Propositive
Pros = Prospective	Rel = Relativizer	Retro = Retrospective	

the long and short vowels, as shown in (2.18a–h). Furthermore, the *i ~ ii* forms of the passive suffix also freely vary between the long and short vowels, as shown in (2.18a–b). Thus, it is possible to derive one from the other by an optional rule. However, this is not always the case. For instance, in (2.17) above, the causative *-u* does not have a corresponding **-uu.* In addition, the causatives *-huu* and *-kuu* do not have corresponding **-hu* and **-ku*, respectively. In (2.18) above, the passives *-lii, -hii,* and *-kii* do not have corresponding **-li, *-hi,* and **-ki,* respectively. Thus, it is not possible for these pairs to derive one from the other.

Vowel quality varies like *-kii* in *nam-kií-ta* 'to remain + Causative + Indi.' and *-kuu* in *il-kuú-ta* 'to rise + Causative + Indi.'. The difference in quality is also unpredictable in the sense that the vowel quality of the suffixes does not rely on that of the stems. For instance, in *nam-kií-ta* 'to remain + Causative + Indi.' in (2.17), the coronal vowel *ii* occurs after the dorsal vowel *a* in *nam-*. However, the dorsal vowel *uu* appears after the same dorsal vowel *a* in *mac-huú-ta* 'to hit (the mark) + Causative + Indi.'. Therefore, both variants of coronal and dorsal vowels are assumed to exist in the UR.

The initial consonants of the causatives and passives show four variants on the surface, that is, *ø ~ l ~ k ~ h.* The three previous studies argue that these four variants are derived from one UR. C.-W. Kim 1973 and S.-Y. Bak 1982 propose that the underlying representation of the suffix-initial consonants is /h/. More recently, Y. Kang 1991 proposes that the UR is /k/. It is not relevant to this paper which proposal is correct and thus realization of real surface forms will not be discussed in this thesis.[3]

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[3] The suffix-initial consonant is realized as *l* both for the passives and for the causatives when the stem ends with /l/, as shown in (1).

(1) a. Passives
/mul-/ 'to bite' > *mul-lií *muɭ-li-* 'to be bitten'

b. Causatives
/nal-/ 'to fly' > *naɭ-li-* 'to cause something to fly'

Second, the suffix-initial consonant is realized as *k* both for the passives and for the causatives when the stem ends with a nasal, as shown in (2). Stem-final long vowels are shortened when the passive or

NK Korean has many inflectional suffixes. This thesis deals with 31 inflectional suffixes listed in (2.19). Most of them were noted in such previous studies as S.-C. Ahn 1985, G.-R. Kim 1988, and Y.-H. Chung 1991a. The following three suffixes are described for the first time in this thesis, i.e., the interrogative suffixes *-no* and *-k'o*, the honorific apperceptive suffix *-ku.ma*.

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causative suffix follows the stem, as in *aǹ-ki-* ~ *an-kií-* 'to be embraced'. This phenomenon will be discussed in 6.7.2.

(2) a. Passives

/aan-/ 'to embrace'	>	*aǹ-ki-* ~ *an-kií-*	'to be embraced'
/kaam-/ 'to wind'	>	*kaḿ-ki-* ~ *kam-kií-*	'to be wound'

b. Causatives

/sum-/ 'to hide'	>	*suḿ-ki-* ~ *sum-kií-*	'to cause something to hide'

Third, the suffix-initial consonant is underparsed after a vowel, /h/, or /k/, as shown in (3). The coda /h/ is underparsed when it is followed by a vowel, as in *sa-ií-* 'to be accumulated'. However, there is indirect evidence that the stem ends with /h/ since it is realized as aspiration on the following stop as in *saʧʰa* 'to accumulate + Indi.'.

(3) a. Passives

/po-/ 'to see'	>	*po-ií-*	'to be seen'
/sah-/ 'to accumulate'	>	*sa-ií-*	'to be accumulated'
/k'ək'-/ 'to break'	>	*k'ək'-i-* ~ *k'ək'-ií-*	'to be broken'

b. Causatives

/po-/ 'to see'	>	*poʹ-ií-*	'to show'
/noh-/ 'tohide'	>	*no-ií-*	'to cause something to hide'
/mək-/ 'to eat'	>	*mək-i* ~ *mək-ií-*	'to cause somebody to eat'

Fourthly, the suffix-initial consonant is realized as *h* after a stop consonant, as shown in (4). Note that /h/ surfaces as aspiration on the preceding stops in (4). However, there is a remaining problem. Note that two variants are realized after /k/. The zero form is realized after /k/ for the passives, as in *mək-i* ~ *mək-ií-* 'to cause somebody to eat' in (3) above. However, the /h/-form is realized for the causatives as in *məkʰií-* 'to be eaten' below. This fact suggests that there is a chance that the UR of the initial consonants of the passives and the causatives are not the same. Or it suggests that if the UR is the same as previous three studies argued, then we need to posit a morphologically-conditioned rules to account for the given data. In addition, I have some additional data that do not follow these four generalizations. Thus, this is another interesting issue for NK Korean Phonology. However, this paper will not give more detailed accounts for this phenomenon.

(4) a. Passives

/cap-/ 'to catch'	>	//cap-hii-//	>	*capʰií-*	'to be caught'
/ʈat-/ 'to close'	>	//ʈat-hii//	>	*ʈacʰií-*	'to be closed'
/mək-/ 'to eat'	>	//mək-hii-//	>	*mʚkʰií-*	'to be eaten'

b. Causatives

/cop-/ 'to be narrow'	>	//cop-hi-//	>	*coṕʰi-*	'to cause to be narrow'
/ƥalk-/ 'to be light'	>	//ƥalk-hi-//	>	*ƥalkʰi-*	'to cause to be light'

(2.19) Inflectional Suffixes

Functions	**Forms**	**Examples**
Present	*-nən ~ -n*	*mək-nən-ta* 'to eat + Present + Ind' ~ *ka-n-ta* 'to go + Present + Ind'
Future	*-ket*	*mək-ket-ta* 'to eat + Future + Ind'
Past	*-ət*	*mək-ət-ta* 'to eat + Past + Ind'
Infinitive	*-ə*	*sə-ə it-ta* 'to stand + Inf. + to exist + Ind.'
Imperative1	*-ə*	*mək-ə* 'to eat + Imp.1'
Relativizer	*-(ə)n*	*mək-ən-* 'to eat + Rel.'
Prospective	*-(ə)l*	*mək-əl-* 'to eat + Pros.'
Honorific	*-(ə)si*	*mək-ə.si* 'to eat + Hon.'
Objective	*-(ə)lo*	*mək-ə.lo* 'to eat + Obj.'
Effective	*-(ə)ni*	*mək-ə.ni* 'to eat + Effec.'
Formal Propositive	*-(ə)so*	*mək-ə.so* 'to eat + Prop.'
Adversative	*-(ə)na*	*mək-ə.na* 'to eat + Adver.'
Conditional	*-(ə)mən*	*mək-ə.mən* 'to eat + Con.'
Connective2	*-ko*	*mək-ko* 'to eat + Connec.2'
Imperative3	*-kə.la*	*mək-kə.la* 'to eat + Imp.3'
Retrospective	*-tə.la*	*mək-tə.la* 'to eat + Retro.'
Projective	*-to.lok*	*mək-to.lok* 'to eat + Proj.'
Apperceptive	*-ku.na*	*mək-nən-ku.na* 'to eat + Present + Apper.'
Honorific (Apperceptive)	*-ku.ma*	*mək-nən-ku.ma* 'to eat + Present + Honorific'
Formal Politeness	*-sim.ni ~ -m.ni*	*mək-sim.ni-* 'to eat + Formal' ~ *ka-mni-* 'to go + Formal'
Indicative	*-ta*	*mək-ta* 'to eat + Indi.'
Propositive	*-ca*	*mək-ca* 'to eat + Prop.'
Informal Propositive	*-ƙe*	*mək-ƙe* 'to eat + Informal Prop.'
Interrogative1	*-na*	*mək-na* 'to eat + Interro.1'
Interrogative2	*-no*	*mək-no* 'to eat + Interro.2'
Interrogative3	*-k'a*	*mək-əl-k'a* 'to eat + Pros. + Interro.3'
Interrogative4	*-k'o*	*mək-k'o* 'to eat + Interro.4'
Imperative2	*-la*	*mək-ə-la* 'to eat + Inf. + Imp.2'
Connective1	*-sə*	*mək-ə-sə* 'to eat + Inf. + Conn.1'
Concessive	*-to*	*mək-ə-to* 'to eat + Inf. + Conce.'
Informal Politeness	*-yo*	*mək-ə-yo* 'to eat + Inf. + Informal Pol.'

The present suffix has two variants, i.e., /-n/ ~ /-nən/. /-n/ is combined with stems ending with a vowel or a liquid, as in *poˊ-n-taˊ* 'to see + Present + Indi.' and *aáˊ-n-taˊ* 'to know + Present + Indi.'. Note that the stem-final /l/ of the stem /aal-/ 'to know' is deleted if it is followed by a nasal consonant or /s/, e.g., *aáˊ-n-taˊ* 'to know + Present + Indi.' and *aáˊ-siˊ-ta* 'to know + Honorific + Indi.'. Otherwise, /-nən/ is attached to the stems as in *mək-nəńˊ-ta* 'to eat + Present + Indi.'.

Eight suffixes that show the ə/ø alternation. They are the relativizer *-(ə)n*, the prospective *-(ə)l*, the honorific *-(ə)si*, the objective *-(ə)lo*, the effective *-(ə)ni*, the conditional *-(ə)mən*, the formal propositive *-(ə)so*, and the adversative *-(ə)na*. When the preceding stem ends with a vowel or a liquid, the ø (zero) form appears, as shown in *ca-mən* 'to sleep + Conditional' and *uúl-mən* 'to cry + Conditional'. Otherwise, the vowel surfaces as shown in *cap-ə-mən* 'to catch + Conditional'. See section 8.2 for detailed discussions.

The formal politeness suffix also has two variants, i.e., /-m.ni/ ~ /-səm.ni/.[4] The first variant /-m.ni/ is combined with stems ending with a vowel and a liquid, as in *ka-m.ni-ta* 'to go + Formality + Indi.' and *aá-m.ni-ta* 'to know + Formality + Indi.'. Note that the stem-final /l/ of the stem /aal-/ 'to know' is deleted when it is followed by a nasal in *aá-m.ni-ta*. Otherwise, the second variant /-səm.ni/ is combined, as in *mək-səm.ni-ta* 'to eat + Formal + Indi.'.

The suffixes, which were assumed to be monomorphemic by Y.-H. Chung 1991a, are reanalysed as dimorphemic, as shown in (2.20). Thus, the following dimorphemic suffixes are assumed not to exist in the lexicon.

(2.20)

Y.-H. Chung 1991a	This Thesis
Honorific Interrogative: /k'ayo/	/-k'a/ 'Interrogative' + /-yo/ 'Informal Politeness'
Simultative: /-mənsə/	/-mən/ 'Conditional' + /-sə/ 'Connective1'

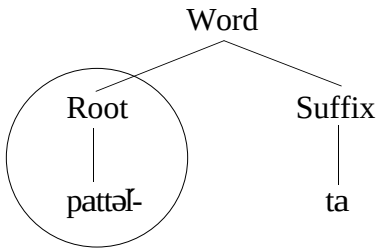
2.4.2. Morphological Structure of Verbs

A 'root' is a morphological unit, which has no suffixes. For instance, the form *pattəɪ-* 'to revere' is a root. Verbal roots cannot be used in isolation, and thus the form **pattəɪ-* is ungrammatical if it stands by itself. On the other hand, a 'word' is a morphological unit, which can be used in isolation. By this definition, verbal roots cannot

[4] We could assume a different stem vowel as the underlying vowel, as Y.-H. Chung 1991a did. That is, /səp.ni/ could be a UR assuming Coronalization of the stem vowel. However, this is irrelevant to this paper and hence this point is ignored.

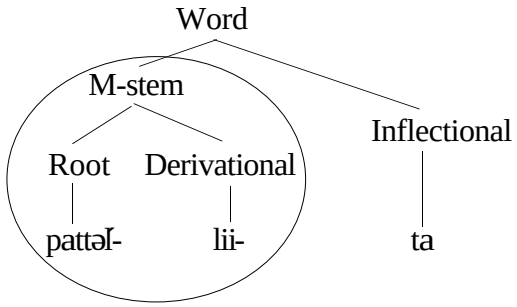
be words since they cannot be used in isolation. The form *pattəɬ-ta* 'to revere + Ind' is a word since it can be used in isolation. Hence, the following word-internal structure is tentatively assumed for the verb *pattəɬ-ta* 'to revere + Ind'.

(2.21)



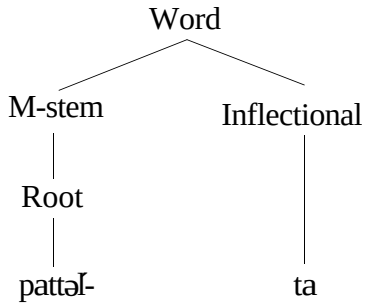
As shown in the preceding section, verbal suffixes are divided into two groups, (i) Derivational, and (ii) Inflectional. Morphologically, a combination of a root plus a derivational suffix differs from that of a root plus an inflectional suffix. The combination of a root plus a derivational suffix cannot stand by itself, but that of a root plus an inflectional suffix can be used in isolation. For instance, the form **pattəl-liíˊ* 'to revere + Pass' cannot be used in isolation, whereas the form *pattəɬ-ta* 'to revere + Ind' can stand by itself. The form **pattəl-liíˊ* 'to revere + Pass' is not a root since this form has a derivational suffix. The form **pattəl-liíˊ* 'to revere + Pass' is not a word since it cannot be used in isolation. Hence, we need to recognize another morphological unit, which can represent a combination of a root plus a derivational suffix. This intermediate morphological unit will be called 'M-stem', which means a 'morphological stem'. For instance, the form *pattəl-liíˊta* 'to revere + Pass + Ind' is assumed to have the structure in (2.22).

(2.22)



Derivational suffixes are optional in the sense that the form **pattəl-ta*'to revere + Ind', which does not have a derivational suffix, is grammatical, as shown in (2.21). In (2.21), a Root Node is directly dominated by a Word Node, while in (2.22), a Root Node is not directly dominated by a Word Node. Assuming the two different structures in (2.21) and (2.22), we miss one generalization. The circled constituent in (2.21) and that in (2.22) show the same morphological distribution. Both of them can be followed by inflectional suffixes. Both of them can be dominated by the same mother node, i.e., Word. If we assign two different morphological categories to these two constituents, it is hard to explain why these two different categories share such similarities in distribution. Thus, instead of (2.21), the following revised one, where a Root Node is dominated by an intervening M-stem Node, is assumed in this thesis. An M-stem is a morphological unit, to which inflectional suffixes can be attached. A combination of a root plus a derivational suffix form an M-stem. A root itself can constitutes an M-stem if a derivational suffix is not used.

(2.21')



Only one derivational suffix can be attached to a root. However, more than one inflectional suffix can be attached to an M-stem, as shown in *pattəl-ket-səmni-ta* 'to revere + Future + Formal + Ind', where all three suffixes are inflectional. Assuming a derivational theory, Y.-H. Chung 1991a argues that 'inflectional suffixes are added to a verbal stem all at once on one cycle'. One justification for this argument is that the forms in

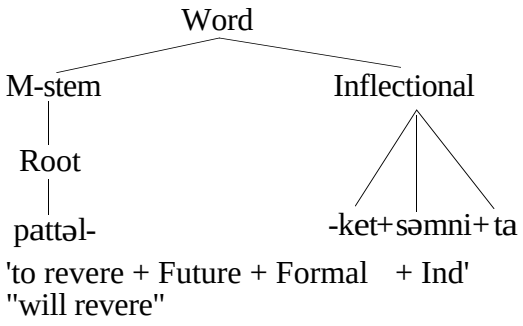
(2.22a) cannot be used in isolation. The verbs can stand alone only when it takes the indicative suffix *-ta*, as shown in (2.22b).

(2.22) a. **pattəl-* 'to revere'
**pattəl-ket-* 'to revere + Future'
**pattəl-ket-səmni-* 'to revere + Future + Formal'

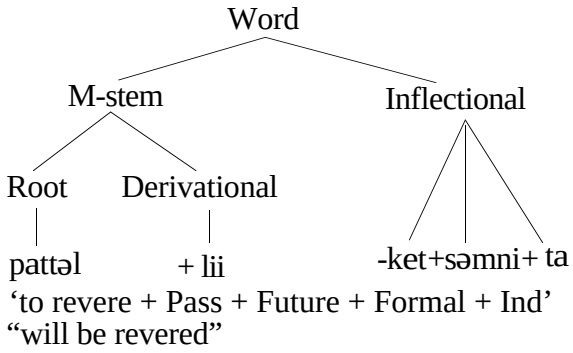
b. *pattəl-ket-səmni-ta* 'to revere + Future + Formal + Ind'

Following Y.-H. Chung 1991a, I assume the 'flat' morphological structure in (2.23), where all inflectional suffixes are directly dominated by one Inflectional Suffix Node.

(2.23) a.

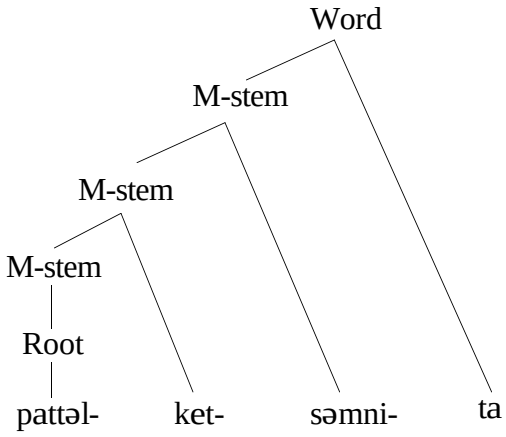


b.



Alternatively, one could assume the structure in (2.24) for that in (2.23a). It is a standard assumption that inflectional morphemes occur at the margin of a word after any derivational suffixes. Assuming this, inflectional suffixes *-ket* 'Future' and *-səmni* 'Formal' would occur word-internally. Hence, it is not possible to explain why inflectional suffixes occur word-internally in NK Korean. Thus, I do not adopt this alternative.

(2.24)



'to revere + Future + Formal + Ind'
"will revere"

In conclusion, three morphological domains are motivated. They are (i) roots, (ii) M-stems, and (iii) words. A root is a morphological unit, which contains no suffix. A word is a morphological unit, which can be used in isolation. An M-stem is a morphological unit, to which inflectional suffixes can be attached. A root itself can constitute an M-stem since it can be followed by inflectional suffixes. A combination of a root plus a derivational suffix forms an M-stem since it can also be followed by inflectional suffixes. A construction of an M-stem plus inflectional suffixes constitutes a word. All inflectional suffixes are directly dominated by one Inflectional Suffix Node.

2.4.3. Nominal Suffixes

Nominal roots can be followed by several types of inflectional suffixes such as case markers, a topic marker, a conjunctive, postpositions, a vocative marker, delimiters, an honorific marker, and a plural marker. In the following, nominal suffixes are divided into groups according to the nature of initial consonants.

First, the nominal suffixes in (2.25) begin with a consonant in UR, and they show no segmental alternations when they are combined with roots.

(2.25) *-to* ‘as well’ *-man* ‘only’

-nim	‘Honorific Marker’	*-təl*	‘Plural’
-k’e	‘to (honorific)’	*-sə*	‘from’
-hantʰe	‘to’	*-tələ*	‘to’
-mankʰəm	‘as much as’	*-cʰələm*	‘like’
-kacʰi	‘like’	*-ƛ’aci*	‘up to’
-putʰə	‘from’	*-cocʰa*	‘even’
-mata	‘each’	*-mɐcə*	‘even’
-potaa	‘than’	*-t’eɱee*	‘because of’
-meŋkulo	‘like’		

Second, the nominal suffixes in (2.26) begin with a vowel in UR, and they also show no segmental alternations when they are combined with roots.

(2.26) *-ə* ‘Poss(essive)’ *-e* ‘to’

Third, the nominal suffixes in (2.27) are assumed to be dimorphemic, i.e., they are combinations of two morphemes. Justification for this assumption is that each of these morphemes can be used separately. For instance, each of the morphemes in *-e-to* can be used as separate nominal suffixes, as *-e* ‘at/in’ and *-to* ‘as well’.

(2.27)
-e-to	>	*-e* ‘at/in’ plus *-to* ‘as well’
-e-man	>	*-e* ‘at/in’ plus *-man* ‘only’
-e-to	>	*-e* ‘at/in’ plus *-to* ‘as well’
-e-k’e	>	*-e* ‘at/in’ plus *-k’e* ‘to (Honorific)’
-e-sə	>	*-e* ‘at/in’ plus *-sə* ‘from’
-e-k’aci	>	*-e* ‘at/in’ plus *-k’aci* ‘up to’

Finally, the nominal suffixes in (2.28) show variation when they are combined with roots.

(2.28) a. Allomorphs

-i / -ka	‘Nom(inative)’

b. Initial Consonant Alternation

-ləl ~ -əl	‘Acc(usative)’	*-nən ~ -ən*	‘Topic Marker’
-ya ~ -a	‘Vocative’	*-ye ~ -e*	‘on, to’

b. Initial Vowel Alternation

-əlo ~ -lo	‘to, with’	*-əlosə ~ -losə*	‘as (person’s position)’
-ilaŋ ~ -laŋ	‘with’	*-ina ~ -na*	‘let alone’

The nominative suffix has two allomorphs, *-i* and *-ka*, as shown in (2.28a). The form *-i* is used when the preceding root ends with a consonant as in *paṕ-i*ˊ 'rice + Nom', whereas the form *-ka* is used when the preceding root ends with a vowel as in *cʰəlsu-ka* 'Chulsoo + Nom'. Both of these forms are assumed to be listed in the lexicon.

The initial consonant of the suffixes in (2.28b) is deleted when the preceding root ends with a consonant, as indicated in (2.29a). Otherwise, the initial consonant surfaces, as shown in (2.29b). It is assumed that the initial consonant exists in UR, and is deleted when the preceding root ends with a consonant.

(2.29) a. *paṕ-əl* 'rice + Acc'
paṕ-əń 'rice + Topic'
yəŋ́cʰəl-a 'Yungchul + Voc'
mat-aŋ́-e 'yard + on'

b. *cʰəlsu-́ləl* 'Chulsoo + Acc'
cʰəlsu-́nən 'Chulsoo + Topic'
cʰəlsu-́ya 'Chulsoo + Voc'
wi-́ye 'top + on'

The initial vowel in (2.28c) alternates with zero. The vowel-initial variant occurs after a consonant, as indicated in (2.30a), whereas the consonant-initial variant occurs after a vowel, as illustrated in (2.30b). It is assumed that the initial-vowel exists in UR since, otherwise, it would not be possible to predict the environment where an appropriate epenthetic vowel, *i* or *ə*, is inserted.

(2.30) a. *toŋseŋ́-əlo* 'younger brother + to'
toŋseŋ́-əlosə 'younger brother + as'
toŋseŋ́-ilaŋ 'younger brother + with'
toŋseŋ́-ina 'younger brother, let alone other people'

b. *cʰəlsu-́lo* 'Chulsoo + to'
cʰəlsu-́losə 'Chulsoo + as'
cʰəlsu-́laŋ 'Chulsoo + with'
cʰəlsu-́na 'Chulsoo, let alone other people'

2.4.4. Morphological Structure of Nouns

In section 2.4.2, a root is defined as a morphological unit, which has no suffixes. By this definition, the form *maŋneé´*'the last child', which is monomorphemic, is a root. Unlike verbal roots, which cannot be used in isolation, a nominal root can stand by itself. In section 2.4.2, it was also pointed out that a morphological unit, which can be used in isolation, is a word. By this definition, the form *maŋneé* is a word as well as a root.

(2.31) *maŋneé´* 'the last child'

All nominal suffixes are inflectional for the following reasons. First, their functions are syntactic. They typically indicate syntactic or semantic relations between different words in a sentence, e.g., case marker, a topic marker, a conjunctive, a vocative marker, delimiters, and a plural marker. The honorific marker *-nim* also has a syntactic function because it selects an appropriate forms of verbs. As shown in (2.32), the honorific suffix is attached to the preceding form, the following verb is expected to have an honorific form *-si* 'Honorofic'. If the following verb is non-honorific, the resulting sentence ends in a semantic/pragmatic anomaly.

(2.32) a. *səns*e*ŋ*-**nim**-*i o*-**si**-*n-ta*
'teacher + Honorific + Nom + to come + Honorific + Present + Ind'
"Our teacher comes"

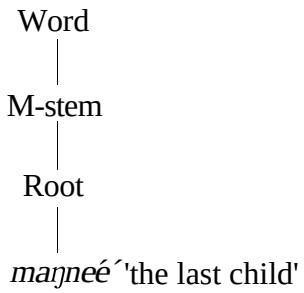
b. *!s*ə*ns*e*ŋ*-**nim**-*i o-n-ta*
'teacher + Honorific + Nom + to come + Present + Ind'
"Our teacher comes"

Second, they are very productive. They typically occur with all nouns. Finally, they do not change parts of speech. All conjugated forms are nouns.

In 2.4.2, an M-stem is defined as a 'morphological unit, to which inflectional suffixes can be attached'. By this definition, the form *maŋneé´*'the last child' forms an M-

stem as well as a root and a word. Hence, the form *maŋneé´*'the last child' is assumed to have the morphological structure in (2.34):

(2.34)

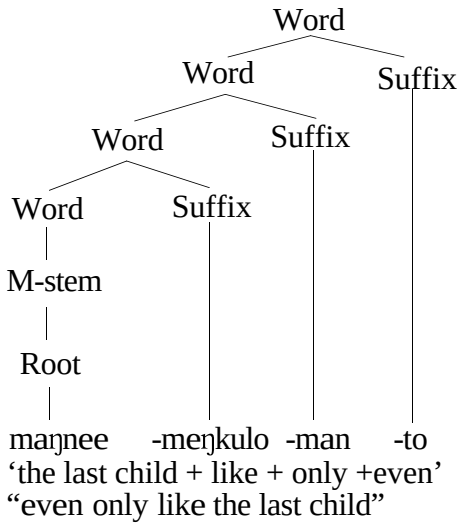


More than one inflectional suffix can be combined with a nominal M-stem. Unlike verbs, a nominal M-stem itself can be used in isolation. Unlike verbs, a combination of a nominal M-stem plus every inflectional suffix can be used in isolation, as illustrated below:

(2.35) *maŋneé´*	'the last child'
maŋneé-meŋkulo	'like the last child'
maŋneé-meŋkulo-man	'only like the last child'
maŋneé-meŋkulo-man-to	'even only like the last child'

Hence, the word is assumed to have the following morphological structure, where an M-stem itself and every combination of a nominal M-stem plus a suffix are considered a word in its own right.

(2.36)



To sum up, a nominal root itself can form a word as well as an M-stem. Every combination of a nominal M-stem plus an inflectional suffix constitutes a word.

2.5. P-stem and the Phonological Structure of Words

Three different prosodic domains are required, that is, (i) a prosodic root, (ii) a prosodic stem (henceforth P-stem) and (iii) a prosodic word. There is no evidence that a prosodic root and word are different from a morphological root and word. Hence, it is unnecessary to distinguish a prosodic root and word from a corresponding morphological one. In Chapter 5, it will be argued that the domain of a prosodic word also corresponds to that of a syntactic word. Thus, I will omit the modifiers 'prosodic', 'morphological' and 'syntactic', and the simple terms 'root' and 'word' will be used throughout this thesis.

Downing (1994, 1996) argues that the P-stem is a prosodic constituent in SiSwati and Xhosa. The domain of a prosodic stem (P-stem) in general corresponds to that of a morphological stem (M-stem). The basic domain of a P-stem is determined by the constraint {Right}-Anchor (M-stem, P-stem):

(2.37) {Right}-Anchor (M-stem, P-stem) (R-Anchor)
Any element at the right edge of a M-stem has a correspondent at the right edge of a P-stem.

As shown in the preceding section, the right edge of an M-stem is aligned with the right edge of a derivational suffix if the given word has a derivational suffix, as in *pattəl-lii#-ta* 'to revere + Pass (Derivational) + Ind (Inflectional) (where the symbol '#' represents the right edge of an M-stem). This basic alignment is required by the constraint R-Anchor. As illustrated in Tableau 2.3, the first two candidates, where the right edge of a P-stem is not aligned with the right edge of an M-stem, are eliminated by the constraint R-Anchor. Throughout this thesis, the symbol '»' means the right edge of a P-stem. The last

candidate *pattəl-lii#»-ta*, where the right edge of a P-stem is aligned with the right edge of an M-stem, is selected as optimal.

Tableau 2.3
Input: /pattəl-lii#-ta/ 'to revere + Pass (Derivational) + Ind (Inflectional)

	R-Anchor
pattəl»-lii#-ta	*!
pattəl-lii#-ta»	*!
☞ pattəl-lii#»-ta	

If the given word does not have a derivational suffix, as in *pattəl#-ta* 'to revere + Ind (Inflectional), the right edge of an M-stem is aligned with the right edge of a root. Hence, the right edge of a P-stem is also aligned with the right edge of a root due to the constraint R-Anchor. In Tableau 2.4, the first candidate **pattəl#-ta»*, where the right edge of a P-stem is not aligned with the right edge of an M-stem, is ruled out by its violation of the constraint R-Anchor.

Tableau 2.4
Input: /pattəl#-ta/ 'to revere + Ind (Inflectional)

	R-Anchor
pattəl#-ta»	*!
☞ pattəl#»-ta	

The phonological structure of nouns is determined by the same principle. In general, the domain of a P-stem corresponds to that of an M-stem. Hence, the basic domain of a P-stem is determined by the constraint R-Anchor. All nominal suffixes are inflectional. Therefore, the right edge of an M-stem is aligned with the right edge of a root, as in *apuć̆i#-cʰələ̆m-man-to* 'father + like + only + even'. The right edge of a P-stem will be aligned with the right edge of an M-stem due to the constraint R-Anchor. In Tableau 2.5, the first three candidates, where the right edge of a P-stem is not aligned with the right edge of an M-stem, are ruled out by their violation of R-Anchor.

Tableau 2.5
Input: /apuci#-cʰələm-man-to/ ‘father + like + only + even’

ˇ ˇ	R-Anchor
apuci#-cʰələm-man-to»	*!***
apuči#-čʰələm-man»-to	*!**
apuči#-čʰələm»-man-to	*!*
☞ apuč͡i#»ˇcʰələm-man-to	

ˇ ˇ

As shown above, the right edge of a P-stem corresponds to the right edge of an M-stem. However, in Chapters 3, 4, 8, and 9, it will be shown that there occur cases where the right edge of a P-stem cannot be properly aligned with the right edge of an M-stem. When verbal stems are followed by a vowel-initial inflectional suffix, certain segmental-prosodic changes occur at the boundary between the M-stem and the vowel-initial inflectional suffix. A vowel-initial inflectional suffix is unstable because it is onsetless. It will obtain an onset by taking an M-stem-final consonant if the preceding M-stem ends with a consonant. It will be fused into the preceding syllable if a preceding M-stem ends with a vowel. Consequently, we encounter a case where the morphological stem boundary is placed inside of the syllable which is constructed across the M-stem boundary.

There is a tendency for the edge of a P-stem to be aligned with the edge of a syllable (Downing 1994, 1996). This generalization can be expressed by the constraint Align (P-Stem, r ; σ, r), which requires the right edge of a P-stem to be aligned with the right edge of a syllable. This constraint outranks R-Anchor, and thus a violation of R-Anchor is compelled.

(2.38) Align (P-Stem, r ; σ, r)
Align the right edge of a P-stem with the right edge of a syllable.

(2.39) Align (P-Stem, r ; σ, r) >> R-Anchor

Due to the ranking in (2.39), we are faced with two choices. Either we can exclude the syllable (which is constructed across the M-stem boundary) from the domain of a P-stem or we can include the syllable within the domain of a P-stem. In the case of Nguni

languages like SiSwati and Xhosa (Downing 1994, 1996), the syllable, which is constructed across the morphological stem boundary, is excluded from the domain of a P-stem. However, in Korean, the syllable (constructed across the M-stem boundary) is included within the domain of a P-stem.

The above facts are explained by the two constraints MAX (M-stem) and DEP (P-stem).

(2.40) a. MAX (M-stem)
Any segment in an M-stem must have an correspondent in a P-stem.

b. DEP (P-stem)
Any segment in a P-stem must have a correspondent in an M-stem.

In Nguni languages like SiSwati and Xhosa, the constraint DEP (P-stem) outranks MAX (M-stem). Hence, inclusion of any non-M-stem material is prohibited.

(2.41) Ranking in Nguni languages
DEP (P-stem) >> MAX (M-stem)

In Korean, exclusion of any M-stem material is prohibited by the reversed ranking MAX (M-stem) >> DEP (P-stem). Therefore, the syllable constructed across the M-stem boundary is incorporated into the domain of a P-stem.

(2.42) MAX (M-stem) >> DEP (P-stem)

In conclusion, it is unnecessary to distinguish between a prosodic root and word and a morphological root and word. The domain of a P-stem generally corresponds to that of an M-stem. However, one mismatch between the right edges of an M-stem and a P-stem is driven by syllabification. The syllable constructed across the M-stem boundary is incorporated into the domain of a P-stem in Korean. Because of this mismatch between the M-stem and the P-stem, we need to recognize four domains: (i) Root, (ii) M-stem, (iii) P-stem, and (iv) Word.

CHAPTER 3

TONE IN NOUNS

This chapter, dealing with tone in nouns, will discuss four significant issues in NK Korean tonology. First, in section 3.1, I will answer the question of whether NK Korean has phonological contour tones or not. This section will provide acoustic evidence that NK Korean does not have phonological contour tones. This issue is closely related to the issue of what the Tone Bearing Unit (TBU) is. In section 3.2, I will argue that the TBU is the syllable in NK Korean. Third, in section 3.3.1, I will refine the concept of the Default H Class. Roots of this class have no H's in the underlying representation (UR). However, they surface with H's on a predictable position in response to constraints. Justification will be given for this with five arguments. Finally, in sections 3.3.1–3, I will show that surface tone patterns are directly derived from inputs without assuming any intervening levels. Not only can this direct mapping of the inputs to outputs simplify NK Korean tonology, but it can also solve a problem with monosyllabic roots that is encountered in procedural approaches.

3.1. Tone in Heavy Syllables

Previous studies have advanced two opposite proposals for tone in heavy syllables. Only syllables with long vowels are assumed to be heavy in NK Korean: the syllable (C)VC is not counted as a heavy syllable. The Contour Tone Hypothesis argues that heavy syllables have contour tones, i.e. a rising tone in a word-initial heavy syllable, and a falling tone in a word-final heavy syllable. For instance, Y.-H. Chung 1991a & b argues that the heavy syllables in /saalam/ 'man' and /maŋnee/ 'the last child' exhibit contour tones as in *saaIaḿ* and *maŋneé*. However, the Level Tone Hypothesis claims that NK Korean does not have contour tones. For instance, G.-R. Kim 1988 and N.-J. Kim 1991 assume that the above two words show level H's in the heavy syllables as in *saáIaḿ* and *maŋneé́*. It is interesting and surprising that these sources do not agree, because they are done by native speakers of NK Korean and deal with the same dialect.

This section will provide the following phonological and acoustic evidence that NK Korean does not have phonological contour tones.

(3.1) a. The tones in heavy syllables are not contrastive.
b. The F0 value on the initial H rises and that on the final H falls, whether the syllable is long or short.
c. The F0 value on the initial L-tone also rises and that on the final L-tone also falls.
d. The F0 value sharply rises and falls in the transition of one H-toned syllable to another H-toned syllable if a prosodic phrase boundary intervenes between the two H-toned syllables.
e. The F0 value never sharply rises and falls in the transition of one H-toned syllable to another H-toned syllable unless a prosodic phrase boundary intervenes between the two H-toned syllables.

It is important to recognize that there is no contrast between level-toned and contour-toned long syllables in NK Korean, i.e., tonal minimal pairs or triplets like *paáḿ - paaḿ - paám* are not found. The lack of contrast suggests a possibility of treating this phenomenon phonetically.

First, I examined whether pitch contours on heavy syllables differ consistantly and substantially from those on light syllables. Chung 1991a & b argues that contour tones always occur on heavy syllables, whereas a level H always falls on light syllables. Thus, I compared the degree of F0 value change in light syllables with that in heavy syllables. If Chung's hypothesis, i.e., the Contour Tone Hypothesis, is correct, then we should find a greater change in F0 value for heavy syllables than light syllables. For this experiment, the pitch in twenty minimal pairs of monosyllabic nouns were compared. Some typical examples are given below. I measured 400 tokens (= 40 types x 5 repetitions x 2 speakers) spoken five times by Kim2 and Lee1. In addition, I examined 160 tokens (= 40 types x 2 repetitions x 2 speakers) spoken twice by Shin and Kim3.

(3.2)	*kan*	'saltiness'	*kaan*	'liver'
	kol	'brain/anger'	*kool*	'trough'
	koŋ	'emptiness'	*kooŋ*	'ball'
	tol	'the first birthday'	*tool*	'stone'
	mal	'horse'	*maal*	'speech'

The results of this experiment in Figures 1–4 and Table 1 show that the Contour Tone Hypothesis is not correct. In each graph, I compare the extent of rise and fall in light syllables with that in heavy syllables. Each graph is drawn based on the numerical data in Table 1. For instance, the first two data points in Figure 1 represent the initial F0 values, e.g. 196.7 Hz for a light syllable, and 180.8 Hz for a heavy syllable. The second two data points in the same figure show F0 value and time for the beginning points of the peak, which continue up to the third data point, e.g. 202.0 Hz for a light syllable, and 189.3 Hz for a heavy syllable. The final two data points represent F0 and time at the end point of the F0 track, e.g., 176.0 Hz for a light syllable, and 166.7 Hz for a heavy syllable. Table 1 provides numerical values for the F0 value and time of each data point. For instance, (196.7, 0.0) means that the F0 value is 196.7 Hz at the onset of the F0 curve.

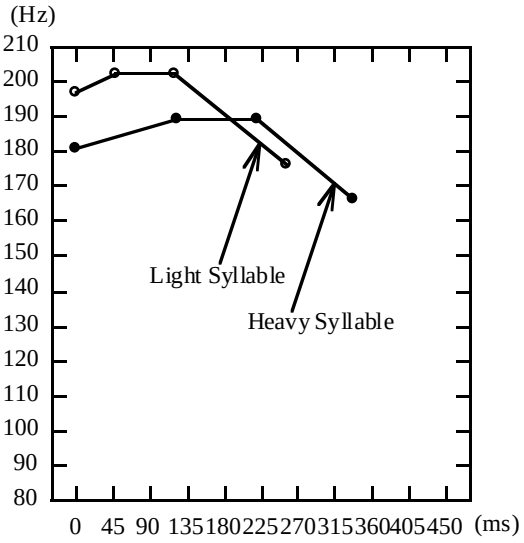


Figure 1: Kim2's F0 Changes at Word Edges

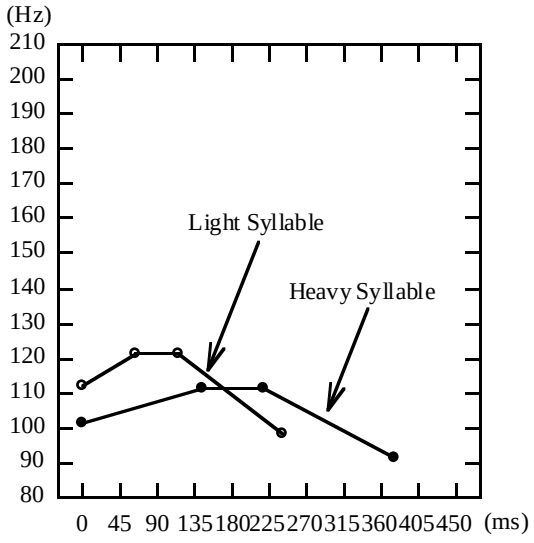


Figure 2: Lee1's F0 Changes at Word Edges

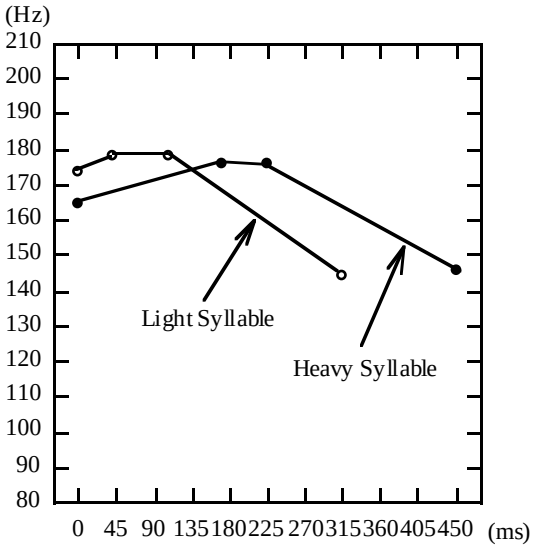


Figure 3: Shin's F0 Changes at Word Edges

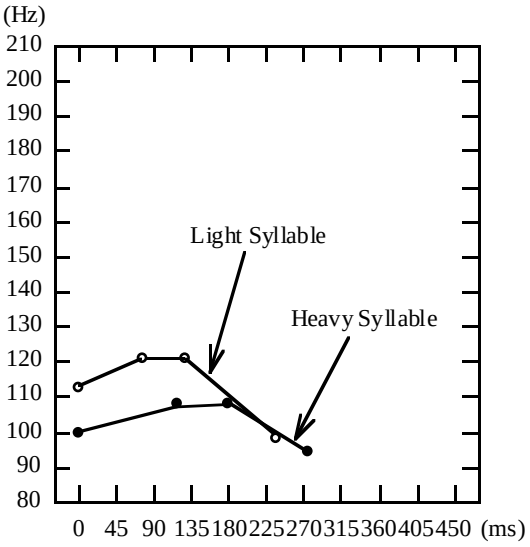


Figure 4: Kim3's F0 Changes at Word Edges

	Kim2 (Figure 1)		Lee1 (Figure 2)		Shin (Figure 3)		Kim3 (Figure 4)	
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy
Initial F0 (Hz) and Time (ms)	(196.7, 0.0)	(180.8, 0.0)	(111.8, 0.0)	(101.7, 0.0)	(173.6, 0.0)	(164.8, 0.0)	(112.3, 0.0)	(99.7, 0.0)
F0 at peak1 and Time (ms)	(202.0, 48.2)	(189.3, 123.4)	(121.0, 64.3)	(111.4, 144.6)	(178.5, 40.8)	(176.2, 169.9)	(121.1, 75.1)	(107.9, 117.3)
F0 at peak2 and Time (ms)	(202.0, 117.8)	(189.3, 220.1)	(121.0, 114.0)	(111.4, 220.1)	(178.5, 105.8)	(176.2, 225.1)	(121.1, 125.9)	(107.9, 179.9)
Final F0 and Time (ms)	(176.0, 256.6)	(166.7, 337.8)	(98.0, 241.1)	(91.2, 376.1)	(143.9, 314.9)	(145.5, 452.5)	(98.5, 237.9)	(94.6, 275.6)

Table 1: Numerical Data for F0 Changes at the Edges of Words

If the Contour Tone Hypothesis were correct, then it should be the case that a H in a short vowel will show no F0 rise or fall, or a slight rise or fall. However, the results in Figures 1-4 and Table 1 show that almost identical F0 changes are found in light and heavy syllables for every subject. Lee1 and Kim4 show almost the same degree of F0 rise for heavy and light syllables. Lee1 shows a 9.2 Hz rise for the light syllable and a 9.7 Hz rise for the heavy syllable. Kim4 shows a 8.7 Hz rise for the light syllable and a 8.2 Hz rise for the heavy syllable. The only difference is that it takes longer for long vowels to reach their peaks. Thus, the Contour Tone Hypothesis is incorrect in assuming that only long vowels show an initial rise or a final fall.

If the initial rise and final fall in F0 value generally occurs at the edges of the H-toned syllable regardless of its weight, then we might expect such changes at the edges of L-toned syllables. For this, fifteen noun phrases consisting of a reduplicated adjective and a noun were used to check whether an initial rise and final fall in F0 occurs even at the edges of L-toned phrases. Some typical examples are given in (3.3a–b–c) below.[1] In (3.3) and hereafter, the hyphen [-] means a morpheme boundary. Note that the noun phrases in (3.3) have a H in the penultimate syllable of the noun root on the surface, which is preceded by seven L-toned syllables and followed by four L-toned syllables. I used reduplicated adjectives in order to obtain long sequences of L-toned syllables.[2] In addition, I used adjectives beginning with different segments in order to consider possible consonantal effects on the F0 value of the following vowel. If the Contour Tone Hypothesis were correct, then we should not see any substantial changes of F0 value at the edges of L-toned phrases.

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[1] Each of the phrases in (3.3) have one H. It would be more interesting if the phrases in (3.3) were toneless. Then, one could not argue that there was some sort of incremental rise to the H and then fall away from it. However, every prosodic phrase must have one H in NK Korean and therefore, a toneless prosodic phrase cannot occur on the surface. See Chapter 6 for detailed discussion of the tone in phrases.

[2] Underlyingly, adjectives have H-tones on their final syllables. However, these word-final H-tones are deleted at the phrase level due to a constraint *WordFinalH. Thus, every phrase in (3.3) surfaces with a single H-tone on a noun.

(3.3) a. *coyoŋ-coyoŋhan malkalyaŋ̀i-meŋkulo* 'like a very quiet tomboy'
b. *ɲoltnoɬəthan mentəlaḿi-meŋkulo* 'like a very yellowish cocks-comb'
c. *əmul-əmulhan acuməńi-meŋkulo* 'like a very hesitating woman'

The results of the second experiment are given in Figures 5–10 and Table 2. Figures 5 and 6 represent the F0 changes in the data in (3.3a), Figures 7 and 8 the F0 changes in the data in (3.3b), and Figures 9 and 10 the F0 changes in the data in (3.3b). The graphs in Figures 5–10 are based on the numerical values in Table 2. Each numerical value is based on 20 tokens (= 5 types x 4 repetitions). Each peak in the six contours marked by 'P' corresponds to a H-toned syllable. The two data points which precede the peak show how the F0 value changes in the L-toned syllable preceding a H. The five data points which follow the peak show how F0 value changes in syllables following a H. We can clearly see that F0 rises in the initial two L-toned syllables represented by the three initial data points in each graph. We can also see that F0 falls in the two final L-toned syllables in each graph. These results strongly suggest that NK Korean has a tendency for the F0 value to rise and fall at the boundaries of certain phonological unit regardless of syllable weight, and also regardless of the kinds of tones. These results thus argue that the Contour Tone Hypothesis is incorrect.

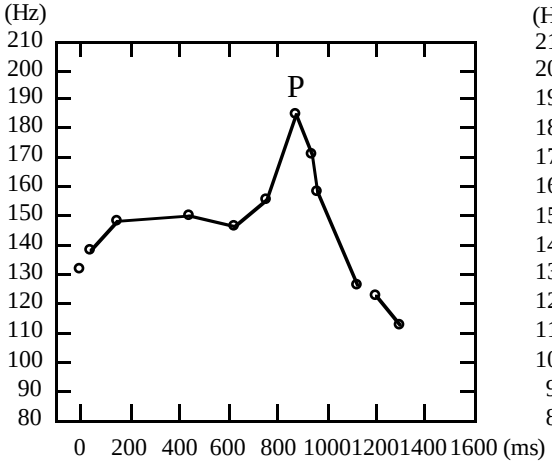

Figure 5: Kim3's F0 Change at the Edges of L-toned Phrases

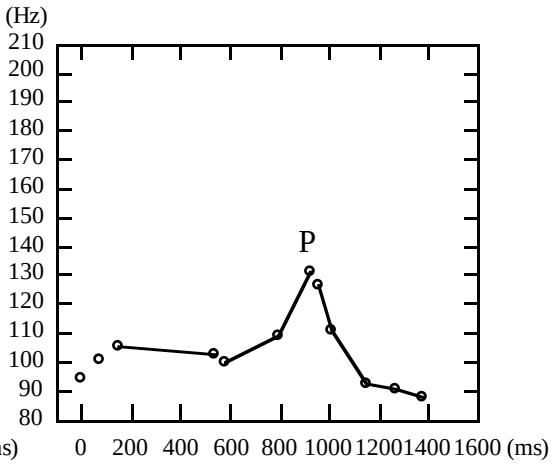

Figure 6: Kim4's F0 Change at the Edges of L-toned Phrases

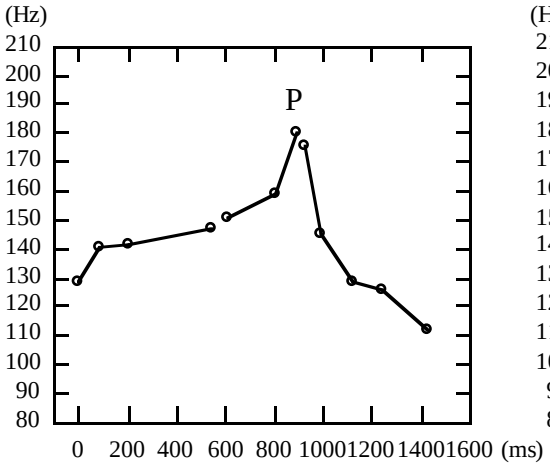

Figure 7: Kim3's F0 Change at the Edges of L-toned Phrases

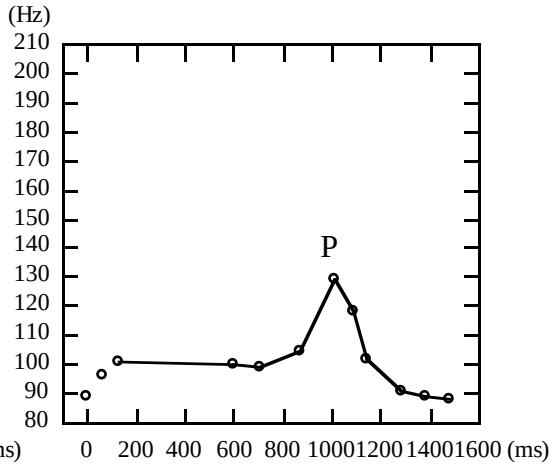

Figure 8: Kim4's F0 Change at the Edges of L-toned Phrases

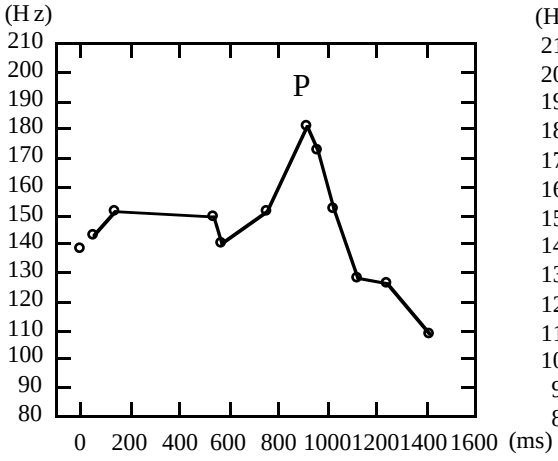

Figure 9: Kim3's F0 Change at the Edges of L-toned Phrases

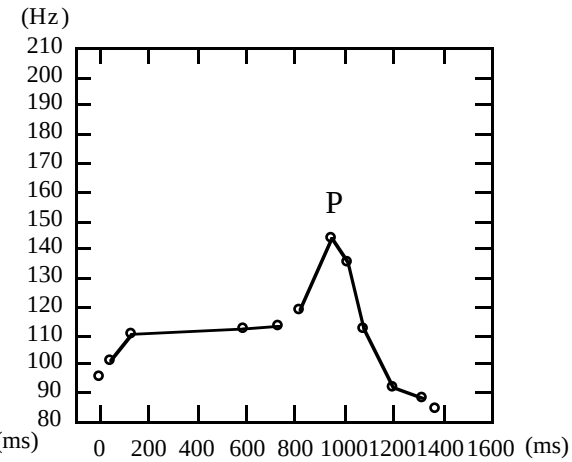

Figure 10: Kim4's F0 Change at the Edges of L-toned Phrases

These results lead to a question about the nature of the domain in which the F0 value generally rises and falls. The first experiment shows that the initial rise and final fall in F0 value occur at the edges of the words. Thus, the domain of the F0 value rise and fall appears to be the word. However, remember that the monosyllabic words used in this experiment are spoken in isolation. In Chapter 5, it will be assumed that a word used in isolation forms a prosodic phrase. Therefore, it can be alternatively assumed that the domain of rise and fall in F0 is the prosodic phrase. The results of the second experiment

and those of two additional experiments that will be presented below show that the domain in question is actually the prosodic phrase.

	Kim3			Kim4		
	Type1	Type2	Type3	Type1	Type2	Type3
	Figure 5	Figure 7	Figure 9	Figure 6	Figure 8	Figure 10
F0 at initial point and Time	(132.1, 0.0)	(128.4, 0.0)	(138.3, 0.0)	(94.8, 0.0)	(89.6, 0.0)	(95.6, 0.0)
F0 at 1st syllable # and Time	(137.8, 36.6)	(140.2, 80.4)	(143.2, 48.5)	(100.5, 76.5)	(96.4, 62.5)	(101.4, 44.6)
F0 at 2nd syllable # and Time	(148.2, 153.4)	(141.6, 205.6)	(151.6, 142.5)	(105.5, 150.4)	(101.3, 133.4)	(110.2, 132.4)
F0 at 5th syllable # and Time	(150.5, 445.0)	(147.2, 542.4)	(149.8, 542.3)	(102.4, 540.2)	(100.4, 592.5)	(112.7, 590.2)
F0 at 6th syllable # and Time	(146.3, 630.0)	(150.8, 606.5)	(140.8, 572.6)	(99.8, 574.5)	(98.8, 702.0)	(112.9, 734.8)
F0 at 7th syllable # and Time	(156.0, 756.4)	(158.8, 804.8)	(151.6, 756.6)	(109.2, 790.0)	(104.3, 874.2)	(118.8, 814.5)
F0 at peak and Time	(184.7, 877.5)	(180.4, 892.5)	(181.4, 922.6)	(131.0, 920.4)	(129.8, 1016.4)	(143.6, 952.2)
F0 at 8th syllable # and Time	(171.1, 940.0)	(175.6, 926.7)	(172.5, 965.4)	(126.4, 950.5)	(118.7, 1092.2)	(135.5, 1012.3)
F0 at 9th syllable # and Time	(158.4, 960.5)	(144.8, 989.6)	(152.4, 1030.4)	(110.7, 1010.8)	(102.4, 1142.4)	(112.1, 1078.8)
F0 at 10th syllable # and Time	(126.6, 1128.5)	(128.6, 1124.4)	(128.6, 1125.5)	(92.4, 1143.5)	(91.3, 1287.2)	(92.4, 1198.2)
F0 at 11th syllable # and Time	(122.4, 1195.0)	(125.4, 1240.8)	(126.4, 1245.3)	(90.8, 1270.2)	(89.5, 1384.3)	(88.6, 1323.4)
F0 at 12th syllable # and Time	(112.2, 1294.4)	(111.6, 1424.9)	(108.4, 1412.2)	(88.2, 1373.2)	(88.2, 1484.6)	(84.7, 1370.5)

Table 2: Numerical Data for F0 Changes at the Edges of L-toned Phrases

The results of the second experiment above show that the initial rise and final fall in F0 value occur at the edges of any linguistic unit which is larger than a word. Remember that the examples in (3.3) which were used in the second experiment consist of two words. The results of this experiment show that the initial rise occurs at the beginning of the first word and that the final fall occurs at the end of the second word. The F0 value does not sharply rise and fall between two words (at or near the fourth data point in each graph in Figures 5–10). In Chapter 5, a linguistic unit which in general

consists of more than one word and which contains only one H on the surface will be defined as a 'prosodic phrase'. Following this definition, the examples in (3.3) are prosodic phrases which consist of two words. Then, the results of this experiment show that the initial rise and final fall in F0 value occurs not at the edges of a word but rather at the edges of a prosodic phrase.

Two additional experiments were conducted to confirm that the F0 value rises and falls at the edges of a prosodic phrase. First, the F0 value changes in the sentences in (3.4) were examined. The sentences in (3.4), which consist of a subject NP, an object NP and Verb, are organized into two prosodic phrases, as the presence of two surface H's shows. (See Chapter 5 for detailed discussion of phrasing.) Prosodic phrases are marked by curly brackets. Note that a floating H is parsed to the first two syllables of a prosodic phrase in *keé-nəń* 'dog + SM' and *maáI-əI* 'speech + OM'. (See section 3.3.3 of this chapter for detailed discussion of tone in the Floating H Class.)

(3.4) a	{keé-nəń} {maáI-əI han-ta}	'dog + SM + speech + OM + to do + Ind' "the dog speaks a word"
b.	{keé-nəń} {maI-əl mann-at-ta}	'dog + SM + horse + OM + to meet + Past + Ind' "the dog met a horse"

The sentences in (3.4) were spoken five times by two speakers, Lee1 and Lee2. The F0 values at eight different points were checked with the CSL (Model 4300B) and their average values are given in Table 3. Each graph in Figures 11–12 is drawn based on the numerical values in Table 3. Two curves in Figure 11 show the F0 value changes in Lee1's repetitions of the sentences (3.4a–b), respectively. The other two curves in Figure 12 show the F0 value changes in Lee2's repetitions of the sentences (3.4a–b), respectively.

	Lee1		Lee2	
	(3.4a)	(3.4b)	(3.4a)	(3.4b)
F0 at initial point and Time	(119.2, 0.0)	(114.2, 0.0)	(141.2, 0.0)	(140.2, 0.0)
F0 at beginning of peak1 and Time	(145.4, 152)	(146.4, 138)	(181.6, 162)	(160.8, 148)
F0 at end of peak1 and Time	(144.2, 316)	(147.6, 300)	(178.0, 290)	(164.0, 202)
F0 at end of second syllable and Time	(104.6, 496)	(114.8, 498)	(132.8, 454)	(145.2, 400)
F0 at beginning of peak2 and Time	(123.4, 628)	(153.6, 608)	(161.0, 738)	(171.4, 526)
F0 at end of peak2 and Time	(122.6, 762)	(152.8, 626)	(166.6, 866)	(169.6, 564)
F0 at end of fourth syllable and Time	(98.6, 990)	(97.4, 780)	(115.4, 1048)	(118.2, 718)
F0 at final point and Time	(82.4, 1290)	(85.4, 1316)	(98.4, 1238)	(98.4, 1266)

Table 3: Numerical Data for F0 Changes at the H-toned Phrase Boundary

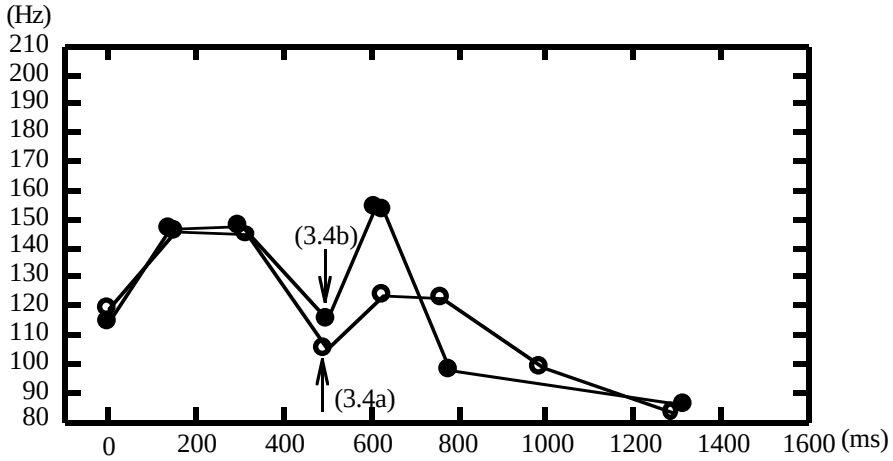

Figure 11: F0 Changes in Lee1's Speech

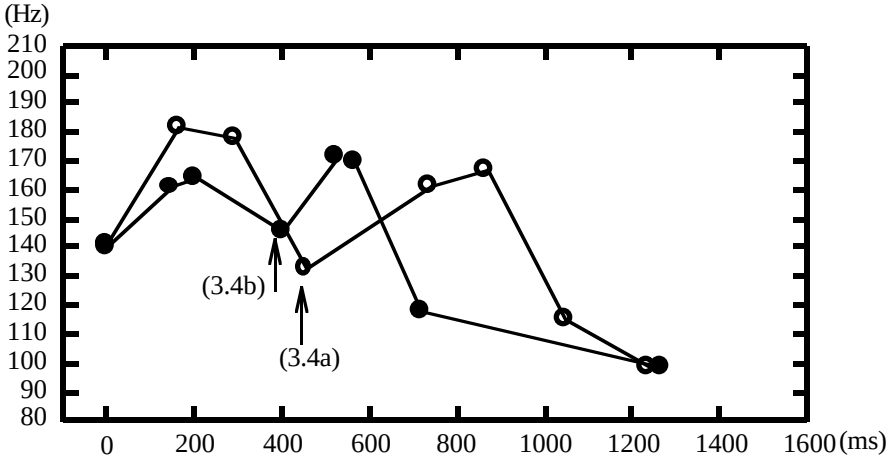

Figure 12: F0 Changes in Lee2's Speech

As shown in Figures 11–12 above, the F0 value rises and falls at the boundaries of prosodic phrases: (i) at the beginning of the first prosodic phrase, (ii) at the end of the second prosodic phrase, and (iii) at the boundary between the first and second prosodic phrases. Note that the prosodic phrase boundary between the first and second prosodic phrases is preceded and followed by H-toned syllables. Therefore, we would not find any F0 fall or rise at this boundary if the prosodic phrase boundary played no role. However, as we can see in each graph of Figures 11–12, the F0 value sharply falls and rises at this boundary. These points are marked by arrows. These data support the hypothes is that the domain whose boundaries are marked by rising and falling F0 values is indeed the prosodic phrase.

A parellel change in the F0 value is found in additional examples in (3.5). The sentences in (3.5), which consist of an object NP, an adverbial phrase and Verb, are grouped into two prosodic phrases, as the presence of two surface H's show. Note also that a floating H is parsed to the first two syllables of a prosodic phrase in *nuúń-əI* 'snow + OM' and *məəIiśə* 'to be in a distance'.

(3.5) a {nuúń-əI} {məəIiśə pa-at-ta} 'snow + OM + to be far away + to see + Past + Ind'
"the dog speaks a word"

b. {nuúń-əI} {nəIi-ke məŋ-nən-ta} 'snow + OM + to be slow + Adverbial + to eat + Present + Ind'
"the dog met a horse"

Each graph in Figures 13–14 is drawn based on the numerical values in Table 4 below. As shown in Figures 13–14, the F0 value rises and falls at the boundaries of prosodic phrases. Without assuming the hypothesis that the F0 value rises and falls at the edges of a prosodic phrase, it would be very hard to explain why the F0 value falls and rises between the two prosodic phrases. The prosodic phrase boundary between the first and second prosodic phrases is preceded and followed by H-toned syllables. Therefore, we would not find any F0 fall or rise at this boundary if the prosodic phrase boundary

played no role. However, as we can see in the graphs of Figures 13–14, the F0 value falls and rises at this boundary. These data also support the hypothesis that the F0 value rises and falls at the edges of a prosodic phrase.

	Lee1		Lee2	
	(3.5a)	(3.5b)	(3.5a)	(3.5b)
F0 at initial point and Time	(32.6, 0.0)	(128.8, 0.0)	(137.2, 0.0)	(130, 0.0)
F0 at beginning of peak1 and Time	(60.8, 168)	(156.4, 156)	(171.6, 164)	(167.6, 188)
F0 at end of peak1 and Time	(161.4, 274)	(154.2, 266)	(173.2, 262)	(169.2, 212)
F0 at end of second syllable and Time	(132.2, 466)	(131.4, 448)	(137.4, 472)	(143.4, 480)
F0 at beginning of peak2 and Time	(141.6, 622)	(164.6, 584)	(179.4, 728)	(172.8, 564)
F0 at end of peak2 and Time	(142.4, 664)	(163.2, 614)	(178.6, 732)	(169.6, 612)
F0 at end of fifth syllable and Time	(118.4, 816)	(124.4, 726)	(118.6, 954)	(104.2, 864)
F0 at final point and Time	(84.6, 1228)	(86.2, 1276)	(94.2, 1272)	(82.8, 1396)

Table 4: Numerical Data for F0 Changes at the H-toned Phrase Boundary

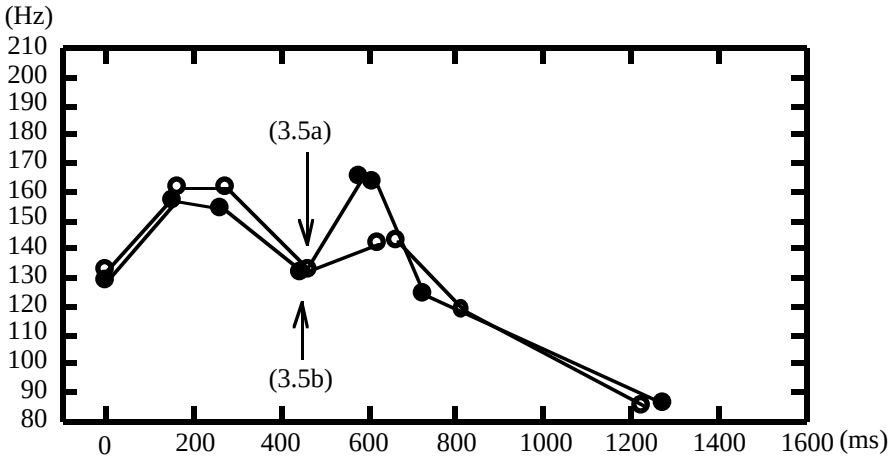

Figure 13: F0 Changes in Lee1's Speech

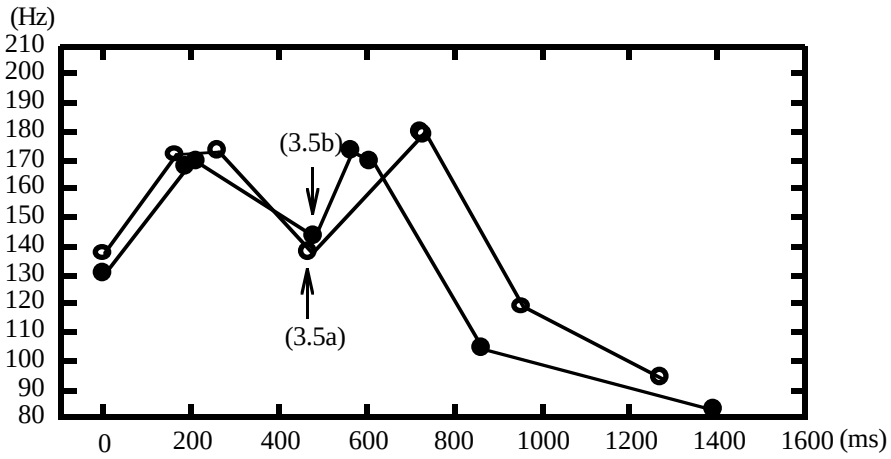

Figure 14: F0 Changes in Lee2's Speech

In Figures 13–14, it was shown that the F0 value falls and rises at the prosodic phrase boundary even though it is preceded and followed by H-toned syllables. The following experiment shows that the F0 value does not change unless the prosodic phrase boundary intervenes between two H-toned syllables. The F0 value changes in the sentences in (3.6) were examined. The sentences in (3.6), which consist of two-word NP plus a verb, are organized into one prosodic phrase. A floating H is parsed to the first two syllables of a prosodic phrase. Since the first word is monosyllabic, a H is parsed to the first two words of each phrase. Therefore, no prosodic phrase boundary intervenes between the first and second words.

(3.6) a.	{hiń nuúń-i on-ta}	'white + snow + SM + to come + Ind' "It snows."
b	{poḿ naɪ̀-i wa-at-ta}	'Spring + day + to come + Past + Ind' "Spring has come"

Schematic contours of these sentences are shown in Figures 15–16. These graphs are based on the numerical values given in Table 5. The two curves in Figure 15 show the F0 value changes in the repetitions of the sentence (3.6a) which were spoken twice by Lee1 and Lee2. The other two curves in Figure 16 show the F0 value changes in the repetitions of the sentence (3.6b) which were spoken twice by Lee1 and Lee2. The

second data point in each of these graphs represents the F0 value at the end of the first syllable *hiń* 'white' or *poḿ* 'Spring'. The F0 value does not fall and rise at this point, and therefore these data show that the F0 value does not fall and rise at the H-toned word boundary unless a prosodic phrase boundary intervenes between two H-toned syllables.[3]

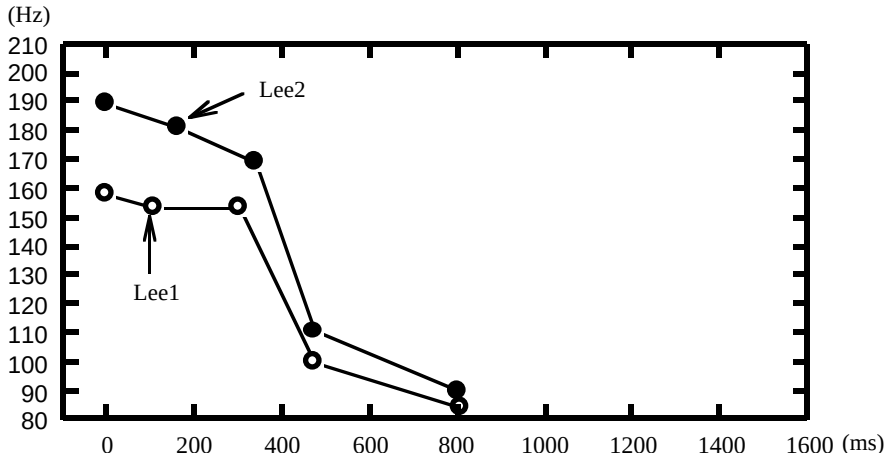

Figure 15: F0 Changes in (3.6a) *hiń nuúń-i on-ta*

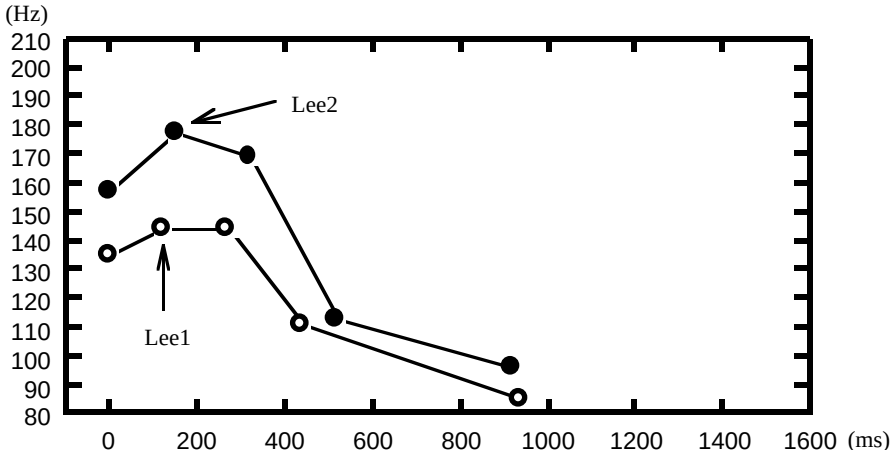

Figure 16: F0 Changes in (3.6b) *poḿ naI-i w-at-ta*

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[3] One could alternatively argue that the F0 value does not change at this word boundary because two H-toned syllables are linked to one H, as shown in (i) below. In order to avoid this problem, it would be better if this experiment were conducted with examples where two separate H's are linked to two adjacent syllables, as shown in (ii) below. In Chapter 6, it will be shown that every prosodic phrase can have only one H in NK Korean. Therefore, the ideal example in (ii) below is not found in NK Korean. Thus, this argument is incomplete in the sense that an alternative interpretation of the given data is also viable.

(i) H — σ + σ

(ii) H H — σ + σ (where + = word boundary)

	(3.6a)		(3.6b)	
	Lee1	Lee2	Lee1	Lee2
F0 at initial point and Time	(157.5, 0.0)	(189, 0.0)	(134.5, 0.0)	(157, 0.0)
F0 at end of first syllable and Time	(153, 110)	(181, 165)	(144, 120)	(177, 150)
F0 at end of second syllable and Time	(153, 305)	(168.5, 340)	(144, 270)	(169, 320)
F0 at end of third syllable and Time	(99, 475)	(110, 475)	(110.5, 440)	(112, 520)
F0 at final point and Time	(83.5, 810)	(89, 8.5)	(84.5, 940)	(96, 920)

Table 5: Numerical Data for F0 Changes at the H-toned Word Boundary

A parallel change in the F0 value is found in additional examples in (3.7). The sentences in (3.7) which consist of an adverbial phrase and Verb are organized into one prosodic phrase, as the presence of one H shows. Note also that a floating H is parsed to the first two syllables of a prosodic phrase.

(3.7) a. {moóń noóĺ-ket-ta} 'not + to play + Future + Ind'
"will not be able to play"

b. {moóń naƙ-ket-ta} 'not + to fish + Future + Ind'
"will not be able to fish"

The F0 value changes in these sentences are shown in Figures 17–18. These graphs are based on the numerical values given in Table 6. The two curves in Figure 17 show the F0 value changes in the repetitions of the sentence (3.7a) which were spoken twice by Lee1 and Lee2. The other two curves in Figure 18 show the F0 value changes in the repetitions of the sentence (3.7b) which were spoken twice by Lee1 and Lee2. The third data point in each of these graphs represents the F0 value at the end of the first syllable *moóń* 'not'.[4] The F0 value does not fall and rise at this point, and therefore these data show that the F0 value does not fall and rise at the H-toned word boundary unless a prosodic phrase boundary intervenes between two H-toned syllables.

[4] Since the examples in (3.7) begin with sonorant consonants, the F0 value rises at the beginning of a prosodic phrase. The second data point in each of the graphs in Figure 6 represents the F0 value at or near the the peak of a curve.

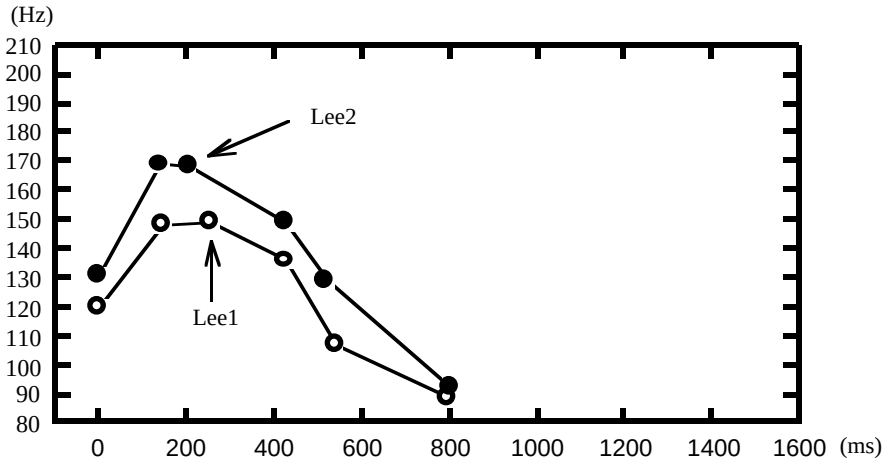

Figure 17: F0 Changes in *moóń noóI-ket-ta*

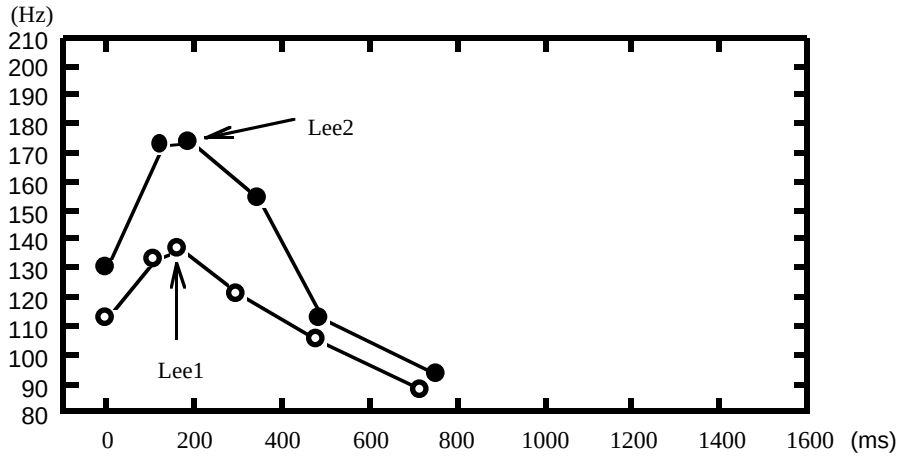

Figure 18: F0 Changes in *moóń nak-ket-ta*

	(3.6a)		(3.6b)	
	Lee1	Lee2	Lee1	Lee2
F0 at initial point and Time	(123.5, 0.0)	(137.5, 0.0)	(122, 0.0)	(130, 0.0)
F0 at beginning of F0 peak and Time	(143, 90.5)	(172, 160)	(133, 110)	(172.5, 125)
F0 at end of first syllable and Time	(144.5, 225)	(170.5, 210)	(136.5, 165)	(173.5, 190)
F0 in middle of second syllable and Time	(135.5, 415)	(156, 410)	(121, 300)	(154, 345)
F0 at in middle of third syllable and Time	(106.5, 550)	(126, 500)	(105, 480)	(112, 490)
F0 at final point and Time	(86, 820)	(89.5, 740)	(87, 720)	(92.5, 755)

Table 6: Numerical Data for F0 Changes at the H-toned Word Boundary

To sum up, the F0 value rises and falls at a phrase boundary regardless of syllable weight and the kinds of tones in NK Korean. It is problematic to explain this phenomenon by phonological rules which refer to categorical units. We would need to refer to a L-tone to explain the F0 rise or fall at the L-toned phrase boundary. There is no independent evidence that we need to assume a L-tone for NK Korean tonology. If the L-tone does not exist in NK Korean phonology, then there would be no way to refer to it. Even if we assume that L-tone exists in NK Korean tonology, we are forced to assume two different types of L-tones, i.e., a L-tone occurring at or near the phrase boundary and a different L-tone occurring elsewhere. Thus, it is hard to explain this phenomenon with recourse to any phonological rules which are categorical. Therefore, I propose that this phenomenon should be explained not in phonology but in phonetics:

(3.8) NK Korean does not have phonological contour tones. The phrase-initial rise or phrase-final fall is accounted for by a phonetic rule.[5]

3.2. The Tone Bearing Unit

One of the fundamental problems in understanding tone is determining what the tone bearing unit (TBU) is. Odden 1995a shows that there is good evidence that the TBU is the mora for certain Bantu languages, e.g. Kimatuumbi (Odden 1989, 1995c) and Kikuria (Odden 1995a). However, there is also good evidence that the TBU is the syllable for the Chimaraba dialect of Makonde (Odden 1990) and Kikuyu (Clements 1984). Zubizarreta (1982) shows that different dialects of the same language can have different TBU's. For instance, Tokyo Japanese is assumed to have the syllable as the TBU, while in Osaka Japanese the mora is considered the TBU.

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[5] One possible solution is to assume a L boundary tone (L%) for NK Korean intonation. For boundary tones, see Pierrehumbert and Beckman 1988.

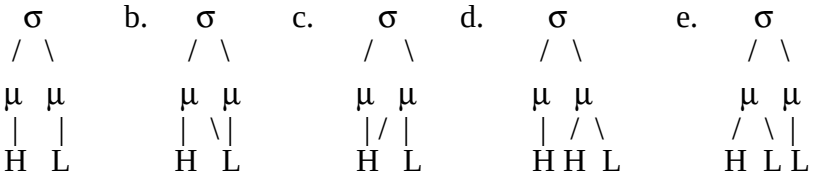
Without justification, G.-R. Kim 1988 assumes that the TBU is the syllable in NK Korean. N.-J. Kim 1991 and Y.-H. Chung 1991a assume that the TBU is the mora in NK Korean. N.-J. Kim 1991 assumes the mora as the TBU in order to capture the contrast between long and short vowels. Since the issue of the TBU is independent of the existence of a vowel length contrast, N.-J. Kim's 1991 proposal is not tenable. Y.-H. Chung 1991a assumes the mora as the TBU in order to explain the contour tones that she believes NK Korean has. If NK Korean has phonological contour tones, then her moraic TBU theory is superior to the syllabic TBU theory, in accounting for contour tones on heavy syllables. However, I argue that NK Korean has no phonological contour tones in section 3.1. Thus, Chung's (1991a) proposal is also unsupported. In this section, I will argue that the TBU is the syllable in NK Korean.

The syllabic TBU hypothesis encounters no problem with roots of the Floating H Class, which pose problems for the moraic TBU theory. Roots of this class have a H on the initial two syllables, as in *mu̍cike* 'rainbow' and *hoóIaŋ̍i* 'tiger', regardless of the weight of the initial syllable. This phenomenon is sometimes referred to as tone doubling, and is found very frequently in tone languages including Makua, Ekegusii, Ekoti, Holoholo, Ciyao, Echuabo, Makonde, Olusamia, and Kikerewe (Poletto 1995:18). Assuming the syllable as the TBU, we can describe the tone pattern with no problems. Roots like *mu̍cike* 'rainbow', and *hoóIaŋ̍i* 'tiger', etc. are assumed to have a floating H in UR. A constraint AlignL requires the left edge of a H that exists in UR to be aligned with the left edge of a word. Furthermore, a constraint Minimal Tone Association (MTA) prohibits a H that exists in UR from being singly-linked to the initial syllable of a word. The optimal output, where a floating H is parsed to the first two syllables of a word, can be selected in terms of the conspiracy of these constraints. Refer to section 3.3.3 for detailed discussion.

However, we encounter a problem if we assume the mora as the TBU. Note that initial syllables can be different in weight, i.e. heavy in *hoóɬaŋ́ji* 'tiger' but light in *muć̆iɬke* 'branch'. If the initial syllable is heavy, then three word-initial moras have a H, while otherwise two word-initial moras have a H. We encounter a problem with formulating the constraint MTA since it is hard to explain the condition under which three moras are H-toned. Thus, this phenomenon of tone doubling cannot be accounted for without recourse to a further parochial constraint, specifically requiring triple-linking of tone when the first syllable is heavy. We do not need this extra stipulation if we simply assume the syllable as the TBU.

Moreover, as pointed out by Hyman 1988 and Odden 1995a, there is an overgeneration problem with the mora being the TBU, in that a bimoraic contour toned syllable could be represented in five ways, as in the representations of a falling tone in (3.9):

(3.9)



However, no language contrasts one kind of a falling tone with another. If we assume the syllable as the TBU, this overgeneration problem does not arise. In the syllabic TBU theory, all that can be said is that the whole syllable has a falling tone. As Odden 1995a:500 argues, there simply is no way to phonologically manipulate the realization of tones relative to the moras of a syllable.

Thus, I propose that the syllable is the TBU in NK Korean. Note that this is a claim only for NK Korean, not for the general theory of phonology since there are a number of other good possible candidates for the TBU.[6]

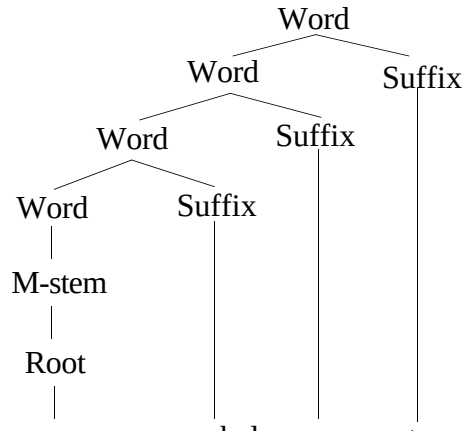
3.3 Tone in Nouns

Nominal roots are divided into three classes in NK Korean, as in (3.10). These three tonal classes will be dealt with in the following three sections.

(3.10) a. The Default H Class: having no H in UR
b. The Prelinked H Class: having a H prelinked with a particular syllable in UR
c. The Floating H Class: having a H which is not linked with a particular syllable in UR

As shown in section 2.3, nominal roots are assumed to form M-stems since they can be combined with inflectional nominal suffixes. Nominal roots are assumed to form words since they can be used in isolation, as in *maŋneé´*'the last child'. Hence, the word *maŋneé-meŋkulo-man-to* 'even only like the last child' is assumed to have the following morphological structure.

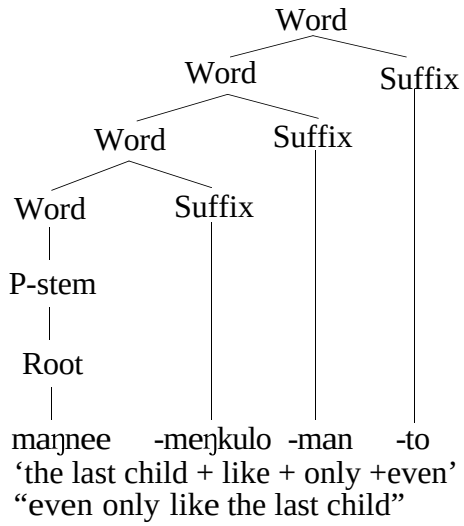
(2.36')



6 There are additional possible candidates for the TBU. For instance, Clark 1990 proposes that tones are features located under the Laryngeal node. Pierrehumbert and Beckman 1988 propose that phrase tones have larger TBU's, e.g. an intermediate phrase is the TBU for the phrase tone in English.

The right edge of a P-stem is anchored to the right edge of an M-stem due to the constraint R-Anchor (M-stem, P-stem). Since the right edge of a P-stem corresponds to that of an M-stem, a root itself in general forms a P-stem. The word *maŋneé-meŋkulo-man-to* ‘even only like the last child’ is assumed to have the following phonological structure.

(2.36")



When nominal roots with final open syllables are followed by a vowel-initial syllable, no syllable fusion occurs across the nominal M-stem boundary, as shown in *məli-e* but **məlye* 'at the head'. The right edge of a P-stem can be aligned with the right edge of an M-stem without violating Align (P-stem, r; σ, r). Hence, there is no reason for the vowel-initial suffix to be incorporated into the domain of a P-stem in nouns.

When nominal roots with final closed syllables are followed by a vowel-initial suffix, the final consonant will be syllabified as an onset of the following syllable, as in *ha.ʔnə.le,* derived from /hanəl-e/ 'on the sky'. The right edge of a P-stem cannot be aligned with the right edge of an M-stem without violating Align (P-stem, r; σ, r). As discussed in section 2.5, the syllable constructed across the M-stem boundary is

incorporated into the domain of a P-stem. Therefore, the right edge of a P-stem no longer corresponds to that of an M-stem, as shown in *ha.ɲə.l#eÕ*, where the symbols # and Õ mark the right edges of an M-stem and a P-stem, respectively. This slight mismatch will have a significant meaning for tone shift.

3.3.1 Default H Class

In this tone class, bare noun stems and constructions of noun stem plus suffixes exhibit a H on the final syllable of an M-stem if the final syllable is heavy, as shown in (3.11a). Only a long vowel is counted as two moras, i.e., a coda consonant is not moraic.[7] If the final syllable is light, the H falls on the penultimate syllable of an M-stem, as indicated in (3.11b–e).

In (3.11), the right edge of an M-stem corresponds to that of a P-stem. One of the constraints which conspire to produce this default tone pattern crucially refers to the right edge of an M-stem. Therefore, in this chapter, I will use the term 'M-stem' unless the distinction of M-stem from P-stem is required.

(3.11)

a. *maŋneé*	*maŋneé-ka*	*maŋneé-cʰələm*	*maŋneé-esə*
'the last son'	'the last son+SM'	'like the last son'	'from the last son'
b. *məli*	*məli-ka*	*məli-cʰələm*	*məli-esə*
'head'	'head+SM'	'like the head'	'from the head'
c. *apući*	*apući-ka*	*apući-cʰələm*	*apući-esə*
'father'	'father+SM'	'like a father'	'from a father'
d. *mik'ulaći*	*mik'ulaći-ka*	*mik'ulaći-cʰələm*	*mik'ulaći-esə*
'mudfish'	'mudfish+SM'	'like a mudfish'	'from a mudfish'

[7] Following Hayes' 1989 moraic theory, a long vowel is universally counted as two moras, while a short vowel is counted as one. However, the moraic status of coda consonants can vary. For instance, a coda is moraic in Latin, whereas it is not in Lardil. Following Y.-H. Chung 1991a and N.-J. Kim 1991, a coda is not counted as moraic in NK Korean.

e. *kʰelliphoniá*	*kʰelliphoniá-ka*	*kʰelliphoniá-cʰələm*	*kʰelliphoniá-esə*
'California'	'California+SM'	'like California'	'in California'

I propose that stems of this class have no H's in UR and that they surface with H's in response to constraints. This proposal is motivated by considering the fact that all words have one and only one H on the surface when they are used in isolation in NK Korean (K. Chung 1980, G.-R. Kim 1988, Y.-H. Chung 1991a, N.-J. Kim 1991, etc.). As shown in (3.12), words containing no H's are not found in NK Korean.[8]

(3.12) a. *kaćí* 'branch'
yəə́ŋ̌cú 'man's name'

b. *kací* 'eggplant'
yəŋcú 'place name'

c. *kaći* 'sort/kind'
yəŋ́cu 'monarch'

d. Gap for a L-tone pattern

This fact is not a logical necessity in languages with a two-way tone system. Many such languages have words with no H-tones. For instance, Ibibio (spoken in Nigeria) has a two-way tone contrast and exhibits toneless words, as shown in (3.13d).[9]

(3.13) a. *iɨ́ḿ* 'urine'
eɨ́ḿ 'millipede'
aɨ́á 'small ants that sting'

b. *ikɨ́ḿ* 'pl. of *kɨ́ḿ* 'to prick one person''
etɨ́ḿ 'beat up'
atá 'sixty'

c. *iɨ̀ɨm* 'completed action of [kɨ́ḿ]'
eɨ̀ɨm 'man's common name'
aɨ́a 'fruits that change the taste of soup'

d. *ikɨm* 'calabash'
etɨm 'to arrange'
ata 'expert'

8 Chonman Korean also exhibits this feature (S.-A. Jun 1993).

9 The Ibibio forms in (13) derive from my own notes, gathered from a native speaker of Ibibio, Sunny Ekp̣o.

Hence, it is argued that toneless M-stems are prohibited by the constraint M-stemH. A similar constraint is found in Olusamia (Poletto 1995) and Tanzanian Yao (Odden 1995b).

(3.14) M-stemH
A toneless M-stem is prohibited.

I argue that this constraint outranks the constraint DEP (H) which requires every H in the output to have a correspondent in the input. Thus, creation of a H will violate DEP (H), but a violation of this constraint is compelled by M-stemH.

(3.15) M-stemH >> DEP (H)

The H is parsed on the final syllable of an M-stem if it is heavy, otherwise on the penultimate syllable. These tone patterns will be selected by the conspiracy of the constraints that I will motivate in this section. These tone patterns will be referred to as the 'default' tone patterns. I argue that NK Korean has constraints which require the default tone patterns to occur on the surface. There are five arguments that support this position.

Argument 1: All loan words exhibit the default tone pattern regardless of the accentual or tonal patterns they had in the languages from which they were borrowed. Out of 34 examples, 30 words show H's on the penultimate syllable, as given in (3.16a-d). Note that the final syllables of all of these words are light and therefore they have a H on the penultimate syllable. Four words in (3.16e) exhibit H's on the final syllable when the final syllable is heavy.

(3.16) a. Disyllabic

p'əśu	'bus'	*cʰuɭək*	'truck'
tʰeksi	'taxi'	*ʦʰoǩʰən*	'token coin'
caǩ'u	'zipper'	*k'eím*	'game'
ʂaćʰu	'shirt'	*p'ańsu*	'panty'

kʰiťʰa	‘guitar’		

b. Trisyllabic

nació	‘radio’	*naiťʰa*	‘lighter’
pʌkeśu	‘bucket’	*kuluḿo*	‘cream’
pulaća	‘brassiere’	*olliḿpʰik*	‘Olympic’
pultʊća	‘bulldozer’	*sukuḿpʰo*	‘shovel’
suić’ɾ̆	‘switch’	*tʰeniśu*	‘tennis’
təlʌḿa	‘drama’	*kʰaćʰuśa*	‘Katusa’
neiɾkan	‘Reagan’	*kʰəɬliń tʰon*	‘Clinton’
wasiŋ̀tʰon	‘Washington’		

c. Quadrisyllabic

hilosiḿa	‘Hiroshima’	*ameliḱʰa*	‘America’
ohaió	‘Ohio’		

d. Quintasyllabic

kʰellipʰoniá	‘California’	*palusellońa*	‘Barcelona’
aisuk’ek’i	‘Ice cream’		

e. Disyllabic with a long vowel

tak’aáŋ́	‘radish pickled in sake lees’
utoóŋ́	‘Japanese-style noodle’
naipaáŋ́	‘sunglasses (named after its maker)’
oteéŋ́	‘Japanese-style sausage’

If there were no such constraints by which the above tone patterns were chosen as the optimal patterns, there would be no explanation for why all loan words show these tone patterns. I claim that just segmental strings of words are borrowed into NK Korean and the appropriate tone patterns are required by the constraints which exist independently for the NK Korean tone system.

Argument 2: Words longer than trisyllabic show only one tone pattern, and it is the pattern predicted by the constraints which guarantee the default tone pattern. Monosyllabic and disyllabic words show all possible tone patterns except a L-tone pattern, e.g. *L or *LL. NK Korean does not allow words containing only L-tones, and this fact is explained by the constraint M-stemH which requires all stems to have a H. However, trisyllabic words show only four tone patterns out of the seven possible

patterns other than all L-tones (= 2^n *-1*, where *n* = the number of syllables and *-1* = the L-tone pattern). Note that the following tone patterns do not occur, i.e. *LHH, *HLH, and *HHH. Interestingly, words that are longer than trisyllabic show only one tone pattern, namely a H on the penultimate syllable. For instance, quadrisyllabic words show only one tone pattern, LLHL, out of fifteen possible patterns. Quintasyllabic words also show only one tone pattern, LLLHL, out of thirty-one possible patterns.

No. of Syllables	Patterns Possible	Patterns Found	Gaps Found	Examples
Monosyllabic	1 (= 2^1 - 1)	1	0	*k'oŋ́* 'pheasant'
Disyllabic	3 (= 2^2 - 1)	3	0	*kaćiˊ* 'branch'
				kačiˊ 'eggplant'
				kaći 'sort/kind'
Trisyllabic	7 (= 2^3 - 1)	4	3	*kaḿai* 'straw mat'
				kasiḱe 'scissors'
				pusələḿ 'abscess'
				cićiḱe 'strech'
Quadrisyllabic	15 (= 2^4 - 1)	1	14	*ɤ̌mǐk'ulaći* 'mudfish'
Quintasyllabic	31 (= 2^5 - 1)	1	30	*aisuk'eḱ'i* 'Ice cream'

Table 7: Surface Tone Patterns: Possible vs. Actual[10]

Without assuming constraints to derive the default tone pattern, it would be very hard to account for why words longer than trisyllabic show that tone pattern. It is a general tendency that longer words illustrate the default tone pattern even though shorter words show various tone patterns in tone languages. It has already been noted that long vowels very rarely occur in the final syllable of stems in NK Korean. In addition, they do not occur in the final syllable of stems longer than disyllabic (Y.-H. Chung 1991a). Thus, the nonexistence of the default pattern, *LLLH, where the final syllable is heavy, is accounted for by an independent phonotactic constraint.

10 This table illustrates only the surface tone patterns. For instance, monosyllabic stems are divided into two tone classes in the underlying representation, which will be discussed in section 3.4. However, these underlying differences are neutralized on the surface.

Argument 3: When a noun or verb shows more than one tone pattern, e.g. *kaḿani* vs. *kamaǹi* 'a straw rice-bag', one of them is always the pattern predicted by the constraints which derive the default tone pattern, as in *kamaǹi*. Note that the final syllable of all words in the first column of (3.17a-c) is light, and therefore they have the default tone pattern LHL. Without assuming constraints which select such a tone pattern, there is no reason why one of the two options is always that tone pattern. As pointed out in Chung (1991a:85), the process of eliminating underlying or non-default tone patterns is still going on in NK Korean. Thus, the pattern in the first column of (3.17a-c), which is the default pattern, is in competition with a non-default pattern, which is in the process of being eliminated. This observation also supports the existence of constraints giving the default tone pattern.

(3.17) a.	*nakə́ne*	vs.	*nakə́ne*	'wanderer'
	halepi	vs.	*halepi*	'grandfather'
	mucike	vs.	*mućike*	'rainbow'
	ˇ		ˇ	
b.	*kamaǹi*	vs.	*kaḿani*	'a straw rice-bag'
	kamulchi	vs.	*kaḿulchi*	'mullet'
	kapuliˇ	vs.	*kaṕuliˇ*	'stingray'
	toksuli	vs.	*toksuli*	'eagle'
c.	*thelepi*	vs.	*thelepi´*	'TV (loan word)'
	piteó	vs.	*piíteó*	'VCR (loan word)'
	khiṕha	vs.	*kiíṕha´*	'guitar'

Argument 4: Words having the default tone patterns are the most numerous in NK Korean. G.-R. Kim 1988, and Y.-H. Chung 1991a already pointed out that words having H's on the penultimate syllables occur much more frequently than those having H's elsewhere. Following N.-J. Kim 1991, 133 words (61%) follow this tone pattern among 218 collected examples of polysyllabic nouns. Out of 107 examples of polysyllabic verbs, 52 words (49%) show this pattern. Without assuming the constraints which select the default tone patterns, it would be hard to explain why such an asymmetry is found in

NK Korean. I claim that words of this tone pattern are the most frequently found because they belong to the Default H Class, for which H's need not be specified underlyingly.[11]

Argument 5: NK Korean has a small group of words whose stem-final light syllables are prelinked with a H in UR. The prelinked H surfaces on the stem-final syllables when the stems are used in isolation, as in *kac̲í*‘eggplant’ and *satal̲í*‘ladder’. The syllable which has a prelinked H is underlined. However, the H prelinked with the stem-final light syllable shifts rightwards when the stem is followed by suffixes, as shown in (3.18). As shown in (3.18a), the H is realized on the penultimate syllable of the word when the final syllable is light. If the final syllable is heavy, as in (3.18b), then the H surfaces on that final syllable.

(3.18) a. *kaci´* ‘eggplant’
kaci-meŋkuɭo ‘like an eggplant’
saɬali´ ‘ladder’
satali-meŋkuɭo ‘like a ladder’

b. *kaci-potaá´* ‘than an eggplant’
saɬali-potaá´ ‘than a ladder’

The same tonal change is found in verbs. The tonal patterns of words change depending on the weight of suffixes. The causative verbal suffixes have two variants: *ki, hi, li,* and *i* with a short vowel, and *kii, hii*, *lii*, and *ii* with a long vowel. The tone patterns of derived words differ depending on the weight of the following suffixes, e.g. *məɬk-i* vs. *məɬk-ií´*‘to know + Caus’. Note that the H falls on the syllable predicted by the weight-sensitive tone constraints.

(3.19) {{i̲ṕ-hi}$_{der}$-ta}$_{infl}$ vs. {{i̲p-hiíʔ}$_{der}$-ta}$_{infl}$ ‘to wear + Causative + Ind’
{{mə̲k-i}$_{der}$-ta}$_{infl}$ vs. {{mə̲k-ií}$_{der}$-ta}$_{infl}$ ‘to eat + Causative + Ind’

11 This argument is based on the assumption that less-marked structures, i.e., ones with fewer specified elements, are more common.

In Arguments 1–4, I have shown that NK Korean has constraints which require a H to be aligned with a syllable in a predictable way within a stem. In Argument 5, I have shown that NK Korean has constraints which require a H to be aligned with a syllable in a predictable way within a domain larger than a stem. There is one thing in common between Arguments 1–4 and Argument 5 in that a H is aligned with the predictable position from the right edges of the domains. In section 3.3.2, I will show that the same constraints giving the default tone patterns in stems conspire to produce the above tone shift. Therefore, the docking places of the above tone shift also support the existence of the constraints which derive the default tone patterns.

For the five reasons discussed above, I argue that NK Korean has constraints which require a H to be realized on a syllable in a predictable way, i.e., (i) on the final syllable of a stem if it is heavy, and (ii) on the penultimate syllable of a stem, if not.

The constraint ParseH requires a H to be realized on some TBU. This constraint does not specifically state where a H should be parsed.

(3.20) ParseH
A H must be realized on some TBU.

The constraint ParseH outranks the constraint DEP (Association) (DEP (Assoc)) which requires an association in the output to have a correspondent in the input. Thus, association of a H will incur a violation of this constraint.

(3.21) DEP (Association) (DEP (Assoc))
An association in the output must have a correspondent in the input.

(3.22) ParseH >> DEP (Assoc)

The constraint DEP (Assoc) does not penalize delinking of a H from a TBU. Delinking of a H is prohibited by an independent constraint AlignH-to-Sponsor

(AlignHS), which will be discussed in the following section. Alternatively, one could propose a constraint Ident-IO (H), which requires a TBU to bear a H in the output if it does so in the input and vice versa. Both delinking and association of a H would incur a violation of this constraint. However, there is evidence that delinking of a H is more serious than association of a H. Hence, these two processes, delinking and association, must be handled by different constraints. Justification for separating these two constraints will be given in section 3.3.3.

A H is required to be aligned with the right edge of a domain due to the constraint Align (H, r; Domain, r) (AlignR):

(3.23) Align (H, r; Domain, r) (AlignR)
Align the right edge of a H with the right edge of a domain (where domain = Root, M-stem, P-stem, or Word)

The constraint AlignR does not specifically require a H to be aligned with the right edge of any particular domain. Hence, all three schematic forms in (3.24) satisfy AlignR because a H is properly aligned with the right edge of each domain. In nouns, the right edge of a root always corresponds to the right edge of an M-stem, and thus the root domain is ignored.

(3.24) a. $[[[\sigma\sigma\acute{\sigma}]_{\text{M-stem}}\sigma]_{\text{P-stem}}\sigma\sigma\sigma]_{\omega}$ (aligned with the right edge of an M-stem)
b. $[[[\sigma\sigma\sigma]_{\text{M-stem}}\acute{\sigma}]_{\text{P-stem}}\sigma\sigma\sigma]_{\omega}$ (aligned with the right edge of a P-stem)
c. $[[[\sigma\sigma\sigma]_{\text{M-stem}}\sigma]_{\text{P-stem}}\sigma\sigma\acute{\sigma}]_{\omega}$ (aligned with the right edge of a Word)

The number of violations of AlignR increases according to the number of toneless syllables which are counted from the right edge of a domain. The schematic form in (3.25a) violates AlignR once because a H is parsed to the syllable which is one syllable away from the right edge of an M-stem. On the other hand, the schematic form in (3.25b)

violates AlignR twice because a H is parsed to the syllable which is two syllables away from the right edge of a word.

(3.25) a. $[[[\sigma\sigma\acute{\sigma}]_{\text{M-stem}}\sigma]_{\text{P-stem}}\sigma\sigma\sigma]_{\omega}$ (one violation of AlignR)
b. $[[[\sigma\sigma\sigma]_{\text{M-stem}}\sigma]_{\text{P-stem}}\sigma\acute{\sigma}\sigma]_{\omega}$ (two violations of AlignR)

Although the constraint AlignR does not specifically require a H to be aligned with the right edge of an M-stem, a H will surface on the right edge of an M-stem due to the conspiracy of the constraints M-stemH and AlignR. Note that the schematic forms in (3.24b–c) and (3.25b) incur a violation of M-stemH because a H does not exists within the domain of an M-stem.

A H on the final syllable of a domain is prohibited by the constraint Nonfinality. Due to this constraint, every H on a domain-final syllable is prohibited regardless of the types of domains, i.e., M-domains and P-domains.

(3.26) Nonfinality
A H on the final syllable of a domain is prohibited (where domain = Root, M-stem, P-stem, or Word).

The constraint Nonfinality is assumed to outrank AlignR. This ranking explains why a H surfaces on the penultimate syllable of a domain if a domain-final syllable is not heavy. Due to the conspiracy of the three constraints M-stemH, AlignR, and Nonfinality, a default H will surface on the penultimate syllable of an M-stem if a domain-final syllable is not heavy, as schematically shown in (3.25a) above. Two additional constraints are required to explain the tone in stems with a final heavy syllable, as will be discussed later.

(3.27) Nonfinality >> AlignR

To sum up, toneless M-stems are not allowed due to the constraint M-stemH which outranks the constraint DEP (H). A created H must be parsed to some TBU due to the constraint ParseH. This constraint outranks the constraint DEP (Assoc). A H is required to be aligned with the right edge of a domain by the constraint AlignR. However, a H on a domain-final syllable is prohibited by Nonfinality, which outranks the constraint AlignR. Due to the conspiracy of the constraints M-stemH, ParseH, Nonfinality, and AlignR, a default H surfaces on the penultimate syllable of an M-stem regardless of the length of an M-stem, as shown in *məɬi* 'head', *apuću* 'father', and *mik'ulaću* 'mudfish'.

As indicated in Tableau 3.1, a H is aligned with the penultimate syllable of a quadrisyllabic M-stem, as in *mik'ulaću* 'mudfish'. The first candidate, which has no H, is ruled out by its violation of M-stemH. All the other candidates have a H, violating the constraint DEP (H). A violation of DEP (H) is compelled by M-stemH. The second candidate, where a H is not parsed to any TBU, is eliminated by its violation of the constraint ParseH. The third candidate, where a H surfaces on the final syllable, is ruled out by its violation of the constraint Nonfinality. The fourth and fifth candidates, where a H surfaces on the antepenultimate or initial syllable, are ruled out by their second violation of the constraint AlignR. The last candidate, where a H surfaces on the penultimate syllable, is selected as optimal. A minimal violation of the constraint AlignR is compelled by the constraint Nonfinality.

Tableau 3.1
Input: mik'ulaci 'mudfish'

Candidates	M-stemH	ParseH	Nonfinality	AlignR	DEP (Assoc)	DEP (H)
mik'ulaci	*!					
mik'ulaću H		*!				*
mik'ulaćú			*!		*	*
mik'uɬaću				**!	*	*
mik'ulaću				**!*	*	*
☞ mik'ulać̆i				*	*	*

Even when M-stems of this class are followed by a suffix, a H must be assigned to the penultimate syllable of the M-stem due to the conspiracy of the constraints M-stemH, Nonfinality and AlignR. If a H is assigned to the TBU which is outside of the domain of an M-stem as in *hanəl-ʧəɬəm 'like the sky', then the form will violate the constraint M-stemH, and therefore it will be ruled out.

(3.28)

məɬi-ʧələm	*məli-ʧəɬəm	'like thehead'
apuć̓-ʧələm	*apuc̓-ʧəɬəm	'like a father'
mik̓ uɬaći-ʧələm	*mik̓ uɬaci-ʧəɬəm	'like a mudfish'

It should be also noted that a H always falls on the penultimate syllable of an M-stem regardless of the number of following suffixes, as indicated in (3.29):

(3.29)

məɬi-ʧələm-man-to	'head + like + even + too'
apuć̓-ʧələm-man-to	'father + like + even + too'
mik̓ uɬaći-ʧələm-man-to	'mudfish + like + even + too'

Evaluation of relevant candidates is given in Tableau 3.2. Constraints which are not crucial in the evaluation of candidates are omitted. The first candidate, which has no H, is ruled out by its violation of M-stemH. The second candidate, where a H is not parsed to any TBU, is eliminated by its violation of the constraint ParseH. The third and fourth candidates, where a H is parsed to a TBU which is outside of the domain of an M-stem, is eliminated by the constraint M-stemH. The fifth candidate, where a H is parsed to the final syllable of an M-stem, is filtered out by its violation of Nonfinality. The last candidate, where a H falls on the penultimate syllable of the M-stem, is selected as optimal.

Tableau 3.2
Input: /məli-cʰələm/ ‘like the head’

Candidates ˇ	M-stemH	ParseH	Nonfinality	AlignR
məli-cʰələm	*!			
məli-ʧʰələm H		*!		
məli-ʧʰələ́m	*!		*	
məli-ʧʰəlam	*!			*
məlí-ʧʰələm			*!	
☞ məli-ʧʰələm				*

ˇ

The suffixes in (3.28) and (3.29) begin with a consonant. Even when an M-stem of this class is followed by a vowel-initial suffix, the default tone will be correctly assigned to the penultimate syllable of an M-stem by the same constraints. When stems with final closed syllables are followed by a vowel-initial suffix, resyllabification occurs across the M-stem boundary, as in *haˊnə.le*, derived from /hanəl-e/ 'on the sky'. Since the syllable built across the M-stem boundary is incorporated into the domain of a P-stem, a mismatch occurs between the right edges of an M-stem and a P-stem, as shown in *haˊnə.l#eÕ*, where the symbols # and Õ mark the right edges of an M-stem and a P-stem, respectively. If a default H is assigned to the final syllable of a P-stem as in **ha.nə.l#eÕ*, this form is ruled out by its violation of the constraints M-stemH and Nonfinality. If a default H is assigned to the final syllable of an M-stem as in **ha.nəˊl#eÕ*, this form is also eliminated by its violation of the constraint Nonfinality. Therefore, the optimal form *haˊnə.l#eÕ* is selected by the same principles discussed above.

Tableau 3.3
Input: /ha.nəl#-e/ ‘like the head’

Candidates	M-stemH	Nonfinality	AlignR
ha.nə.l#eÕ	*!	*	
ha.nəˊl#eÕ		*!	
☞ haˊnə.l#eÕ			*

The constraints that have been discussed so far are not able to handle stems with final heavy syllables. For instance, they do not provide a means of choosing the optimal form *maŋneéˑ* To account for the correct realization of the form *maŋneéˑ,* I propose that

there is a constraint Weight-to-Tone Principle (WTP) which requires a heavy syllable to be aligned with a H.[12] This constraint outranks the constraint Nonfinality, and thus a violation of Nonfinality is compelled in the optimal form *maŋneé.́* The form **maŋnee*, where a heavy syllable is not aligned with a H, is eliminated by its violation of the constraint WTP. This constraint requires at least one edge of a heavy syllable to be aligned with a H.

(3.30) Weight-to-Tone Principle (WTP)
Align a heavy syllable with a H.

(3.31) Weight-to-Tone Principle (WTP) >> Nonfinality

The connection between tone and heavy syllables is expressed by the constraint WTP. Goldsmith (1978, 1992) notes that heavy syllables tend to be H-toned and H-toned syllables tend to be heavy in Kintandu and KiYaka (two related languages of the KiKongo Group) and Llogoori.

A heavy syllable tends to be shortened on the surface when it does not have a H on the surface. Therefore, we need to consider another candidate **maŋne*<*e*> where a final heavy syllable is shortened on the surface. The notation <*e*> means that the mora which exists in UR is deleted. The final heavy syllable in UR is no longer heavy in the candidate **maŋne*<*e*>. Therefore, this candidate satisfies the constraint WTP. However, in CT, deletion of any underlying segment is prohibited by the family of MAX constraints. Deletion of any underlying mora (μ) will be prohibited due to the constraint MAX (μ). This constraint outranks the constraint Nonfinality, and therefore a violation of Nonfinality is compelled. This ranking explains why the form **maŋne*<*e*> (which

---

[12] Recognizing a connection between stress and heavy syllables, Prince & Smolensky (1993:53) propose the constraint Weight-to-Stress Principle. The constraint in (3.31) is a revised version of this constraint.

Weight-to-Stress Principle
Heavy syllables are prominent in foot structure and on the grid.

violates MAX (μ)) is less harmonious than *maŋneé´* (which satisfies MAX (μ) but violates Nonfinality).

(3.32) MAX (μ)
Every mora (μ) in the input has a correspondent in the output.

(3.33) MAX (μ) >> Nonfinality

Evaluation of relevant candidates is given in Tableau 3.4. Constraints which are not crucial in the evaluation of candidates are omitted. The first two candidates are ruled out because they violate constraints that the optimal candidate *maŋneé´* satisfies. The first candidate **maŋ́nee,* where a heavy syllable remains toneless, is ruled out by its violation of the constraint WTP. The second candidate *maŋ́ne<e>,* where the final mora is deleted, is eliminated by its violation of MAX (μ). The last candidate *maŋneé,´* where a H is parsed to the final heavy syllable, is selected as optimal. A violation of the constraint Nonfinality is compelled by WTP and MAX(μ).

Tableau 3.4
Input: /maŋnee/ 'the last child'

Candidates	WTP	MAX(μ)	Nonfinality	AlignR
maŋ́nee	*!			*
maŋ́ne<e>		*!		*
☞ maŋneé´			*!	

Even when stems of this class are followed by suffixes, a H must be assigned to the final heavy syllable of an M-stem as shown in (3.34). It should be noted that a H always falls within the M-stem regardless of the number of following suffixes as shown in *maŋneé-́cʰələm-man-to* 'the last child + like + even + too'.
ˇ

(3.34) *maŋneé-́cʰələm* 'like the last child'
maŋneé-́cʰələm-man-to 'the last child + like + even + too'
ˇ

The tone pattern in (3.34) is explained by the same constraints discussed above. As shown in Tableau 3.5, if a H is assigned to the following suffix as in the first candidate *maŋnee-cʰəɬəm 'like the last child', then this candidate is ruled out by its violation of the constraint M-stemH as well as WTP. If a H is assigned to the following suffix and a heavy syllable is shortened as in the second candidate *maŋne<e>-cʰəɬəm 'like the last child', then this candidate is eliminated by its violation of the constraint M-stemH as well as MAX (μ). The last candidate, where a H is parsed to the stem-final heavy syllable, is selected as optimal.

Tableau 3.5
Input: /maŋnee-cʰələm/ 'like the last child'

Candidates	M-stemH	WTP	MAX(μ)	Nonfinality	AlignR
maŋnee-cʰəɬəm	*!	*			*
maŋne<e>-cʰəɬəm	*!		*		*
☞ maŋneé-cʰəɬəm				*!	

In Chapter 8, it will be shown that a root-final heavy syllable is shortened in verbs when it is followed by a vowel-initial suffix. However, this shortening does not occur in nouns, as shown in *apəə́m-i* 'father + Subject Marker'. Thus, a default H will be assigned to an M-stem-final heavy syllable even when the stem *apəə́m* 'father' is followed by a vowel-initial suffix. The tone pattern in *apəə́m-i* is explained by the principles discussed above.

There are suffixes which contain a heavy syllable, as in *potaa* 'than' and *t'emee* 'because of'. These suffixes show an alternation between long and short vowels according to the surface tone. When they have a H on the surface, they are long as shown in (3.35a). The tone pattern in (3.35a) will be discussed in the following section. However, they are shortened when they do not have a H on the surface as shown in (3.35b).

(3.35) a. *satali-potaá´* 'than a ladder'
satali-t'emeé´ 'because of a ladder'

b. *apuć́i-pota* 'than a father'
apuć́i-t'eme 'because of a father'

Not all H-toned vowels are long on the surface, as shown in *satali´*'ladder', *kaḿani* 'rice sack', and *apuć́i* 'father'. Thus, it is not possible to assume that the vowels which show an alternation between long and short vowels are short in UR and that they are lengthened when they have a H on the surface. Therefore, it is assumed that the vowels which show an alternation between long and short vowels are long in UR. They are shortened when they do not have a H on the surface.

The tone pattern in (3.35b) shows that the constraints M-stemH and WTP outrank MAX (μ):

(3.36) M-stemH, WTP >> MAX (μ)

If the outputs have a H on the word-final heavy syllable, as in **apuć́i-potaá´* and **apuć́i-t'emeé´*, they incur a violation of M-stemH. Since the forms **apuć́i-potaá´* and **apuć́i-t'emeé´* (which violate M-stemH) are less harmonious than the forms *apuć́i-pota*<*a*> and *apuć́i-t'eme*<*e*> (which violate MAX (μ)), these forms show that the constraint M-stemH outranks MAX (μ). A violation of MAX (μ) is compelled by M-stemH.

On the other hand, if the suffix-final heavy syllable surfaces as a toneless heavy syllable as in **apuć́i-potaa*, it will satisfy MAX (μ), incurring a violation of WTP. Since the form *apuć́i-pota*<*a*> is preferred over the form **apuć́i-potaa*, this fact shows that the constraint WTP outranks MAX (μ). A violation of MAX (μ) is compelled by WTP.

In Tableau 3.6, the first candidate, where a H is parsed to the word-final heavy syllable, is ruled out by its violation of the constraint M-stemH. The second candidate,

which contains a toneless heavy syllable, fatally violates WTP. The last candidate, where a H is parsed to the penultimate syllable of an M-stem and a toneless heavy syllable is shortened, is selected as optimal. A violation of MAX (μ) is compelled by M-stemH and WTP.

Tableau 3.6:
Input: /apuci-potaa/ 'like the last child'

Candidates ˇ	M-stemH	WTP	MAX (μ)
apuci-potaá´	*!*		
apučˇi-potaa		*!	
☞ apučˇi-pota<a>			*

When stems containing a heavy syllable are followed by suffixes like *potaa* 'than' and *t'emee* 'because of' (which have a heavy syllable), a H falls on the M-stem-final heavy syllable. The word-final heavy syllables are toneless on the surface and therefore they are shortened on the surface, as shown in (3.37):

(3.37) *maŋneé-́pota<a>* 'than the last child'
maŋneé-́t'eme<e> 'than the last child'

This tone pattern is also predicted by the ranking in (3.36). In Tableau 3.7, the first candidate, where a H is parsed to the word-final heavy syllable, is ruled out by its violation of the constraint M-stemH. The second candidate, which contains a toneless heavy syllable, is eliminated by its violation of WTP. The last candidate, where a H is parsed to the final heavy syllable syllable of an M-stem and a toneless word-final heavy syllable is shortened, is selected as optimal. A violation of MAX (μ) is compelled by M-stemH and WTP.

Tableau 3.7
Input: /maŋnee-potaa/ 'like the last child'

Candidates	M-stemH	WTP	MAX (μ)
maŋne<e>-potaá´	*!*		*
maŋneé-́potaa		*!	
☞ maŋneé-́pota<a>			*

One could wonder why the output cannot have more than one H, as in **maŋneé-potaá.́* In Chapters 5 and 6, it will be shown that a prosodic phrase can have only one H due to the Obligatory Contour Principle (OCP) which prohibits a prosodic phrase from having more than one H. This constraint is inviolable in NK Korean. If a word is used in isolation, the word itself forms a prosodic phrase. Hence, the output **maŋneé-potaá*́ is eliminated by the constraint OCP.

To sum up, tones in stems of this class are explained by the constraints and their ranking in (3.38):

(3.38) M-stemH >> DEP (H) in (3.15)
ParseH >> DEP (Assoc) in (3.22)
Nonfinality >> AlignR in (3.27)
Weight-to-Tone Principle (WTP) >> Nonfinality in (3.31)
MAX (μ) >> Nonfinality in (3.33)
M-stemH, WTP >> MAX (μ) in (3.36)

Stems of this class are the most 'productive' in the sense that this class comprises the largest group of words in NK Korean. Typical examples are given in (3.39):

(3.39) Stems of the Default H Class

a. Disyllabic

aɬəl̀	'son'	*epi*	'father (informal)'
caɬi	'seat'	*ceŋ́ki*	'plow'
ʿciɬəm	'oil'	*ʿciḿcʰi*	'Kimchee'
ʿcoŋ́i	'paper'	*ʿcʰuéa*	'walnut'
ʰhańəl	'sky'	*ʰhiŋ́a*	'elder brother'
hoḿi	'hoe'	*həɬi*	'loin'
ikʾi	'moss'	*iɬəm*	'name'
iḿo	'mother's sister'	*kaći*	'kind/sort'
kaksi	'bride'	*kaḿe*	'pot'
kaẃi	'scissors'	*kəẃi*	'goose'
koki/keki	'fish/meat'	*koɬi*	'ring'
koḿo	'father's sister'	*kʾaśi*	'thorn'
kʾoɬi	'tail'	*koke*	'ridge'

kuksi	‘noodle’	*kuli*	‘copper’
kəpʰum	‘foam’	*kəpuk*	‘turtle’
mańəl	‘garlic’	*mańtʰe*	‘net bag’
miýək	‘sea weed’	*mole*	‘sand’
mule	‘cucumber’	*məli*	‘head’
nalak	‘grain’	*napi*	‘butterfly’
napal	‘bugle’	*nole*	‘song’
nuńa/nuýa	‘elder sister’	*pańku*	‘rock’
peluk	‘flea’	*panəl*	‘needle’
p’uli	‘root’	*pəśət*	‘mushroom’
sek’i	‘cub’	*səli*	‘frost’
soli	‘sound’	*teku*	‘Taegu (city name)’
toḿa	‘cutting board’	*ək’e*	‘shoulder’
ələm	‘ice’	*əće*	‘yesterday’
uli	‘barn’	*yələm*	‘summer’
yəńki	‘smoke’		

b. Disyllabic with a Final Heavy Syllable

apəə́m	‘father’	*əməə́m*	‘mother’
halməə́m	‘grandmother’	*halpəə́m*	‘grandfather’
maŋneé´	‘the last child’		

c. Trisyllabic

apući	‘father’	*akali*	‘mouth (pejorative)’
akaśi	‘lady’	*camcali*	‘dragon fly’
c’aŋpeki	‘summit’	*čeleki*	‘kind of food’
čumuí	‘pocket’	*čəpsiki*	‘dish’
halmańku	‘old woman’	*halmuí*	‘grandmother’
halpući	‘grandfather’	*haŋali*	‘jar’
ipʰali˘	‘leaf’	*kaləḿe*	‘parting one’s hair’
kalkoli	‘hook’	*kaŋaći*	‘puppy’
kaŋcili	‘bamboo basket’	*kasike*	‘scissors’
kicəki	‘diaper’	*k’amaku*	‘raven’
k˘atʰuli	‘female pheasant’	*k’ek’oli*	‘lark’
k’ekuli	‘frog’	*k’əpteki*	‘cover’
k’oceńi	‘stick’	*k’otʰuli*	‘clue’
kultúma	‘cart’	*met’uki*	‘grasshopper’
maŋaći	‘pony’	*minali*	‘dropwort’
melućʰi	‘anchovy’	*mecʰuli*	‘quail’
moŋtuli	‘stick/club’	*muŋtʰiki*	‘bunch/lump’
muteki	‘heap/mound’	*nəkuli*	‘raccoon’
nuluńci	‘scorched rice’	*nutəki*	‘ragged clothes’
pakaći	‘dipper’	*olcʰeńi*	‘tadpole’
oleńi˘	‘thread’	*olkaḿi*	‘trap’
pic’ali	‘broomstick’	*pot’ali*	‘package’
pəpəli	‘mute’	*pituĺki/p’ituĺki*	‘dove’

p'ənt̪iki	'pupa'	*puəńji*	'owl'
p'ək'uki	'cuckoo'	*p'ikaɬi*	'chick'
pocaki	'wrapping cloth'	*samaku*	'mole'
sapaɬi	'bowl'	*sikaɬi*	'lice egg'
sileki	'trash'	*sokʰuɬi*	'bamboo basket'
soneki	'shower'	*soŋaći*	'calf'
sucepi	'soup with tough flakes'	*talpʰeńji*	'snail'
taŋnaku	'donkey'	*teciṕi*	'plate'
talek'i	'creel'	*taɬkući*	'oxcart'
tekaɬi	'head (pejorative)'	*tok'epi*	'goblin'
tolaći	'bell flower'	*tulumi*	'crane'
tuk'əṕi	'toad'	*əmuí*	'mother'
ukəći	'dried cabbage'	*moŋtińji*	'stick/bar'

d. Quadrisyllabic

acileńji	'heat haze'	*acuk'aɬi*	'castor-bean'
acumuí	'aunt'	*acupańim*	'elder brother-in-law'
ancənpeńji	'cripple'	*hepalaki*	'sunflower'
isusike	'tooth-picker'	*kananpeńji*	'poor person'
k'ak'əleki	'awn/glume'	*kosəmtoćʰi*	'porcupine'
ketəleńji	'armpit'	*kotəlp'eki*	'kind of vegetible'
mentəlami	'cockscomb'	*malt'oŋkuɬi*	'buzzard'
mik'ulaći	'mudfish'	*məŋtʰəŋkuɬi*	'fool'
noləmceńji	'gambler'	*nəŋmacuí*	'ragpicker'
pʰallaŋkepi	'pinwheel'	*satʰakuńi*	'groin'
t'akt'akuɬi	'woodpecker'	*sumpak'okcil*	'hide-and-seek'
tulumeki	'scroll'	*yəŋkamceńji*	'old man'

3.3.2 Prelinked H Class

This thesis argues that the stems in (3.40) have a H underlyingly prelinked with a particular syllable. This H will be referred to as a 'prelinked' H, and the syllable to which a H is underlyingly associated will be referred to as a 'H-sponsor'. Following Inkelas 1995:290, full specification is required for predictable though nonalternating structure. Syllable structure is predictable, but it is in general nonalternating. Therefore, syllable structure is assumed to exist in UR.[13] The H-sponsor is the initial syllable of the stems in

[13] One could wonder why a default H is assumed not to exist in UR. The default H, discussed in section 3.3.1, is predictable but alternating. In Chapter 4, it will be shown that the position of a default H varies when the verbal roots of this class are followed by a derivational suffix, which is heavy. In Chapter 5, it

(3.40a), while it is the final syllable of the stems in (3.40b). The underlying H-sponsors are underlined in this thesis. Note that this class is the least productive in the sense that it comprises the smallest number of words in NK Korean.[14]

(3.40)	a.	*kámani*	'straw rice-bag'	*kámucʰi*	'mullet'
		kápuli	'stingray'	*ménɯli*	'daughter-in-law'
	b.	*ciṕ*	'house'	*kʰoŋ́*	'bean'
		ʻk'of	'flower'	*k'oŋ́*	'pheasant'
		acʰiḿ	'morning/breakfast'	*cituŋ́*	'pole'
		cɯmək	'fist'	*ʻkacuk*	'leather'
		ʻcintalle´	'azalea'	*mintəlle´*	'dandelion'
		ʻk'ucilaḿ	'scolding'	*pusələḿ*	'abscess'

The trisyllabic stems in (3.40a) always exhibit H's on the stem-initial syllable, as in *kámani* 'straw rice-bag', *kámani-meŋkulo* 'like a straw rice bag', and *kámani-meŋkulo-man-to* 'a straw rice bag + like + even + too'. A H is required to be aligned with its sponsor by the constraint AlignH-to-Sponsor (AlignHS). This constraint penalizes shifting of a H to another TBU.

(3.41) AlignH-to-Sponsor (AlignHS)[15]
Align (H, Edge: Sponsor, Edge) (where Edge = {Left, Right}

The above tone pattern is explained if we assume that the constraint AlignHS outranks AlignR. Hence, a violation of AlignR is compelled by AlignHS.

---

will be shown that every prosodic phrase (P-phrase) can have only one H. Therefore, roots of the Default H class surfaces toneless in certain contexts, while surface with H's in the other context.

14 Trisyllabic stems containing H-tones on the initial or on the final light syllables are very rare. Less than 10 words are collected for each of the two subgroups of trisyllabic stems by the three previous studies by G.-R. Kim 1988, Y.-H. Chung 1991a, and N.-J. Kim 1991.

15 This constraint is an abbreviation of two constraints. In other words, this constraint can be factorized into two constraints, that is, Align (H, l; Sponsor, l) and Align (H, r; Sponsor, r). These two constraints require the left and right edges of a H to be aligned with the corresponding edge of a sponsor. This alternative solution is also viable. Since factorizing AlignHS into two does not affect the rest of my discussion, I will use the constraint in (3.41).

(3.42) AlignHS >> AlignR

In Tableau 3.8 below, the first two candidates, where a H shifts rightward, are ruled out because they violate a higher ranked constraint AlignHS that the optimal output *ka̱ḿani* satisfies. The last candidate, where a H stays on its sponsor, is selected as optimal although it violates AlignR twice.

Tableau 3.8
Input: /ka̱ḿani/ 'straw rice-bag'

	AlignHS	Nonfinality	AlignR
ka̱mań́i	*!		*
ka̱maní	*!	*	
☞ ka̱ḿani			**

Even when the stem *ka̱ḿani* is followed by a suffix, a prelinked H on the initial syllable surfaces on its sponsor. In Tableau 3.9 below, the first five candidates, where a H shifts rightward, are eliminated by their violation of AlignHS. The last candidate, where a H stays on its sponsor, is selected as optimal although it violates AlignR twice.

Tableau 3.9
Input: /ka̱ḿani-meŋkulo/ 'like a straw rice-bag'

	AlignHS	Nonfinality	AlignR
ka̱mań́i-meŋkulo	*!		*
ka̱maní-meŋkulo	*!	*	
ka̱mani-meŋ́kulo	*!		**
ka̱mani-meŋkuɭo	*!		*
ka̱mani-meŋkuló	*!	*	
☞ ka̱ḿani-meŋkulo			**

When the stems in (3.40b) are followed by a suffix which is longer than monosyllabic, they exhibit 'tone shift' in that the tone surfaces to the right of its underlying sponsor, as indicated in (3.43a–b).

(3.43) a. *ci̱p-cʰəɭəm* 'like a house'
n̄amu̱-cʰəɭəm 'like a tree'
satali̱-cʰəɭəm 'like a ladder'
b. *ci̱p-meŋkuɭo* 'like a house'
n̄amu̱-meŋkuɭo 'like a tree'
satali̱-meŋkuɭo 'like a ladder'

First, the conditions under which a H can shift should be clarified. As already shown in (3.40a) above, a H whose sponsor is not a final syllable does not undergo a tone shift. Thus, only the H whose sponsor is a final syllable shows a tone shift. All the syllables that sponsor H's in UR are light.[16] Therefore, the generalization is that only the H prelinked with the stem-final syllable undergoes a tone shift. This is explained by the assumption that the constraint Nonfinality outranks AlignHS. A violation of AlignHS is compelled by Nonfinality.

(3.44) Nonfinality >> AlignHS

Second, the docking place of this tone shift must be determined. As indicated in (3.43) above, a H falls on the penultimate syllable of a word when the final syllable is light. However, as shown in (3.45) below, a H falls on the final syllable of a word when it is heavy.

(3.45) a.	*cip-potaá´*	‘ than a house’
	ɲamu̲-potaá´	‘than a tree’
	satali̲-potaá´	‘than a ladder’
b.	*cip-t’emeé´*	‘because of a house’
	ɲamu̲-t’emeé´	‘because of a tree’
	satali̲-t’emeé´	‘because of a ladder’

The above two docking places are determined by the conspiracy of the constraints AlignR, Weight-to-Tone Principle (WTP), MAX (μ) and Nonfinality, discussed in section 3.3.1. These four constraints are ranked as in (3.46). Since the constraint Nonfinality is outranked by Weight-to-Tone Principle (WTP) and MAX (μ), a H surfaces on the word-final syllable when the final syllable is heavy as in (3.45). A violation of

16 Following Y.-H. Chung 1991a, long vowels always occur at the edges of the stem. All the stems whose final syllables are heavy belong to the Default H-tone Class. In addition, all the stems whose initial syllables are heavy belong to the Unsponsored H-tone Class, which will be discussed in section 3.3.3. Therefore, all the vowels that sponsor H-tones in the UR are short.

Nonfinality is compelled. Since the constraint AlignR is dominated by Nonfinality, a H surfaces on the penultimate syllable of a word when a word-final syllable is not heavy as in (3.43). A violation of AlignR is compelled by Nonfinality.

(3.46) Weight-to-Tone Principle (WTP), MAX (μ) >> Nonfinality >> AlignR

Third, it should be explained why the final H shifts rightward, rather than leftward. Note that the forms in (3.47), where a H shifts leftward, also satisfy all the constraints that the real optimal forms in (3.43) satisfy.

(3.47) a. *naḿu̲-cʰələm ‘like a tree’
*sataɬi̲-cʰələm ‘like a ladder’

b. *naḿu̲-meŋkulo ‘like a tree’
*sataɬi̲-meŋkulo ‘like a ladder’

It is argued that there is a constraint *Pre-sponsorH (*PSH), which prohibits a H-toned TBU from preceding an underlying H-sponsor. Due to this constraint, a H cannot shift leftward.

(3.48) *Pre-sponsorH (*PSH)
A H-toned TBU must not precede an underlying H-sponsor within a word.

There is evidence that the constraints *PSH, M-stemH, and ParseH outrank Nonfinality. Even when the stems in (3.40b) are used in isolation, a H does not shift leftward as shown in (3.49a). A H cannot shift leftward due to the constraint *PSH. A H cannot be unparsed or deleted due to the constraints ParseH and M-stemH.

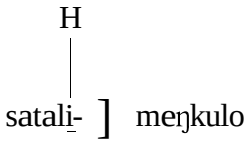
(3.49) namu̲´ *naḿu̲ ‘than a tree’
satali̲´ *sataɬi̲ *safali̲ ‘than a ladder’

The correct surface forms in (3.49) violate Nonfinality, and it is argued that a violation of Nonfinality is compelled by the constraint *PSH, M-stemH, and ParseH.

(3.50) *Pre-sponsorH (*PSH), M-stemH, ParseH >> Nonfinality

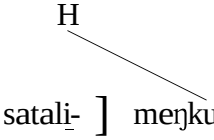
The optimal forms in (3.43) and (3.45) might appear that they violate the constraint M-stemH because the underlying H surfaces on a TBU which is outside of the domain of an M-stem. Although the prelinked H shifts rightward, it is assumed to stay within the domain of an M-stem where it underlyingly belongs, as shown in (3.51b).

(3.51) a. Input



'like a ladder'

b. Output



(where] = M-stem boundary)

Following McCarthy & Prince 1993a:20, one of the principles that underlie the theory of Gen is the Consistency of Exponence, which states that 'no changes in the exponence of a phonologically-specified morpheme are permitted'. The prelinked H is specified for a given M-stem. Hence, the prelinked H stays within the domain of an M-stem even though it shifts rightward.

In section 3.3.1, it was argued that a default H must stay within the domain of an M-stem due to the constraint M-stemH. Hence, the following forms where a H surfaces on a TBU which is outside of an M-stem are not optimal. Note that only the H that exists in UR is subject to the principle Consistency of Exponence. The default H which is created in Gen is not subject to the principle, and therefore it is not possible to assume an analogous representation as in (3.51b) for a default H. This is the reason why the forms in (3.52) are ruled out by the constraint M-stemH.

(3.52) *apuci-meŋkulo 'like a father'
*apuci-t'emeé 'because of a father'

To sum up, a H on the M-stem-final light syllable shifts rightward, and it docks on a predictable syllable in a predictable way due to the conspiracy of the following constraints:

(3.53) a. Nonfinality >> AlignHS in (3.44)
b. WTP, MAX (μ) >> Nonfinality >> AlignR in (3.46)
c. *PSH, M-stemH, ParseH >> Nonfinality in (3.50)

If the following suffix does not contain a heavy syllable, as in *satalḭ-meŋkuɭo* 'like a ladder', a H will be aligned with the penultimate syllable of a word by the conspiracy of the above constraints. The first candidate, where a H shifts leftward, is ruled out by its violation of the constraint *PSH. The second candidate, where a H stays on its underlying sponsor, is eliminated by its violation of Nonfinality. The third candidate, where a H shifts to the word-final syllable, is also ruled out by its violation of Nonfinality. The fourth candidate, where a H occurs on the antepenultimate syllable of a word, is eliminated by its second violation of AlignR. The fifth candidate, where a H occurs on the penultimate syllable of a word, is selected as optimal, although it violates AlignHS and AlignR. Violations of these constraints are compelled by Nonfinality and *PSH.

Tableau 3.10
Input: /satalḭ́-meŋkulo/ 'like a ladder'

	*PSH	Nonfinality	AlignHS	AlignR
sataɭḭ-meŋkulo	*!		*	*
satalḭ́-meŋkulo		*!		
satalḭ-meŋkulo´		*!	*	
satalḭ-meńkulo			*	**!
☞ satalḭ-meŋkuɭo			*	*

If the following suffix contains a heavy syllable word-finally, a H falls on that heavy syllable because of the conspiracy of the constraints discussed above. In Tableau 3.11. The first candidate, where a H shifts leftward, is eliminated by the constraint *PSH.

The first candidate, where a H stays on its sponsor and a word-final heavy syllable surfaces as toneless, is ruled out by its violation of the constraint WTP. The third candidate, a H stays on its sponsor and a word-final heavy syllable is shortened, is filtered out by the constraint MAX (μ). The fourth candidate, where a H surfaces on the penultimate syllable of a word and a final heavy syllable remains toneless, is ruled out by WTP. The fifth one, where a H surfaces on the penultimate syllable of a word and the final heavy syllable is shortened, is ruled out by MAX (μ). The last candidate, where a H falls on the word-final heavy syllable, is selected as optimal although it violates Nonfinality and AlignHS. A violation of these constraints are compelled by *PSH, WTP and MAX (μ).

Tableau 3.11
Input: /satalí-potaa/ 'than a ladder'

	*PSH	WTP	MAX (μ)	Nonfinality	AlignHS	AlignR
satalı̄-pota<a>	*!		*		*	*
satalí-potaa		*!		*		
satalí-pota<a>			*!	*		
satali-poɗaa		*!			*	*
satali-poɗa<a>			*!		*	*
☞ satali-potaá´				*	*	

The stems, where the H's are prelinked with the final syllables, exhibit H's on the final syllables when they are used in isolation, as in *cı̄́p* 'house', *namú´*'tree' and *satali´* 'ladder'. This tone pattern is also explained by the ranking in (3.50).

In Tableau 3.12 below, the first candidate, where a H is deleted, is eliminated by the constraint M-stemH. The second candidate, where a H is not parsed to any TBU, is ruled out by the constraint ParseH. The third and fourth candidates, where a H shifts leftward, are ruled out by the constraint *PSH. The last candidate, where a H stays on its sponsor, is selected as optimal although it violates the constraint Nonfinality. A violation of Nonfinality is compelled.

Tableau 3.12
Input: /satali/ ‘ladder’

	M-stemH	ParseH	*PSH	Nonfinality
satali	*!			
satali H		*!		
sataɬi			*!	
saʈali			*!	
☞ satali´				*

When the following suffix is monomoraic, a H prelinked with the stem-final syllable stays on its sponsor, as indicated in (3.54).

(3.54) *ciṕ-təl* ~ **cip-təɬ* ‘house + Plural marker’
ɲamú-ka ~ **ɲamu-ka´* ‘tree + Subject marker’
satalí-ka ~ **satali-ka´* ‘ladder + Subject marker’

Due to the ranking *Pre-sponsorH (*PSH) >> Nonfinality, a H cannot shift leftward. Even if the H on the M-stem-final syllable were to shift to the word-final syllable, the resulting tone pattern would incur a violation of Nonfinality. In other words, a violation of Nonfinality is unavoidable. Therefore, the H will stay on its sponsor due to the lower ranked constraints AlignHS.

In Tableau 3.13, the first candidate, where a H shifts leftward, violates the constraint *PSH, and thus it is ruled out. The next two candidates are evaluated as equivalent by the constraint Nonfinality. However, the second candidate is ruled out by AlignHS. The last candidate is selected as optimal although it violates the constraint Nonfinality. A violation of Nonfinality is unavoidable.

Tableau 3.13
Input: /kací-ka/ ‘eggplant + Subject Marker’

ˇ	*PSH	Nonfinality	AlignHS
kaći-ka	*!		*
kacı-ka´		*	*!
☞ kačí-ka		*	

ˇ

There is evidence that the morpheme where the H docks must be domain-adjacent to an M-stem. Note that the real surface forms in (3.55) violate the constraint Nonfinality, whereas the ungrammatical forms in (3.55) satisfy it.

(3.55) *ci̱ṕ-təl-meŋkulo* ~ **ci̱p-təl-meŋkuɭo* 'house + Plural + like'
ɲamú̱-təl-meŋkulo ~˘ **ɲamu̱-təl-meŋkuɭo* 'tree + Plural + like'
satalí̱-təl-meŋkulo ~ **satali̱-təl-meŋkuɭo* 'ladder + Plural + like'

The constraints and their ranking that we have discussed so far will incorrectly choose the form **ci̱p-təl-meŋkuɭo*, as shown in Tableau 3.14. The first two candidates are eliminated by Nonfinality. The last candidate, where a H surfaces on the penultimate syllable of a word, satisfies Nonfinality, and thus this form will be incorrectly selected as optimal.

Tableau 3.14
Input: /ci̱ṕ-təl-meŋkulo/ 'house + Plural + like'

˘	Nonfinality	AlignHS	AlignR
✌ ci̱ṕ-təl-meŋkulo	*!		
čip-təl-meŋkulo	*!	*	
☛ čip-təl-meŋkuɭo		*	*

The tone shift illustrated above shows two properties. First, a H may shift to a non-adjacent syllable, as in *ci̱p-meŋkuɭo* 'like a house', as well as to an adjacent syllable, as in *ci̱p-cʰəɭəm* 'like a house'. This type of shift differs from the 'local' tone shift by which a H can shift only to an adjacent TBU, as in Tonga, a major language of Zambia (Goldsmith 1984) and Jita (Downing 1990a). For instance, the second H shifts only to the following syllable in Tonga, as shown in (3.56). The recent past marker *-a´* and the accusative 3rd person plural marker *ba´* have a H in UR, whereas the nominative first person singular marker *ndi-*, the verbal roots *laŋ-* 'to look at' and *tobel-* 'to follow', and the final vowel *-a* are toneless in UR.

(3.56)

UR's	—>	SR's	'gloss'
ndi-a-ba-laŋ-a	—>	*ndi-a-ba-laɲ-a*	'I + recent past + look at + Final Vowel' "I looked at them"
ndi-a-ba-tobel-a	—>	*ndi-a-ba-toɓel-a*	'I + recent past + follow + Final Vowel' "I followed them"[17]

Second, the tone shift in NK Korean is bound in the sense that underlying and surface locations must be domain-adjacent to each other. This type of bounded shift differs from unbounded shift by which a H can go as far as the domain extends, as in Digo (Kisseberth 1984) and Nguni languages (Downing 1990b). For instance, the third H (H_3) associated with the root-initial vowel in UR shifts to the ultimate vowel in Digo, as shown in (3.57a). This tone shift is basically the same as that in NK Korean in the sense that a H docks on the following morpheme. However, unlike NK Korean, a H can shift across a word boundary as well as several intervening morphemes in Digo, as shown in (3.57b). In (3.57b), the H associated with the 3rd person singular marker *a* docks on the ultimate vowel of the object noun. In (3.57), such irrelevant phenomena as the realization of a boundary L-tone, vowel elision, etc. are ignored. The symbol '$' represents an utterance boundary.

(3.57) a.

UR	—>	Intermediate Form
L $H_1H_2H_3$ L		L H_1 H_2 H_3 L
| | |	—>	| | |
$n(i)-a-kumbukir-a$		$n(i)-a-kumbukir-a$

'I + past tense + remember + Final Vowel'
"I rembered"

b.

UR	—>	Intermediate Form
LH_1 L		L H_1L
|	—>	|
$a-na-henz-a mu-gaŋa$		$a-na-henz-a mu-gaŋa$

"He + present tense + to look for + doctor"
"He is looking for a doctor"

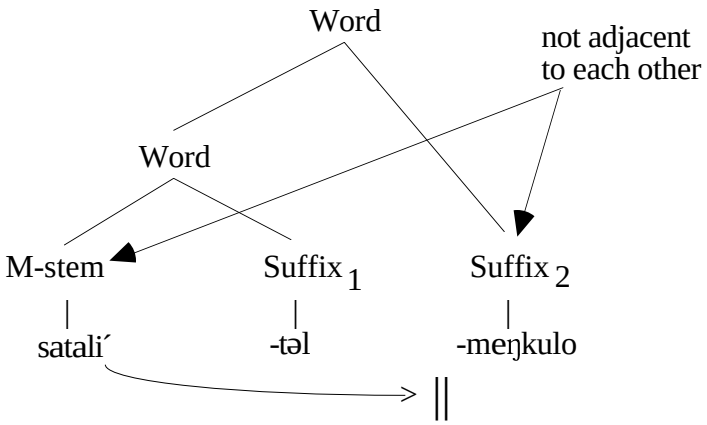
[17] The meaning of the verbal root *tobel-* 'to follow' is given in Meeussen 1963:72.

The tone shift in NK Korean can be handled by the constraint Bounding which prohibits a H from shifting beyond the adjacent domain.

(3.58) Bounding
Underlying and surface locations of H must be domain-adjacent to each other (where domain = Root, M-stem, P-stem, or Word)

Due to this constraint, a prelinked H cannot shift beyond the domain that immediately follows the domain of an M-stem, as shown in (3.59). This constraint outranks Nonfinality, and thus a violation of Nonfinality is compelled.

(3.59)



(3.60) Bounding >> Nonfinality

The tone pattern in (3.57) is handled by this constraint. In Tableau 3.15, the first two candidates are evaluated as equivalent by the constraint Nonfinality. However, the first one is preferred over the second due to the constraint AlignHS. The third candidate, where a H shifts to a non-adjacent morpheme, violates Bounding, and thus it is filtered out.

Tableau 3.15
Input: /ci̱ṕ-təl-meŋkulo/ ‘house + Plural + like’

ˇ	Bounding	Nonfinality	AlignHS	AlignR
☞ ci̱ṕ-təl-meŋkulo		*		
ci̱p-təl-meŋkulo		*	*!	
ci̱p-təl-meŋkulo	*!		*	*

ˇ

The words in (3.61) appear to be counterexamples to tone shift. A H stays on its sponsor even though it is followed by suffixes.

(3.61) *satalḭ́-e-to* 'even on the ladder'
satalḭ́-e-man 'only on the ladder'
satalḭ́-e-k'e 'to the ladder'
satalḭ́-e-sə 'from the ladder'
satalḭ́-e-k'aci 'up to the ladder'
satalḭ́-lo-sə˘ 'as a ladder'

The above words are not real counterexamples. As discussed in Chapter 2, nominal suffixes in (3.61) are dimorphemic, i.e., they are combinations of two morphemes. Justification of this assumption is that each of these morphemes can be used separately. Hence, the suffixes in (3.61) are analysed as separate suffixes, as shown in (3.62).

(3.62) *-e-to* > *-e* 'at/in' plus *-to* 'as well'
-e-man > *-e* 'at/in' plus *-man* 'only'
-e-k'e > *-e* 'at/in' plus *-k'e* 'to (Honorific)'
-e-sə > *-e* 'at/in' plus *-sə* 'from'
-e-k'aci > *-e* 'at/in' plus *-k'aci* 'up to'
-(ə)lo-sə > *-lo* 'to/with' plus *-sə* 'from'

Assuming the morphological analysis in (3.62), the tone pattern in (3.61) is automatically explained. This tone pattern is exactly the same as that in (3.56), illustrated in Tableau 3.13. A H cannot shift leftward due to the constraint *PSH. Although a H shifts to an immediately following suffix *-e* 'at/in', the resulting form would incur a violation of Nonfinality. A H cannot shift beyond an immediately following suffix due to the constraint Bounding. Therefore, the H will stay on its sponsor due to the lower ranked constraint AlignHS.

The initial vowel in the suffixes in (3.63) alternates with zero. The vowel-initial variant occurs after a consonant, as indicated in (3.63a), whereas the consonant-initial variant occurs after a vowel, as illustrated in (3.63b). The tone pattern in (3.63b) is

explained by the constraints discussed above. This is exactly the same pattern illustrated in Tableau 3.13.

(3.63) a. *toŋse̲ŕ-ələ* ‘younger brother + to’
toŋse̲ŕ-ilaŋ ‘younger brother + with’
toŋse̲ŕ-ina ‘younger brother, let alone other people’
b. *sataḷi̲ ́-lo* ‘ladder + to’
sataḷi̲ ́-laŋ ‘ladder + with’
sataḷi̲ ́-na ‘ladder, let alone other people’

A mismatch between the right edge of an M-stem and a P-stem is found in (3.63a). When M-stems with final closed syllables are followed by a vowel-initial suffix, the M-stem-final consonant is syllabified as the onset of the following syllable. The right edge of a P-stem cannot be properly aligned with the right edge of an M-stem because of the constraint Align (P-stem, r; σ, r). The syllable built across the M-stem boundary will be incorporated within the domain of a P-stem. Thus, a mismatch is found as in *toŋse̲ŕ#əÕlo*. Remember that the constraint Nonfinality prohibits a H on any domain-final syllable. Therefore, all forms in (3.64) violate Nonfinality. Thus, the optimal form in (3.64a) will be selected by the lower ranked constraint AlignHS.

(3.64) a. *toŋse̲ŕ#əÕlo* (a H on an M-stem-final syllable)
b. **toŋse̲ŋ#əÕlo* (a H on a P-stem-final syllable)
c. **toŋse̲ŋ#əÕlo´* (a H on a word-final syllable)

As illustrated in Tableau 3.16, the first candidate, where a H shifts leftward, is ruled out by the constraint *PSH. The next three candidates are evaluated as equivalent by the constraint Nonfinality. However, the second candidate, where a H stays on its sponsor, is selected by the constraint AlignHS.

Tableau 3.16
Input: /ci̲ṕ-təl-meŋkulo/ ‘house + Plural + like’

ˇ	*PSH	Nonfinality	AlignHS
toŕŋse̲ŋ#əÕlo	*!		*
☞ toŋse̲ŕŋ#əÕlo		*	
toŋse̲ŋ#əÕlo		*	*!

toŋse͡ŋ#əÕlo´		*	*!

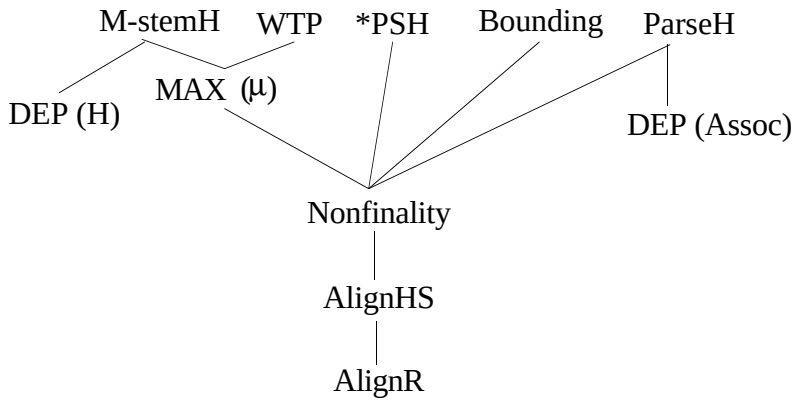
In sum, a H prelinked to an M-stem-initial syllable stays on its sponsor since the constraint AlignHS outranks AlignR. The H prelinked to a domain-final syllable is prohibited by the constraint Nonfinality. The H on a final syllable cannot shift leftward due to the constraint *PSH. The H shifts rightward and surfaces on a syllable predicted by the constraints. Constraints and their ranking as discussed so far are listed below:

(3.65) a. Undominated (Inviolable) — M-stemH, ParseH, Weight-to-Tone Principle (WTP), *Pre-sponsorH (*PSH), and Bounding

b.

M-stemH >> DEP (H)	in (3.15)
ParseH >> DEP (Assoc)	in (3.22)
Nonfinality >> AlignR	in (3.27)
Weight-to-Tone Principle (WTP) >> Nonfinality	in (3.31)
MAX (μ) >> Nonfinality	in (3.35)
M-stemH, WTP >> MAX (μ)	in (3.38)
AlignHS >> AlignR	in (3.42)
Nonfinality >> AlignHS	in (3.44)
*PSH, M-stemH, ParseH >> Nonfinality	in (3.50)
Bounding >> Nonfinality	in (3.60)

c. Relative Ranking



Additional examples of the Prelinked H Class are given below:

(3.66) Stems of the Prelinked H Class

a. Monosyllabic

ciṕ	‘house’	*kʰoń*	‘bean’
ɬk'ot	‘flower’	*k'oń*	‘pheasant’
piń	‘bottle’	*maI*	‘horse’
mok	‘neck’	*pat*	‘field’
aṕ	‘front’	*c’ak*	‘pair’
həI	‘soil’	*ɬaI*	‘bow’
k’oI	‘form’	*kuk*	‘soup’
mit	‘bottom’	*nat*	‘face’
ot	‘lacquer’	*pak*	‘outside’
pʰaI	‘arm’	*pit*	‘debt’
suṕ	‘forest’	*sak*	‘sprout’
soń	‘guest’	*sot*	‘pot’
suI	‘alcohol’	*taI*	‘chicken’
t’oń	‘dung’	*tʰəI*	‘body hair’
təń	‘back’	*tok*	‘jug’

b. Disyllabic Stems

acʰiḿ	‘morning/breakfast’	*cituń*	‘pole’
cɯməɬ	‘fist’	*ɬacuk*	‘leather’
ɬali´	‘powder’	*kaci´*	‘eggplant’
kamca´	‘potato’	*kasiI*	‘autumn’
kəne´	‘trapeze’	*kənəI*	‘shade’
kole´	‘whale’	*kutu´*	‘boot’
k’əpʰuI	‘cover’	*malu´*	‘floor’
matań	‘yard’	*nalu´*	‘ferry’
namu´	‘tree’	*palaḿ*	‘wind’
poksuń	‘peach’	*poli´*	‘barley’
tali´	‘bridge/leg’	*tancʰu´*	‘button’
əlku̇I	‘face’		

c. Trisyllabic Stems with a H on the initial syllable

kaḿani	‘straw rice-bag’	*kaḿucʰi*	‘mullet’
kaṕuli	‘stingray’	*meńɯɬi*	‘daughter-in-law’
tokṡuli	‘eagle’	*aćime*	‘aunt’
kəṕuki	‘turtle’		

d. Trisyllabic Stems with a H on the final syllable

cintalle´	‘azalea’	*mintəlle´*	‘dandelion’
ɬk’ucilaḿ	‘scolding’	*pusələḿ*	‘abscess’
pilɯ̈mp’ak	‘wall’	*satali´*	‘ladder’
tosilak	‘lunch box’		

3.3.3. Floating H Class

Stems of the Floating H Class exhibit a H on the leftmost two syllables if there are available syllables, as indicated in (3.67):

(3.67) a. Stems in isolation

t'aŋ́	'earth'	*muI*	'water'
kaći´	'branch'	*hoóp̀ak*	'pumpkin'
kəɬiḿ	'painting'	*kaáḿa´*	'palanquin'
mućike	'rainbow'	*hoóIaŋ́i*	'tiger'

b. Stems combined with some suffixes

t'aŋ́-cʰəIəm	'earth'	*muI-cʰəIəm*	'water'
kaći-cʰələm	'like a branch'	*hoóp̀ak-cʰələm*	'like a pumpkin'
kəɬiḿ-cʰələm	'like a painting'	*kaáḿa-cʰələm*	'like a palanquin'
mućike-cʰələm	'like a rainbow'	*hoóIaŋ́i-cʰələm*	'like a tiger'

I argue that stems of this class have a H which is not prelinked to a particular syllable. This H, which does not have an underlying H-sponsor, is referred to as a 'floating' H. The floating H must be aligned with some TBU, as required by the constraint ParseH. As mentioned before, the constraint ParseH does not specify where the H should be parsed.

First, the correct surface forms in (3.67) show that the left edge of a floating H must be aligned with the left edge of a word. There is a constraint AlignL which requires the left edge of a H that exists in UR (H_u) to be aligned with the left edge of a word. Following McCarthy (1994:6), the conditions of a given constraint may be met not only at the surface level but also by a combination of the underlying and surface levels. The targets defined by phonological constraints can include aspects of the input as well. The constraint AlignL refers to aspects of the input as well as those of the output.

(3.68) AlignL
Align the left edge of a H that exists in UR (H_u) to the left edge of a word.

Since the constraint AlignL specifically refers to a H that exists in UR (H_u), this constraint does not apply to a H created by Gen. Therefore, words like *apuć̆i* 'father' and *apuć̆i-meŋkulo* 'like a father,' which are discussed in section 3.3.1, are not subject to this constraint. However, the constraints AlignL and MTA apply to the prelinked H discussed in the preceding section. This issue will be dealt with at the end of this section.

The correct surface forms in (3.67) show that a floating H must be parsed to the first two syllables of a word. Following Poletto 1995 and Odden 1995b, there is a constraint Minimal Tone Association (MTA) which prohibits a H that exists in UR (H_u) from occurring singly-linked on the word-initial syllable.[18] Like the constraint AlignL, this constraint refers to aspects of the input as well as those of the output.

(3.69) Minimal Tone Association (MTA)
A H that exists in UR (H_u) is prohibited from occurring singly-linked on the word-initial syllable.

Since this constraint specifically refers to a H that exists in UR (H_u), it does not apply to the H created by Gen. Hence, words like *afəl* 'son' and *afəl-meŋkulo* 'like a son', discussed in section 3.3.1, do not violate this constraint. However, it does apply to the H prelinked in UR, as will be discussed at the end of this section.

The constraint MTA applies only to the H on the word-initial syllable. When verbal roots of this class are followed by a derivational suffix which is heavy, the floating H surfaces on the derivational suffix as singly-linked, as shown in *kal-lií́-ta*, derived from

[18] The constraint in (3.69) is redefined based on the constraint in Poletto 1995 and Odden 1995b, which prohibits a H from occurring singly-linked, regardless of its position.

/kal-lii-ta/ 'to grind + Passive + Ind'. This shows that MTA does not apply to the H on a non-word-initial syllable.

One might wonder whether words like *muI-meńkulo* 'like water', where a floating H is parsed to the monomoraic stems of this class, violate the constraint Nonfinality. One could also wonder whether words like *hoóṕaǩ-cʰələm* 'like a pumpkin' and *kaáḿaˊ-cʰələm* 'like a palanquin', where a floating H is parsed to the disyllabic stems of this class, violate the constraint Nonfinality. It is assumed that the constraint Nonfinality applies only to the singly-linked H on the final syllable.[19] Therefore, a doubly-linked H in (3.67) is not subject to the constraint Nonfinality.

One could alternatively argue that the constraint Nonfinality is outranked by AlignL and MTA. Assuming this ranking, it would be unnecessary for the constraint Nonfinality to distinguish a singly-linked H from a multiply-linked H. We could assume that a violation of Nonfinality is compelled by AlignL and MTA in examples such as *muI-meńkulo* and *hoóṕaǩ-cʰələm*. However, there is evidence that the ranking of AlignL >> Nonfinality is not viable. Note that the constraints AlignL and MTA also apply to the prelinked H discussed in the preceding section. Remember that a prelinked H on the stem-final light syllable shifts rightward due to the constraint Nonfinality, as shown in *cip-cʰəIəm* 'like a house'. This rightward shift induces a violation of the constraint AlignL, and therefore AlignL must be ranked lower than Nonfinality. Otherwise, the form **cip-cʰələm* (which satisfies AlignL, violating Nonfinality) would be evaluated as more harmonious than *cip-cʰəIəm* (which violates AlignL, satisfying Nonfinality). Thus, ranking AlignL above Nonfinality is not viable. Furthermore, there is independent evidence that a singly-linked H is distinguished from a multiply-linked H

[19] This argument follows Hayes' Linking Constraint (LC) which states that 'association lines in structural descriptions are interpreted as exhaustive' (Hayes 1986:332). LC is intended to cover structural descriptions in which an autosegment is multiply-linked: an autosegment bearing *n* linkages in structural descriptions must be matched to an autosegment bearing exactly *n* linkages in the actual form. Since only one linkage is mentioned in the structural description of the constraint *FinalH, this constraint does not apply to the doubly-linked H.

in phrases. In Chapter 6, an additional constraint *Word-Final H (*WFH) is required to explain tone in phrases. The constraint *WFH prohibits a H in UR from occurring *singly-linked* on the word-final syllable when the word is followed by another word (See Chapter 6 for detailed discussion). Since a distinction of a singly-linked H from a multiply-linked H is required independently, the alternative under consideration complicates the tonology of NK Korean in that it requires additional ranking among the three constraints AlignL, MTA, and Nonfinality. Therefore, I do not adopt this alternative.

The two constraints AlignL and MTA induce a violation of the constraint DEP (Assoc), which penalizes association of a H to a TBU. Hence, it is argued that they outrank DEP (Assoc):

(3.70) AlignL, MTA >> DEP (Assoc)

Evaluation of relevant candidates is given in Tableau 3.17. The first candidate, where a floating H is singly linked to the first syllable of a word, is eliminated by its violation of the constraint MTA.[20] The second candidate, where a floating H surfaces on the penultimate syllable of a word, is ruled out by its violations of the constraint AlignL.[21] Remember that the constraint MTA applies only to the singly-linked H on the word-initial syllable. Hence, the H on the penultimate syllable of a word does not induce a violation of MTA. The third candidate, where a floating H surfaces on the first two syllables of a word, is selected as optimal although it violates the constraint DEP (Assoc) twice. Violations of DEP (Assoc) are forced by AlignL and MTA.

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[20] This candidate also violates the constraint Nonfinality. However, Nonfinality is omitted in Tableau 3.16 because I want to show that the optimal form can be selected without recourse to the constraints which were discussed before.

[21] The constraint AlignL is assumed to be non-gradient, and thus its violation is evaluated non-gradiently. This issue will be revisited at the end of this section.

Tableau 3.17
Input: H

/mul-meŋkulo/ ‘like water’

	AlignL	MTA	DEP (Assoc)
H | mul-meŋkulo		*!	*
H | mul-meŋkulo	*!		*
H / \ ☞ mul-meŋkulo			**

In Tableau 3.18, the first candidate, where a floating H is singly linked with the first syllable of a word, is ruled out by MTA. The second candidate, where a floating H surfaces singly-linked on the second syllable of a word, is eliminated by AlignL.[22] The third candidate, where a floating H surfaces singly-linked on the penultimate syllable of a word, is also filtered out by its violations of AlignL. The fourth candidate, where a floating H surfaces on the first two syllables of a word, is selected as optimal although it violates the constraint DEP (Assoc) twice.

Tableau 3.18
Input: H

/kaci-meŋkulo/ ‘like water’

˘	AlignL	MTA	DEP (Assoc)
H | kaci-meŋkulo		*!	*
H | kaci-meŋkulo	*!		*
˘ H | kaci-meŋkulo	*!		*
˘ H / \ ☞ kaci-meŋkulo ˘			**

22 This candidate also violates the constraint Nonfinality. See footnote 20.

When monomoraic stems of this class occur in isolation, the constraints MTA and Nonfinality are unavoidably violated as in *muI* 'water', *t'aŋ́* 'earth', etc. It is assumed that MTA is outranked by the constraints M-stemH and ParseH. As discussed in section 3.3.2, the constraint Nonfinality is also outranked by M-stemH and ParseH. Therefore, violations of MTA and Nonfinality are compelled by these higher ranked constraints.

(3.71) M-stemH, ParseH >> MTA, Nonfinality

Evaluation of relevant candidates is given in Tableau 3.19. The first candidate, where a floating H is deleted, is ruled out by its violation of M-stemH. The second candidate, where a H is not parsed to any TBU, is filtered out by its violation of ParseH. The third candidate, where a H is parsed to a monosyllabic stem, is selected as optimal although it violates MTA and Nonfinality. Violations of these constraints are compelled by M-stemH and ParseH.

Tableau 3.19
Input: H

/mul/ 'water'

	M-stemH	ParseH	Nonfinality	MTA
mul	*!			
H mul		*!		
H | ☞ mul			*	*

As mentioned above, the two constraints AlignL and MTA specifically refer to a H that exists in UR (H_u). Thus, these constraints do not apply to a H created by Gen.

Therefore, words like *apuć̌i* ‘father’ and *apuć̌i-meŋkulo* ‘like a father’ do not violate AlignL. In addition, words like *aʃəl* ‘son’ and *aʃəl-meŋkulo* ‘like a son’ do not violate MTA.

However, the constraints which were discussed in section 3.3.1 (especially the constraint AlignR) apply to a H which exists in UR. Therefore, the interaction of AlignL with the constraint AlignR, discussed in section 3.3.1, needs to be explained. Since the words like *hoóIaŋ́i* 'tiger' and *muć̌ike* 'rainbow' incurs violations of AlignR, it is argued that the constraint AlignL outranks AlignR. Hence, a violation of AlignR is compelled.

(3.72) AlignL >> AlignR

It needs to be still explained why the forms like **hoóIaŋ́iˆ*tiger' and **muć̌ike´* 'rainbow', where a H spreads to the final TBU of the words, are less harmonious than the forms like *hoóIaŋ́i* and *muć̌ike*. Note that the two incorrect forms **hoóIaŋ́i´* and **muć̌ike´*satisfy AlignL and AlignR, whereas the correct forms *hoóIaŋ́i* and *muć̌ike* violate AlignR. As shown in (3.70), the constraints AlignL and MTA outrank DEP (Assoc). However, it is argued that the constraint DEP (Assoc) in turn outranks AlignR. Therefore, a violation of AlignR is compelled by these higher ranked constraints in the forms *hoóIaŋ́i* and *muć̌ike* .

(3.73) AlignL, MTA >> DEP (Assoc) >> AlignR

In Tableau 3.20, the first candidate, where a floating H is singly-linked to the initial syllable, is ruled out by its violation of the constraint MTA. The second candidate, where a floating H spreads to the final TBU of the word, is eliminated by its third

violation of DEP (Assoc). The third candidate, where a floating H is parsed to the first two syllables of the word, is selected as optimal.

Tableau 3.20
Input: H

/mucike/ 'rainbow'

˘	AlignL	MTA	DEP (Assoc)	AlignR
H | mucike	*!			**
H / | \ mucike			***!	
H / \ ☞ mucike ˘			**	*

Since the two constraints AlignL and MTA also apply to the prelinked H discussed in section 3.3.2, the interaction of these constraints with the constraints discussed in the preceding section needs to be explained. Remember that the prelinked H on the stem-final light syllable shifts to the penultimate syllable of the word, as shown in *cip-meŋkuIo* 'like a ladder'. In section 3.3.2, it was argued that the H shifts rightward due to the constraint AlignR. However, as shown in (3.72), the constraint AlignR is outranked by AlignL. If this ranking is correct, why is the form *cip-meŋkuIo* evaluated as more harmonious than the forms *cip-meŋ́kulo and *ciṕ-meŋkulo?

First, it is argued that the constraint AlignL is outranked by Nonfinality. Therefore, the form *ciṕ-meŋkulo (which violates Nonfinality) is evaluated as less harmonious than the form cip-meŋkuIo (which violates AlignL).

(3.74) Nonfinality >> AlignL

Second, it is argued that the family of alignment constraints are divided into two groups, that is, (i) gradient and (ii) non-gradient. The constraint AlignR is gradient, and

thus its violation is evaluated by counting the TBU's that intervene between a H-toned TBU and the right edge of a domain. Hence, the form *cı̆p-meŋkuɭo* violates AlignR once, while the form **cı̆p-meńkulo* violates it twice. One violation of AlignR is evaluated as more harmonious than two violations. However, the constraint AlignL is non-gradient, and thus its violation is not evaluated gradiently, i.e., one violation of AlignL is as bad as multiple violations. Therefore, both forms *cı̆p-meŋkuɭo* and **cı̆p-meńkulo* are evaluated as equivalently by the constraint AlignL.

To sum up, the final H in the input /cíp-meŋkulo/ is prohibited by the constraint Nonfinality. The final H will shift rightward and a violation of AlignL is compelled by Nonfinality. Since AlignL is non-gradient, one violation is as bad as multiple violations. Thus, the role of AlignL is effectively rendered invisible. The optimal form will be determined by the lower ranked constraint AlignR which is gradient. Since the form *cı̆p-meŋkuɭo* (which violates AlignR once) is evaluated as more harmonious than the form **cı̆p-meńkulo* (which violates AlignR twice), the form *cı̆p-meŋkuɭo* will be selected as optimal.

In Tableau 3.21, the first two candidates are ruled out by the constraint Nonfinality. The third candidate, where a H shifts to the antepenultimate syllable of the word, is ruled out by its second violation of AlignR. The last candidate, where a H shifts to the penultimate syllable of the word, is selected as optimal, although it violates AlignL and AlignR. A violation of these constraints are compelled by Nonfinality.

Tableau 3.21
Input: /cíp-meŋkulo/ 'like a ladder'

	Nonfinality	AlignL	AlignR
cíp-meŋkulo	*!	*	
čı̆p-meŋkuló	*!	*	
čı̆p-meńkulo		*	**!
☞ čı̆p-meŋkuɭo		*	*

When words like *satali´* 'ladder' and *cintalle´* 'azalea,' are used in isolation, the prelinked H stays on its sponsor, as discussed in section 3.3.2. As shown in (3.74), the constraint AlignL is outranked by Nonfinality. In section 3.3.2, it was shown that the constraint Nonfinality is in turn outranked by *Pre-sponsorH (*PSH), which prohibits a H-toned TBU from preceding an underlying H-sponsor within a word. Hence, the effect of AlignL is rendered invisible.

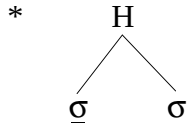
In Tableau 3.22, the optimal form is selected by the conspiracy of the constraints which are ranked higher than AlignL. The first two candidates, where a prelinked H shifts leftward, are eliminated by *PSH. The last candidate is selected as optimal although it violates Nonfinality and AlignL.

Tableau 3.22
Input: /satali/ 'ladder'

	*PSH	Nonfinality	AlignL
satali	*!		*
safali	*!		
☞ satali´		*	*

As discussed above, the constraint Nonfinality applies only to the singly-linked H on the final syllable. Therefore, a doubly-linked H is not subject to Nonfinality. Assuming this, it is hard to explain why the form *satali-meŋ(kulo)* 'like a ladder' (which violates AlignHS (AlignHS) is preferred over **sata(li)-meńkulo* (which satisfies AlignHS). (See Tableau 3.14 for the evaluation of this form.) The latter does not violate AlignHS. It is argued that there is a constraint *Spread-for-SponsoredH (*SpreadSH), which prohibits a prelinked H from doubling rightward. A prelinked H has a sponsor in UR, which is underlined in (3.75).

(3.75) *Spread-for-SponsoredH (*SpreadSH)



This constraint is assumed to outrank AlignH-to-Sponsor (AlignHS):

(3.76) *Spread-for-SponsoredH (*SpreadSH) >> AlignH-to-Sponsor (AlignHS)

Assuming the ranking in (3.76), it can be explained why the form *satali-meŋkuɭo* 'like a ladder' is preferred over **satali-meŋkulo.* In Tableau 3.23, the first candidate, where a prelinked H doubles rightward, is eliminated by its violation of *SpreadSH. The second candidate, where a H stays on its sponsor, is ruled out by its violation of Nonfinality. The third candidate is selected as optimal although it violates AlignHS and AlignR.

Tableau 3.23
Input: /satali-meŋkulo/ 'like a ladder'

	*SpreadSH	Nonfinality	DEP (Assoc)	AlignHS	AlignR
satali-meŋkulo	*!		*	*	**
satali-meŋkulo		*!			
☞ satali-meŋkuɭo				*	*

Alternatively, one could argue that the constraint DEP (Assoc) outranks AlignHS. Assuming this ranking, the above phenomenon appears to be explained without recourse to the constraints *SpreadSH. The form *satali-meŋkuɭo* 'like a ladder' (which violates AlignHS) is preferred over **satali-meŋkulo* (which violates DEP (Assoc)). If this alternative is viable, this would be better than the proposal made above.

In Chapter 6, it will be shown that there is a strong tendency for a H to surface on the leftmost word in a P-phrase due to the constraint AlignPL. However, a H singly linked to a word-final syllable is prohibited by the constraint *WordFinalH (*WFH). The constraint *WFH outranks AlignPL. Thus, if the first word has a H on a final syllable,

the second word shows a H on the surface, as in *nəmu̲ talli-n-ta*, derived from /nəmu̲´ talli-n-ta/ 'too + to run + Present + Ind'. It will be shown that the constraint DEP (Assoc) is outranked by AlignPL. Therefore, without assuming the constraint *SpreadSH, it is hard to explain why the form *nəmu̲ talli-n-ta* (which violates AlignPL) is preferred over the form **nəmu̲´talli-n-ta* (which violates DEP (Assoc)). Note that a doubly-linked H in the form **nəmu̲´talli-n-ta* does not violate *WFH. Thus, the incorrect form **nəmu̲´talli-n-ta* would be selected as optimal under this hypothesis. Hence, this simpler hypothesis is not adopted in this thesis.

To sum up, stems of the Floating H Class have a floating H in UR. This H is parsed to the initial two syllables of the word by the conspiracy of the following constraints and their ranking:

(3.77) AlignL, MTA >> DEP (Assoc)

All the constraints that have been discussed in this chapter are ranked in (3.78):

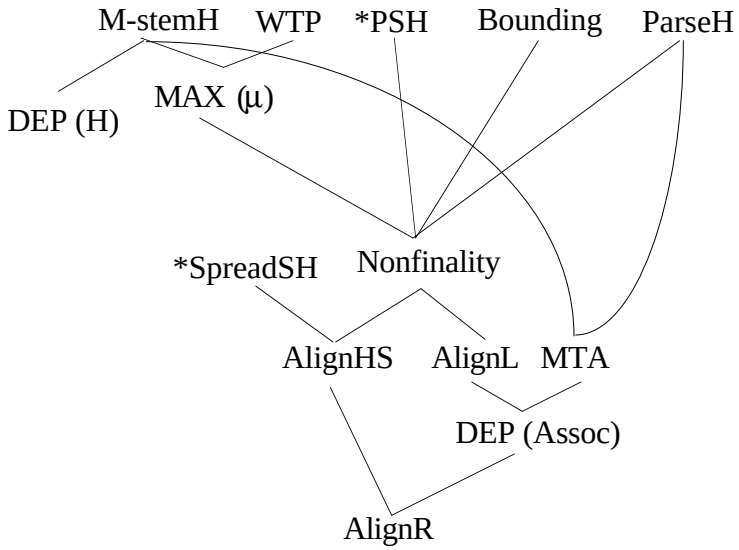
(3.78) a. Undominated (Inviolable) — M-stemH, ParseH, Weight-to-Tone Principle (WTP), *Pre-sponsorH (*PSH), Bounding, and *Spread-for-SponsoredH (*SpreadSH)

b.

M-stemH >> DEP (H)	in (3.15)
ParseH >> DEP (Assoc)	in (3.22)
Nonfinality >> AlignR	in (3.27)
Weight-to-Tone Principle (WTP) >> Nonfinality	in (3.31)
MAX (μ) >> Nonfinality	in (3.35)
M-stemH, WTP >> MAX (μ)	in (3.38)
AlignHS >> AlignR	in (3.42)
Nonfinality >> AlignHS	in (3.44)
*PSH, M-stemH, ParseH >> Nonfinality	in (3.50)
Bounding >> Nonfinality	in (3.60)
AlignL, MTA >> DEP (Assoc)	in (3.70)
M-stemH, ParseH >> MTA, Nonfinality	in (3.71)

AlignL >> AlignR	in (3.72)
AlignL, MTA >> DEP (Assoc) >> AlignR	in (3.73)
Nonfinality >> AlignL	in (3.74)
*SpreadSH >> AlignHS	in (3.76)

c. Relative Rankings



Additional examples of this class are listed below:

(3.79) Stems of the Floating H Class

a. Monosyllabic with a short vowel

caḿ	‘sleeping’	*cʰəI*	‘season’
cʰuḿ	‘dance’	*coḿ*	‘bookworm’
ɨṕ	‘mouth’	*kaǹ*	‘saltiness’
kaṕ	‘price’	*kəI*	‘letter’
kʰaI	‘knife’	*kʰi´*	‘stature’
kʰo´	‘nose’	*ki´*	‘ear’
kəḿ	‘price’	*koI*	‘brain’
kot́	‘place’	*k’e´*	‘sesame’
k’əǹ	‘belt’	*k’ət́*	‘end’
k’i	‘trick’	*k’oI*	‘hay/feed’
me´	‘rod’	*mat́*	‘taste’
miI	‘wheat’	*moḿ*	‘body’
mot́	‘pond’	*məǩ*	‘ink stick’
muI	‘water’	*nat́*	‘daytime’

naI	‘day’	*naḿ*	‘others’
paṕ	‘meal’	*noń*	‘rice paddy’
paI	‘foot’	*paḿ*	‘knight’
pe´	‘boat/belly’	*pʰa´*	‘green onion’
pʰuI	‘grass’	*pi´*	‘rain’
piť	‘light’	*poḿ*	‘spring’
p’uI	‘horn’	*puť*	‘brush’
saI	‘flesh/rice’	*saḿ*	‘hemp’
se´	‘tongue’	*siḿ*	‘strength’
siń	‘shoe’	*soń*	‘hand’
taḿ	‘fence’	*te´*	‘bamboo’
tʰek	‘jaw’	*tʰəI*	‘frame’
tʰəḿ	‘gap’	*t’aḿ*	‘sweat’
t’aŋ́	‘earth’	*t’e´*	‘time/chance’
t’i´	‘belt’	*t’əť*	‘intention’
t’ək	‘rice cake’	*yəI*	‘ten’

b. Monosyllabic with a long vowel

meé´	‘falcon’	*moó´*	‘angle’
nuúń	‘snow’	*paáI*	‘blind’
paáḿ	‘chestnut’	*peé´*	‘two times’
peémˊ	‘snake’	*pəəḿ*	‘tiger’
piíŋ́	‘illness’	*seé´*	‘bird’
siíĺ	‘thread’	*soók*	‘inside’
soóI	‘brush’	*suúḿ*	‘breath’
toóI	‘stone’	*toóń*	‘money’
tií´	‘back/hind’	*təəI*	‘field’
uúḿ	‘bud’		

c. Disyllabic

kaći´	‘branch’	*kəIiḿ*	‘painting’
koIcʰi´	‘headache’	*moIe´*	‘the day after tomorrow’
naIke´	‘wing’	*nuku´*	‘who’
naksi´	‘fishing’	*sek’i´*	‘straw rope’
tańci´	‘jug’	*toćaŋ́*	‘seal’

d. Disyllabic with a heavy syllable

hoópak	‘pumpkin’	*kaáḿa´*	‘palanquin’
keémi´	‘ant’	*k’uúIt’uk*	‘chimney’
muútaŋ́	‘sorceress’	*paáŋ́ku´*	‘fart’
piIke´	‘pillow’	*poópe´*	‘treasure’
saáIaḿ	‘person’	*suúpak*	‘watermelon’
taáḿpe´	‘tobacco’	*teécʰu´*	‘jujube’

e. Trisyllabic

cićike	‘a stretch’	*haIepi*	‘grandfather’
mućike	‘rainbow’	*oIepi*	‘elder brother’
sək’aIe	‘raft’		

f. Trisyllabic with a heavy syllable

koókuma	'sweet potato'	*koómpʰeŋi*	'fungus'
kuúmpeŋi	'sluggard'	*kəəmɔli*	'leech'
kəətəlɔm	'strutting'	*maánuɭa*	'wife'
saátʰuɭi	'dialect'	*soókaci*	'personality'
uúɭəŋi	'mud snail'	*muúntiŋi*	'leper'

3.4 Comparison with Previous Studies

Previous studies have proposed two opposite analyses of tone in heavy syllables. The contour tone hypothesis argues that heavy syllables have contour tones, i.e. a rising tone in the word-initial heavy syllable, and a falling tone in the word-final heavy syllable. For instance, Y.-H. Chung 1991a & b argues that *saaɭam* 'man' and *maŋneé* 'the last child' have an initial rise and a final fall, respectively. However, the level tone hypothesis claims that NK Korean does not have contour tones. For instance, G.-R. Kim 1988 assumes that the above two words are on the surface *saáɭam* and *maŋneé*. In section 3.1, I have provided acoustic evidence that suggests NK Korean does not have phonological contour tones.

The above issue is closely related to the issue of what the Tone Bearing Unit is in NK Korean. Previous studies have proposed two different possibilities for the TBU in NK Korean, i.e., (i) the moraic TBU theory (e.g., Y.-H. Chung 1991a), and (ii) the syllabic TBU theory (e.g., G.-R. Kim 1988, N.-J. Kim 1991, 1994). In section 3.2, I have argued that the TBU is the syllable in NK Korean.

In section 3.3.1, I have refined the concept of the Default H Class in NK Korean. The Default H Class is a class of words which have no H's in UR and receive H's in Gen. Y.-H. Chung 1991a argues that stems having H's on the final mora on the surface are underlyingly toneless. Y.-H. Chung's toneless class could be interpreted as the Default H Class. However, Y.-H. Chung's proposal encounters three problems.

First, Y.-H. Chung argues that monomoraic stems such as *cip* ‘house’ and *mək-* ‘to eat’, which show a non-spreading H on the surface, are toneless in UR. In (3.80a–b), a non-spreading H surfaces on the penultimate syllable of the words. Hence, it appears that a H could be predictably assigned to the words in (3.80).

(3.80) a. *cip-cʰəlam* ‘ like a housé
cip-meŋkul-o ‘ like a housé

b. *mək-ta* ‘to eat + Ind’
mək-ket-ta ‘to eat + Future + Ind’
mək-ket-səmni-ta ‘to eat + Future + Formal + Ind’

There is no way to prove whether monomoraic nominal stems are toneless or not. However, there is evidence that monomoraic verbal stems, which show a non-spreading H on the surface, have a prelinked H in UR. The stem *i-* ‘to carry something on the head’ shows the same tone pattern as the verbal stem *mək-* ‘to eat’, as illustrated in (3.81).

(3.81) *i-ta* ‘to carry something on the head + Ind’
i-ket-ta ‘to carry something on the head + Future + Ind’
i-ket-səmni-ta ‘to carry something on the head + Future + Formal + Ind’

Since a H surfaces on the penultimate syllable of the words in (3.81), it also appears that a H could be predictably assigned to the words in (3.81).

In Chapters 8 and 9, it will be shown that several phenomena, which cause changes in segments, accompany changes in tone. For instance, glide formation acompanies a change in tone. The stem vowel *i-* ‘to carry something on the head’ is realized as a glide when it is followed by a vowel-initial suffix, as shown in (3.82). It should be noted that glide formation accompanies a change in tone, i.e., a non-spreading H becomes a spreading H.

(3.82) *y-ət-ta* ‘to carry something on the head + Ind’
y-ət-ket-ta ‘to carry something on the head + Future + Ind’
y-ət-ket-səmni-ta ‘to carry something on the head + Future + Formal + Ind’

If monomoraic verbal stems were toneless in UR, a H should be assigned by rules or constraints. If we apply the same rules which obtain the surface forms in (3.80) and (3.81), we would obtain such incorrect forms in (3.83), where a H surfaces on the penultimate syllable of the words. Assuming that these verbal stems are toneless in UR, it is hard to explain the tone pattern in (3.82). In Chapter 9, it will be shown that the tone pattern in (3.82) is automatically explained by the hypothesis that these stems have a prelinked H in UR. Hence, it is argued that monomoraic stems, which show a non-spreading H, have a prelinked H in UR.

(3.83)	*y-ət-ta	'to carry something on the head + Ind'
	*y-ət-ket-ta	'to carry something on the head + Future + Ind'
	*y-ət-ket-səmni-ta	'to carry something on the head + Future + Formal + Ind'

Second, Y.-H. Chung argues that bimoraic stems such as *tali* 'bridge' and *kaci* 'eggplant' are toneless. However, assuming this as a default tone pattern for the disyllabic stems, it is hard to give any plausible reason why all the disyllabic loan words have a H on the penultimate syllable, rather than on the final syllable, as indicated below:

(3.84)	*p'əśu*	'bus'	*cʰuɬək*	'truck'
	tʰeksi	'taxi'	*tʰokʰən*	'token coin'
	caɬ'u	'zipper'	*k'eím*	'game'
	saćʰu	'shirt'	*p'ańsu*	'panty'
	kʰi.tʰa	'guitar'		

Finally, Y.-H. Chung argues that the stems in (3.85a) and (3.85b) are underlyingly toneless, assuming that the final mora of the stems in (3.85a) is extratonal. H's are assigned to the final mora by the rules.

(3.85)

a.	*apuć(i)*	'father'	*əmu(i)*	'mother'
	acəś(i)	'uncle'	*pakuń(i)*	'basket'
	kasik(e)	'scissors'	*nolik(e)*	'toy'
	kaləḿ(e)	'parting one's hair'	*k'amak(u)*	'raven'

	halmaŋ́ku	'old woman'	*kulúm(a)*	'cart'
b.	*satalí*	'ladder'	*cintalé*	'azalea'
	mintəllé	'dandelion'	*ɬk'ucilaḿ*	'scolding'

However, this theory is problematic in the sense that the stems in (3.85a) are not distinguishable from those in (3.85b). First, stems in both groups are trisyllabic. Second, the quality of the final vowel is not entirely distinguishable. Most vowels which are extratonal are /i/, but there are exceptions like *kasiɬ(e)* 'scissors', *kulúm(a)* 'cart', etc. Most vowels which are not extratonal are vowels other than /i/, but there is also the exception *satalí* 'ladder'. Thus, there is no way to predictably apply extratonality only to the stems in (3.85a). Furthermore, the H's in both groups exhibit a difference in tonal behavior when the stems are followed by suffixes. The H in (3.84a) remains unshifted, as indicated in (3.86a), whereas the H in (3.85b) shifts to the penultimate syllable, as shown in (3.86b). Thus, in sections 3.3.1–2, I have argued that the above two groups of stems should not be collapsed into the same toneless class.

(3.86) a. *apúci-meŋkulo* "like a father"
b. *satáli-meŋkuɬo* "like a ladder"

N.-J. Kim 1993 argues that the Default H Class is a class of words having no underlying H's which receive H's by the following two rules:

(3.87) H-Insertion (HI)
ø ------> H / [ ]

(3.88) H-Association (HA)
a. Construct a single left-headed foot based on the two moras at the right edge of the domain.
b. Associate a H with the syllable that is the head of the foot.
c. Domain = any toneless unit, i.e. a toneless stem or word

N.-J. Kim's 1993 proposal does not encounter the two problems of Y.-H. Chung's proposal. Note that the loan words in (3.84) show the default tone pattern, i.e., a H on the

penultimate syllable. The two different tonal groups in (3.85a-b) are considered separately, i.e., only the stems in (3.85a) are assumed to be toneless. However, N.-J. Kim's proposal encounters a problem with monosyllabic stems since N.-J. Kim assumes a derivational theory where surface tone patterns are derived by way of intermediate levels.

Monosyllabic stems are divided into two separate tonal groups in NK Korean. For instance, the stem in (3.89a) exhibits a spreading H and it is assumed to belong to the Floating H Class. The stem in (3.89b) shows a non-spreading H and it is assumed to belong to the Prelinked H Class.

(3.89)	a.	*t'aŋ́*	'earth'
		t'aŋ́-i´	'ground + Subject Marker'
		t'aŋ́-cʰəlləm	'like ground'
		t'aŋ́-mneŋ́kulo	'like ground'
	b.	*suɭ*	'alcohol'
		suɭ-i	'alcohol + Subject Marker'
		sul-cʰəlləm	'like alcohol'
		sul-mneŋkuɭo	'like alcohol'

N.-J. Kim assumes two different levels, the stem level and the word level. Thus, the floating H in UR will be associated to the initial stem syllable. Since the stem is monosyllabic, the H has no chance to spread rightward at the stem level. Thus, the inputs to the word level will be (3.90a). The H prelinked with the stem-final syllable in UR will stay on its sponsor at the stem level. Thus, the inputs to the word level will be (3.90b). The tone pattern of (3.90a) is exactly the same as that of (3.90b) at the word level, and therefore they are not distinguishable.

(3.90)	a.	{t'aŋ́}	b. {suɭ}
		{t'aŋ́-i}	{suɭ-i}
		{t'aŋ́-cʰələm}	{suɭ-cʰələm}
		{t'aŋ́-mneŋkulo}	{suɭ-mneŋkulo}

Assuming two different levels, it is hard to explain why tone doubling occurs only in the words in (3.90a) and tone shift occurs only in the words in (3.90b). This problem is solved in the framework of CT which directly derives surface forms from underlying forms without assuming any intervening levels. The two tone classes are distinguishable in the inputs, and thus the problem that is encountered in procedural approaches is not encountered here.

CHAPTER 4

TONE IN VERBS

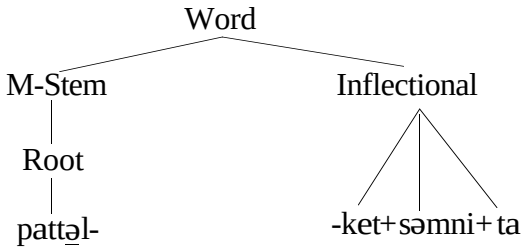
This chapter, dealing with tone in verbs, will show that the proposals in (4.1) that I made for nouns in Chapter 3 do not need to be revised to handle tones in verbs.

(4.1) a. Verbs are divided into three classes: they are the Default H Class, the Prelinked H Class, and the Floating H Class.
b. Verbs containing heavy syllables do not exhibit phonological contour tones.
c. Verbs of the Default H Class have no H's in UR, and a H will be created and parsed to the predictable syllable in response to constraints.

However, tone doubling which occurs within a word does not occur when a verbal root is followed by a derivational suffix. This will be studied in section 4.3.2. Nine monosyllabic roots show two different tone patterns according to the types of the following inflectional suffixes. Tones in these nine 'irregular' verbs will be discussed in section 4.3.3.

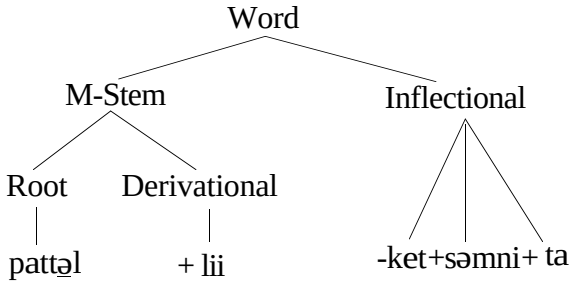
In Chapter 2, it has been shown that verbs have a word-internal structure that differs from that of nouns in three respects.

(4.2) a.



'to revere + Future + Formal + Ind'
"will revere"

b.



'to revere + Pass + Future + Formal + Ind'
"will be revered"

First, a verbal root itself or a verbal root plus a derivational suffix do not constitute a word since they cannot be used in isolation, as shown in (4.3):

(4.3) **pattə̲l-* 'to revere'
**pattə̲l-lií-* 'to revere + Pass'

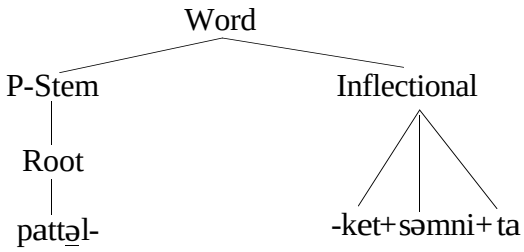
Second, M-stem is defined as a linguistic unit, where inflectional suffixes can be attached. A verbal root itself forms an M-stem when it is not followed by a derivational suffix, since it can be followed by inflectional suffixes, as illustrated in (4.2a). A combination of a verbal root plus a derivational suffix also constitutes an M-stem since it can be followed by inflectional suffixes, as shown in (4.2b). Therefore, the M-stem boundary varies according to the occurrence of a derivational suffix in verbs.

Finally, assuming a derivational theory, Y.-H. Chung 1991a argues that 'inflectional suffixes are added to a verbal stem all at once on one cycle'. Following Y.-

H. Chung 1991a, I assume the 'flat' morphological structure in (4.2) where all inflectional suffixes are directly dominated by an Inflectional Suffix Node. The boundaries between inflectional suffixes (represented by the symbol '+') are not counted as the edges of the relevant morphological domains.

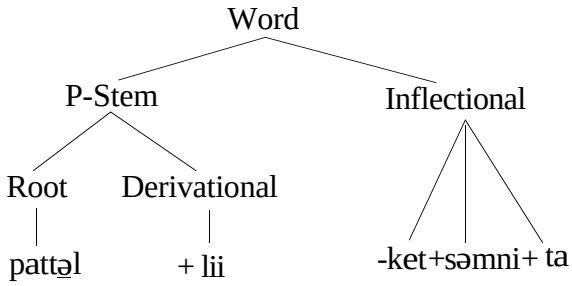
The right edge of a P-stem is in general aligned with the right edge of an M-stem due to the constraint R-Anchor. Hence, the words in (4.2) have the following phonological structures:

(4.4) a.



'to revere + Future + Formal + Ind'
"will revere"

b.



'to revere + Pass + Future + Formal + Ind'
"will be revered"

When verbal roots with final open syllables are followed by a vowel-initial suffix, resyllabification and segmental-prosodic changes occur across the M-stem boundary, as shown in *soófta,* derived from /so-ət-ta/ 'to shoot + Past + Ind'. Therefore, the right edge of a P-stem cannot be aligned with the right edge of an M-stem without violating the constraint Align (P-stem, r; σ, r). Hence, the syllable built across the M-stem boundary is incorporated into the domain of a P-stem. A mismatch occurs between the right edges of

a P-stem and an M-stem. The segmental-prosodic changes will be studied in Chapter 8. The interaction of tone and segmental-prosodic changes will be examined in Chapter 9.

When verbal roots with final closed syllables are followed by a vowel-initial suffix, resyllabification occurs across the M-stem boundary, as shown in *mə̲ʔkə.tta*, derived from /mə̲k-ət-ta/ 'to shoot + Past + Ind'. Thus, the right edge of a P-stem cannot be aligned with the right edge of an M-stem without violating the constraint Align (P-stem, r; σ, r). Hence, the syllable built across the M-stem boundary is incorporated into the domain of a P-stem. A mismatch also occurs between the right edges of a P-stem and an M-stem. This mismatch has a significant meaning for tone shift.

4.1. Default H Class

Bare verbal roots cannot occur in isolation. Constructions of a verbal root plus inflectional suffixes exhibit a H on the penultimate syllable of a root when the root-final syllable is not heavy, as in (4.5a–c). If the root-final syllable is heavy, a H surfaces on the final syllable of a root, as in (4.5d). Since the verbal roots in (4.5) are not followed by derivational suffixes, they form M-stems by themselves. Therefore, the right edge of a root boundary corresponds to that of an M-stem boundary, as represented by the symbol "#" in (4.5).

(4.5) a.	miɕʰi#-n	'to be crazy + Present '
	miɕʰi#-ke	'to be crazy + Adverbial'
	miɕʰi#-kes+səmni+ta	'to be crazy + Future + Formal + Ind'
b.	sukɯl̚i#-nən	'to bend + Present'
	sukɯl̚i#-ko	'to bend + Connective'
	sukɯl̚i#-kes+səmni+ta	'to bend + Future + Formal + Ind'
c.	həlt'əkkəl̚i#-nən	'to gasp + Present'
	həlt'əkkəl̚i#-ko	'to gasp + Connective'
	həlt'əkkəl̚i#-kes+səmni+ta	'to gasp + Future + Formal + Ind'
d.	poneé#-n	'to send + Present'
	poneé#-ke	'to send + Adverbial'
	poneé#-kes+səmni+ta	'to send + Future + Formal + Ind'

Since verbal roots of this class have no H's in UR, a H is created and parsed in a predictable way due to the conspiracy of the constraints and their ranking which was discussed in Chapter 3. A H will be created in a toneless M-stem due to the constraint M-stemH which requires every M-stem to have a H. A H must be parsed to some TBU due to the constraint ParseH which requires a H to be realized on some TBU. A H is required to be aligned with the right edge of a domain by the constraint AlignR. However, a H on a domain-final syllable is prohibited by Nonfinality, which outranks the constraint AlignR. Due to the conspiracy of the constraints M-stemH, ParseH, Nonfinality, and AlignR, a default H surfaces on the penultimate syllable of an M-stem when the M-stem ends with a light syllable. When an M-stem ends with a heavy syllable, a default H surfaces on the final heavy syllable due to the constraints Weight-to-Tone Principle (WTP) and MAX (μ). The constraint WTP requires a heavy syllable to be aligned a H. The constraint MAX (μ) penalizes deletion of a mora. Since these two constraints outrank Nonfinality, a default H surfaces on the M-stem-final heavy syllable. A violation of Nonfinality is compelled.

In Tableau 4.1, the first candidate, which has no H, is eliminated by its violation of the constraint M-stemH. The second candidate, where a H is parsed to the TBU which exists outside of the domain of an M-stem, is also ruled out by its violation of M-stemH. The third candidate, where a H is not parsed to any TBU, is ruled out by the constraint ParseH. The fourth candidate, where the right edge of a H is aligned with the right edge of an M-stem, is filtered out by its violation of Nonfinality. The fifth candidate, where the right edge of a H is aligned with the right edge of an M-stem-initial syllable, is eliminated by its second violation of AlignR. The last candidate, where the right edge of a H is aligned with the right edge of the penultimate syllable, is chosen as optimal although it violates the constraint AlignR. A violation of AlignR is compelled by Nonfinality.

Tableau 4.1
Input: /sukuli-ket+ta/ ‘to bend + Future + Ind’

Candidates	M-stemH	ParseH	Nonfinality	AlignR
sukuli#-ket+ta	*!			
sukuli#-keʈ+ta	*!			
sukuli#-ket+ta H		*!		
sukuli#-ket+ta			*!	
sukuɭi#-ket+ta				**!
☞ sukuɭi#-ket+ta				*

When a verbal root with a final closed syllable is followed by a vowel-initial suffix, the M-stem-final consonant is syllabified as an onset of the following syllable. Since the syllable constructed across the M-stem boundary is incorporated into the domain of a P-stem, a mismatch occurs between the right edges of a P-stem and an M-stem, as shown in *yəḿu.l#ə»tta*, derived from /yəmul-ət-ta/ 'to get ripe + Past + Ind'. Since a default H is required to be aligned with the penultimate syllable of an M-stem by the constraints AlignR and Nonfinality, the mismatch found in *yəḿu.l#ə»tta* does not affect the assignment of a default H.

If the final syllable of an M-stem is heavy, a H is created and parsed to the final heavy syllable of the M-stem. The Weight-to-Tone Principle (WTP) requires a heavy syllable to be aligned with a H. The constraint MAX (μ) penalizes deletion of a mora. Due to the constraints WTP and MAX (μ) and additional constraints used in Tableau 1, a default H will surface on an M-stem-final heavy syllable.

In Tableau 4.2, the first candidate, where a heavy syllable surfaces as toneless, is not optimal due to its violation of the Weight-to-Tone Principle (WTP). The second candidate, where a H surfaces on the penultimate syllable of an M-stem and an M-stem-final heavy syllable is shortened, violates MAX (μ), and thus it is not optimal. The last candidate, where a H falls on the M-stem-final heavy syllable, is selected as optimal although it violates the constraint Nonfinality. A violation of Nonfinality is compelled by WTP and MAX(μ).

Tableau 4.2
Input: /ponee#-ket+ta/ ‘to send + Future + Ind’

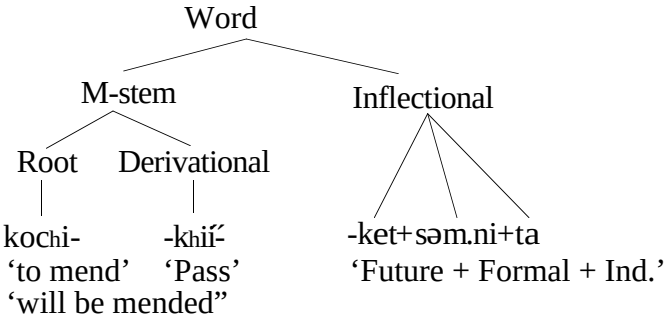
Candidates	WTP	MAX(μ)	Nonfinality	AlignR
pońee#-ket+ta	*!			*
pońe<e>#-ket+ta		*!		*
☞ poneé#-ket+ta			*	

When a verbal root is followed by a derivational suffix -*kʰii* ‘passive’, a H is parsed to the derivational suffix, as shown below. Note that this is the only derivational suffix that can be attached to the roots of this class.

(4.6) Root + Infl	vs.	Root + Deri + Infl
koćʰi#-ta ‘to mend + Ind’	vs.	kocʰi+kʰií#-ta ‘to mend + Pass + Ind’
kəńci#-ta ‘to take out of water + Ind’	vs.	kənci+kʰií#-ta ‘to take out of water + Pass + Ind’
oĺli#-ta ‘to raise high + Ind’	vs.	olli+kʰií#-ta ‘to raise high + Pass + Ind’

The tone pattern in the second column of (4.6) is automatically explained by assuming the structure in (4.7) where a verbal root and a derivational suffix form an M-stem. In (4.7), the right edge of an M-stem corresponds to that of a derivational suffix. The constraint WTP requires a heavy syllable should be aligned with a H. The constraint MAX (μ) penalizes deletion of a mora. Hence, a H will surface on the final heavy syllable of an M-stem.

(4.7)



In Tableau 4.3, the first candidate, where a heavy syllable surfaces as toneless, is ruled out by its violation of the Weight-to-Tone Principle (WTP). The second candidate, where a H surfaces on the antepenultimate syllable of an M-stem and an M-stem-final heavy syllable is shortened, violates MAX (μ) and AlignR, and thus it is not optimal. The last candidate, where a H falls on the M-stem-final heavy syllable, is selected as optimal although it violates the constraint Nonfinality. A violation of Nonfinality is compelled by WTP and MAX(μ).

Tableau 4.3
Input: /kocʰi+kʰii#-ta/ 'to mend + Pass + Ind'

Candidates˘	WTP	MAX(μ)	Nonfinality	AlignR
koćʰi+kʰii#-ta	*!			*
koč̀ʰi+kʰi<i>#-ta		*!		**
☞ koč̀ʰi+kʰií#-ta			*	

˘

To sum up, verbal roots of this class do not have H's in UR. A H is created and parsed with a predictable syllable of an M-stem in terms of the conspiracy of the constraints discussed for nouns in section 3.3.1. Additional examples of this class are given below:

(4.8) a. Disyllabic Roots with heavy syllables

poneé-	'to send'	*paleé-*	'to expect'

b. Disyllabic Roots with light syllables

c'iĭki-	'to be durable'	*cʰeĭi-*	'to prepare'
ɔ̀ə́nti-	'to endure'	*ɬ̀kʰiú-*	'to grow'
ɬ̀koćʰi-	'to mend'	*kəćʰi-*	'to drop by'
kəńci-	'to take out of water'	*mańcʰi-*	'to touch'
maśi-	'to drink'	*meɬ̀ki-*	'to decide/to set'
mićʰi-	'to become insane'	*neĭi-*	'to bring down'
oĭɬ̀i-	'to raise high'	*piṕi-*	'to rub'
səćʰi-	'to go past by'	*saú-*	'to fight'
suśi-	'to poke'	*tiťi-*	'to step on'

t'eɬi-	'to beat'	*t'eŋ́ki-*	'to pull'
təńci-	'to throw'	*yəḿul-*	'to get ripe'
kəɬi-	'to behave like'		

c. Trisyllabic

cumuɬli-	'to cajole'	*heaɬi-*	'to count'
ɬiləkʰi-	'to erect'	*kaləćʰi-*	'to teach'
kanciɬi-	'to tickle'	*k'upuɬi-*	'to bend'
kəmtəɬi-	'to touch'	*okuɬi-*	'to crouch'
pəmuɬi-	'to mix'	*sipuɬi-*	'to say (pejorative)'
sukuɬi-	'to lower one's head'		

4.2. Prelinked H Class

Roots in (4.9) have a H underlyingly prelinked with a particular syllable which serves as a H-sponsor. This H is referred to as a 'prelinked' H. The H-sponsor is the initial syllable of the root in (4.9a), while it is the final syllable in (4.9b). The underlying H-sponsors are underlined.

(4.9) a. me̲ḿolcʰa#-ta 'to be harsh + Ind'
s̲əɬ̲kəci#-ta 'to get rotten + Ind'

b. i̲ṕ#-ta 'to wear + Ind'
pattə̲ɬ#-ta 'to revere + Ind'
aləmta̲ṕ#-ta 'to be beautiful + Ind'

The verbal roots cannot occur in isolation. The roots in (4.9a) always exhibit H's on the root-initial syllable, as in *me̲ḿolcʰa#-ket+ta* 'to be harsh + Future + Ind' and *me̲ḿolcʰa#-ket+səmni+ta* 'to be harsh + Future +Formal Pol + Ind'. In section 3.3.2, it has been shown that the constraint AlignH-to-Sponsor (AlignHS) outranks AlignR. The constraint AlignHS penalizes shifting of a H from its sponsor. The constraint AlignR requires the right edge of a H to be aligned with the right edge of a domain. Due to the fact that the constraint AlignHS outranks AlignR, a H prelinked to a non-final syllable

will stay on its sponsor, violating AlignR. A violation of AlignR is compelled by AlignHS.

In Tableau 4.4, the first two candidates, where a prelinked H shifts rightward, are ruled out by its violation of the constraint AlignHS.[1] The third candidate, where a prelinked H stays on its sponsor, is selected as optimal, although it violates the constraint AlignR twice. Violations of AlignR is compelled by AlignHS.

Tableau 4.4
Input: /mé̱molcha#-ket+ta/ 'to be harsh + Future + Ind'

Candidates ˇ	AlignHS	AlignR
me̱molcha#-ket+ta	*!	*
me̱molcha#-ket+ta	*!	
☞ mé̱molcha#-ket+ta		**

ˇ

The H prelinked to a root-final syllable exhibits a tone shift just as it does with nouns. First, the examples where a derivational suffix intervenes between a root and inflectional suffixes will be considered. The tone patterns of words change depending on the weight of a derivational suffix. The causative suffix, which is derivational, has two variants, (i) one with a short vowel and (ii) the other with a long vowel. The H prelinked with the root-final syllable stays on the root-final syllable when the derivational suffix is not heavy, as indicated in (4.10a), whereas the H surfaces on the derivational suffix if the derivational suffix is heavy, as shown in (4.10b):

(4.10) a. í̱+hi#-ket+ta 'to wear + Caus (derivational) + Future + Ind'
b. i̱+hií#-ket+ta 'to wear + Caus (derivational) + Future + Ind'

The two variants of a causative suffix are assumed to exist in UR for the following reason. The causative suffix does not always show an alternation in length. The length alternation occurs only after certain verbal roots. In (4.11a), both variants are

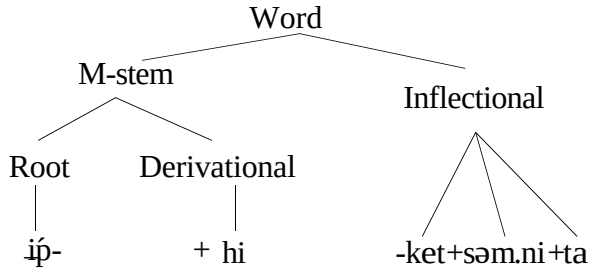
[1] The second candidate also violates the constraint Nonfinality.

possible. In (4.11b), only the short variant is possible. In (4.11c), only the long variant is possible. Therefore, it is not possible to explain the variation in length in terms of the distribution of a H.

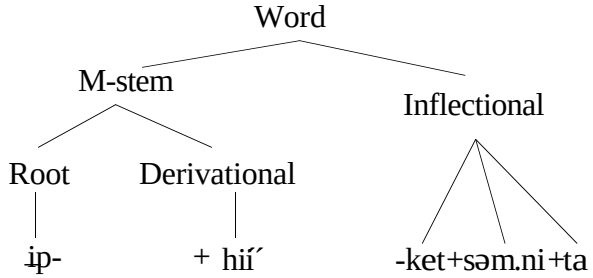
(4.11)	a.	*məɬ-i-ta*	~	*mək-iíˊ-ta*	'to eat + Caus + Ind'
		pəʈ-ki-ta	~	*pət-kiíˊ-ta*	'to take off + Caus + Ind'
	b.	*cuɬ-i-ta*	~	**cuk-iíˊ-ta*	'to die + Caus + Ind'
		ɲoṕ-hi-ta	~	**ɲop-hiíˊ-ta*	'to be high + Caus + Ind'
		kuṕ-hi-ta	~	**kup-hiíˊ-ta*	'to bend + Caus + Ind'
		soɬ-i-ta	~	**sok-iíˊ-ta*	'to be cheated+ Caus + Ind'
	c.	**ań-ki-ta*	~	*an-kiíˊ-ta*	'to sit + Caus + Ind'

As discussed previously, a root and a derivational suffix form an M-stem, i.e., the right edge of the M-stem corresponds to that of the derivational suffix, as shown in (4.12).

(4.12) a.



b.



‘to wear + Pass + Future + Formal + Ind’

The prelinked H stays on its sponsor in the word *íp+hi#-ket+ta* 'to wear + Caus (derivational) + Future + Ind' in (4.10a). A H on a domain-final syllable is prohibited by Nonfinality which outranks AlignHS. In Chapter 2, four domains are defined: (i) Root, (ii) M-stem, (iii) P-stem, and (iv) Word. Hence, a H on any of these domain-final syllables are prohibited by Nonfinality. Even though the H in *íp+hi#-ket+ta* shifts to a derivational suffix as in **ip+hi#-ket+ta*, the resulting form incurs a violation of Nonfinality because the H surfaces on an M-stem-final syllable. This H cannot shift beyond the adjacent domain due to the constraint Bounding. This H cannot be unparsed or deleted due to the constraints ParseH and M-stemH. Therefore, a violation of Nonfinality is unavoidable. The optimal output *íp+hi#-ket+ta* (which does not violate AlignHS) will be preferred over the form **ip+hi#-ket+ta* (which violates AlignHS) due to the lower ranked constraint AlignHS.

In Tableau 4.5, the first candidate, where a prelinked H shifts beyond an adjacent domain, is ruled out by the constraint Bounding. The next two candidates are evaluated as equivalent by Nonfinality. However, the second candidate, where a H shifts to a derivational suffix, is eliminated by AlignHS. The third candidate, where a H stays on its sponsor, is selected as optimal although it induces a violation of Nonfinality. A violation of Nonfinality is unavoidable.

Tableau 4.5
Input: /íp+hi#-ket+ta/ 'to wear + Pass + Future + Ind'

Candidates	Bounding	Nonfinality	AlignHS	AlignR
ip+hi#-keɬ+ta	*!		*	*
ip+hi#-ket+ta		*	*!	
☞ íp+hi#-ket+ta		*		

However, in (4.10b), the H shifts to the following heavy syllable. The tonal change exhibited in (4.10b) is predicted by the constraints Weight-to-Tone Principle (WTP) and MAX (μ), which outrank Nonfinality.

In Tableau 4.6, the first candidate, where a heavy syllable remains toneless, is eliminated by its violation of the constraint WTP. The second candidate, where a heavy syllable is shortened, is ruled out by MAX (μ). The last candidate, where a H surfaces on the M-stem-final heavy syllable, is selected as optimal although it violates the constraints Nonfinality and AlignHS. A violation of Nonfinality and AlignHS is compelled by the other higher ranked constraints.

Tableau 4.6
Input: /i̱ɸ́+hii#-ket+ta/ 'to wear + Pass + Future + Ind'

Candidates	WTP	MAX(μ)	Nonfinality	AlignHS
i̱ɸ́+hii#-ket+ta	*!			
i̱ɸ́+hi<i>#-ket+ta		*!		
☞ i̱p+hií#-ket+ta			*	*

When no derivational suffix follows a root, the H prelinked with a root-final syllable falls on the penultimate syllable of a word, as shown in (4.13). In (4.13), the three suffixes *-ket* 'Future,' *-səmni* 'Formal Pol,' and *-ta* 'Ind' are inflectional.

(4.13) i̱p-ket+səmni˝ta 'to wear + Future + Formal Pol + Ind'
pattə̱l-ket+səmni˝ta 'to revere + Future + Formal Pol + Ind'

The H sponsored by a root-final syllable falls on the penultimate syllable of words, regardless of the number of the following inflectional suffixes, as indicated in (4.14):

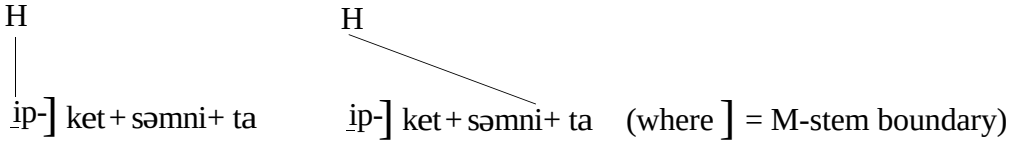
(4.14) i̱ɸ́-ta 'to revere + Ind'
i̱p-keɬ+ta 'to revere + Future + Ind'
i̱p-səmni˝ta 'to revere + Formal Pol + Ind'
i̱p-ket+səmni˝ta 'to revere + Future + Formal Pol + Ind'

As mentioned above, when more than one inflectional suffix is attached to a stem, all of them are dominated by one Inflectional Suffix Node. Thus, the boundaries between the inflectional suffixes that are marked by the symbol plus [+] are not counted as the

relevant edges of the domains. Therefore, the tone shift shown in (4.13) and (4.14) is explained by the constraints discussed in Chapter 3.

As discussed in Chapter 3, one of the principles that underlie the theory of Gen is the Consistency of Exponence, which states that 'no changes in the exponence of a phonologically-specified morpheme are permitted' (McCarthy & Prince 1993a:20). The prelinked H is specified for a given M-stem. Hence, the prelinked H stays within the domain of an M-stem although it shifts rightward, as schematically shown in (4.15). Therefore, the output form in (4.15b) does not incur a violation of the constraint M-stemH.

(4.15) a. Input b. Output



In Tableau 4.7 below, the first candidate, where a H stays on its sponsor, is ruled out by its violation of the constraint Nonfinality. The second candidate, where a H shifts to the final syllable of the word, is also eliminated by Nonfinality. The third and fourth candidates, where a H shifts to the pre-penultimate syllables of the word, are ruled out by their second violations of AlignR. The last candidate, where a H shifts to the penultimate syllable of the word, is selected as optimal although it violates AlignHS and AlignR. Violations of these constraints are compelled by Nonfinality. Remember that the boundary (marked by +) between the inflectional suffixes is not counted as the edge of the domain. Therefore, the optimal candidate does not violate the constraint Nonfinality.

Tableau 4.7
Input: /i̱ɟ́#-ket+səmni+ta/ ‘to wear + Future + Formal Pol + Ind’

Candidates	Nonfinality	AlignHS	AlignR
i̱ɟ́#-ket+səmni+ta	*!		
i̱p#-ket+səmni+ta´	*!	*	
i̱p#-keɬ+səmni+ta		*	**!*
i̱p#-ket+səḿni+ta		*	**!
☞ i̱p#-ket+səmnɨ́+ta		*	*

Not all suffixes cause a tone shift. Only those that begin with a consonant do so. As indicated in (4.16), the H remains on the M-stem-final light syllable when the following suffix begins with a vowel.

(4.16) i̱ɟ́-ət+səmni+ta ‘to wear + Past + Formal Pol + Ind’
pattə̱I̱-ət+səmni+ta ‘to revere + Past + Formal Pol + Ind’

Remember that the M-stem-final consonant is syllabified as an onset of the following syllable. Hence, a mismatch occurs between the right edges of a P-stem and an M-stem. The P-stem includes the syllable constructed across the M-stem boundary, as shown below:

(4.17) i̱ɟ́#ət»səmni+ta ‘to wear + Past + Formal Pol + Ind’
pattə̱I̱#ət»səmni+ta ‘to revere + Past + Formal Pol + Ind’

The mismatch between the M-stem and the P-stem in (4.16) explains why the prelinked H stays on its sponsor. Even though the H in *i̱ɟ́#ət»səmni+ta* shifts to the following syllable as in **i̱p#əɬ»səmni+ta*, the resulting form incurs a violation of Nonfinality because the H surfaces on a P-stem-final syllable. This H cannot shift beyond the adjacent domain due to the constraint Bounding. This H cannot be unparsed or deleted due to the constraints ParseH and M-stemH. Therefore, a violation of Nonfinality is unavoidable in the examples in (4.17).

In Tableau 4.8, the first candidate, where a prelinked H shifts beyond an adjacent domain, is ruled out by the constraint Bounding. The next two candidates are evaluated as equivalent by Nonfinality. However, the second candidate, where a H shifts to the following syllable, is eliminated by AlignHS. The third candidate, where a H stays on its sponsor, is selected as optimal although it induces a violation of Nonfinality. A violation of Nonfinality is unavoidable.

Tableau 4.8
Input: /i̱ṕ#-ət+ket+ta/ 'to wear + Pass + Future + Ind'

Candidates	Bounding	Nonfinality	AlignHS	AlignR
i̱p#ət»səmni+́ta	*!		*	*
i̱p#əʃ»səmni+ta		*	*!	
☞ i̱ṕ#ət»səmni+ta		*		

To sum up, the H prelinked with a non-final syllable of a root stays on the H-sponsor since the constraint AlignHS outranks the constraint AlignR. The H prelinked with a stem-final syllable shifts in a predictable way due to the conspiracy of constraints that have been discussed in Chapter 3.

Additional examples of this class are given below:

(4.18) Stems of the Prelinked H Class

a. H prelinked with the initial syllable

mé̱molcha-	'to be harsh'	*mə̱ɬəci-*	'to fall down'
sə̱ǩəci-́	'to get rotten'	*ta̱ɬaꞑa-*	'to run away'
to̱ɬaka-	'to go round'		

b. H prelinked with the final syllable

(i) Monosyllabic

a̱ń-	'to sit'	*ca̱ṕ-*	'to catch'
cə̱ṕ-	'to fold'	*ɦa̱ɬ-*	'to lick'
i̱ǩ-	'to ripen'	*i̱ṕ-*	'to wear'
i̱t́-	'to present'	*ka̱ṕ-*	'to pay back'
k'a̱k-	'to cut down'	*k'e̱-́*	'to break'

k'o̲t́-	'to insert'	*k'o̲ṕ-*	'to count'
ku̲ṕ-	'to bend'	*kə̲t́-*	'to fold up'
ma̲k-	'to defend'	*ma̲I-*	'to roll up'
mə̲k-	'to eat'	*na̲k-*	'to fish'
no̲-́	'to place'	*no̲ṕ-*	'to be high'
pa̲k-	'to strike'	*pa̲t́-*	'to receive'
pə̲t́-	'to take off'	*so̲k-*	'to be cheated'
sə̲-́	'to stand'	*tə̲t́-*	'to listen'
ə̲ń-	'to place'		

(ii) Disyllabic

ak'a̲ṕ-	'to be regrettable'	*ik'ə̲I-*	'to lead'
mo̲lə̲-́	'do not know'	*məkə̲ḿ-*	'keep hold in one's mouth'
pa̲lə̲-́	'to coat'	*pattə̲I-*	'to revere'
p'a̲lə̲-́	'to be fast'	*ta̲lə̲-́*	'to be different'
tiŋku̲I-	'to trumble about'	*t'ata̲ḿ-*	'to trim'
t'ətə̲I-	'to make a noise'		

(iii) Trisyllabic Stems

mik'əla̲ṕ-	'to be slippery'	*aləmta̲ṕ-*	'to be beautiful'

4.3. Floating H Class

Verbal roots of this class, in general, exhibit the same tone pattern as nouns of this class. This basic tone pattern will be discussed in 4.3.1. However, they exhibit tonal behavior that differs from that of nouns. First, when verbal roots of this class are followed by a derivational suffix, they shows a tone pattern which differs from that of nouns. This phenomenon will be discussed in section 4.3.2. Second, nine monosyllabic verbal roots show two different tone patterns according to the types of the following inflectional suffixes. Tones in these nine verbs will be discussed in section 4.3.3.

4.3.1. Basic Tone Pattern

Roots of this class exhibit a H on first two syllables of the word when the root is followed by inflectional suffixes, as indicated in (4.19). The words in (4.19) exhibit a H on the initial two syllables, regardless of the length of the stems and the number of following inflectional suffixes .

(4.19)	a.	*kaɬ-ta´*	'to grind + Ind'
		kaɬ-keɬ+ta	'to grind + Future + Ind'
		kaɬ-keɬ+səmni+ta	'to grind + Future + Formal Pol + Ind'
	b.	*aáɬ-ta´*	'to know + Ind'
		aáɬ-keɬ+ta	'to know + Future + Ind'
		aáɬ-keɬ+səmni+ta	'to know + Future + Formal Pol + Ind'
	c.	*cʰakaƥ-ta*	'to be cold + Ind'
		cʰakaƥ-ket+ta	'to be cold + Future + Ind'
		cʰakaƥ-ket+səmni+ta	'to be cold + Future + Formal Pol + Ind'
	d.	*moóśi-ta*	'to escort + Ind'
		moóśi-ket+ta	'to escort + Future + Ind'
		moóśi-ket+səmni+ta	'to escort + Future + Formal Pol + Ind'

In section 3.3.3, I have argued that stems of this class have a H which is not prelinked with a particular syllable in UR. The optimal outputs can be selected by the conspiracy of constraints like ParseH, AlignL, and Minimal Tone Association (MTA) which were discussed in section 3.3.3. A H is required to be parsed to some TBU due to the constraint ParseH. The left edge of a H that exists in UR is required to be aligned with the left edge of a word due to the constraint AlignL. A H that exists in UR is required not to be singly linked with the word-initial syllable by the constraint MTA.

In Tableau 4.9, the first candidate, where a H is not parsed to any TBU, is ruled out by its violation of the constraint ParseH. The second candidate, where a H is singly linked with the initial syllable, is ruled out by the constraint Minimal Tone Association (MTA).[2] The third candidate, where the left edge of a H is not aligned with the left edge of a word, is eliminated by AlignL. The last candidate is selected as optimal even though it violates the constraint DEP (Assoc). Violations of DEP (Assoc) are compelled by AlignL and MTA.

[2] This candidate also violates the constraint Nonfinality.

Tableau 4.9
Input: H

/kal#-ket+ta/ ‘to grind + Future + Ind’

	ParseH	MTA	AlignL	DEP (Assoc)
H kal#-ket+ta	*!			
H | kal#-ket+ta		*!		*
H | kal#-ket+ta			*!	*
H / \ ☞ kal#-ket+ta				**

In Tableau 4.10, the first candidate, where a H is not parsed to any TBU, is eliminated by the constraint ParseH. The second candidate, where a H is singly linked to the initial syllable, is not optimal due to MTA. The third candidate, where the left edge of a H is not aligned with the left edge of a word, is ruled out by AlignL.[3] The last candidate is selected as optimal even though it violates the constraint DEP (Assoc). A violation of DEP (Assoc) is compelled by AlignL and MTA.

Tableau 4.10
Input: H

/moosi#-ket+ta/ ‘to escort + Ind’

	ParseH	MTA	AlignL	DEP (Assoc)
H moosi#-ket+ta	*!			
H | moosi#-ket+ta		*!		*
H | moosi#-ket+ta			*!	*
H / \ ☞ moosi#-ket+ta				**

[3] This candidate also violates the constraint Weight-to-Tone Principle (WTP).

4.3.2. Blocking of Tone Doubling within the Domain of an M-stem

When the roots of the Floating H Class are followed by a derivational suffix, they shows an unexpected tonal behavior. It will be shown that this phenomenon is explained by recognizing the domain of a P-stem.

When multisyllabic roots of the Tone Doubling Class are followed by a derivational suffix which is light, the resulting word shows a spreading H on the initial two syllables, as indicated in (4.20).

(4.20) *təáɬəṕ-hi-ta* ‘ to be dirty + Caus + Ind
“to make something dirty”
noɬle-́kʰi-ta ‘ to be surprised + Caus + Ind
“to make someone surprised”

This tone pattern is exactly the same as that in nouns and thus it is explained by the conspiracy of the constraints discussed in the preceding section.

However, when multisyllabic roots of this class are followed by a derivational suffix which is heavy, a H surfaces on the derivational suffix, as indicated in (4.21).

(4.21) *nolle-kʰií-ta* ‘to surprise + Pass + Ind’

As discussed in section 3.3, the constraint WTP outranks MAX (μ). The constraint MAX (μ) in turn outranks AlignL. The constraint AlignL in turn outranks DEP (Assoc). Thus, the following relative ranking is obtained:

(4.22) Weight-to-Tone Principle (WTP) >> MAX (μ) >> AlignL >> DEP (Assoc)

Assuming this ranking, I can explain why the form *nolle-kʰiíˊ-ta* (which violates AlignL) is more harmonious than the forms **noɬleˊ-kʰii-ta* (which violates WTP) and **noɬleˊ-kʰi<i>-ta* (which violates MAX (μ)). However, it needs to be explained why the form *nolle-kʰiíˊ-ta* (which violates AlignL) is more harmonious than the form **noɬleˊ-kʰiíˊ-ta* (which satisfies AlignL as well as WTP and MAX (μ)). Although the form **noɬleˊ-kʰiíˊ-ta*, where a H triples rightward, incurs three violations of DEP (Assoc), this form would be selected as optimal because the constraint DEP (Assoc) is ranked very low.

Before proposing an additional constraint for the above phenomenon, consider more examples. When the monosyllabic roots of this class are followed by a derivational suffix which is heavy, a floating H also surfaces as a non-spreading H on a derivational suffix, as shown in (4.23). As shown in Chapter 2, all five variants of the passive suffix are heavy, and therefore, it is not possible to show the forms like **kal-li#-ta* 'to grind + Pass + Ind' (where the following derivational suffix is light).

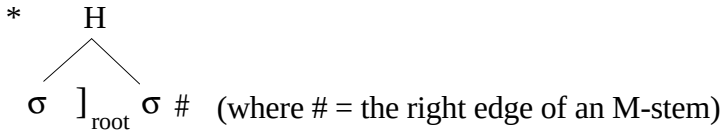
(4.23)	*kaɬ+liíˊ-ta ~ *kaɪ+liíˊ-ta*	'to grind + Pass + Ind'
	*kʼaɬ+liíˊ-ta ~ *kʼaɪ+liíˊ-ta*	'to spread out + Pass + Ind'
	*pʰaɬ+liíˊ-ta ~ *pʰaɪ+liíˊ-ta*	'to sell + Pass + Ind'

A singly-linked H surfaces on the heavy syllable where a doubly-linked H would otherwise be expected. Note that the above phenomenon occurs only when the roots of this class are followed by a derivational suffix. When they are followed by an inflectional suffix, a floating H surfaces as a spreading H on the first two syllables of the words, as shown in (4.24).

(4.24)	kaɪ#-keɬ+ta	'to grind + Future + Ind'
	kʼaɪ#-keɬ+ta	'to spread out + Future + Ind'
	pʰaɪ#-keɬ+ta	'to sell + Future + Ind'

For this phenomenon, I propose the constraint *Spread-in-M-stem (*SpreadMS) which prohibits a H from doubly linked across the root boundary within the domain of an M-stem. This constraint outranks the constraint AlignL.

(4.25) *Spread-in-M-stem (*SpreadMS)



(where # = the right edge of an M-stem)

(4.26) *SpreadMS >> AlignL

As shown in (4.20) above, a floating H surfaces as a spreading H when the root is multisyllabic as in *təáɬəṕ-hi-ta*ʻ to be dirty + Caus + Indɬ. A H can double without incurring a violation of *SpreadMS, and hence it doubles, as expected. In (4.21) above, the form *nolle-kʰií-ta*, where a floating H surfaces on a derivational suffix, is selected as optimal because the form **noɬle-́kʰií-ta*, where a H triples rightward, incurs a violation of *SpreadMS. In (4.23) above, the form *kal-lií-ta*, where a floating H surfaces on a derivational suffix, is selected as optimal because the form **kaɬ-lií-ta*, where a H doubles rightward, also incurs a violation of *SpreadMS. A violation of AlignL is compelled by *SpreadMS. However, in (4.24), the right edge of a root corresponds to that of an M-stem. Therefore, tone doubling does not incur a violation of *SpreadMS. Thus, a spreading H surfaces in *kaɬ#-keɬ+ta*.

In Tableau 4.11 below, the first candidate, where a H is parsed to the first two syllables of a word, is ruled out by its violation of the constraint *SpreadMS. The second candidate, where a heavy syllable remains toneless, is also eliminated by the constraint WTP. The third candidate, where a H is singly linked with the first syllable and a heavy syllable is shortened, violates the constraint MAX (μ) as well as MTA, and it is also ruled

out. The last candidate, where a H surfaces on the derivational suffix, is selected as optimal although it violates the constraint AlignL. A violation of AlignL is compelled.

Tableau 4.11
Input: H

/kal+ lii#-ta/ 'to grind + Pass + Ind'

	*SpreadMS	WTP	MAX (μ)	AlignL	MTA
H / \ kal+lii#-ta	*!				
H | kal+lii#-ta		*!			*
H | kal+li<i>#-ta			*!		*
H | ☞ kal+lii#-ta				*	

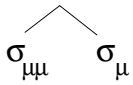
Alternatively, one could argue propose a revised version of the constraint Weight-to-Tone-Principle in (4.27).

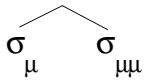
(4.27) Weight-to-Tone-Principle (WTP)
A heavy syllable should be aligned with the left edge of a H.

This alternative would be proposed by observing the fact that heavy syllables show asymmetry in distribution within words.[4] When a floating H is parsed to the two adjacent syllables, a heavy syllable can occur at the left edge of a H, as in (4.28a), but it cannot occur at the right edge of a H, as in (4.28b). The representation in (4.28b) can be ruled out by the revised constraint in (4.27) because the second heavy syllable is not aligned with the left edge of a H. Y.-H. Chung 1991a reports one word, where a heavy

[4] I owe the insight of the following argument to Elizabeth Hume (personal communication).

syllable cannot be aligned with the left edge of a H, that is, *muúńtiíˊ*'leper'. This word has a floating H in UR, and the floating H is parsed to the two heavy syllables of the word. The second heavy syllable cannot be aligned with the left edge of a H. However, I argue that this word should be transcribed as a trisyllabic word like *muúńtiŋ́i*. A heavy syllable tends to be shortened on the surface when it does not have a H on the surface. In Chapter 6, it will be shown that every prosodic phrase (P-phrase) can have only one H due to the constraint Obligatory Contour Principle. When this word is used in a binary branching P-phrase like *cʰaǩʰaˊn muntiŋi* 'nice leper', the word *muúńtiŋ́i* 'leper' is toneless. The first heavy syllable is shortened in this context, whereas the second and third light syllables remain as they are. If Y.-H. Chung's 1991a transcription were correct, the word should be realized as **cʰaǩʰaˊn munti*. However, this is not the case. Assuming the word is *muúńtiŋ́i* 'leper', it is not a counterexample to the above generalization.[5]

(4.28) a. 

b. * 

However, the above generalization is correct only within the domain of a word. In Chapter 6, it will be shown that a floating H can doubles rightward across a word boundary. Therefore, the representation in (4.28b) is found in the phrase *hiń hoóɬaŋi* 'white tiger', where a heavy syllable is not alighed with the left edge of a H. Due to this problem, this alternative is not adopted in this thesis.

To sum up, tone cannot doubles across a root boundary within an M-stem due to the constraint *SpreadMS. Since this constraint outranks AlignL, a violation of AlignL is compelled.

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5 There is another word, which is transcribed differently from Y.-H. Chung 1991a, that is *moŋtiŋ́i* 'stick'. She transcribed this word as *moŋtiíˊ* omitting the intervocalic nasal consonant. Additional words, which have the sequence *-iŋi-*, are *kuúŋ́tiŋ́i* 'hip' and *əəŋ́tiŋ́i* 'another expression of the word 'hip''.

4.3.3 Tones in Nine Verbs

The following monomoraic stems exhibit two different tone patterns depending on the type of the following inflectional suffixes. Examples in (4.29) are cited from Y.-H. Chung 1991a:156.

(4.29)

cu-	'to give'	*po-*	'to see'
ʧu-	'to place'	*o-*	'to come'
nu-	'to defacate'	*na-*	'to be born'
ka-	'to go'	*ca-*	'to sleep'
ha-	'to do'		

When the stems in (4.29) combine with the inflectional suffixes in (4.30a), they behave like stems of the Floating H Class. Thus, the H parses to the first two syllables of the word, as indicated in (4.30b). In (4.30b), the stem vowel *u* and the following suffix *ə* are realized as *oo* in the forms *coóʧ-ta´* 'to give + Past + Ind' and *coó-sə´* 'to give + Connec1'. This segmental-prosodic change will be dealt with in Chapter 8.

(4.30)

a. Suffixes that cause tone doubling		b. Examples	
Honorific:	/-si/	*cu-si-ta*	'to give + Hon + Ind'
Propositive:	/-so/	*ʧu-so´*	'to give + Propo'
Retrospective:	/-təla/	*ʧu-təla*	'to give + Retro'
Present:	/-nən/ ~ /-n/	*ʧu-n-ta´*	'to give + Present + Ind'
Formal Pol:	/-simni/ ~ /-mni/	*ʧu-simni-ta*	'to give + Formal Pol + Ind'
Interrogative:	/-na/	*ʧu-na´*	'to give + Interro1'
Past:	/-ət/	*ʧoóʧ-ta´*	'to give + Past + Ind'
Infinitive:	/-ə/	*ʧoó-sə´*	'to give + Inf + Connec1'

On the other hand, the stems in (4.29) behave like the stems of the Prelinked H Class when they combine with the inflectional suffixes in (4.31).

(4.31) Suffixes that do not cause tone doubling

Relativizer:	/-n/	Prospective:	/-l/
Effective:	/-ni/	Objective:	/-lo/
Conditional:	/-mən/	Adversative:	/-na/
Indicative:	/-ta/	Connective2:	/-ko/

Future: /-ket/ Projective: /-tolok/
Imperative3: /-kəla/

A non-spreading H surfaces on a root when the root is followed by a moraless or monomoraic inflectional suffix, as shown in (4.32a). A non-spreading H is realized on the penultimate syllable of a word when a root is followed by inflectional suffixes which are longer than monosyllabic, as indicated in (4.32b). These tone patterns would be automatically explained if we assume that the stems in (4.29) belong to the Prelinked H Class.

(4.32) a. *cu-́n* 'to give + Rel'
ʗu-́l 'to give + Pros'
ʗu-́ni 'to give + Effective'
ʗu-́lo 'to give + Obj'
ʗu-́mən 'to give + Con'
ʗu-́na 'to give + Adver'
ʗu-́ta 'to give + Ind'
ʗu-́ko 'to give + Connec2'
b. *ʗu-toɭok* 'to give + Proj'
ʗu-kəɭa 'to give + Imp3'
ʗu-keɬ-ta 'to give + Future + Ind'

Since words like *cu-́n* 'to give + Rel' and *cu-́l* 'to give + Pros' are monosyllabic, we can not tell whether they really exhibit a non-spreading H. However, in Chapter 5 which deals with the phrase level tonology, I will provide evidence that they exhibit a non-spreading H. Tone doubling occurs across a word boundary. Thus, if the stem *hiń* 'white' containing a floating H in UR is followed by an toneless noun /coŋi/ 'paper', the resulting noun phrase exhibits a spreading H as in *hiń coŋ́i* 'white paper'. However, phrases like *cun coŋ́i* 'the paper that (I) gave' and *cul coŋ́i* 'the paper that (I will) give' exhibit a different tone pattern. Thus, the forms *cu-́n* and *cu-́l* are assumed to have a non-spreading H-tone.

We have two possible alternatives for explaining the two different tone patterns of the nine verbs in (4.29). First, we can assume that the stems in (4.29) belong to the Floating H Class. Assuming that, we need to account for why these stems behave like

stems of the Prelinked H Class when they are combined with the suffixes in (4.31). This alternative is named Hypothesis A. Second, we could alternatively assume that the stems in (4.29) belong to the Prelinked H Class. Then, we should explain why they behave as the stems of the Floating H Class when they are followed by the suffixes in (4.30a). This alternative is called Hypothesis B. I adopt Hypothesis A. After discussing Hypothesis A, I will point out a problem with Hypothesis B.

I argue that the roots in (4.29) belong to the Floating H Class in UR. The tone pattern in (4.30b) is automatically explained by the constraints that have been used in section 4.3.1. In Tableau 4.12 below, the first candidate, where a H is not parsed to any TBU, violates the constraint ParseH. Therefore, it is ruled out. The second candidate, where a H is singly linked with the initial syllable, violates the constraint Minimal Tone Association (MTA). Thus, it is not selected as optimal. The third candidate, where the left edge of a H is not aligned with the left edge of a word, violates the constraint AlignL. Thus, it is also filtered out. The last candidate, where a H is parsed to the first two syllables of a word, is selected as optimal even though it violates the constraint DEP (Assoc). A violation of DEP (Assoc) is compelled by AlignL and MTA.

Tableau 4.12
Input: H

/cu-təla/ ‘to give + Retrospective’

˘	ParseH	MTA	AlignL	DEP (Assoc)
H cu-təla	*!			
H | cu-təla		*!		*
˘ H | cu-təla			*!	*
˘ H / \ ☞ cu-təla ˘				**

It needs to be explained why the nine verbs behave like the stems of the Prelinked H Class when they are followed by the suffixes in (4.31). The observations which will be made below will lead to the following conclusions. A constraint *Spread-in-Irregular-Verb (*SpreadIV) which will be formalized later is required which prevents a floating H from spreading rightward. The constraint AlignL outranks MTA. The constraint *SpreadIV applies only when the stems in (4.29) are followed by the suffixes in (4.31). The suffixes in (4.31) must be marked in the lexicon because they are not distinguishable phonologically or morphologically from those in (4.30a). The stems in (4.29) can be descrived as a group by considering three phonological factors.

As already shown in (4.32) above, a floating H behaves as a prelinked H in certain constructions. Assuming that the constraint #Spread 1 outranks AlignL and MTA, it can be explained why the forms *cu-toǀok* 'to give + Proj' (which violates AlignL) and *cu-́mən* 'to give + Con' (which violates MTA) are more harmonious than **cu-́toǀok* and **cu-́məń* (which violate *SpreadIV).

(4.33) *Spread-in-Irregular-Verb (*SpreadIV) >> AlignL, MTA

Assuming the ranking in (4.33), it is not yet possible to explain why the form *cu-́mən* 'to give + Con' (which violates MTA and Nonfinality) is more harmonious than **cu-məń* (which violates AlignL and Nonfinality). Note that both forms *cu-́mən* and **cu-məń* are evaluated as equivalent by the constraint Nonfinality. It is argued that the constraint AlignL outranks MTA. Therefore, the former (which violates MTA) is evaluated as more harmonious than the latter (which violates AlignL).

(4.34) *SpreadIV >> AlignL >> MTA

Assuming the ranking in (4.34), the optimal outputs can be selected. As shown in Tableau 4.13, if the following suffix is monosyllabic, a H surfaces on the root, violating the constraint Nonfinality. A violation of Nonfinality is forced by the constraint ParseH. The first candidate, where a H is not parsed to any TBU, violates the constraint ParseH. Thus, it is not selected as optimal. The second candidate, where a H is parsed to the first two syllables of a word, violates *SpreadIV. Thus, it is filtered out. The next two candidates are evaluated as equivalent by the constraint Nonfinality. However, the fourth candidate, which violates MTA, is selected as optimal due to the ranking AlignL >> MTA.

Tableau 4.13
Input: H

/cu-ni/ 'to give + Effective'

˘	ParseH	*SpreadIV	Nonfinality	AlignL	MTA	DEP (Assoc)
H cu-ni	*!					
˘ H / \ cu-ni		*!				**
˘ H | cu-ni			*	*!		*
˘H | ☞ cu-ni ˘			*		*	*

As shown in Tableau 4.14, if the following suffix is multisyllabic, a H surfaces on the penultimate syllable of the word, violating the constraint AlignL. A violation of AlignL is forced by Nonfinality. The first candidate, where a H is not parsed to any TBU, violates the constraint ParseH. Thus, it is ruled out. The second candidate, where a H is parsed to the first two syllables of a word, violates *SpreadIV. Thus, it is not optimal. The third candidate, where a H is parsed to the initial syllables of a word,

violates Nonfinality as well as MTA, and thus it is not selected as optimal. The fourth candidate, where a H surfaces on the final syllable of a word, violates Nonfinality as well as AlignL. Thus, it is filtered out. The last candidate, where a H is parsed to the penultimate syllable of a word, is selected as optimal even though it violates AlignL. A violation of AlignL is compelled by Nonfinality.

Tableau 4.14
Input: H

/cu-tolok/ 'to give + Proj'

˘	ParseH	*SpreadIV	Nonfinality	AlignL	MTA	DEP (Assoc)
H cu-tolok	*!					
˘H / \ cu-tolok		*!				**
˘H | cu-tolok			*!		*	*
˘ H | cu-tolok			*!	*		*
˘ H | ☞ cu-tolok ˘				*		*

The constraint *SpreadIV applies only when the stems in (4.29) are followed by the suffixes in (4.31). The suffixes in (4.31) must be marked in the lexicon because they are not distinguishable phonologically and morphologically from those in (4.30a). Both groups of the suffixes are inflectional. Both groups of suffixes share certain phonological properties, and thus they are not distinguishable. For instance, the Adversative Suffix /-na/ belongs to (4.31), whereas the Interrogative Suffix /-na/ belongs to (4.30a). Therefore, one of these groups must be marked in the lexicon and it is assumed that the suffixes in (4.31) are marked in the lexicon.

The roots in (4.29) can be distinguishable from the other regular stems of the Floating H Class if the following three phonological properties are considered. All the regular roots that belong to the Floating H Class are listed in (4.35) and (4.36). Roots which end in open syllable are listed in (4.35), while those which end in a closed syllable are in (4.36). Roots are in turn classified into three subgroups according to the nature of onsets: (i) roots beginning with an aspirated consonant (which is [+spread glottis]), (ii) those beginning with a tensed consonant (which is [+constricted glottis]), and (iii) those with a plain consonant. I assume that /s/ is specified for [+spread glottis] in NK Korean.

(4.35)

a. aspirated consonants		b. tensed consonants		c. plain consonants	
pʰu-	'to dip out'	*k'u-*	'to dream'	*me-*	'to weep out'
tʰa-	'to burn'	*t'a-*	'to pick'	*ki-*	'to crawl'
tʰa-	'to get on'	*c'a-*	'to fabricate'	*hi-*	'to be white'
tʰa-	'to mix'	*ʨ'a-*	'to squeeze'		
cʰu-	'to dance'	*ʨ'a-*	'to be salty'		
ʨʰa-	'to become full'	*ɬk'a-*	'to peel'		
ʨʰa-	'to kick'	*k'e-*	'to wake up'		
ʨʰa-	'to attach'	*t'e-*	'to remove'		
ʨʰa-	'to be cold'	*c'e-*	'to tear'		
ʨʰi-	'to hit'	*ʨ'i-*	'to steam'		
ɸʰi-	'to bloom'	*ɬk'ə-*	'to extinguish'		
su-	'to make a soup'	*t'ə-*	'to take off'		
so-	'to shoot'				
sa-	'to be cheap'				
si-	'to write'				

(4.36)

a. aspirated consonants		b. tensed consonants		c. plain consonants	
cʰam-	'to endure'	*k'al-*	'to spread'	*kal-*	'to grind'
ʨʰup-	'to be cold'	*p'al-*	'to suck'	*olh-*	'to be correct'
ɸʰal-	'to sell'	*c'al-*	'to cry (colloquial)'		

All the roots in (4.35) and (4.36) are regular in the sense that they show a spreading H regardless of the types of the following suffixes, as shown in (4.37a–b). One root and suffix are selected out of each subgroup, and their tone pattern is illustrated below:

(4.37) a. Stem plus Suffixes in (4.30a)

pʰu-ket-ta	'to dip out + Future + Ind'
k'u-ket-ta	'to dream + Future + Ind'
me-ket-ta	'to weep out + Future + Ind'

chám-ke-ta	‘to endure + Future + Ind’
ƛ’al-ke-ta	‘to spread + Future + Ind’
kaɬ-ké-ta	‘to grind + Future + Ind’

b. Stem plus Suffixes in (4.31)

phú-toɬok	‘to dip out + Proj’
k’ú-toɬok	‘to dream + Proj’
mé-toɬok	‘to weep out + Proj’
chám-toɬok	‘to endure + Proj’
ƛ’al-toɬok	‘to spread + Proj’
kaɬ-toɬok	‘to grind + Proj’

In order to distinguish the irregular stems in (4.29) from the other regular stems of the Floating H Class in (4.35) and (4.36), three phonological properties must be considered. First, all nine stems in (4.29) end in an open syllable. Thus, syllable structure should be considered to distinguish the stems in (4.29) from those in (4.36) which end in a closed syllable. Second, all nine stems in (4.29) have dorsal vowels. Thus, vowel quality is an another factor that distinguish the stems in (4.29) from those in (4.35c) which have non-dorsal vowels. Finally, the property of onsets should be considered to distinguish the stems in (4.29) from those in (4.35a–b).

All the stems in (4.35a-b) begin with an consonant which has a laryngeal feature such as [spread glottis] or [constricted glottis]. However, all in (4.29) but /o-/ ‘to come’ and /ha-/ ‘to do’ begin with a plain consonant which does not have laryngeal features. If we assume that the onset is optional, then we can classify all stems in (4.29) but /ha-/ ‘to do’ as a natural class: they do not have laryngeal features. Then, is there any way to define all stem-initial consonants in (4.29) including /h/ as a natural class?

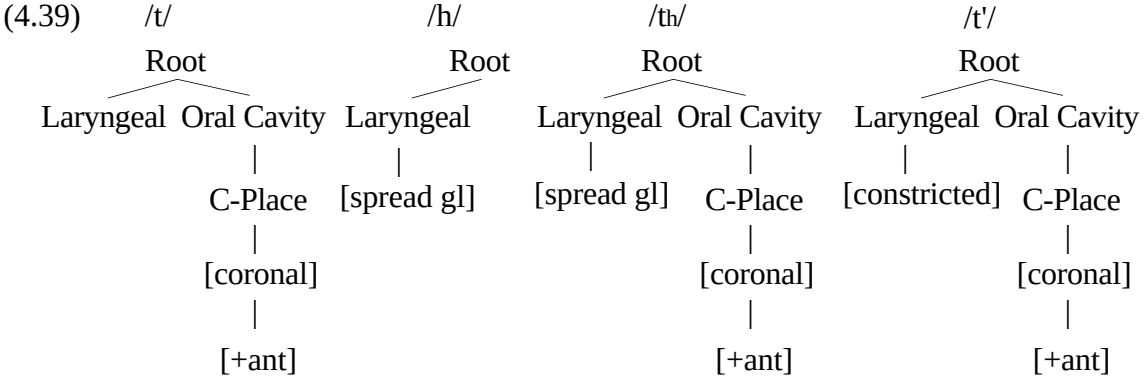
The answer is found in Itoˆ & Mester 1993. Assuming that segments are conceived ‘as headed structures whose head position is occupied by the Place Node,’ Itoˆ & Mester 1993:4 proposes the following:

(4.38) Place Head Hypothesis: Head (Root) = Place (Itoˆ& Mester 1993:4)

The above hypothesis states that the head of a Root is a Place Node. I will assume that the other non-head nodes are 'dependent' nodes. The concept of 'dependent' is defined as relative to the Head Node. If there is a Head Node, then the other nodes are dependent to the Head Node. If there is no head node, the other nodes cannot be defined as dependent to the head node. Furthermore, I will assume that features dominated by the Head Node are defined as head features, while those dominated by the dependent node are defined as dependent features.

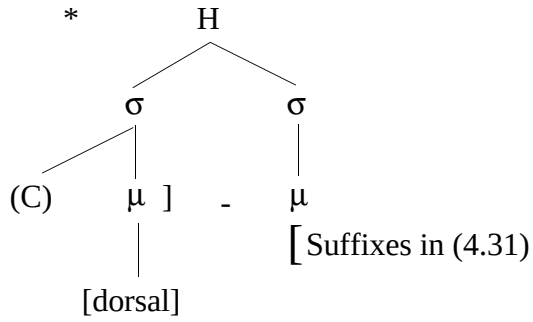
Four different types of segments are shown in (4.39). Some irrelevant features are omitted. Following Clements & Hume 1995, the Laryngeal Node dominates three features, that is, [spread glottis], [constricted glottis], and [±voice]. The feature [±voice] is irrelevant to this discussion, and thus is omitted. The segment /t/ does not dominate any laryngeal features. The segment /h/ dominates [spread glottis]. However, it is a 'headless' segment since it has no Place Node. Since it is headless, the Laryngeal Node is not a dependent node. The other two segments, /tʰ/ and /t'/, dominate either [spread glottis] or [constricted glottis]. These two segments contain the Place Node, and therefore, they have the Laryngeal Node as a dependent node. Thus, by definition, [spread glottis] or [constricted glottis] dominated by a dependent node is a dependent feature. We can define all plain segments and /h/ as segments 'that do not dominate any dependent laryngeal features.

(4.39)



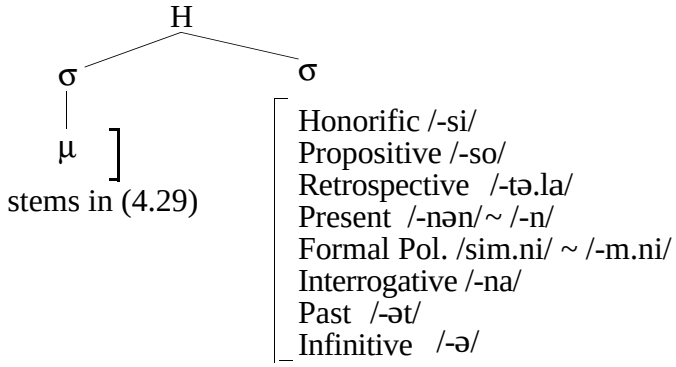
Based on these observations, I argue that a floating H behaves as a prelinked H when the following four conditions are met. (i) when the stem-initial consonant begins with a plain consonant (not aspirated, nor tensed, nor [s]) or /h/ that does not dominate a dependent laryngeal feature, if it occurs. (ii) when stem vowels are [dorsal]. (iii) when roots end in open syllable. (iv) when roots are followed by suffixes in (4.31). Thus, the constraint *SpreadIV in (4.40) is required.

(4.40) *Spread-in-Irregular-Verb (*SpreadIV)



Assuming Hypothesis B which is that the irregular roots in (4.29) have a prelinked H, I need to explain why they show a spreading H when they are followed by the suffixes in (4.30a). Then, I need to assume a positive constraint which causes a prelinked H to double rightward when the stems in (4.29) are followed by the suffixes in (4.30a). The constraint can be roughly formulated like (4.41):

(4.41) Spreading



Constraints differ from rules in that rules tell us what to do and constraints tell us what we should not do. Following McCarthy (1994:5), every constraint is a prohibition. Hypothesis B requires a positive constraint which requires something to occur. This constraint leads to incorrect results. Remember that a prelinked H is prohibited from spreading due to the constraint *Spread-for-SponsoredH (*SpreadSH). If *SpreadSH outranks Spreading, then the effect of Spreading would be invisible. This is not a desirable result. If Spreading outranks *SpreadSH, then both underlying H's would be incorrectly allowed to spread rightward in the context which is specified in (4.41). Furthermore, both underlying H's that occur in the contexts which differ from that in (4.41) incur a violation of the above constraint, and this is incorrect. Therefore, the above constraint leads to incorrect results under both rankings, and therefore this alternative is not adopted.

Additional examples of the Tone Doubling Class are given below:

(4.42) The Floating H Class

a. Monosyllabic with a short vowel

c'a-́	'to squeeze'	*cʰaḿ-*	'to endure'
cʰi-́	'to hit'	*cʰuṕ-*	'to be cold'
ɬaI-	'to grind'	*ɬʰə-́*	'to be tall'
k'aI-	'to spread'	*k'e-́*	'to be awake'
oI-	'to be correct'	*pʰaI-*	'to sell'
p'aI-	'to suck'	*sə-́*	'to write'
tʰa-́	'to ride'	*tʰə-́*	'to open'
t'a-́	'to pluck'		

b. Monosyllabic with a long vowel

aáI-	'to know'	*aáń-*	'to hug'
caák-	'to be short'	*ciít-*	'to build'
cəə́k-	'to be small'	*ɬaáḿ-*	'to wind'
ɬiíI-	'to be long'	*kəə́I-*	'to hang'
k'əə́ḿ-	'to be black'	*k'uúṕ-*	'to roast'
kəə́t-	'to walk'	*məə́I-*	'to be far'
naáḿ-	'to remain'	*noóI-*	'to play'
nəə́ḿ-	'to overflow'	*paáI-*	'to tread'

puúI-	'to blow'	*saáI-*	'to live'
saáḿ-	'to make something of'	*siíń-*	'to wear'
siíṕ-	'to chew'	*taáḿ-*	'to put in'
tʰəáI-	'to take off'	*toóI-*	'to turn'
təáI-	'to reduce'	*təáṕ-*	'to be hot'
əáI-	'to freeze'	*uúṫ-*	'to smile'
yəáI-	'to open'		

c. Disyllabic

cʰakaṕ-	'to be cold'	*kaḿəI-*	'to be slim'
ʊoIíˊ	'to cut into stripe'	*paIaˊ*	'to want'
paḿkaṕ-	'to be glad'	*təIíˊ*	'to give'
puIíˊ	'keep something at work'	*əćiI-*	'to be kindhearted'
təəIəṕ-	'to be dirty'		

4.4 Post-Inflectional Suffixes

Certain suffixes can be attached after inflectional suffixes. These suffixes are named Post-Inflectional Suffixes. They include (i) Delimiters and (ii) Complementizers.

(4.43) a. Delimiters
-man 'even/only'
-(la)to 'as well'

b. Complementizers
-(la)ko

The above post-inflectional suffixes differ from the inflectional suffixes discussed in Chapter 2. First, the two different groups can be attached to the different linguistic units. The inflectional suffixes are attached to an M-stem to form a word, as in *mək-keɬ+ta* 'to eat + Future + Ind' where the two suffixes 'Future' and 'Ind' are inflectional. However, the post-inflectional suffixes can be attached to a word to form another word, as shown in (4.44).

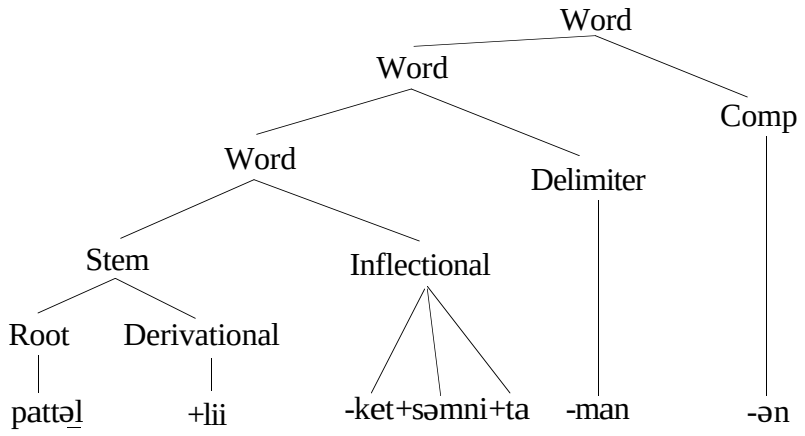
(4.44)	$mə\underline{k}$-keɬ+ta]$_{ω1}$	'to eat + Future + Ind'
	$mə\underline{k}$-keɬ+ta]$_{ω1}$-man]$_{ω}$	'to eat + Future + Ind + even'
	$mə\underline{k}$-keɬ+ta]$_{ω1}$-man]$_{ω}$-to]$_{ω}$	'to eat + Future + Ind + even + as well'
	$mə\underline{k}$-keɬ+ta]$_{ω1}$-man]$_{ω}$-ən]$_{ω}$	'to eat + Future + Ind + even + Complementizer'
	$mə\underline{k}$-keɬ+ta]$_{ω1}$-(la)ko]$_{ω}$	'to eat + Future + Ind + Complementizer'

Second, as already shown in Chapter 3 and in section 4.2, a H can shift only to an adjacent domain due to the constraint Bounding. The tone pattern in (4.44) shows that the inflectional and post-inflectional suffixes form different domains. Note that a H surfaces on the penultimate syllable of the first word domain (ω_1) in (4.44). If the inflectional and post-inflectional suffixes formed the same domain, a H would incorrectly surface on the penultimate syllable of the incorrect domain, as shown in (4.45) below:

(4.45)	mə̲k-keɬ+ta]$_\omega$	'to eat + Future + Ind'
	*mə̲k-ket+tá-man]$_\omega$	'to eat + Future + Ind + even'
	*mə̲k-ket+ta-mań-to]$_\omega$	'to eat + Future + Ind + even + as well'
	*mə̲k-ket+ta-mań-ən]$_\omega$	'to eat + Future + Ind + even + Complementizer'
	*mə̲k-ket+ta-(laƔ)ko]$_\omega$	'to eat + Future + Ind + Complementizer'

Therefore, the post-inflectional suffixes are treated differently from the inflectional suffixes. A complete morphological structure of verbs is given in (4.46). Note that every combination of a word plus a post-inflectional suffix form a word.

(4.46)



These post-inflectional suffixes are assumed to have no H in UR, and there is no evidence that they affect word-level tonology.

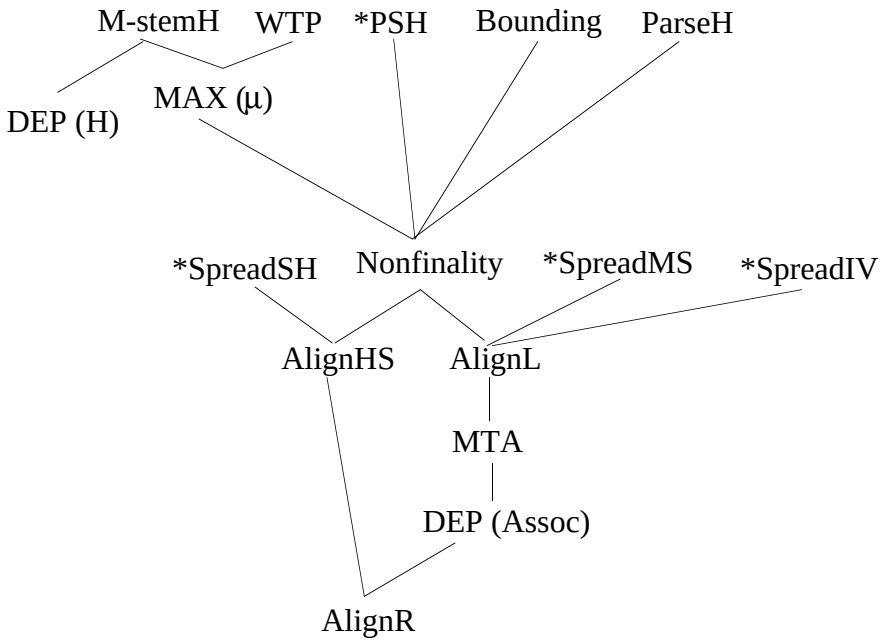
In conclusion, in Chapters 3 and 4, we have arrived at the following relative ranking in NK Korean:

(4.47) a. Undominated (Inviolable) — M-stemH, ParseH, Weight-to-Tone Principle (WTP), *Pre-sponsorH (*PSH), Bounding, *Spread-for-SponsoredH (*SpreadSH), *Spread-in-M-stem (*SpreadMS), and *Spread-in-Irregular-Verb (*SpreadIV)

b.

M-stemH >> DEP (H)	in (3.15)
ParseH >> DEP (Assoc)	in (3.22)
Nonfinality >> AlignR	in (3.27)
Weight-to-Tone Principle (WTP) >> Nonfinality	in (3.31)
MAX (μ) >> Nonfinality	in (3.35)
M-stemH, WTP >> MAX (μ)	in (3.38)
AlignHS >> AlignR	in (3.42)
Nonfinality >> AlignHS	in (3.44)
*PSH, M-stemH, ParseH >> *Nonfinality	in (3.50)
Bounding >> Nonfinality	in (3.60)
AlignL, MTA >> DEP (Assoc)	in (3.70)
M-stemH, ParseH >> MTA, Nonfinality	in (3.71)
AlignL >> AlignR	in (3.72)
AlignL, MTA >> DEP (Assoc) >> AlignR	in (3.73)
Nonfinality >> AlignL	in (3.74)
*Spread-for-SponsoredH (*SpreadSH) >> AlignHS	in (3.76)
*Spread-in-M-stem (*SpreadMS) >> AlignL	in (4.26)
*Spread-in-Irregular-Verb (*SpreadIV) >> AlignL >> MTA	in (4.34)

c. Relative Rankings



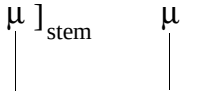
4.5 Comparison with Previous Studies

As shown in section 4.2, not all suffixes cause a tone shift. Only those that begin with a consonant do so. As indicated in (4.48), the H remains on the root-final light syllable when the following suffix begins with a vowel.

(4.48) i̱ṕ-ət+səmni+ta 'to wear + Past + Formal Pol + Ind'
pattə̱-ət+səmni+ta 'to revere + Past + Formal Pol + Ind'

Y. H. Chung 1991a argues (i) that the roots in (4.48) are toneless in UR, and (ii) that a H is assigned to a root-final TBU by the rule of Pre-Vocalic Docking in (4.49).

(4.49) Pre-vocalic Docking (Y.-H. Chung 1991:50)



(where r = root node)

If tone was influenced by the nature of the tone bearing syllable, that would be a phenomenon frequently found in tone languages. However, the problem with the rule in (4.49) is that tone appears to be influenced by the nature of the initial segment of the following syllable.

This thesis argues that the roots in (4.48) have a prelinked H in UR. In section 3.4, it was already shown that monomoraic verbal roots, which show a non-spreading H on the surface, must have a prelinked H in UR. In Chapter 9, three independent arguments will be given for this hypothesis. This thesis also argues that the above phenomenon results from the mismatch between the M-stem and the P-stem boundaries. Recognizing this mismatch, the above phenomenon is automatically explained by the independent constraints. Remember that the M-stem-final consonant is syllabified as an

onset of the following syllable. The right edge of a P-stem is required to be aligned with the right edge of an M-stem by the constraint R-Anchor. The right edge of a P-stem is also required to be aligned with the right edge of a syllable by the constraint Align (P-stem, r: σ, r). Since the constraint Align (P-stem, r: σ, r) outranks R-Anchor, we are faced with two choices. Either we can exclude the syllable (which is constructed across the morphological stem boundary) from the domain of a P-stem or we can include the syllable within the domain of a P-stem. In Korean, the syllable (constructed across the M-stem boundary) is included within the domain of a P-stem. Hence, a mismatch occurs between the right edges of a P-stem and an M-stem. The P-stem includes the syllable constructed across the M-stem boundary, as shown below:

(4.50) i̱ṕ#ət»səmni+ta ‘to wear + Past + Formal Pol + Ind’
pattə̱ɭ#ət»səmni+ta ‘to revere + Past + Formal Pol + Ind’

The mismatch between the M-stem and the P-stem in (4.50) explains why the prelinked H stays on its sponsor. Even though the H in *i̱ṕ#ət»səmni+ta* shifts to the following syllable as in **i̱p#əɕ»səmni+ta*, the resulting form incurs a violation of Nonfinality because the H surfaces on a P-stem-final syllable. This H cannot shift beyond the adjacent domain due to the constraint Bounding. This H cannot be unparsed or deleted due to the constraints ParseH and M-stemH. Therefore, a H stays on its sponsor due to the constraint AlignHS, violating the constraint Nonfinality. A violation of Nonfinality is unavoidable in the examples in (4.50).

As shown in section 4.3.1, a floating H surfaces on the first two syllables of a word, as in *pʰaɭ-keɕ+ta* 'to sell + Future + Ind'. However, as shown in section 4.3.2, when roots of the Floating H Class are followed by a derivational suffix which is heavy, a H surfaces on the derivational suffix, as indicated in (4.51). As shown in Chapter 2, all five variants of the passive suffix are heavy, and therefore, it is not possible to show the

forms like **kal-li#-ta* 'to grind + Pass + Ind' (where the following derivational suffix is light).

(4.51)	a.	*kal+lií#-ta ~ *kaI+lií#-ta*	'to grind + Pass + Ind'
		*k'al+lií#-ta ~ *k'aI+lií#-ta*	'to spread out + Pass + Ind'
		*pʰal+lií#-ta ~ *pʰaI+lií#-ta*	'to sell + Pass + Ind'
	b.	*nolle-kʰií́-ta*	'to surprise + Pass + Ind'

In order to explain why a spreading H becomes a non-spreading H in (4.51), Y.-H. Chung 1991a proposes the rule of Derivational H-Deletion, which deletes a H when a root is followed by a derivational suffix. A H is reassigned to the heavy syllable later in the derivation.

(4.52) Derivational H-Deletion (Y.-H. Chung 1991a:204)

H $]_{stem}$ -----> Ø (Domain = Derivational Stratum)

A spreading H becomes a non-spreading H only when the following derivational suffix is heavy. A floating H surfaces as a spreading H when the following derivational suffix is light, as shown in (4.53). The rule in (4.52), which blindly deletes a H when a root is followed by a derivational suffix, cannot explain this tone pattern. If a floating H were deleted by the rule in (4.52), and a H is reassigned at the derivational stratum, then incorrect forms such as **tə<ə>ləṕ-hi-ta* and **nolle-́kʰi-ta* would be obtained.

(4.53)	*təələ́p-hi-ta*	' to be dirty + Caus + Ind "to make something dirty"
	nolle-́kʰi-ta	' to be surprised + Caus + Ind "to make someone surprised"

For this phenomenon, I propose the constraint *Spread-in-M-stem (*SpreadMS) which prohibits a H from doubly linked across the root boundary within the domain of an

M-stem. As discussed in Chapter 3, the constraint Weight-to-Tone Principle (WTP) requires a heavy syllable to have a H on the surface. The constraint MAX (μ) penalizes deletion of a mora. These three constraints outranks AlignL, and thus a floating H surfaces as a non-spreading H on a heavy derivational suffix in (4.51) above. A violation of AlignL is compelled.

CHAPTER 5

PHRASING

In section 5.1, it will be shown that phrasing is important in the analysis of tone in NK Korean, and one of the diagnostics of phrasing is that only one H can appear within a prosodic phrase. In sections 5.2.1–5, phrasing is considered when contrastive focus is not given to any word. Six constraints are required to map syntactic phrases to prosodic phrases, i.e., Parse-ω, Hierarchical Alignment at Phrase (HAϕ), Phrase Minimality (*{ω}), C-command (CC), *{XP^2}, and Align (ϕ, r; I, r). The constraint C-command (CC) plays the most significant role in phrasing. Phrasing under focus will be studied in section 5.2.6. Three constraints, which are additionally required, are AlignFocusL AlignFL), Align (Focus, r: Non-prominent, l) (**W**ω), and Ident-OO. In section 5.2.7, it will be illustrated that the domain of Stop Nasalization is also the prosodic phrase. Thus, this segmental phenomenon can be used as another diagnostic of phrasing. A ‘word’ is defined as a linguistic unit which can be used in isolation. Certain monosyllabic adverbs cannot be used by themselves. However, there is tonal evidence that these monosyllabic words behave as ‘words’. In section 5.2.8, a brief discussion will be made regarding these ‘dependent' words. Comparison with previous studies will be made in section 5.3.

5.1. Diagnostic of Phrasing

In Chapter 3, I argued that every word must have a H due to the constraint M-stemH.

(5.1) M-stemH — Every M-stem must contain a H.

When a word is used in isolation, it is required to have a H due to the constraint M-stemH, as in *cʰaǩʰań* 'nice', *aɾəl* 'son', *yeéṕ'əń* 'pretty', *talə̲ń* 'different', etc. A word is a linguistic unit which can in general be used in isolation.[1] When more than one word occurs together, a space will be placed between them. For example, a linguistic unit *cʰaǩʰań atəl* 'nice son' consists of two words. It is assumed that a syntactic word corresponds to a prosodic one in NK Korean. Therefore, it is unnecessary to distinguish a syntactic word from a prosodic one. Thus, omitting the epithet 'syntactic' or 'prosodic', the simple term 'word' is used throughout this chapter.

When two words are used together, either the first word or the second word does not have a H, as shown in (5.2). In (5.2a) and (5.2c), the second word loses its H, whereas, in (5.2b) and (5.2d), the first one does.

(5.2)	a.	*cʰaǩʰań atəl*	'nice son'
		cʰaǩʰań mə̲nuli	'nice daughter-in-law'
		yeéṕ'əń satali̲	'pretty ladder'
	b.	*talə̲n aɾəl*	'different son'
		talə̲n mə̲ńuli	'different daughter-in-law'
		talə̲n satalí̲	'different ladder'
	c.	*utóṓŋ mə̲ŋnənta*	'Japanese-style noodle + eat'
		kiḿcʰi mə̲ŋnənta	'Kimchee + eat'
		kə̲ḿuchi mə̲ŋnənta	'mullet + eat'
		hoóṕaŋ́ mə̲ŋnənta	'pumpkin + eat'
	d.	*ku̲ŋ mə̲ŋnəńta*	'soup + eat'[2]
		acʰi̲m mə̲ŋnəńta	'breakfast+ eat'
		tʊsilə̲ŋ mə̲ŋnəńta	'lunch box + eat'

[1] A small group of words which cannot be used in isolation will be discussed in section 5.2.8.

[2] The UR forms of *ku̲ŋ* and *tosilə̲ŋ* are /ku̲ǩ/ 'soup' and /tosilə̲ǩ/. 'lunch box'. The phenomenon of Stop Nasalization occurs within the domain of a P-phrase, and this will be discussed in section 5.2.7.

In order to explain the tone patterns in (5.2), we need to recognize an additional prosodic unit which differs from a word, and this additional prosodic unit, which in general consists of more than one word, will be henceforth named a 'P-phrase'.[3] All the phrases in (5.2) share one thing in common in that they have only one H on the surface. Note that words like *cʰakʰań* 'nice' and *yeép'əń* 'pretty' have one H which is doubly linked to the first two syllables of a word. This tonal property, the occurrence of one H on the surface, will be used as one of the diagnostics of the phrasing, i.e., a P-phrase is a phonological unit which has only one H on the surface (K. Chung 1980, G.-R. Kim 1988, Y.-H. Chung 1991a, and Kenstowicz & Sohn 1996).

The reason of why only one H is allowed in a phrase is explained by the Obligatory Contour Principle (OCP) which prohibits more than one H from occurring within the domain of a P-phrase (Myers 1994).[4]

(5.3) The Obligatory Contour Principle (OCP)
*H H (domain = P-phrase)

This constraint outranks the constraint M-stemH, and therefore a violation of M-stemH is compelled.

(5.4) OCP >> M-stemH

The curly brackets '{}' represent a P-phrase throughout this thesis. In Tableau 5.1, the first candidate, which has two H's, is ruled out by a violation of the OCP. Remember that the word *yəća-l-əl* 'woman + OM' has one H which is doubly linked to the

[3] G.-R. Kim 1988 first used the term 'P-phrase'. I use this term as an abbreviation of 'prosodic phrase' or 'phonological phrase'.

[4] The OCP is one of the central constraints on autosegmental representations which prohibits adjacent identical elements from occurring at the melodic level (Leben 1973, 1978; McCarthy 1986; Odden 1986). Applying the original concept of the OCP to tone, Myers 1994 proposes the constraint in (5.3).

first two syllables of a word. The second candidate, where the second H is deleted, is selected as optimal although it violates M-stemH. A violation of M-stemH is compelled by the OCP. The reason why the first H is retained in this example will be explained in Chapter 6.

Tableau 5.1
Input: *aləmtaʔ-ən yəćaʔ-ləl*
'to be beautiful + Adjectival + woman + Object Marker'
"beautiful woman"

	OCP	M-stemH
{aləmtaʔ-ən yəćaʔ-ləl}	*!	
☞ {aləmtaʔ-ən yəčaʔ-ləl}		*

In tableau 5.2, the first candidate, which has more than one H, is also ruled out due to the OCP. The second candidate, where the first H is deleted is selected as optimal even though it violates M-stemH. A violation of M-stemH is forced by the OCP. The reason why the second H is kept in this example will be explained in Chapter 6.

Tableau 5.2
Input: *talə́-n meńuli-ləl*
'to be different + Adjectival + daughter-in-law + Object Marker'
"different daughter-in-law"

	OCP	M-stemH
{talə́-n meńuli-ləl}	*!	
☞ {talə-n meńuli-ləl}		*

5.2. Phrasing

Regarding the phrasing of sentences without focus, the following descriptive generalizations are found. First, a P-phrase can have maximally three words. If any syntactic phrase has more than three words, it is organized into more than one P-phrase. However, a focused P-phrase can have maximally four words.

Second, the most preferred P-phrase consists of two words. This binary branching P-phrase satisfies four higher ranked constraints Phrase Minimality (*{ω}), C-command (CC), *{XP^2}, and Hierarchical Alignment at Phrase (HAϕ).

Third, the next preferred P-phrase consists of three words. This ternary branching P-phrase satisfies three higher ranked constraints Phrase Minimality (*{ω}), C-command (CC), and *{XP^2}, violating Hierarchical Alignment at Phrase (HAϕ).

Fourth, a unary branching P-phrase is the least preferred one. This unary branching P-phrase satisfies the higher ranked constraint Parse-ω, violating the constraint Phrase Minimality (*{ω}). This unary branching P-phrase is formed (i) when the c-command relationship does not hold between words and (ii) when a prosodic word is used in isolation.

Fifth, membership in a P-phrase when a word is focused is partially determined by the phrasing that occurs in the corresponding unfocused sentences. A focused word always occurs as the leftmost word within a P-phrase. A focused word is always followed by a 'non-prominent' word except when a focused word is used as utterance-final. The term 'non-prominent' means 'non-H-toned'. When a focused word is P-phrase-final in the corresponding sentence where it is unfocused, the focused word and the words in the following P-phrase form a single P-phrase. If the following P-phrase consists of three words, then the resulting focused P-phrase will end up with a four-word P-phrase. The constraint Ident-OO, which requires a correspondence between a non-focused P-phrase and a focused P-phrase, regulates incorporation of the words into a focused P-phrase.

Although tone in P-phrases will be discussed in Chapter 6, it is important to know that there are two ways of deciding which H is retained within a P-phrase. There is a strong tendency for a H to fall on the leftmost word within a P-phrase, as shown in *p'aIli talli-n-ta* 'fast + to run + Present + Ind' "run fast". This generalization will be captured by the constraint AlignPL which requires the left edge of a H-toned word to be aligned with

the left edge of a P-phrase. If a word which contains a prelinked H on a final light syllable is followed by another word, the first word loses its prelinked H, as shown in *{hay̲an cəkoǀi}* ‘white jacket’. This generalization will be captured by the constraint *WFH which prohibits a H from falling on a word-final light syllable when the word is followed by another syllable. When the first monosyllabic word has a floating H in UR, tone doubling occurs across a word boundary, as shown in *hiń hoóǀaŋi* 'white tiger'. Remember that the form *hiń hoóǀaŋi* has one H which is doubly linked to the first two syllables of a P-phrase. Hence, the form *hiń hoóǀaŋi* does not violate the constraint OCP.

A focused word must retain its H due to the constraint *Toneless Focused Word (*TFW) which prohibits a toneless focused P-phrase. (A focused word is in bold type throuthout this chapter.) Although a H on a word-final light syllable is prohibited by the constraint *WFH, it surfaces when focus is given to the word containing a final H, as shown in *{**hay̲áń** cəkoli}* ‘white (rather than black) jacket’, where focus is given to the word ***hay̲áń*** 'white'. Tone doubling, which occurs across a word boundary within an unfocused P-phrase, does not occur across a word boundary in a focused P-phrase, as illustrated in *{**hiń** holaŋi}* 'white tiger'. This phenomenon is explained by the above-mentioned principle that a focused word should be followed by a non-prominent word.

In Chapter 3, it was shown that a heavy syllable tends to have a H on the surface due to the constraint Weight-to-Tone Principle (WTP). As shown in the forms *{hiń hoóǀaŋi}* and *{**hiń** holaŋi}*, a heavy syllable is shortened when it is non-H-toned. See Chapter 6 for tone in P-phrases and see Chapter 9 for the interaction of tone with segments.

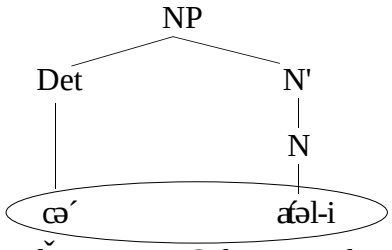
5.2.1. Binary Branching P-phrases

5.2.1.1. Binary Branching P-phrases

A lexical head and a preceding one-word modifier or complement form a single P-phrase. First, a combination of a determiner plus a noun always forms a single P-phrase as

the presence of one H indicates in (5.5). Remember that examples like *cə́afəl-i* that son + Subject Marker, *íafəl-i* 'this son + Subject Marker', and *cə́-lə́n atəl-i* 'that kind of son + Subject Marker' are assumed to have one H which is doubly linked to the first two syllables of a P-phrase. Circles on the syntactic trees represent P-phrases throughout this thesis.

(5.5) a. Determiner plus Noun



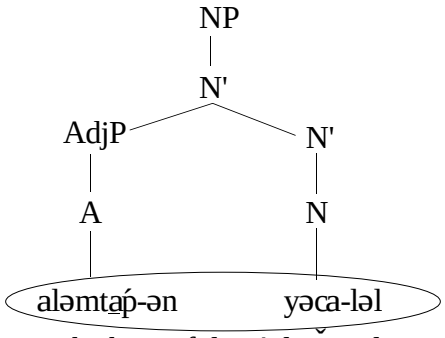
'that + son + Subject Marker'
"that son"

b. Additional Examples

í afəl-i	'this + son + Subject Marker'
kə̲ afəl-i	'that + son + Subject Marker'
kə̲-lə́n atəl-i	'that + kind of + son + Subject Marker'
	"that kind of son (when the son is not present)"
cə́-lə́n atəl-i	'that + kind of + son + Subject Marker'
	"that kind of son (when the son is present)"

A combination of one-word adjective phrase (AdjP) plus a head noun also constitute a single P-phrase as the presence of one H shows in (5.6):

(5.6) a. Adjective Phrase plus Noun



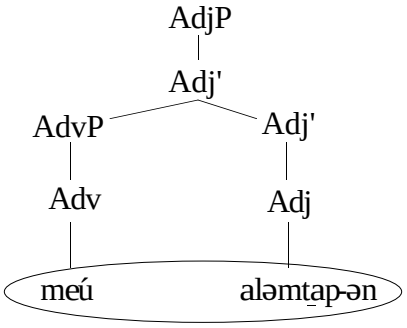
"to be beautiful + Adjectival + woman + Objective Marker"
"beautiful woman"

b. Additional Examples

hay̲an cəkoɭi	'white jacket' (G.-R. Kim 1988:171)
t'əsi̲ń mul	'warm water'
nap'ə̲ń il	'bad affair'

A construction of one-word adverbial phrase (AdvP) and a head adjective also constitute a single P-phrase as the survival of one H indicates in (5.7):

(5.7) a. Adverbial Phrase plus Noun



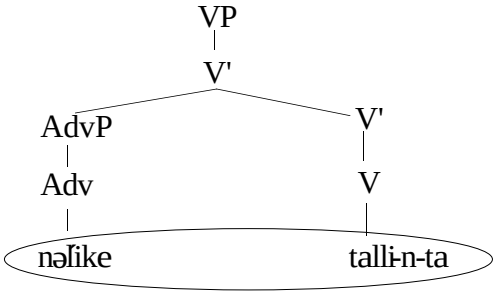
"very + to be beautiful + Adjectival"
"very beautiful"

b. Additional Examples

nəmu-́na aləmt̲ap-ən	'very + Emphatic + to be beautiful + Adjectival' "very beautiful"
nəmu̲ p'alə̲-́n	'too + to be fast + Adjectival' "too fast"

A construction of one-word adverbial phrase (AdvP) plus a head verb also constitute a single P-phrase as the survival of one H indicates in (5.8):

(5.8) a. Adverbial Phrase + Verb



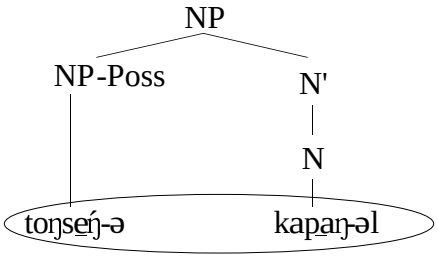
'slowly + to run + Present + Ind'
"run slowly"

b. Additional Examples

p'alli məŋ-nən-ta	'quickly + to eat + Present + Ind'
	"eat quickly"
p'alli talli-n-ta	'fast + to run + Present + Ind'
	"run fast"

A combination of a possessive NP plus a noun is also organized into one P-phrase as the survival of one H indicates in (5.9):

(5.9) a. Possessive NP + Noun



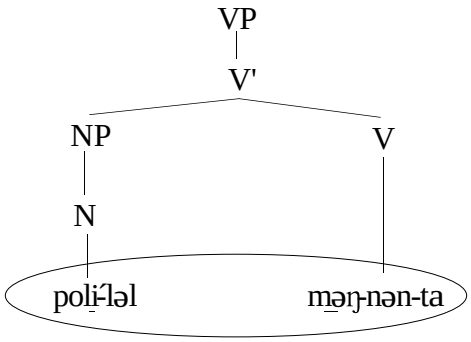
"younger brother + Poss + bag + Object Marker"
"younger brother's bag"

b. Additional Example

toŋsəŋ́-ə caŋnank'am-əl	'younger brother + Poss + toy + OM'
	"younger brother's toy"

Finally, a construction of one-word object NP plus a head verb also constitutes a single phrase as the presence of one H shows in (5.10):

(5.10) a. Object NP + Verb



'barley + Object Marker + to eat + Present + Ind'
"eat barley"

b. Additional Examples

namu̲l-əl mə̲ŋ-nən-ta	'vegetable + OM + to eat + Present + Ind' "eat vegetable"
koŋpu̲-ĺəl ha-n-ta	'study + Object Marker + to do + Present + Ind' "do study"

Every two-word construction in (5.5) to (5.10) forms a single P-phrase as the presence of one H indicates. This phrasing is explained by the following three constraints. First, there exists a constraint Parse-ω, which requires every word to be incorporated into a P-phrase.

(5.11) Parse-ω
Every word must be incorporated into a P-phrase.

Second, the constraint Hierarchical Alignment states that every prosodic constituent is aligned with some (properly) containing prosodic constituent (Ito et. al. 1996:25). This constraint requires maximally binary constituents, disfavoring a degree of branching higher than binary. This can be defined differently according to the level of constituents in prosodic hierarchy. The constraint which is relevant to this chapter is Hierarchical Alignment at Phrase (HA_{ϕ}).

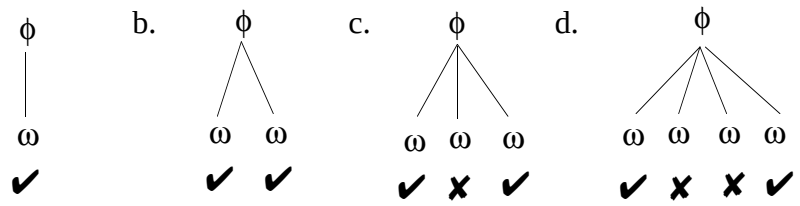
(5.12) Hierarchical Alignment at Phrase (HA_{ϕ})

A word (ω) should be properly aligned with a P-phrase ($_{\phi}$).

Due to this constraint, at least one edge of a word must be aligned with the edges of a P-phrase. The basic effects of the above two constraints are illustrated in (5.13). If only one word is contained in a P-phrase, as in (5.13a), both edges of a word are aligned to the edges of a mother constituent, and thus the form satisfies the constraint HA_{ϕ}. If two words occur in a P-phrase, as in (5.13b), one edge of each word is aligned with the edge of a mother constituent. Thus, this form also satisfies the constraint HA_{ϕ}. However, if more

than two words occurs in a P-phrase, as in (5.13c–d), the phrase-internal word(s) is/are not properly aligned. Hence, the representation in (5.13c) violates the constraint HA_{ϕ} once, and that in (5.13d) does so twice.

(5.13) a. b. c. d.



As shown in (5.13a–b), both unary and binary branching phrases satisfy the constraint HA_{ϕ}. The reason why a binary branching phrase is preferred over a unary branching phrase is explained by the constraint Phrase Minimality (*{ω}):

(5.14) Phrase Minimality (*{ω})
A unary branching P-phrase is prohibited.

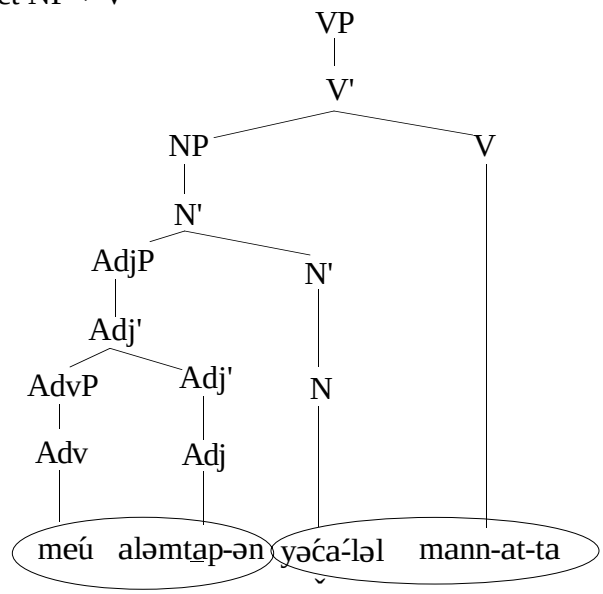
Assuming the above three constraints, we can account for the phrasing found in (5.5) to (5.10). In Tableau 5.3, the first candidate, where two unary branching P-phrases are formed, is eliminated by Phrase Minimality (*{ω}). The second candidate, where both words are not incorporated into a P-phrase, is ruled out by its violation of the constraint Parse-ω. The third candidate, where one binary branching P-phrase is formed, is selected as optimal.

Tableau 5.3
Input: *ələmtaʔ-ən yəca-ləl*
'to be beautiful + Adjectival + woman + Object Marker'
"beautiful woman"

	*{ω}	HA_{ϕ}	Parse-ω
{ələmtaʔ-ən}{yəća-ləl}	*!*		
ələmtaʔ-ən yəćaˀləl			*!*
☞ {ələmtaʔ-ən yəca-ləl}			

Certain sentences which have an even number of words are grouped into binary P-phrases, as shown in (5.15) to (5.17). A construction of a three-word object NP plus a verb is grouped into two P-phrases as the survival of two H's indicates in (5.15).

(5.15) a. Object NP + V

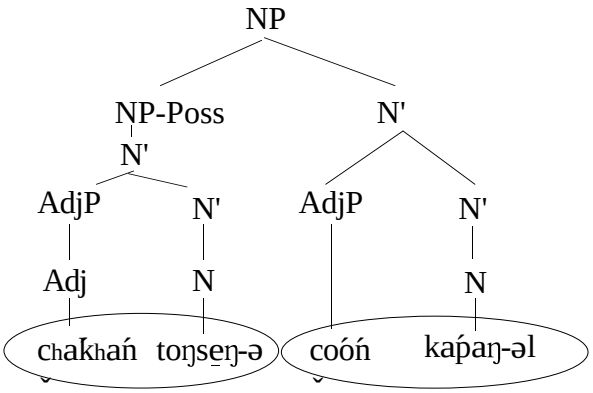


'very + to be beautiful + Adjectival + woman + OM + to meet + Past + Ind'
"met a very beautiful woman"

b. Additional Example
{meú con} {əə́msiǩ-əl məŋ-nən-ta}
'very + good + food + Object Marker + to eat + Present + Ind'
"eat very good food"

A construction of a two-word possessive NP plus an N' is also phrased into two P-phrases as the presence of two H's shows in (5.16). Note that one H is doubly linked to the first two syllables of the second P-phrase *coóń kaṕaŋ-əl* in (5.16).

(5.16) $[AdjP + N]_{NP\text{-}POSS} + [AdjP + N]_{N'}]$

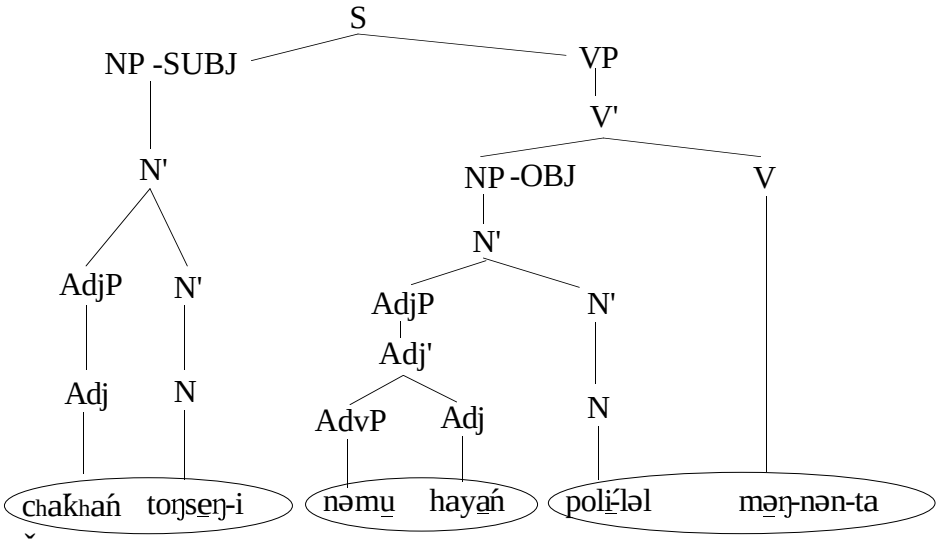


'nice + brother + Poss + good + bag + OM'
"nice brother's good bag"

b. Additional Example
{cʰaǩʰań toŋsēŋ-ə} {coóń caŋ́nank'am-əl}
'younger brother + Poss + toy + OM' "younger brother's toy"

The six-word sentence in (5.17) is grouped into three P-phrases as the survival of three H's indicates:

(5.17) a. $NP_{\text{-}SUBJ} + NP_{\text{-}OBJ} + V$



'nice + brother + too white + barley + OM + to eat + Present + Ind'
"A nice brother eats too white barley"

b. Additional Example
{cʰaǩʰań toŋsēŋ-i} {meú con} {əə́msiǩ-əl məŋ-nən-ta}
'nice + brother + SM + very + good + food + OM + to eat + Present + Ind'
"A nice brother eats very good food"

The phrasing in (5.15) to (5.17) is also predicted by the constraints Parse-ω, Hierarchical Alignment at Phrase (HA_ϕ), and Phrase Minimality (*{ω}). The first four candidates are not optimal because they violate constraints that the optimal form satisfies. The first candidate, where four unary branching P-phrases are formed, violates *{ω}. The second candidate, where a unary and ternary branching P-phrases are constructed, violates both of *{ω} and HA_ϕ. The third candidate, where one four-word P-phrase is formed, violates HA_ϕ. The fourth candidate, where no P-phrases are constructed, violates the constraint Parse-ω. The last one, where two binary branching P-phrases are formed, is selected as optimal.

Tableau 5.4
Input: meu cʰakʰan minsu-ka mə̲ŋ-nən-ta
'very + nice + Minsu + Subject Marker + to eat + Present + Ind'
"Minsu (who is) very nice eats"

	*{ω}	HA_ϕ	Parse-ω
{meú}{cʰaǩʰań}{mińsu-ka}{mə̲ŋnəńta}	*!***		
{meú} {ʧʰaǩʰań minsu-ka mə̲ŋnənta}	*!	*	
{meú cʰa̍kʰan minsu-ka mə̲ŋnənta}		*!*	
meú cʰa̍kʰań mińsu-ka mə̲ŋnəńta			*!***
☞{meú ʧʰakʰan} {mińsu-ka mə̲ŋnənta}			

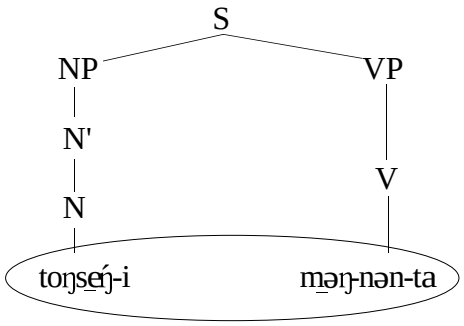
To sum up, P-phrases tend to be binary due to the constraints Parse-ω, Hierarchical Alignment at Phrase (HA_ϕ), and Phrase Minimality (*{ω}).

5.2.1.2. Binary Branching P-phrases and Subject Noun Phrases

Previous Studies (G.-R. Kim 1988 and Kenstowicz & Sohn 1996 for NK Korean, Y.-M. Yu Cho 1990 for Seoul Korean, S.-A. Jun 1993 for Chonnam Korean and Seoul Korean) argue that a subject NP plus a VP are organized into two separate P-phrases. This generalization was captured based on the main sentences as in (5.18) which contain two

words. However, I argue that a subject NP behaves the same as the other NP's, and that a subject NP and a one-word VP form one P-phrase for the following three reasons.

(5.18) a. Subject NP + Verb



'brother + SM + to eat + Present + Ind'
"(My) brother eats"

b. Additional Examples

{mińsu-ka mə̄ŋ-nən-ta}	'Minsu + SM + to eat + Present + Ind' "Minsu eats"
{sənsɐ́ŋnim-i o-si-n-ta}	'teacher + SM + to come + Hon + Present + Ind' "a teacher comes"

First, I asked five non-linguist native speakers of NK Korean to read the following twelve sentences without giving focus to either of the words.[5] Note that the length of Subject NP varies from two to five syllables. Regardless of the length of the subject NP's, all five speakers read all of the following sentences as one P-phrase.

(5.19) a.	{kə́-ka catta}	'the man + SM + to sleep + Past + Ind'
	{kə́-ka ə̄nc-at-ta}	'the man + SM + to sit + Past + Ind'
	{kə́-ka mənt̄ə̄l-ət-ta}	'the man + SM + to make + Past + Ind'
b.	{cʰəlsú-ka catta}	'Chulsoo + SM + to sleep + Past + Ind'
	{cʰəlsú-ka ə̄nc-at-ta}	'Chulsoo + SM + to sit + Past + Ind'
	{cʰəlsú-ka mənt̄ə̄l-ət-ta}	'Chulsoo + SM + to make + Past + Ind'
c.	{əmuí-ka catta}	'mother + SM + to sleep + Past + Ind'
	{əmuí-ka ə̄nc-at-ta}	'mother + SM + to sit + Past + Ind'
	{əmuí-ka mənt̄ə̄l-ət-ta}	'mother + SM + to make + Past + Ind'

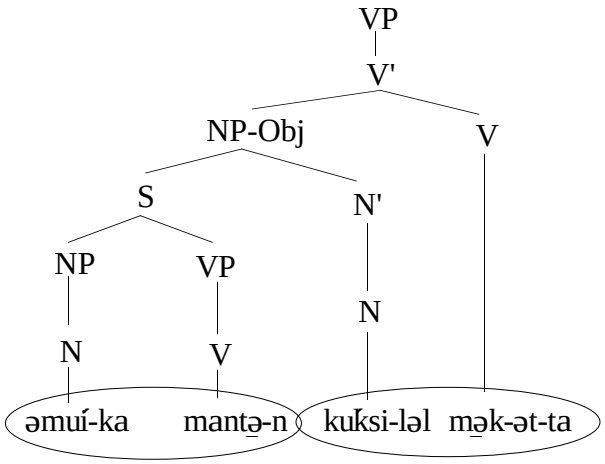
[5] For this experiment, I selected non-linguist native speakers to be sure that knowledge of competing syntactic theories had no influence on intuitions.

d. {halapúci-ka catta} 'grandfather + SM + to sleep + Past + Ind'
{halapúci-ka a̲nc-at-ta} 'grandfather + SM + to sit + Past + Ind'
{halapúci-ka mantə̲l-ət-ta} 'grandfather + SM + to make + Past + Ind'

One can read the above sentences as two P-phrases only when focus is given to the verb. (Phrasing under focus will be discussed in section 5.2.6.)

Second, there is a case where the difference in phrasing results in a syntacticosemantic difference. Previous studies encounter a problem when the above sentences are used as subordinate clauses, as in (5.20). In (5.20), the sentence *əmuí-ka mantə̲-n* 'mother made' modifies the object NP *kuksi-ləl* 'noodle + OM'. In order to correctly represent the meaning of this sentence, the sentence must be organized into two P-phrases, where the subject NP and VP in a relative clause are organized into the same P-phrase.

(5.20)

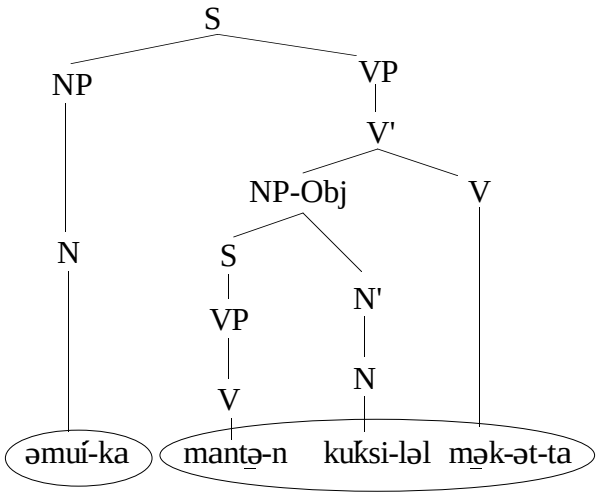


'mother + SM + to make + Relativizer + noodle + OM + to eat + Past + Ind'
"(I) ate noodle (my) mother cooked."

If the subject NP and VP in a relative clause are divided into separate P-phrases, the resulting sentence has a different meaning. The subject NP will be interpreted as the subject of the main clause. Thus, the sentence is interpreted as '(My) mother ate noodle

cooked (by someone)'. This reading is possible only when the given sentence has the structure in (5.21), rather than that in (5.20).

(5.21)

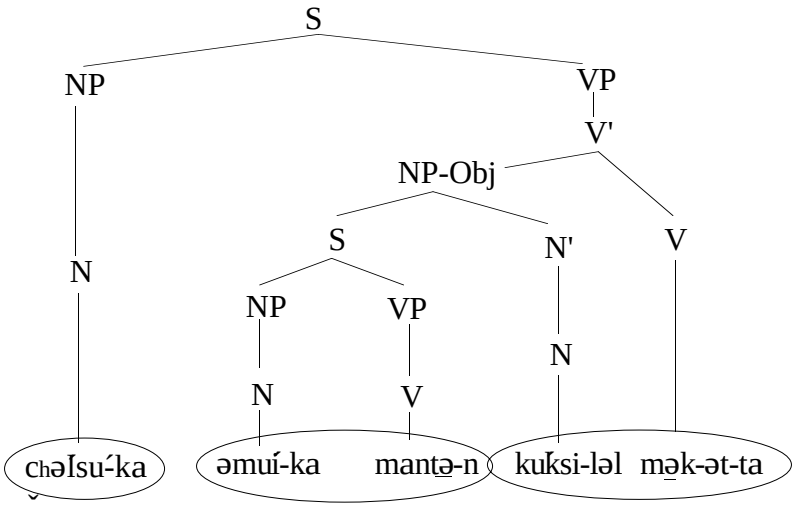


'mother + SM + to make + Relativizer + noodle + OM + to eat + Past + Ind'
"(My) mother ate noodle cooked (by someone)."

The reading in (5.20) shows that the subject NP and VP must be organized into the same P-phrase. Otherwise, we are obliged to devise two different ways of Phrasing, (i) one for main sentences, and (ii) the other for embedded or subordinate clauses.

Assuming that the subject NP and VP are divided into separate P-phrases, one could still argue for the constraint Avoid Ambiguity, which would explain the reading in (5.20). I argue that this is not the issue of ambiguity because the subject NP and VP are consistently organized into the same P-phrase although the sentence has an overt main clause subject NP, as shown below:

(5.22)



'Chulsoo + SM + mother + SM + to make + Relativizer + noodle + OM + to eat + Past + Ind'
"Chulsoo ate noodle (his) mother cooked."

Since the above sentence has an overt main clause subject, the ambiguity would not result from the reading in (5.23). However, the reading in (5.23) is not possible.

(5.23) *{chəlsu-ka} {əmuí-ka} {mantə̲-n kuk̚si-ləl mə̲k-ət-ta}

Finally, I asked the same five native speakers to read the following sentences. Note that the NP's in (5.24) have different functions, i.e., Subject, Object, Locative, Instrumental, etc. Regardless of the difference in functions, all following sentences are read as one P-phrase.

(5.24) a.	Subject	{chəlsuˊka anc-at-ta}	'Chulsoo sat.'
b.	Object	{kimchi-ləl mə̲k-ət-ta}	'ate Kimchee'
c.	Dative	{chəlsuˊeke phal-at-ta}	'sold to Chulsoo'
d.	Locative	{caɭi-e anc-at-ta}	'sat on the place'
e.	Instrumental	{yənphil-lo sə-t-ta}	'wrote with a pencil'
f.	Comitative	{chəlsuˊhako nol-at-ta}	'played with Chulsoo'
g.	Comparative	{chəlsuˊpota əli-ta}	'be younger than Chulsoo'
h.	Causal	{chəlsuˊt'eme nol-at-ta}	'played because of Chulsoo'

Therefore, it is argued that a subject NP behaves the same as the other NP's, and that a subject NP and a one-word VP form the same P-phrase. The phrasing in (5.20) is predicted by the same constraints discussed above.

In Tableau 5.5, the first candidate, where two unary branching P-phrases are formed, is eliminated by Phrase Minimality (*{ω}). The second candidate, where both words are not incorporated into a P-phrase, is ruled out by its violation of the constraint Parse-ω. The third candidate, where one binary branching P-phrase is formed, is selected as optimal.

Tableau 5.5
Input: *toŋsēŕ-i məŋ́-nən-ta*
'younger brother + SM + to eat + Present + Ind'
"A younger brother eats."

	*{ω}	HA_{ϕ}	Parse-ω
{toŋsēŕ-i}{məŋ-nəń-ta}	*!*		
toŋsēŕ-i məŋ-nəń-ta			*!*
☞ {toŋsēŕ-i məŋ-nən-ta}			

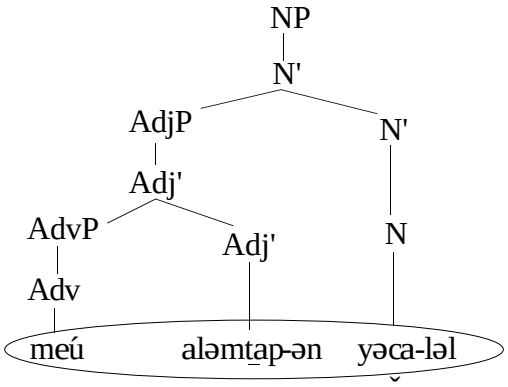
5.2.2. Ternary Branching P-Phrases

I have so far assumed that the three constraints Parse-ω, Phrase Minimality (*{ω}) and Hierarchical Alignment at Phrase (HA_{ϕ}) are unranked. However, the constraints Phrase Minimality (*{ω}) and Parse-ω must outrank the constraint HA_{ϕ} since ternary branching P-phrases are formed in the following constructions.

(5.25) a. $[[Adv + Adj]_{AdjP} + N]_{NP}$
b. $[[Adj + N]_{NP\text{-}OBJ} + V]_{VP}$
c. $[[Adj + N]_{NP\text{-}LOC} + VP]_{VP}$
d. $[[Adj + N]_{NP\text{-}SUB} + VP]_{S}$
e. $[[Adv + Adv]_{AdvP} + V]_{VP}$
f. $[[[N]_{NP\text{-}POSS} + N]_{NP\text{-}POSS} + N]_{NP}$
g. $[[ADjP + N]_{NP\text{-}POSS} + N]_{NP}$

A combination of two-word AdjP plus a noun forms a single P-phrase as the presence of one H indicates in (5.26):

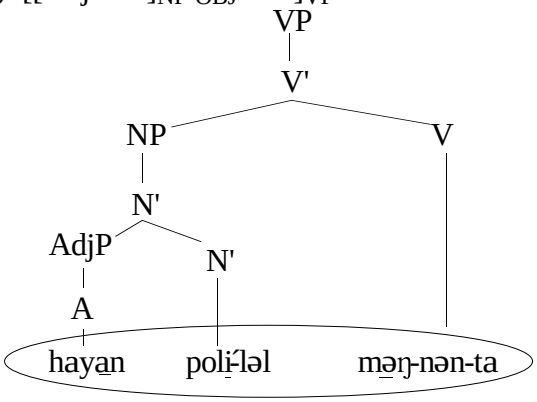
(5.26) $[[Adv + Adj]_{AdjP} + N]_{NP}$



"very + to be beautiful + Adjectival + woman + Objective Marker"
"very beautiful woman"

A construction of two-word NP_{-OBJ} plus a verb constitutes a single P-phrase as the survival of one H shows in (5.27):

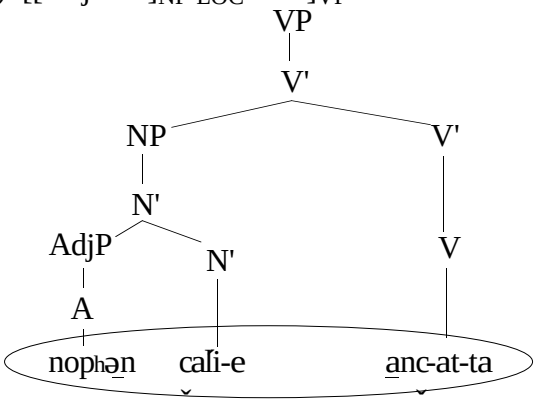
(5.27) $[[Adj + N]_{NP\text{-}OBJ} + V]_{VP}$



'white + barley + Object Marker + to eat + Present + Ind'
"eat white barley"

A construction of two-word NP_{-LOC} plus a verb constitutes a single P-phrase as the survival of one H shows in (5.28):

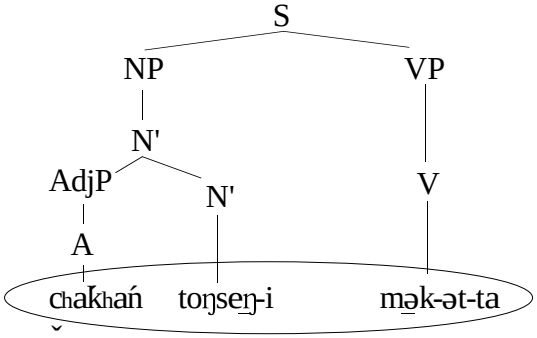
(5.28) $[[Adj + N]_{NP\text{-}LOC} + V']_{VP}$



'high + position + Locative + to sit + Past + Ind'
"took a high position"

A combination of two-word $NP_{\text{-}SUB}$ plus one-word VP constitutes a single P-phrase as the survival of one H shows in (5.29):

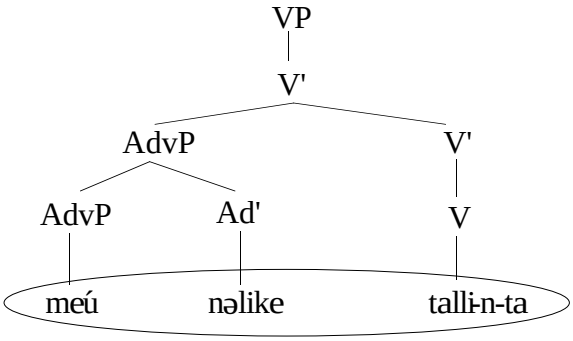
(5.29) $[[Adj + N]_{NP\text{-}SUB} + VP]_{VP}$



'nice + brother + Subject Marker + to eat + Past + Ind'
"A nice brother ate."

A construction of two-word AdvP plus a verb makes a single P-phrase as the presence of one H shows in (5.30):

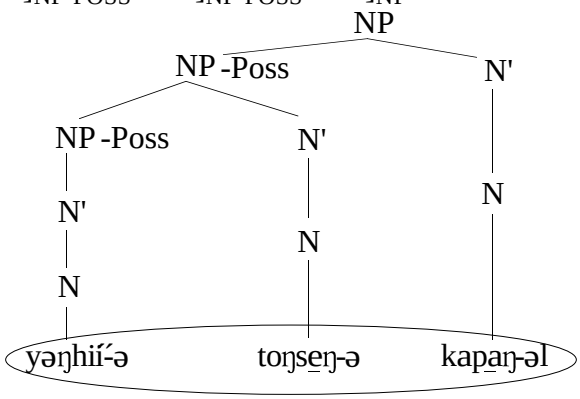
(5.30) $[[Adv + Adv]_{AdvP} + V']_{VP}$



'very + slowly + to run + Present + Ind'
"run very slowly"

A construction of $[NP_{-POSS} + NP_{-POSS} + N]$ forms a single P-phrase as the presence of one H indicates in (5.31):

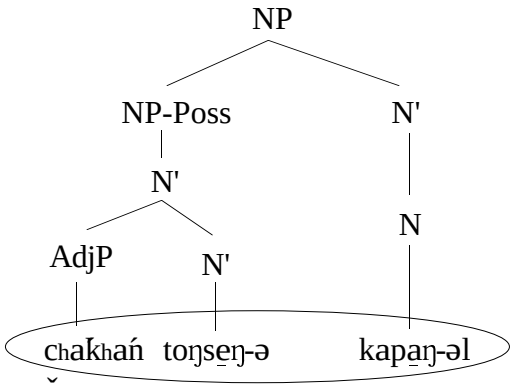
(5.31) $[[[N]_{NP\text{-}POSS} + N']_{NP\text{-}POSS} + N']_{NP}$



“Yunghee + Poss + brother + Poss + bag + Object marker”
‘Yunghee’s brother’s bag’

A combination of two-word NP_{-POSS} plus a noun forms a single P-phrase as the survival of one H shows in (5.32):

(5.32) [[AdjP + N']$_{NP\text{-}POSS}$ + N']



'nice + brother + Poss + bag + Object Marker'
"nice brother's bag"

The phrasing in (5.26) to (5.32) is explained by assuming that the constraints Phrase Minimality (*{ω}) and Parse-ω outrank the constraint HA_{ϕ}.

(5.33) Phrase Minimality (*{ω}), Parse-ω >> HA_{ϕ}

As shown in Tableau 5.6, the first three candidates are not optimal because they violate *{ω}. The fourth candidate, where the first word is not incorporated into a P-phrase, is eliminated by its violation of Parse-ω. The last candidate, where one ternary branching P-phrase is formed, is selected as optimal although it violates HA_{ϕ}. A violation of HA_{ϕ} is forced by Parse-ω and *{ω}.

Tableau 5.6
Input: *meu aləmtaṕ-ən yəca-ləl*
'to be beautiful + Adjectival + woman + Object Marker'
"beautiful woman"

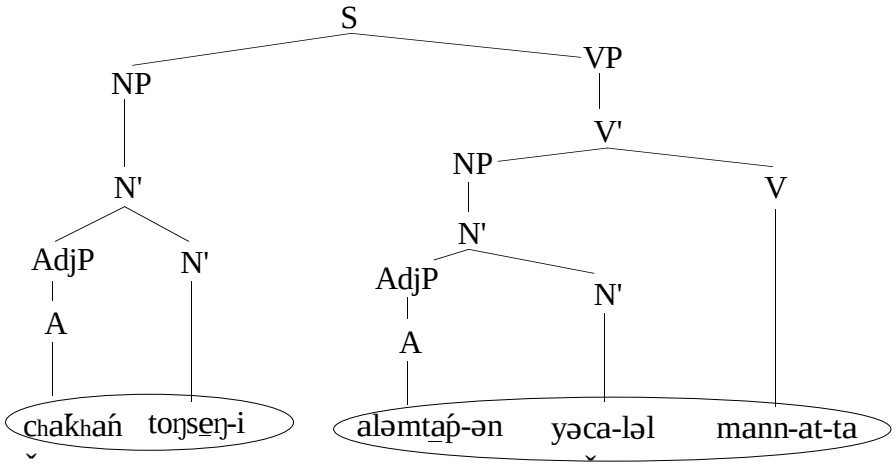
	*{ω}	Parse-ω	HA_{ϕ}
{meú} {aləmtaṕ-ən} {yəća-ləl}	*!**		
{meú} {aləmtaṕ-ən yəcaˇ-ləl}	*!		
{meú aləmtap-ən}{yəćă-ləl}	*!		
meú {aləmtaṕ-ən yəčа-ləl}		*!	
☞ {meú aləmtap-ən yəčа-ləl}			*

In conclusion, ternary branching syntactic phrases tend to be organized into one ternary branching P-phrase due to the fact that Phrase Minimality (*{ω}) and Parse-ω outrank Hierarchical Alignment at Phrase (HA_{ϕ}).

5.2.3 Combination of Binary and Ternary Branching Phrases

One additional constraint is required to explain the phrasing in a combination of binary and ternary branching phrases. For instance, the sentence in (5.34) is organized into two binary and ternary branching P-phrases rather than two ternary and binary branching P-phrases. The output form *{cʰaƙʰań toŋse̲ŋ-i aləmta̲p-ən}{yəćá-ləl mann-at-ta} is not optimal.

(5.34)



'nice + brother + to be beautiful + Adjectival + OM + to meet + Past+ Ind'
"A nice brother met a beautiful woman"

With the constraints discussed so far, it is not possible to choose the real optimal output. The above five-word sentence can be phrased into two different ways, i.e., ternary and binary branching P-phrases and binary and ternary branching P-phrases, as shown in Tableau 5.7. Note that both of these phrasings incur one violation of the constraint HA_{ϕ},

and thus they are evaluated as equivalently harmonious by HA_{ϕ}. However, the second candidate is the real optimal output.

Tableau 5.7
Input: *nəmu̲ aləmta̲ṕ-ən yəca-ləl siicaŋ-esə mann-at-ta*
'too + to be beautiful + Adjectival + woman + OM + Market + LOC + to meet + Past + Ind'
"(I) met a too beautiful woman in the market"

	*{ω}	Parse-ω	HA_{ϕ}
{cʰaƙʰań toŋse̲ŋ-i aləmta̲p-ən} ✓ {ɣəćaˊləl mann-at-ta}			*
✓(✌) {cʰaƙʰań toŋse̲ŋ-i} {aləmta̲ṕ-ən yəca-ləl mann-at-ta}			*

Another constraint C-command (CC) is required to explain the phrasing in (5.34).

(5.35) C-command (CC)
If α and β form a single P-phrase, β must c-command α.

The concepts of 'C-command' (as first discussed and defined by Reinhart 1981) and 'dominence' (as discussed in Haegeman 1991) are given below:

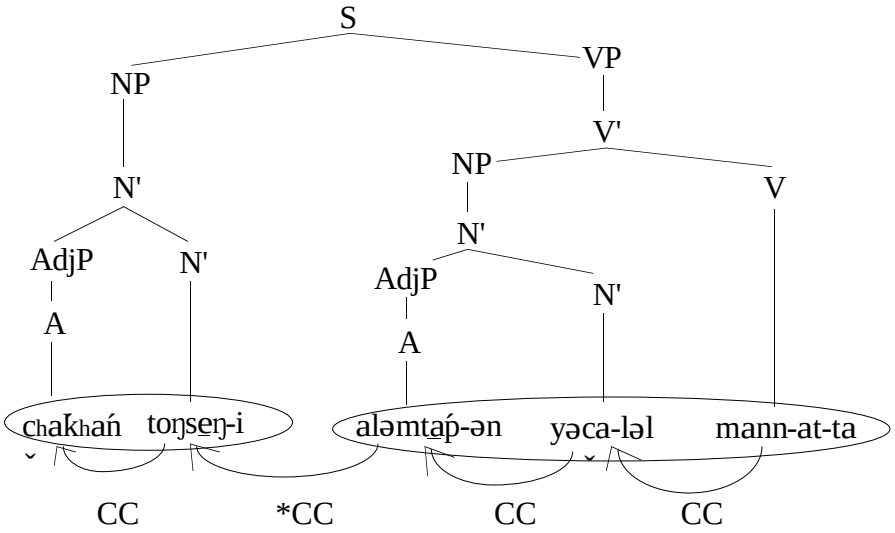
(5.36) a. Node α C-commands node β iff
(i) α does not dominate β and β does not dominate α; and
(ii) the first branching node dominating α also dominates β (Reinhart 1981).

b. Node α dominates node β iff α is higher up in the tree than β and if you can trace a line from α to β going only downwards (Haegeman 1991:75).

As illustrated in (5.37) below, the first branching node dominating the verb *mańn-at-ta* is V' and this V' also dominates the preceding NP *aləmta̲ṕ-ən yəćaˊləl*. Thus, the verb *mańn-at-ta* c-commands the preceding noun *yəćaˊləl* as well as the preceding adjective *aləmta̲ṕ-ən*. The first branching node dominating the noun *yəćaˊləl* is N' and this N' also dominates the preceding adjective *aləmta̲ṕ-ən*. Thus, the noun *yəćaˊləl* c-commands the preceding adjective *aləmta̲ṕ-ən*. However, the first branching node

dominating the adjective *aləmtaʔ-ən* is N' and this N' does not dominate the preceding noun *toŋseŋ́-i*. Thus, the adjective *aləmtaʔ-ən* cannot c-commands the preceding noun *toŋseŋ́-i*. Finally, the first branching node dominating the noun *toŋseŋ́-i* is N' and this N' also dominates the preceding adjective *cʰaǩʰań*. Thus, the noun *toŋseŋ́-i* c-commands the preceding adjective *cʰaǩʰań*. In short, the c-command relationship does not hold between the noun *toŋseŋ́-i* and the adjective *aləmtaʔ-ən*, and this is the reason why these two words cannot be organized into the same P-phrase.

(5.37)



'nice + brother + to be beautiful + Adjectival + OM + to meet + Past+ Ind'
"A nice brother met a beautiful woman"

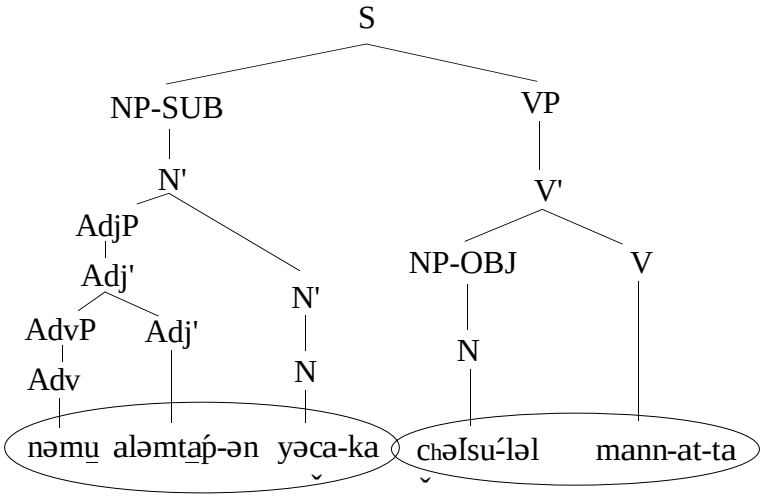
In Tableau 5.8, without justification, it is assumed that the constraint CC outranks HA_{ϕ}. Justifications for the ranking CC >> HA_{ϕ} will be made in the following section. The first candidate, where the noun *toŋseŋ́-i* and the adjective *aləmtaʔ-ən* are organized into the same P-phrase, is ruled out by its violation of the constraint CC. The second candidate, where the noun *toŋseŋ́-i* and the adjective *aləmtaʔ-ən* are divided into separate P-phrases, is selected as optimal although it violates HA_{ϕ}. A violation of HA_{ϕ} is compelled by *{ω} and Parse-ω.

Tableau 5.8
Input: cʰakʰan toŋse̲ŋ́-i *aləmta̲ṕ-ən yəca-ləl mann-at-ta*
'nice + younger brother + to be beautiful + Adjectival + woman + OM + to meet + Past + Ind'
"A nice younger brother met a beautiful woman"

	*{ω}	Parse-ω	CC	HA_{ϕ}
{cʰakʰań toŋse̲ŋ-i aləmta̲p-ən} {yəca-ləl mann-at-ta}			*!	*
☞ {cʰakʰań toŋse̲ŋ-i} {aləmta̲ṕ-ən yəca-ləl mann-at-ta}				*

The sentence in (5.38) is organized into two ternary and binary branching P-phrases as the presence of two H's shows. This phrasing is explained by the constraint CC.

(5.38) NP_{-SUB} + NP_{-OBJ} + V



'too + to be beautiful + Adjectival + woman + SM + Chulsoo + OM + to meet + Past + Ind'
"The too beautiful woman met Chulsoo"

In (5.38), the c-command relationship does not hold only between the third and fourth words. Thus, they are divided into separate P-phrases. The first branching node dominating the verb *mańn-at-ta* is V' and this V' also dominates the preceding NP *cʰəIsu-́ləl*. Thus, the verb *mańn-at-ta* c-commands the preceding noun *cʰəIsu-́ləl*. However, the

first branching node dominating the noun *cʰəlsuˊləl* is V' and this V' does not dominate the preceding noun *yəćaˊka*. Thus, the noun *cʰəlsuˊləl* does not c-command the preceding noun *yəćaˊka*. The first branching node dominating the noun *yəćaˊka* is N' and this N' also dominate the preceding adjective *aləmtaṕ-ən*. Thus, the noun *yəćaˊka* c-commands the preceding adjective *aləmtaṕ-ən*. Finally, the first branching node dominating the adjective *aləmtaṕ-ən* is Adj' and this Adj' also dominates the preceding adverb *meú*. Thus, the adjective *aləmtaṕ-ən* c-commands the preceding adverb *meú*.

In Tableau 5.9, the first candidate, where the adjective *aləmtaṕ-ən* and the noun *yəćaˊka* are organized into the same P-phrase, is ruled out by its violation of the constraint CC. The second candidate, where the adjective *aləmtaṕ-ən* and the noun *yəćaˊka* are divided into separate P-phrases, is selected as optimal although it violates HA_{ϕ}. A violation of HA_{ϕ} is compelled by *{ω} and Parse-ω.

Tableau 5.9
Input: *nəmu aləmtaṕ-ən yəca-ka cʰəlsuˊləl mann-at-ta*
'too + to be beautiful + Adjectival + woman + SM + Chulsoo + OM + to meet + Past + Ind'
"The too beautiful woman met Chulsoo"

	*{ω}	Parse-ω	CC	HA_{ϕ}
{nəmu aləmtaṕ-ən} {yəćaˊka cʰəlsu-ləl mann-at-ta}			*!	*
☞ {nəmu aləmtaṕ-ən yəca-ka} {cʰəlsuˊləl mann-at-ta}				*

In section 5.2.5, we will encounter the examples where the c-command relationship holds among five words. Those five words are divided into two ternary and binary branching P-phrases, and these examples will be explained with one additional constraint Align (ϕ, r; I, r) which requires the right edge of a P-phrase to be aligned with the right edge of an Intonational Phrase.

To sum up, one additional constraint C-command (CC) is required to explain the phrasing in a combination of binary and ternary branching P-phrases. The following

constraints and their ranking are required. Justifications for the ranking CC >> HA_{ϕ} will be made in the following section.

(5.39) Phrase Minimality (*{ω}), Parse-ω, C-command (CC) >> HA_{ϕ}

5.2.4. Unary Branching P-phrases

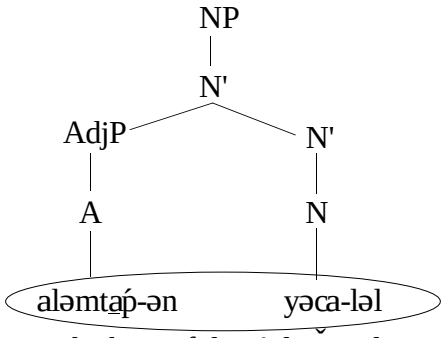
5.2.4.1. C-command and Unary Branching P-phrases

There is evidence that the constraints C-command (CC) and Parse-ω outrank Phrase Minimality (*{ω}). In (5.33), it was already assumed that the constraint Parse-ω outranks HA_{ϕ}. Therefore, the following relative ranking is required:

(5.40) C-command (CC), Parse-ω >> Phrase Minimality (*{ω}) >> HA_{ϕ}

It should be noted that binary branching P-phrases which were discussed in section 5.2.1.1 always satisfy the constraint CC. For instance, the first branching node dominating the noun *yəćaˊ-ləl* is N' and this N' also dominates the preceding adjective *aləmtaṕ-ən*. Hence, the second word *yəćaˊ-ləl* c-commands the first word *aləmtaṕ-ən* in (5.6'), and therefore, the phrasing in (5.6') satisfies the constraint CC.

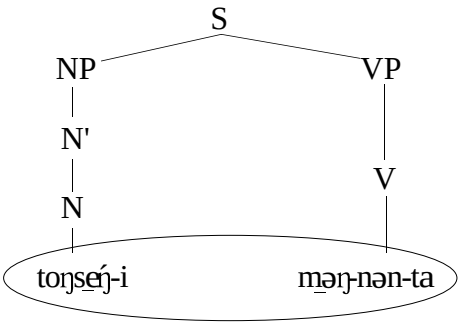
(5.6') Adjective Phrase plus Noun



"to be beautiful + Adjectival + woman + Objective Marker"
"beautiful woman"

In addition, binary branching P-phrases which were discussed in section 5.2.1.2 also satisfy the constraint CC. For instance, the first branching node dominating the verb *məŋ-nəń-ta* is S and the S also dominates the preceding noun *toŋseŋ́-i* . Hence, the second word *məŋ-nəń-ta* c-commands the first word *toŋseŋ́-i* in (5.18'), and therefore, the phrasing in (5.18') satisfies the constraint CC.

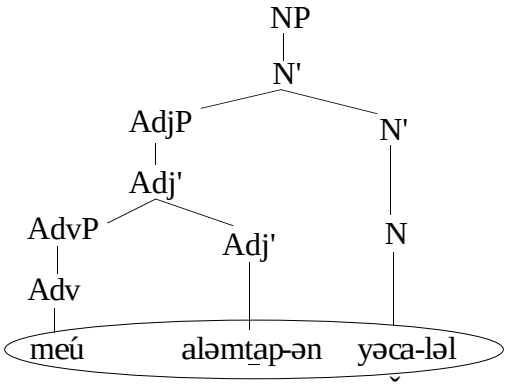
(5.18') Subject NP + VP



'brother + SM + to eat + Present + Ind'
"(My) brother eats"

The ternary branching P-phrases, which were discussed in section 5.2.2, always satisfy the constraint CC. For instance, the first branching node dominating the noun *yəćaˊ-ləl* is N' and this N' also dominates the preceding adjective *aləmtaṕ-ən*. Hence, the third word *yəćaˊ-ləl* c-commands the second word *aləmtaṕ-ən* in (5.26'). The first branching node dominating the adjective *aləmtaṕ-ən* is Adj' and this Adj' also dominates the preceding adverb *meú*. Hence, the second word *aləmtaṕ-ən* c-commands the first word *meú*. Therefore, the phrasing in (5.26') also satisfies the constraint CC.

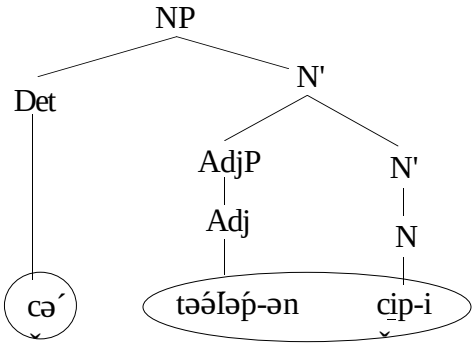
(5.26') [[Adv + Adj]$_{AdjP}$ + N]$_{NP}$



"very + to be beautiful + Adjectival + woman + Objective Marker"
"very beautiful woman"

However, in (5.41), the first and second words cannot be organized into the same P-phrase because both of the first two words show H's. A P-phrase is defined as a prosodic unit which has only one H. Following this definition, the first two words in (5.41) cannot be grouped into the same P-phrase because both of them show H's:

(5.41)



'that + to be dirty + Adjectival + house + Object Marker' (G.-R. Kim 1988:176)
"that dirty house"

Unlike the structure in (5.6'), (5.18'), and (5.26'), the construction in (5.41) does not satisfy the constraint CC if all three words were grouped into a single P-phrase. The first branching node dominating the adjective *təəIəṕ-ən* is N' and this N' does not dominate the preceding determiner *cə.́* Hence, the second word *təəIəṕ-ən*

does not c-command the first word *cə*.́ Thus, if the first and second words were phrased into the same P-phrase, it would incur a violation of CC.

It is argued that the three-word syntactic phrases in (5.41) are divided into two P-phrases, i.e., a unary and binary branching P-phrases, as shown in {cə} {təə́Iəṕ-ən cip-i}. This hypothesis can explain why the first two words in (5.41) show two H's. Under this hypothesis, we are obliged to assume that the constraints C-command (CC) and Parse-ω outrank the constraint Phrase Minimality (*{ω}). Due to this ranking, a unary branching P-phrase, which violates the lower ranked constraint Phrase Minimality (*{ω}) is formed in (5.41).

(5.42) C-command, Parse-ω >> Phrase Minimality (*{ω})

As illustrated in Tableau 5.10, the first candidate, where three unary branching P-phrases are formed, are ruled out by its violations of *{ω}. The second and third candidates, where the first and second words are organized into the same P-phrase, are eliminated by the constraint CC. The fourth candidate, where the first word is not incorporated into a P-phrase, is ruled out by Parse-ω. The last candidate, where the given phrase is organized into two separate P-phrases, is selected as optimal although it violates the constraint *{ω}. A violation of *{ω} is compelled.

Tableau 5.10
Input: /cə təələp-ən cip-i/
'that + to be dirty + Adjectival + house + SM'
"that dirty house"

	CC	Parse-ω	*{ω}	HA_{ϕ}
{cə}{təə́Iəṕ-ən}{ciṕ-i}			**!*	
{cə́təə́Iəp-ən}{ciṕ-i}	*!		*	
{cə́təə́Iəp-ən cip-i}	*!			*
cə́{təə́Iəṕ-ən cip-i}		*!		
☞ {cə}{təə́Iəṕ-ən cip-i}			*	

Alternatively, one could argue that the first word in (5.41) is unparsed, assuming a different constraint ranking. The problem with this alternative will be discussed at the end of this section.

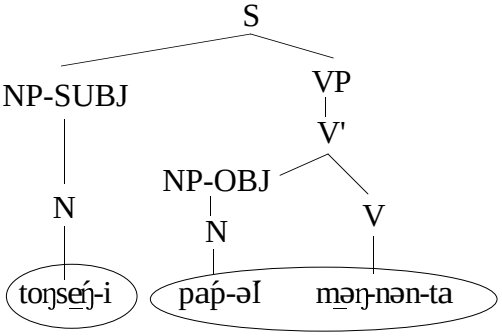
Additional examples are given below. The particles *iˊ* 'this' and *kə̲ˊ* 'the' are classified as determiners.

(5.43) a. {i} {aləmtaṕ-ən kəlim-əl} 'this + beautiful + picture + OM'
"this beautiful picture"

b. {kə̲} {yeéṕ'əˊ-n yəca-ləl} 'the + to be pretty + Adjectival + woman + OM'
"the pretty woman"

The construction in (5.44) has a syntactic structure analogous to that in (5.41), as shown below. The first branching node dominating the object *paṕ-əI* is V' and this V' does not c-command the preceding subject *toŋsə̲ḱ-i*. If these two words were phrased into the same P-phrase, it would incur a violation of CC. Thus, the first two words are divided into separate P-phrases. The first word forms a unary branching P-phrase, violating the constraint Phrase Minimality (*{ω}). A violation of *{ω} is compelled by C-command (CC) and Parse-ω.

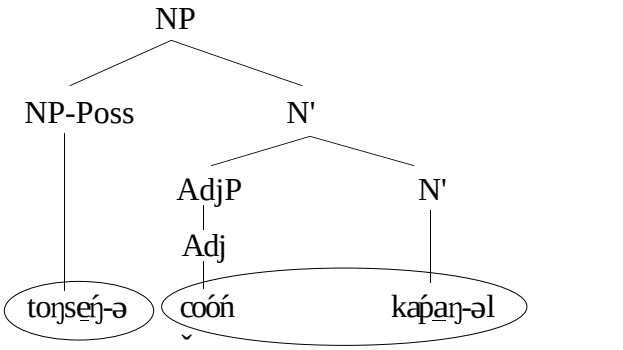
(5.44) NP_{-SUB} + $[NP \quad V]_{VP}$



'brother + SM + rice + OM + to eat + Present + Ind'
"(My) brother eats rice."

The first word in the construction in (5.45) also forms a unary branching P-phrase. The adjective *coóń* ‘good’ does not c-command the preceding NP_{-POSS}, and therefore these two words cannot be organized into the same P-phrase. Thus, the first word forms a unary branching P-phrase, violating the constraint Phrase Minimality (*{ω}). A violation of *{ω} is compelled by C-command (CC) and Parse-ω. In the second P-phrase *coóń kaṕa̲ŋ-əl*, one H is doubly linked to the first two syllables of a P-phrase, and this tone pattern will be discussed in Chapter 6.

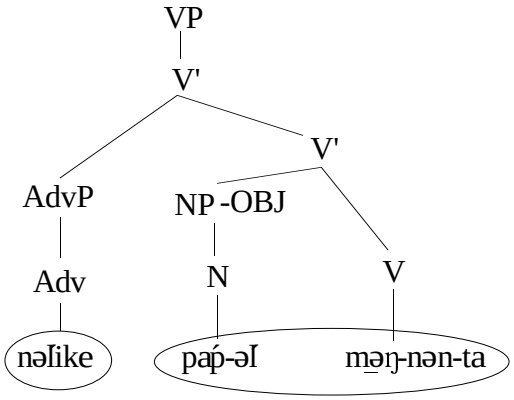
(5.45) $[NP_{-POSS}\ [AdjP\ N]_{N'}]_{NP}$



'brother + Poss + good + bag + Object Marker'
"brother's good bag"

The c-command relationship does not hold between the first two words in (5.46). In (5.46), the first word *nəlike* is an adjunct which combines with a V'. The complement NP-Accusative *paṕ-əl* does not c-command the preceding adjunct *nəlike*, and thus these two words cannot be organized into the same P-phrase. Hence, the first word forms a unary branching P-phrase, violating the constraint Phrase Minimality (*{ω}). A violation of *{ω} is compelled by C-command (CC) and Parse-ω.

(5.46) AdvP + [NP (Object) + V]$_{V'}$



'slowly + rice + Object Marker + to eat + Present + Ind'
"to eat rice slowly"

All types of adjuncts show the same pattern, as shown in (5.47). Except two NP's NP-Accusative and NP-Dative, the other types of NP's (e.g., NP-Locative, NP-Instrumental, NP-Comitative, NP-Causal, NP-like, etc.) are used as adjuncts. The c-command relationship does not hold between the first word (used as an adjunct) and the second word (used as a complement), and thus the first word forms a separate P-phrase.

(5.47) a. NP-LOC + NP-OBJ + V
{pa̲ŋ́-esə} {paʹ-əI mə̲ŋ-nən-ta}
'room + at/in + rice + Object Marker + to eat + Present + Ind'
"to eat rice in the room"

b. NP-INSTRUMENTAL + NP-OBJ + V
{soń-əIo} {paʹ-əI mə̲ŋ-nən-ta}
'hand + with + rice + Object Marker + to eat + Present + Ind'
"eat rice with a hand"

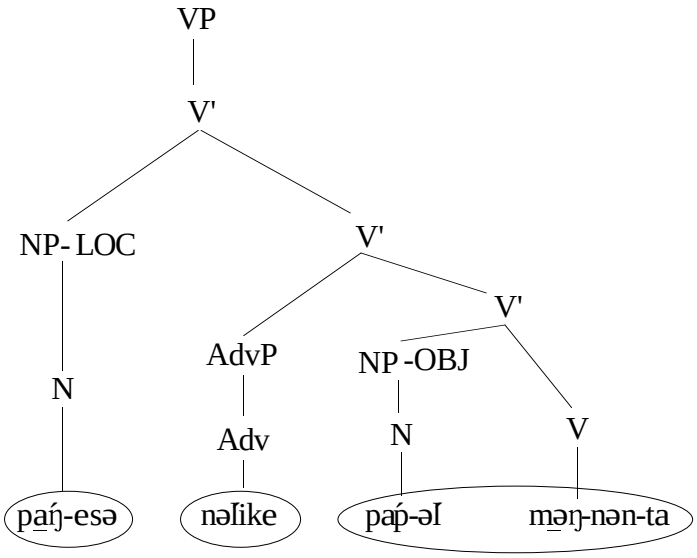
c. NP-Comitative + NP-OBJ + V
{cʰəIsuʹ-hako} {paʹ-əI mə̲ŋ-nən-ta}
'Chulsoo + with + rice + Object Marker + to eat + Present + Ind'
"eat rice with Chulsoo"

d. NP-Causal + NP-OBJ + V
{cʰəIsuʹ-t'eme} {paʹ-əI mə̲ŋ-nən-ta}
'Chulsoo + because of + rice + Object Marker + to eat + Present + Ind'
"eat rice because of Chulsoo"

e. NP-like + NP-OBJ + V
{cʰəlsu-cʰələm} {paʔ-əl məŋ-nən-ta}
'Chulsoo + like + rice + Object Marker + to eat + Present + Ind'
"eat rice like Chulsoo"

When more than one adjunct phrase is attached to a V', they show a hierarchical structure, as illustrated in (5.48). The c-command relationship hold neither between the two adjunct phrases nor between the second adjunct phrase and the NP-Accusative. Therefore, both adjunct phrases form unary branching P-phrases. This is the reason why the first three words show H's on the surface.

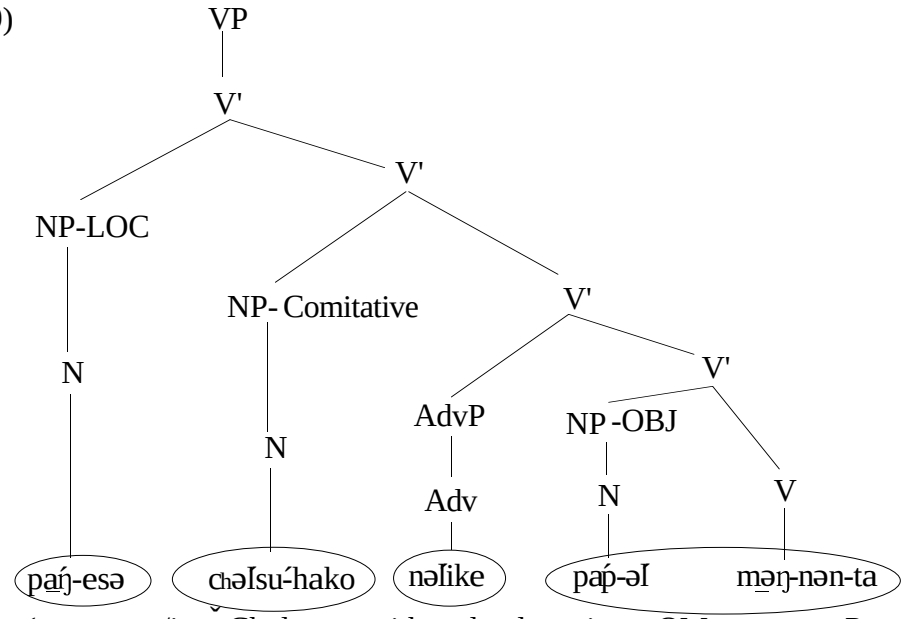
(5.48)



'room + in + slowly + rice + Object Marker + to eat + Present + Ind'
"to eat rice slowly in the room"

Although one additional adjunct phrase is added to the construction in (5.48), all three adjunct phrases form separate unary branching P-phrases, as illustrated in (5.49). The c-command relationship does not hold among the first four words in (5.49):

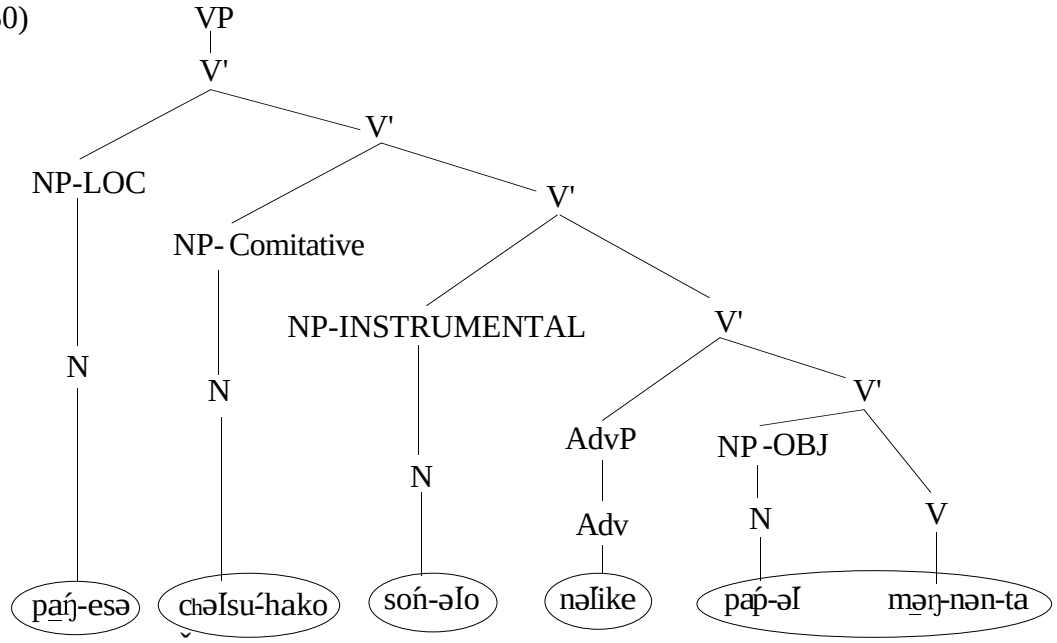
(5.49)



'room + at/in + Chulsoo + with + slowly + rice + OM + to eat + Present + Ind'
"to eat rice in the room"

Even when one additional adjunct phrase is added to the construction in (5.49), all adjunct phrases form separate unary branching P-phrases due to the constraint C-command (CC), as illustrated in (5.50).

(5.50)



'room + at/in + Chulsoo + with + hand + with + slowly + rice + OM + to eat + Present + Ind'
"to eat rice slowly with a hand with Chulsoo in the room"

All examples discussed above are explained by the fact that the constraints C-command (CC) and Parse-ω outrank Phrase Minimality (*{ω}). When the c-command relationship does not hold between the two words, they cannot be organized into the same P-phrase due to the constraint CC. They cannot be left unparsed due to the constraint Parse-ω. Hence, they form separate unary branching P-phrases.

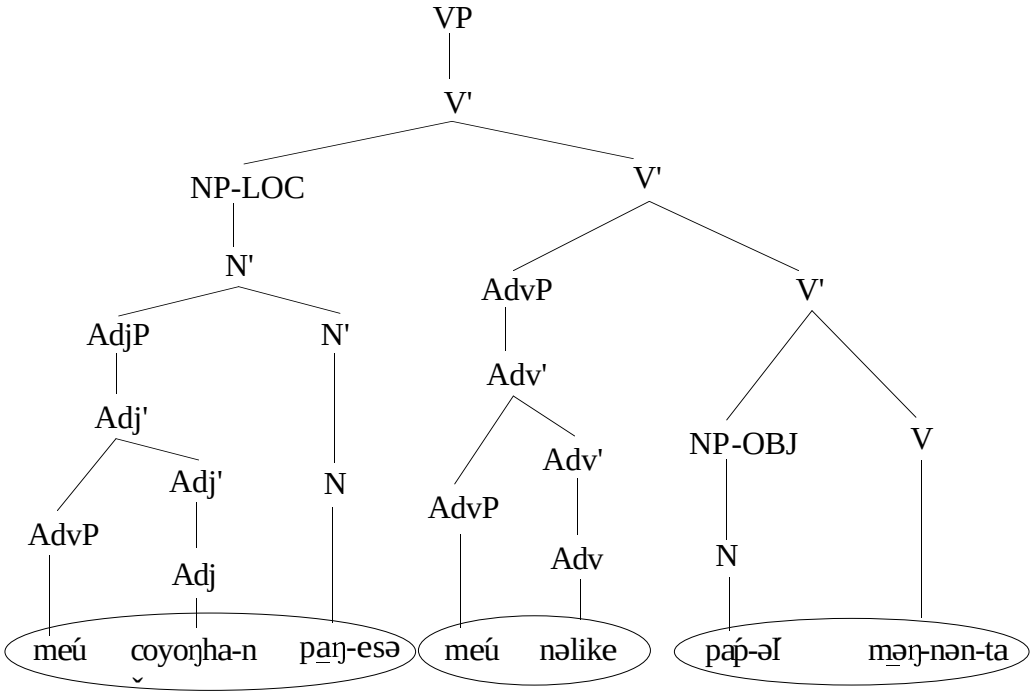
The evaluation of the sentence in (5.48) is illustrated in Tableau 5.11. The first candidate, where the first two words form a binary branching P-phrase, is eliminated by its violation of the constraint CC. The second candidate, where the second and third words form a binary branching P-phrase, is also ruled out by its violation of the constraint CC. The third candidate, where the first two adjuncts are unparsed, is by its violation of the constraint Parse-ω. The last candidate, where two unary branching P-phrases are formed, is selected as optimal although it violates the constraint *{ω} twice. Violations of *{ω} are forced by CC and Parse-ω.

Tableau 5.11
Input: paˍ́ŋ-esə nəlike pap-əl maˍ́ŋ-nən-ta
'room + at/in + slowly + rice + OM + ate' "ate rice slowly in the room"

	CC	Parse-ω	*{ω}
{paˍ́ŋ-esə nəlike} {paṕ-əI maˍŋ-nən-ta}	*!		
{paˍ́ŋ-esə} {nəIike pap-əl} {maˍŋ-náˊ-ta}	*!		
paˍ́ŋ-esə nəIike {paṕ-əI maˍŋ-nən-ta}		*!*	
☞ {paˍ́ŋ-esə} {nəIike} {paṕ-əI maˍŋ-nən-ta}			

When adjunct phrases are modified by the other adjuncts, the resulting phrasing is explained by the constraints discussed so far. The construction in (5.51) is organized into three P-phrases. All three P-phrases in (5.51) satisfy the constraint CC. The other phrasing is not allowed because the c-command relationship hold neither between the third and fourth words nor between the fifth and sixth words. The first P-phrase is ternary, violating the constraint HA_{ϕ}. A violation of HA_{ϕ} is compelled by *{ω}.

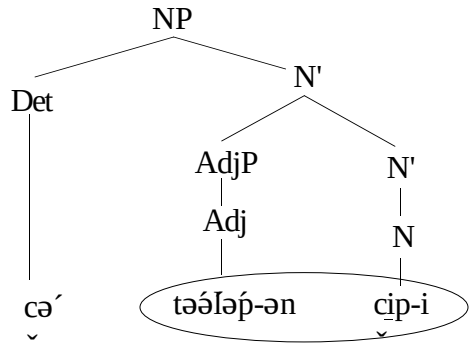
(5.51)



To sum up, the constructions discussed in this section are explained by the assumption that the constraints CC and Parse-ω outrank *{ω}. Binary and ternary branching P-phrases are possible only when the constraint C-command is satisfied. Unless the c-command relationship holds between the two words, they cannot be organized into the same P-phrase. They cannot be left unparsed due to the constraint Parse-ω.

Alternatively, one could argue that the first word in (5.41') is unparsed, assuming the different constraint ranking in (5.52).

(5.41')



'that + to be dirty + Adjectival + house + Object Marker' (G.-R. Kim 1988:176)
"that dirty house"

(5.52) (Tentative) C-command, Phrase Minimality (*{ω}) >> Parse-ω

Since the c-command relationship does not hold between the adjective *təáIəṕ-ən* and the determiner *cə́*, they cannot be organized into one P-phrase. Assuming the ranking in (5.52), the candidate where the first word is left unparsed will be preferred over the candidate where a unary branching P-phrase is constructed. This hypothesis also explains why the first two words in (5.41') show H's on the surface. Every word must have a H on the surface due to the constraint M-stemH which requires every M-stem to have a H. Although a certain word is left unparsed, it must have a H due to the same constraint M-stemH.

As shown in Tableau 5.12, the first candidate, where all three words are organized into the same P-phrase, is eliminated by the constraint CC. The second candidate, where a unary branching P-phrase is formed, is ruled out by its violations of *{ω}. The third candidate, where the first word is not incorporated into a P-phrase, is selected as optimal although it violates the constraint Parse-ω. A violation of Parse-ω is compelled.

Tableau 5.12
Input: /cə təələp-ən cip-i/
'that + to be dirty + Adjectival + house + SM'
"that dirty house"

	CC	*{ω}	Parse-ω	HA_{ϕ}
{cə́təáIəp-ən cip-i}	*!			*
{cə} {təáIəṕ-ən cip-i}		*!		
☞ cə́{təáIəṕ-ən cip-i}			*	

With this alternative, we do not encounter a problem with the phrasing of sentences without focus. However, we encounter a problem with the phrasing of sentences under focus. In section 5.2.6, it will be shown that when a P-phrase-final word is focused, the focused word and the words in the following P-phrase form a focused P-phrase. The

constraint Align (Focus, r: Non-prominent, l) (**W**ω) causes the words in the following P-phrase to be incorporated into a focused P-phrase. The constraint **W**ω requires the right edge of a focused word to be aligned with the left edge of a word within a P-phrase. Even when focus is given to an unparsed word, the words in the following P-phrase are incorporated, as shown in {**cə̲́**tələp-ən c̲i̲p-i}, where the focused word is in bold type. If the first word were assumed to be unparsed, it would be not possible to formulate an alignment constraint which causes the words in the following P-phrase to be incorporated into a focused P-phrase. Therefore, this alternative is not adopted in this thesis.

5.2.4.2. Unary Branching P-phrases and the Constraint *{XP[2]}

Certain adjacent words cannot be organized into the same P-phrase even when the c-command relationship holds between the two words. For instance, the two XP's in the conjoined phrases are not organized into the same P-phrase although the c-command relationship holds between the two XP's, as shown in (5.53).[6] If they were assumed to be organized into one P-phrase as in *{hoóɪaŋ́i-wa koyaŋi}, it would be hard to explain why both words show H's on the surface. They cannot be left unparsed due to the constraint Parse-ω. Therefore, two unary branching P-phrases are formed in (5.53):

(5.53) a. NP and NP
{hoóɪaŋ́i-wa}{koóýaŋ́i} 'tiger + Conj + cat'
"tiger and cat"

b. AdjP and AdjP
{aləmt̲á̲p-ko}{pʰuɪə-n} 'to be beautiful + Conj + blue + Adjectival'
"beautiful and blue"

6 Y.-M. Yu Cho 1990:49 argues that in Seoul Korean the construction of [NP-Conj-NP]$_{NP}$ is also phrased into two separate prosodic phrases, as follows:

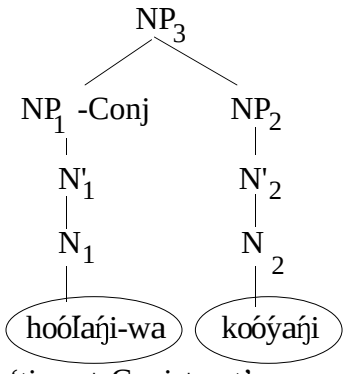
{holaŋi-wa} {koyaŋi} (Y.-M. Yu Cho 1990:49)
'tiger + Conj + cat'
"tiger and cat"

c. AdvP and AdvP
{nəɬi-ko}{tuúńha-́ke} ‘to be slow + Conj + to be stupid + Adverbial’
“slowly and stupidly”

d. VP and VP
{ca-́ko}{noɬatta} ‘slept + Conj + played’
ˇ “slept and played”

As shown below, the first branching node dominating the noun *koóýaŋ́ji* is NP_3, and NP_3 also dominates the preceding noun *hoóɬaŋ́i-wa*. The constraints and their rankings discussed so far would incorrectly select the output *{hoóɬaŋ́i-wa koyaŋi}, where both words are organized into one P-phrase. However, this phrasing is not optimal.

(5.54)



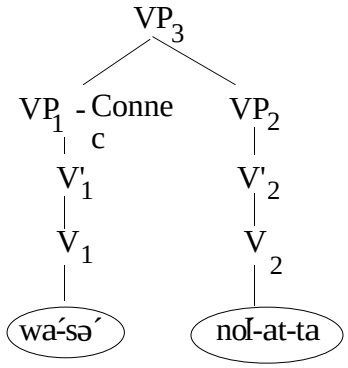
‘tiger + Conj + cat’
“tiger and cat”

When two VP's are connected by the connectives *-sə*, *-taka* and *-ka*, the two connected VP's show the same behavior. They cannot be organized into the same P-phrase although the c-command relationship holds between them. They are divided into two unary branching P-phrases as the presence of two H's in (5.55) shows.

(5.55) VP Connective VP
{waɬta-́ka} {kaɬta} ‘came + Connective + went’ “came and went”
{mə̱k-taka} {noɬatta} ‘ate + Connective + played’ “ate and played”
{wa-́sə} {noɬatta} ‘came + Connective + played’ “came and played”

As shown below, the first branching node dominating the verb *nolatta* is VP_3, and VP_3 also dominates the preceding verb *wá-sə́*. The constraints and their rankings discussed so far would incorrectly select the output *{wá-sə́ nolatta}, where both words are organized into one P-phrase. With this incorrect phrasing, it is not possible to explain why both words show H's on the surface.

(5.56)



'to come + Connective + to play + Past + Ind'
"came and played"

There are two types of verb complements, Accusative and Dative. When both complements are used with a ditransitive verb, the same phenomenon is found, as shown in (5.57):

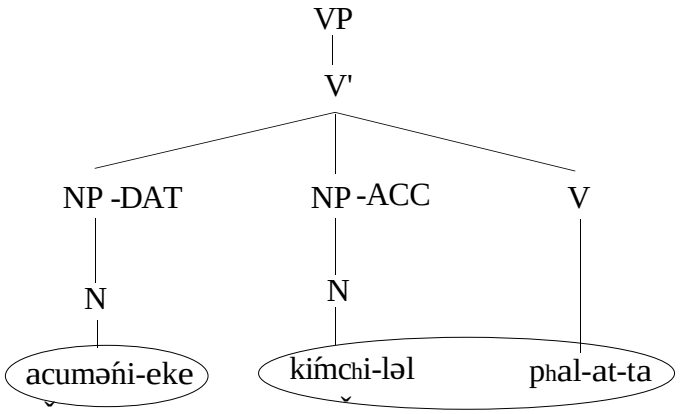
(5.57) NP-DAT + NP-ACC + V
{acuməńi-eke} {kiḿcʰi-ləl pʰal-at-ta}
'housewife + to + Kimchee + Object Marker + to sell + Past + Ind'
"sold Kimchee to a housewife in the market"

{cʰəlsú-eke} {kapa̱ŋ́-əl co-t-ta}
'Chulsoo + to + bag + Object Marker + to give + Past + Ind'
"gave a bag to Chulsoo"

The constructions in (5.57) have the syntactic structure in (5.58). Note that the two complements and a verb form a ternary branching syntactic tree. Hence, the c-command relationship holds among all three words. Therefore, the constraints and their rankings

discussed so far would incorrectly select the output *{acuməńi-eke kimchi-ləl phal-at-ta}, where one ternary branching P-phrases are formed. Assuming this incorrect phrasing, it is not possible to explain why the first two words show H's on the surface.

(5.58)



'housewife + to + market + in + Kimchee + OM + to sell + Past + Ind'
"sold Kimchee to a housewife in the market"

For the constructions in (5.53), (5.55), and (5.57), I propose the constraint *{XP^2}, which prohibits identical maximal projections from being organized into the same P-phrase. The constraint *{XP^2} outranks the constraint *{ω}, and thus a violation of *{ω} is compelled.

(5.59) *{XP^2}
Identical maximal projections cannot be organized into the same P-phrase.

(5.60) *{XP^2} >> *{ω}

In (5.53), the syntactic categories of the two words in the conjoined phrases are always identical, and thus the two words cannot be organized into the same P-phrase due to the constraint *{XP^2}. They cannot be left unparsed due to the constraint Parse-ω. Therefore, they are divided into two unary branching P-phrases, violating the constraint Phrase Minimality (*{ω}).

In Tableau 5.13, the first candidate, where two words are organized into the same P-phrase, is eliminated by its violation of the constraint *{XP^2}. The second candidate, where both words are unparsed, is ruled out by its violation of the constraint Parse-ω. The last candidate, where two unary branching P-phrases are formed, is selected as optimal although it violates the constraint *{ω}. Violations of *{ω} are compelled.

Tableau 5.13
Input: hoolaŋi-wa kooyaŋi 'tiger + Conj + cat'
"tiger and cat"

	CC	Parse-ω	*{XP^2}	*{ω}	HA$_\phi$
{hoóIaŋ́i-wa koyaŋi}			*!		
hoóIaŋ́i-wa koóýaŋ́i		*!*			
☞ {hoóIaŋ́i-wa}{koóýaŋ́i}				**	

In (5.55), two VP's connected by a connective are identical and thus they cannot be organized into the same P-phrase. They are divided into two unary branching P-phrases, as illustrated in Tableau 5.14.

Tableau 5.14
Input: watta-ka katta 'came + Connective + went' "came and went"

	CC	Parse-ω	*{XP^2}	*{ω}	HA$_\phi$
{waɬta-́ka katta}			*!		
waɬta-́ka kaɬtá		*!*			
☞ {waɬta-́ka}{kaɬta}				**	

In (5.57), when a head verb takes two NP complements, the two NP complements are identical and thus they cannot be organized into the same P-phrase. Thus, they form two separate P-phrases. In Tableau 5.15, the first candidate, where the first two words are organized into the same P-phrase, is eliminated by its violation of the constraint *{XP^2}. The second candidate, where the first word is unparsed, is ruled out by its violation of the constraint Parse-ω. The last candidate, where the first word forms a unary branching P-

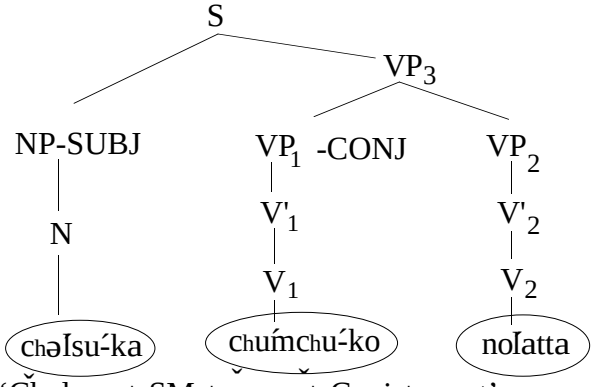
phrase, is selected as optimal although it violates the constraint *{ω}. A violation of *{ω} is compelled.

Tableau 5.15
Input: /acuməni-eke kimchi-ləl phal-at-ta/
'housewife + to + Kimchee + Object Marker + to sell + Past + Ind'
"sold Kimchee to a housewife in the market"

	CC	Parse-ω	*{XP²}	*{ω}	HA_{ϕ}
{acuməńi-eke kimchi-ləl} {pʰaɾ-aɾ-ta}			*!	*	
acuməńi-eke {kiḿchi-ləl phal-at-ta}		*!			
☞ {acuməńi-eke} {kiḿchi-ləl phal-at-ta}				*	

The sentence in (5.61) has a conjoined VP, and this sentence is divided into three unary branching P-phrases as the presence of three H's shows. The first two words cannot be organized into the same P-phrase because the c-command relationship does not hold between them. Note that the first branching node dominating the verb *chuḿchu-ɾ́-ko* is VP_3, and VP_3 does not dominate the preceding subject *chəlsu-ɾ́-ka*. The second and third words cannot be organized into the same P-phrase because they are identical. Therefore, they are divided into three unary branching P-phrases, violating the constraint *{ω}.

(5.61) $[[NP]_{-SUBJ}\ [VP_{-CONJ}\ VP]]$



'Chulsoo + SM + came + Conj + went'
"Chulsoo danced and played."

In Tableau 5.16, the first candidate, where all three words are organized into the same P-phrase, is ruled out by its violation of the constraint C-command (CC) as well as *{XP[2]}. The second candidate, where the first two words form a binary branching P-phrase, is ruled out by its violation of the constraint CC. The third candidate, where the two conjoined VP's are organized into the same P-phrase, is eliminated by its violation of the constraint *{XP[2]}. The fourth candidate, where all three words are unparsed, is ruled out by its violation of Parse-ω. The last candidate, where three unary branching P-phrases are formed, is selected as optimal although it violates *{ω} three times. Violations of *{ω} are compelled.

Tableau 5.16
Input: /cʰəlsu-ka cʰumcʰu-ko no͟ɭatta/ 'Chulsoo + SM + danced + Conj + played'
"Chulsoo danced and played"

	CC	Parse-ω	*{XP[2]}	*{ω}
{cʰəlsú-ka cʰumcʰu-ko no͟latta}	*!		*	
{cʰəlsú-ka cʰumcʰu-ko} {no͟ɭatta}	*!			
{cʰəlsú-ka} {cʰúmcʰú-ko no͟latta}			*!	
cʰəlsú-ka cʰúmcʰú-ko no͟ɭatta		*!**		
☞ {cʰəlsú-ka} {cʰúmcʰú-ko} {no͟ɭatta}				***

Additional examples are given below:

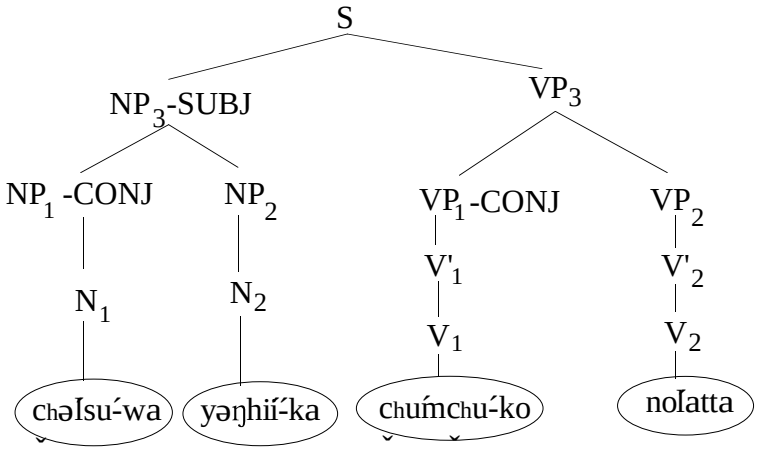
(5.62) a. {cʰəlsú-ka} {maśi-ko} {cʰúmcʰú-n-ta}
'Chulsoo + SM + drink + Conj + dance'
"Chulsoo drinks and dances"

b. {cʰəlsú-ka} {mə͟k-ko} {noɭ-at-ta}
'Chulsoo + SM + ate + Conj + played'
"Chulsoo ate and played"

The sentence in (5.63) has a conjoined NP and VP, and all four words are divided into four separate P-phrases. The conjoined NP's cannot be organized into the same P-phrase because they are identical. The conjoined VP's cannot be organized into the same P-phrase for the same reason. The second and third words cannot be organized into the same P-phrase because the c-command relationship does not hold between them. Note that

the first branching node dominating the verb *cʰuḿcʰuˊ-ko* is VP_3, and VP_3 does not dominate the preceding subject *yəŋhiíˊ-ka*. Therefore, all four words are divided into separate P-phrases.

(5.63) [[NP_{-CONJ} NP]$_{-SUBJ}$ [VP_{-CONJ} VP]]



'Chulsoo + Conj + Younghee + SM + came + Conj + went'
"Chulsoo and Younghee danced and played."

In Tableau 5.17, the first candidate, where the conjoined NP's and VP's are organized into the same P-phrases, is eliminated by its violation of the constraint *{XP^2}. The second candidate, where the second and third words are organized into the same P-phrase, is ruled out by its violation of the constraint C-command (CC). The third candidate, where all four words are unparsed, is eliminated by its violation of the constraint Parse-ω. The last candidate, where four unary branching P-phrases are formed, is chosen as optimal. Violations of *{ω} are compelled.

Tableau 5.17
Input: /cʰəlsu-wa yəŋhii-ka cʰumcʰu-ko no͟latta/
'Chulsoo + Conj + Yunghee + SM + danced + Conj + played'
"Chulsoo and Yunghee danced and played"

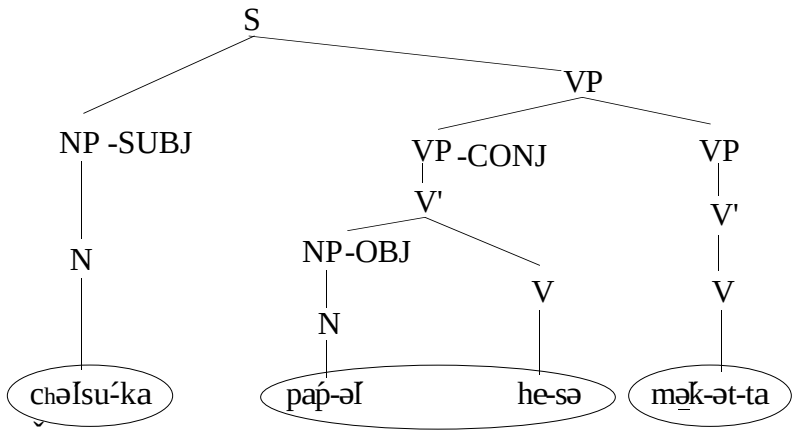
	CC	Parse-ω	*{XP^2}	*{ω}
{cʰəlsú-wa yəŋhi-ka} {cʰumcʰú-ko no͟latta}			*!*	
{cʰəlsú-wa} {yəŋhií-ka cʰumcʰu-ko} {no͟latta} ˇ ˇ	*!	**		
cʰəlsú-wa yəŋhií-ka cʰumcʰú-ko no͟latta ˇ ˇ		*!***		
☞ {cʰəlsú-wa} {yəŋhií-ka} {cʰumcʰú-ko} {no͟latta} ˇ ˇ				****

Additional examples are given below:

(5.64) {cʰəlsú-wa} {yəŋhií-ka} {mə͟k-ko} {maśi-t-ta}
'Chulsoo + Conj + Yunghee + SM + ate + Conj + drank'
"Chulsoo and Yunghee ate and drank."

When a conjoined VP takes an NP object, an NP and a following V form a binary branching P-phrase, as shown in (5.65). In (5.65), the whole VP cannot be organized into the same P-phrase due to the constraint *{XP^2}. The subject NP and the object NP cannot be organized into the same P-phrase due to the constraint CC and *{XP^2}. Hence, the sentence is divided into three P-phrases.

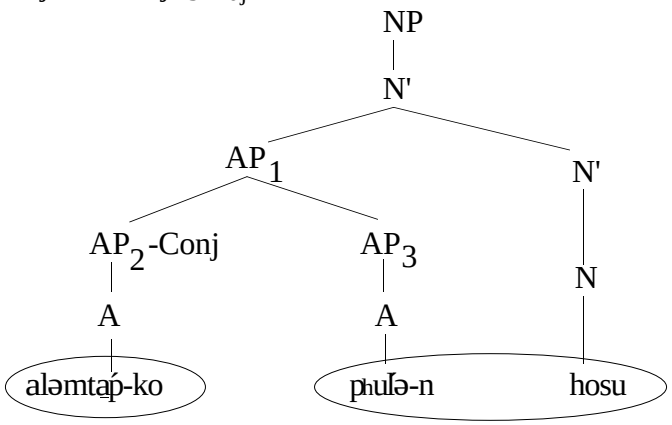
(5.65) [[NP-SUBJ] [[NP-OBJ V']$_{VP\text{-}CONJ}$ VP]$_{VP}$]$_S$



ˇ
'Chulsoo + SM + rice + OM + cooked + Conj + ate'
"Chulsoo [cooked rice]$_{VP}$ and [ate]$_{VP}$ "

In the phrase in (5.66), the head noun *hośu* 'lake' is modified by a conjoined adjective phrase *aləmtaʔ-ko pʰulə-n* 'beautiful and blue'. Although the c-command relationship holds among the three words, the first two words cannot be organized into the same P-phrase due to the constraint *{XP^2}. Thus, the first word forms a separate P-phrase. On the basis of tonal evidence, i.e., the presence of two H's, G.-R. Kim 1988:173 also argues that this syntactic phrase forms two P-phrases, as in (5.66):

(5.66) [[AdjP$_2$ & AdjP$_3$]$_{AdjP1}$ N']



"to be beautiful + Conj + blue + Adjectival + lake"
"beautiful and blue lake"

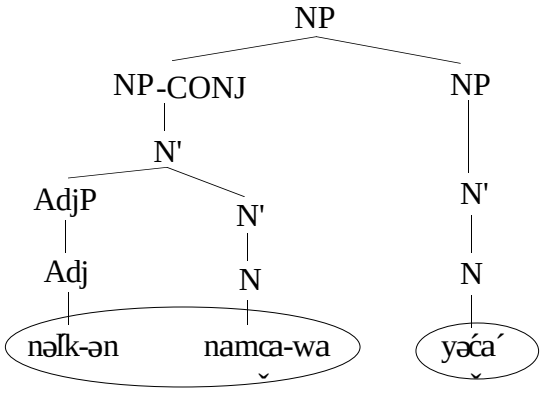
In Tableau 5.18, the first candidate, where all three words are organized into one P-phrase, is ruled out by the constraint *{XP^2}. The second candidate, where the first word is unparsed, is eliminated by the constraint Parse-ω. The last candidate, where the first word forms a unary branching P-phrase, is selected as optimal although it violates the constraint *{ω} once. A violation of *{ω} is compelled.

Tableau 5.18
Input: /aləmtaʔ-ko pʰulən hosu/ 'to be beautiful + Conj + blue + lake'
"beautiful and blue lake"

	*{XP^2}	Parse-ω	*{ω}
{aləmtaʔ-ko pʰulən hosu}	*!		
aləmtaʔ-ko {pʰuɬən hosu}		*!	
☞ {aləmtaʔ-ko}{pʰuɬən hosu}			*

Phrases which are structurally ambiguous are found. First, a noun phrase *nəlkən namca-wa yəca* 'old man and woman' shows two different syntactic configurations. The adjective phrase *nəlkən* 'old' can modify only the immediately following N' *namca-wa*, as in (5.67). In (5.67), the first two words are organized into a binary branching P-phrase, leaving the third word as a unary branching P-phrase. The second and third words cannot be organized into the same P-phrase due to the constraint *{XP^2}. This phrasing is explained by the constraint *{XP^2}.

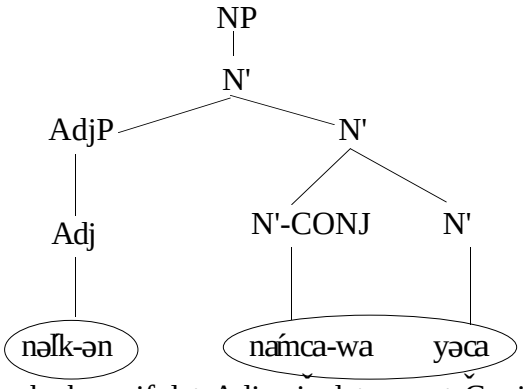
(5.67) [[AdjP N']$_{\text{NP-CONJ}}$ NP]



"to be old + Adjectival + man + Conj + woman"
"[old man] $_{\text{NP}}$and [woman] $_{\text{NP}}$"

On the other hand, an adjective phrase can modify the conjoined N' *namca-wa yəca*, as in (5.68). Then, the second and third words are organized into a binary branching P-phrase, leaving the first word as a unary branching P-phrase. Note that the first branching node dominating the noun *namca-wa* is N' and this N' does not dominates the preceding adjective *nəɬk-ən*. Hence, the c-command relationship does not hold between the first and second words. The constraint *{XP^2} prohibits the identical maximal projections from being organized into the same P-phrase. However, the P-phrase *{namca-wa yəca}* does not violate the constraint *{XP^2} because the two nouns are N-bar's in this syntactic context. This phrasing is explained by the constraint CC.

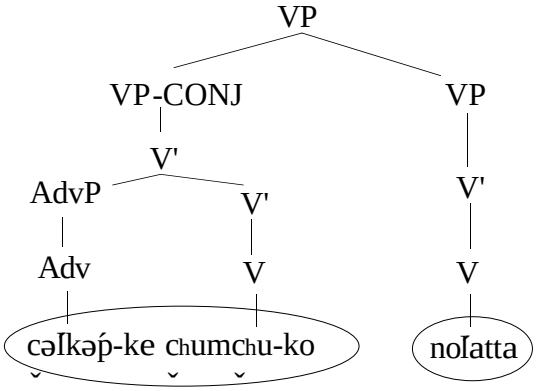
(5.68) [[AdjP [N'$_{-CONJ}$ N']]



'to be beautiful + Adjectival + man + Conj + woman'
"[old]$_{AdjP}$ [man and woman]$_{N}$"

The VP *cəlkəp-ke cʰumcʰu-ko nolatta* 'joyfully danced and played', which contains a modifier *cəɬkəṕ-ke* 'joyfully', is also structurally ambiguous. The modifier can modify only the immediately following V' *cʰumcʰú-ko* 'danced + Conj', as in (5.69). In (5.69), the first two words are organized into a binary branching P-phrase, leaving the third word as a unary branching P-phrase. This phrasing is explained by the constraint *{XP^2}.

(5.69) [[AdvP V]$_{VP-CONJ}$ VP]

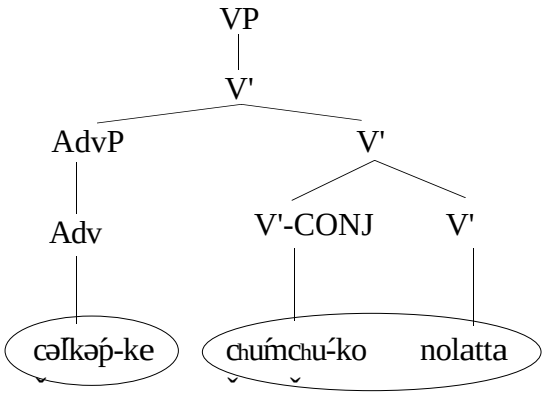


"joyfully + danced + Conj + played"
"[danced joyfully]$_{VP}$ and [played]]$_{VP}$"

On the other hand, the modifier can modify a conjoined V' *cʰumcʰu-ko nolatta* 'danced and played', as in (5.70). Then, the second and third words are organized into a

binary branching P-phrase, leaving the first word as a unary branching P-phrase. This phrasing is explained by the constraint CC.

(5.70) [[AdvP [V'$_{-CONJ}$ V']]



'joyfully + danced + Conj + played'
"[joyfully]$_{AdvP}$ [danced and played]$_{VP}$"

To sum up, a construction of [XP-CONJ XP]$_{XP}$ cannot be organized into the same P-phrase due to the constraint *{XP^2}. When a conjoined X' is modified by a modifier, the resulting syntactic structure is structurally ambiguous. When a modifier modifies the whole conjoined X', the modifier forms a unary branching P-phrase due to the constraint CC. However, when a modifier modifies the immediately following X', the resulting syntactic structure is [[YP X']$_{XP}$-CONJ [X']$_{XP}$]$_{XP}$. Then, the second XP forms a unary branching P-phrase due to the constraint *{XP^2}.

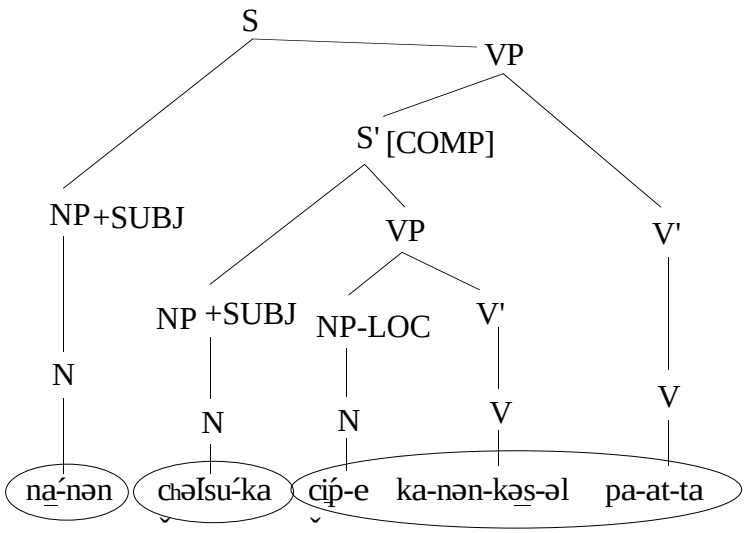
5.2.5 Phrasing in Complex Sentences

In this section, the phrasing in the constructions in (5.71) will be examined. The phrasing in these complex sentences is explained by all constraints but one, which have been discussed in the previous sections. One additional constraint Align (ϕ, r; I, r) is required to explain the phrasing in five- or seven-word utterances where the C-command relationship holds among all the words.

(5.71) a. an embedded sentence as an object of a verb in (5.72) and (5.73)
b. an embedded sentence as a subject of a sentence in (5.74)
c. an embedded sentence used as a relative clause in (5.75) to (5.79) and (5.82) to (5.84)
d. combination of b and c in (5.85)

A sentence can be embedded as an object of a verb, as in (5.72).[7] The c-command relationship does not hold among the first three words: the noun *cip̌-e* does not c-command the preceding NP-Subject *cʰəlsu-ka* 'Chulsoo + SM', and the noun *cʰəlsu-ka* does not c-command the main clause NP-Subject *na-nən* 'I + SM'. Hence, the first two words are divided into separate unary branching P-phrases. The main verb *pa-at-ta* 'to see + Past + Ind' can c-command the preceding embedded clause verb *ka-nən-kəs-əl* 'to go + Present + Comp + OM', and the embedded clause verb *ka-nən-kəs-əl* in turn c-commands the NP-Locative *cip̌-e* 'house + Locative'. Thus, the remaining three words are grouped into one P-phrase. This phrasing is explained by the constraints discussed so far.

(5.72)

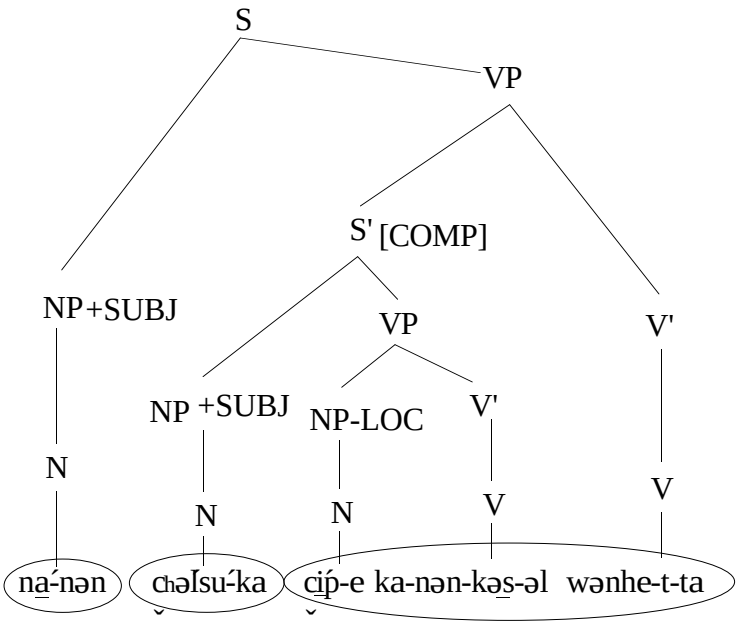


'I + SM + Chulsoo-SM + House + Loc + to go + Present + Comp + OM + to see + Past + Ind'
"I saw Chulsoo go home"

[7] The structures in (5.72), (5.73), (5.74), and (5.85) are simplified in the sense that the detailed structural description for COMP *-kəɬ* is abbreviated. The detailed structural description is not relevant to the discussion. One crucial point is that the four morphemes *ka-nən-kəs-əl* 'to go + Present + COMP + Object Marker' behaves as one word.

The sentence in (5.73) has an structure analogous to that in (5.72). A sentence is embedded as an object of a verb. The c-command relationship does not hold among the first three words. Hence, the first two words are divided into separate unary branching P-phrases. However, the remaining three words are organized into one P-phrase because the c-command relationship holds among the three words. This phrasing is also explained by the constraints discussed so far.

(5.73)

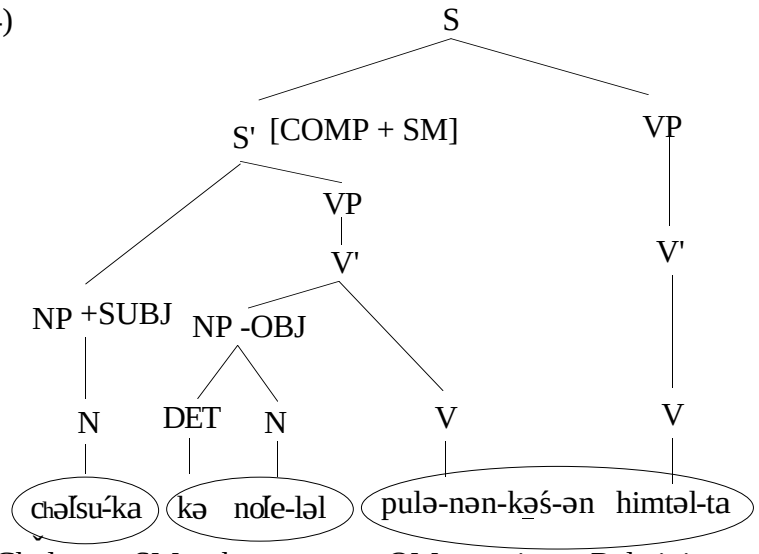


'I + SM + Chulsoo-SM + House + Loc + to go + Present + Comp + OM + to want + Past + Ind'
"I wanted Chulsoo to go home"

A sentence can also be embedded as a subject, as in (5.74). The c-command relationship does not hold between the first two words. Hence, the first word forms a separate P-phrase. The c-command relationship holds among the rest of the words *kə noɭe-lə̀l pulə̲-nən-kə̲ś-ən himtə̀l-ta.* Hence, the phrasing is determined by the other two constraints *{ω} and HA_{ϕ}. Since the phrase consists of four words, they are evenly

divided into two binary branching P-phrases. This phrasing is also explained by the constraints discussed so far.

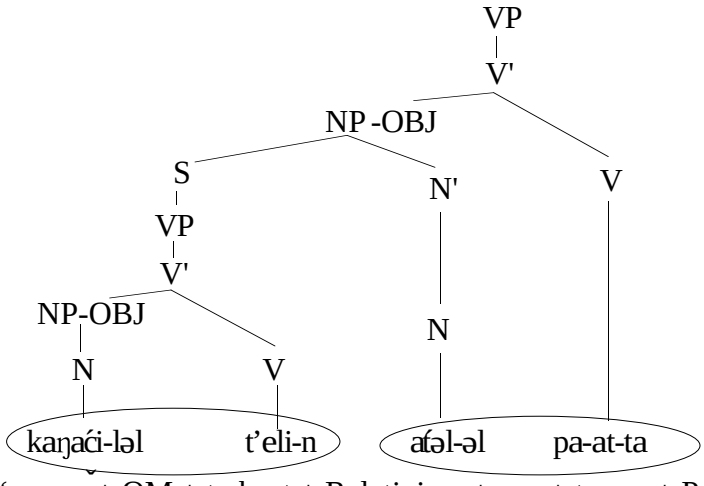
(5.74)



'Chulsoo + SM + that + song + OM + to sing + Relativizer + Comp + SM + to be hard + Ind'
"It is hard for Chulsoo to sing the song."

An object NP can be modified by a relative clause as in (5.75). In (5.75), the c-command relationship holds among all four words. Thus, the phrasing is determined by the other two constraints *{ω} and HA_{ϕ}. The four words are evenly divided into two binary branching P-phrases.

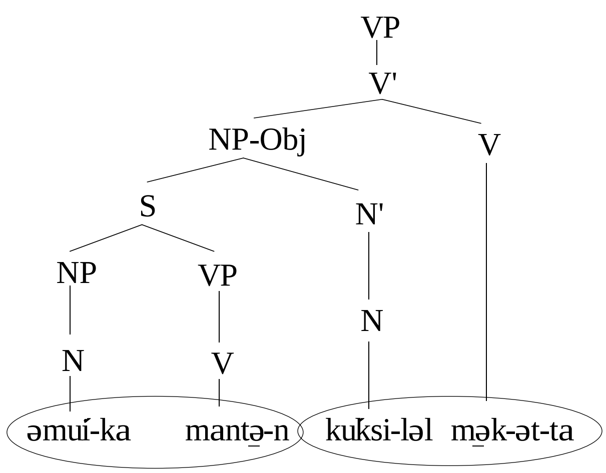
(5.75)



'puppy + OM + to beat + Relativizer + son + to see + Past + Ind'
"I saw the son who beat a puppy"

In (5.75) above, a relative clause does not have a subject NP. As discussed in section 5.2.1.2, although a relative clause contains a subject NP, the phrasing of the resulting sentence is explained by the same constraints. In (5.20'), the c-command relationship holds among all four words. Hence, the four words are evenly divided into two binary branching P-phrases.

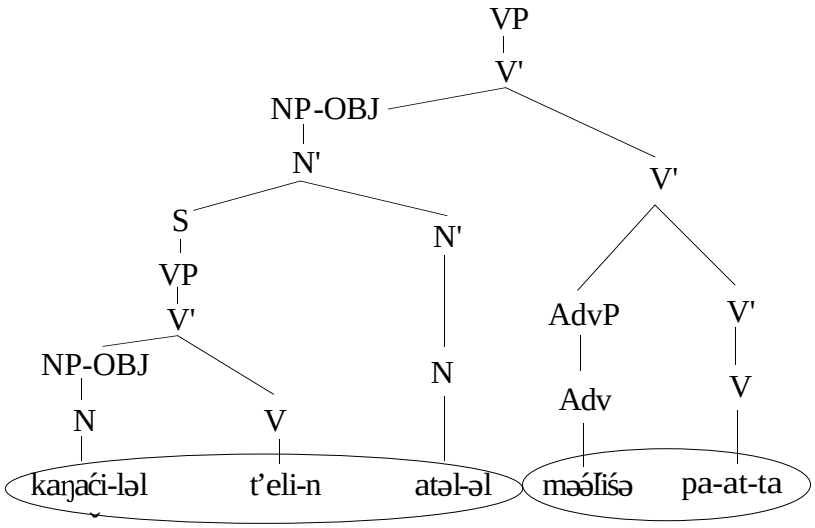
(5.20')



'mother + SM + to make + Relativizer + noodle + OM + to eat + Past + Ind'
"(I) ate noodle (my) mother cooked."

If an adverbial phrase *məə́Iiśə*‘ from a distance’ is added before a main verb *pa-́at-ta´* in (5.75) above, the resulting sentence is grouped into two P-phrases as in (5.76). Note that the adverbial phrase *məə́Iiśə* cannot c-command the preceding noun *atəl-əl* ‘son + OM’, and thus a new P-phrase must begin with the adverb *məə́Iiśə* due to the constraint CC.

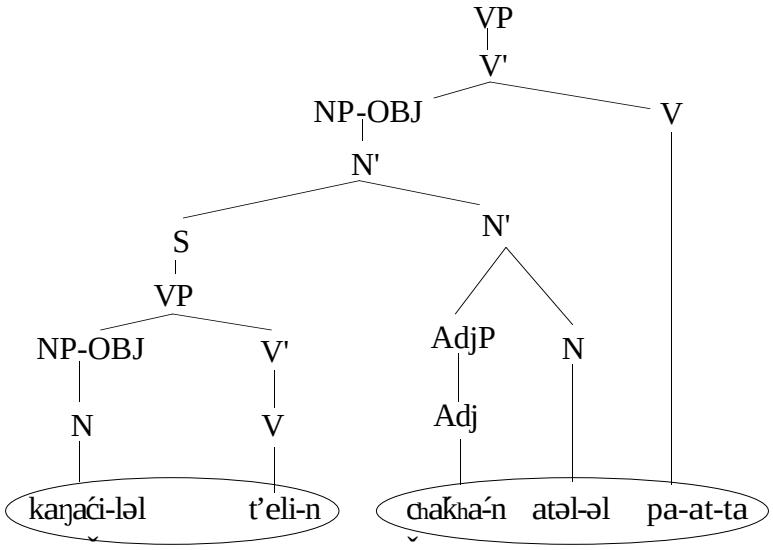
(5.76)



'puppy + OM + to beat + Relativizer + son + from a distance + to see + Past + Ind'
"I saw the son who beat a puppy from a distance"

If an adjective phrase *cʰaǩʰaǵ-n* 'to be nice + Adjectival' is added before a noun *aɬəl-əl* 'son + OM', the resulting sentence is grouped into two P-phrases as in (5.77). The adjective phrase *cʰaǩʰaǵ-n* does not c-command the preceding verb *t'eli-n* 'to beat + Relativizer', and therefore, a new P-phrase must begin with the adjective *cʰaǩʰaǵ-n* due to the constraint CC.

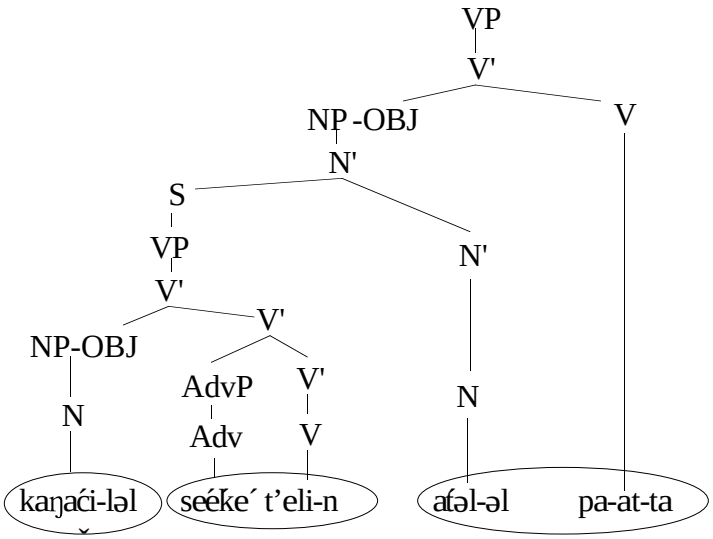
(5.77)



'puppy + OM + to beat + Relativizer + nice + son + to see + Past + Ind'
"I saw the nice son who beat a puppy"

If an adverbial phrase *seé-keʻ* to be strong + Adverbial is added before a dependent clause verb *t'eɬi-nʻ* to beat + Relativizer, the c-command relationship does not hold between the first and second words. Hence, the first word forms a separate unary branching P-phrase. The four words excluding the first one are evenly divided into two P-phrases due to the constraints *{ω} and HAϕ. This phrasing is also explained by the constraints discussed so far.

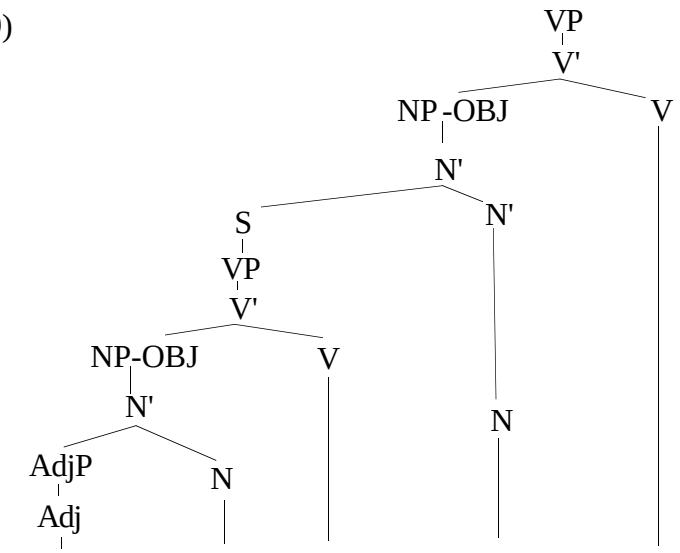
(5.78)



'puppy + OM + forcefully + to beat + Relativizer + son + to see + Past + Ind'
"I saw the son who forcefully beat a puppy"

However, we encounter a problem if we add an additional AdjP *yeép'ə-́n* 'to be pretty + Relativizer' before an NP *kaŋaći-ləl* 'puppy + OM'. Note that the c-command relationship holds among all five words in (5.79).

(5.79)



'to be pretty + Adjectival + puppy + OM + to beat + Relativizer + son + to see + Past + Ind'
"I saw the son who beat a pretty puppy"

The five-word sentence in (5.79) can be organized into two different ways, i.e., ternary and binary branching P-phrases or binary and ternary branching P-phrases, as shown in Tableau 5.19. The two candidates are evaluated as equivalent by the five constraints that have been discussed so far. The second candidate is actually optimal, and therefore one additional constraint is required in order to distinguish the second optimal candidate from the first one.[8]

[8] In order to determine the optimal phrasing in the sentence in (5.79) which consists of five words where the c-command relationship holds among all words, I conducted an experimanet. I presented seven native speakers of NK Korean with a set of pre-recorded readings where the sentence is spoken in four different ways in phrasing, as given below. When I have them choose the most natural reading, six (out of seven) speakers selected the reading in c. One person chose the reading in b. None of them selected the readings in a and d. Based on this experiment, the phrasing in c is selected as optimal. This accords with my own judgement.

a. {yeep'ə-n} {kaŋaci-ləl t'eli-n atəl-əl pa-at-ta}
b. {yeep'ə-n kaŋaci-ləl} {t'eli-n atəl-əl pa-at-ta}
c. {yeep'ə-n kaŋaci-ləl t'eli-n} {atəl-əl pa-at-ta}
d. {yeep'ə-n kaŋaci-ləl t'eli-n atəl-əl} {pa-at-ta}

Tableau 5.19
Input: yeéɸ'ə-́n kaŋaci-ləl t'eli-n atəl-əl pa-́aɬ-ta´
'to be pretty + Adjectival + puppy + OM + to beat + Relativizer + son + OM + to see + Past +Ind'
"(I) saw the son who beat a pretty puppy."

	CC	Parse-ω	*{XP²}	*{ω}	HA_{ϕ}
✓ {yeéɸ'ə-́n kaŋaci-ləl} {t'eli-n atəl-əl pa-at-ta}					*
✓(☹){yeéɸ'ə-n kaŋaci-ləl t'eli-n} {aɬəl-əl pa-at-ta}					*

The constraint Align (ɸ, r; I, r) requires the right edge of a P-phrase to be aligned with the right edge of an Intonational Phrase. The Intonational Phrase is the higher unit in the prosodic hierarchy which consists of one or more P-phrases (Selkirk 1986 and Nespor & Vogel 1986).[9]

(5.80) Align (ɸ, r; I, r) — Align the right edge of a P-phrase with the right edge of an intonational phrase.

This constraint is outranked by the constraint HA_{ϕ}, and therefore violation of this constraint is compelled in intonational phrases which have more than three words.

(5.81) HA_{ϕ} >> Align (ɸ, r; I, r)

Assuming the constraint , the correct optimal form can be selected, as illustrated in Tableau 5.20. The second candidate is selected as optimal by the lower ranked constraint Align (ɸ, r; I, r). The constraint Align (ɸ, r; I, r) is gradient, and thus if the right edge of any P-phrase is farther away from the right edge of an intonational phrase, it will incur more violations of this constraint. The first candidate violates this constraint more severely (i.e., three times) since the right edge of the first P-phrase is three words away from the

[9] This thesis leaves open the question of what the prosodic unit is which is higher than a P-phrase. Although I use the term 'Intonational Phrase' following Selkirk 1986 and Nespor & Vogel 1986, I have no evidence that shows the existence of anIntonational Phrase. Alternatively, the term 'Utterence' can be used. However, note that the difference in the use of terminology does not affect the rest of my discussion.

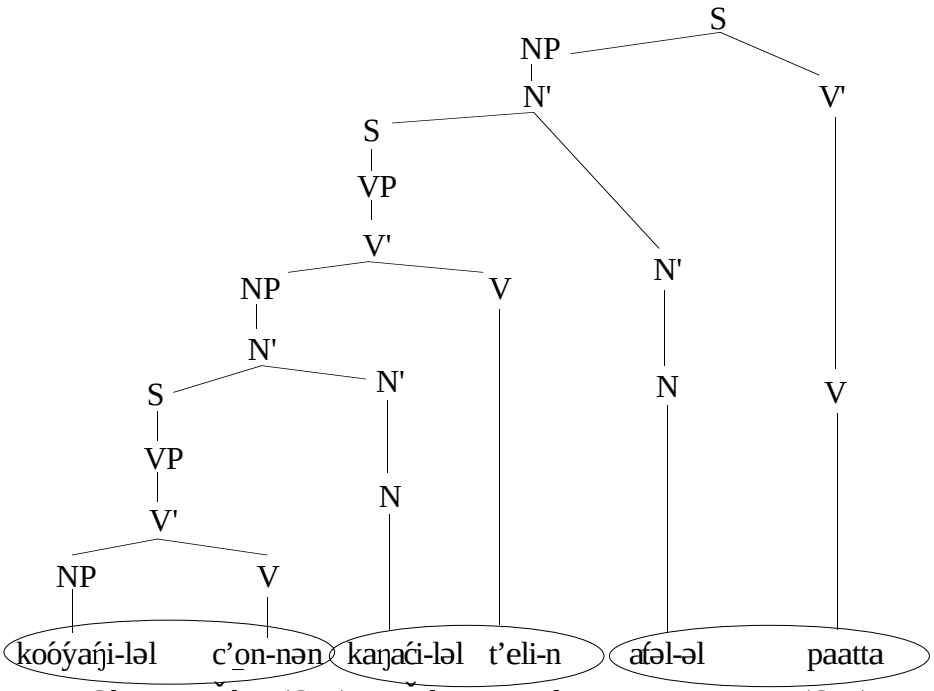
right edge of an intonational phrase. Thus, the second candidate is selected as optimal, which violates Align (ϕ, r; I, r) twice.

Tableau 5.20
Input: /yeep'ə-n kaŋaci-ləl t'eli-n atəl-əl pa-at-ta/
'to be pretty + Adjectival + puppy + OM + to beat + Relativizer + son + OM + to see + Past +Ind'
"(I) saw the son who beat a pretty puppy."

	CC	Parse-ω	*{XP²}	*{ω}	HA$_{ϕ}$	Align (ϕ, r; I, r)
{yeép'ə-n kaŋaci-ləl} {t'eli-n atəl-əl pa-at-ta}					*	***!
☞{yeép'ə-n kaŋaci-ləl t'eli-n} {atəl-əl pa-at-ta}					*	**

Even when an additional relative clause is added to the structure in (5.79), the phrasing is predicted, as shown in (5.82). In (5.82), the c-command relationship holds among all six words. Thus, the phrasing is determined by the other two constraints *{ω} and HA$_{ϕ}$. The six words are evenly divided into three binary branching P-phrases:

(5.82)



'cat + Object Marker (OM) + to chase + Relativizer + puppy + (OM) + to beat + Relativizer + son + (OM) + saw'
"(I) saw the son who beat the puppy who chased a cat"

If an adjectival phrase *yeéṕ'ə-́n* 'to be pretty + Adjectival' is added before a noun *koóýaŋ́-i-ləl* 'cat + OM' in (5.82), the resulting sentence has seven words, where the c-command relationship holds among all seven words. This sentence will be organized into three P-phrases in which the first P-phrase consists of three words, as indicated in (5.83). This phrasing is explained by the constraint Align (ϕ, r; I, r).

(5.83) {yeéṕ'ə-́n koyaŋi-ləl c'o͞n-nən} {kaŋaći-ləl t'eli-n} {aɬ-əl pa-at-ta}
'to be pretty + Adjectival + cat + OM + to chase + Relativizer + puppy + OM + to beat + Relativizer + son + OM + to see + Past +Ind'
"(I) saw the son who beat the puppy who chased a pretty cat."

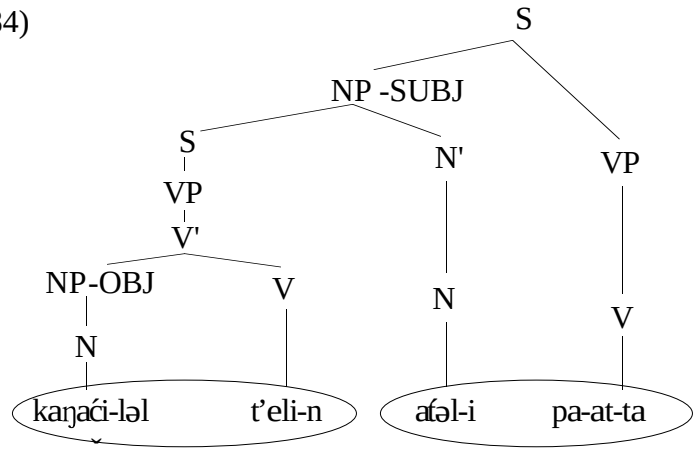
In Tableau 5.21, the first candidate, where all seven words are organized into one P-phrase, is eliminated by the constraint HA_{ϕ}. The remaining candidates are evaluated as equivalent by the constraint HA_{ϕ}. The last candidate is selected as optimal because it incurs the minimum number of violations of Align (ϕ, r; I, r). The second candidate violates it eight times in total, i.e., the first P-phrase ($_{\phi 1}$) violates it five times and the second one ($_{\phi 2}$) three times. The third candidate violates it seven times in total, i.e., the first P-phrase ($_{\phi 1}$) violates it five times and the second one ($_{\phi 2}$) twice. The last candidate violates it six times in total, i.e., the first P-phrase ($_{\phi 1}$) violates it four times and the second one ($_{\phi 2}$) twice. Violations of Align (ϕ, r; I, r) are compelled.

Tableau 5.21
Input: /yeep'ə-n koyaŋi-ləl c'o͞n-nən kaŋaci-ləl t'eli-n atəl-əl pa-at-ta/
'to be pretty + Adjectival + cat + OM + to chase + Relativizer + puppy + OM + to beat + Relativizer + son + OM + to see + Past +Ind'
"(I) saw the son who beat the puppy who chased a pretty cat."

	Parse-ω	*{ω}	HA_{ϕ}	Align (ϕ, r; I, r)
{yeéṕ'ə-́n koyaŋi-ləl c'o͞n-nən kaŋaci-ləl t'eli-n atəl-əl pa-at-ta}$_{\phi 1}$			**!** **	
{yeéṕ'ə-́n koyaŋi-ləl }$_{\phi 1}$ {c'o͞n-nən kaŋaći-ləl}$_{\phi 2}$ {t'eɬi-n atəl-əl pa-at-ta}$_{\phi 3}$			*	*******! *
{ỹeéṕ'ə-́n koyaŋ̃i-ləl}$_{\phi 1}$ {c'o͞n-nən kaŋaći-ləl t'eli-n}$_{\phi 2}$ {aɬ-əl pa-at-ta}$_{\phi 3}$			*	*******!
☞{yeéṕ'ə-́n koyaŋi-ləl c'o͞n-nən}$_{\phi 1}$ {kaŋaći-ləl t'eli-n}$_{\phi 2}$ {aɬ-əl pa-at-ta}$_{\phi 3}$			*	******

A subject NP can also be modified by a relative clause as in (5.84). In (5.84), the c-command relationship holds among all four words *kaŋaći-ləl t'eli-n atəl-i pa-at-ta*, and thus they are evenly divided into two binary branching P-phrases. This phrasing is also predicted by the constraints discussed so far.

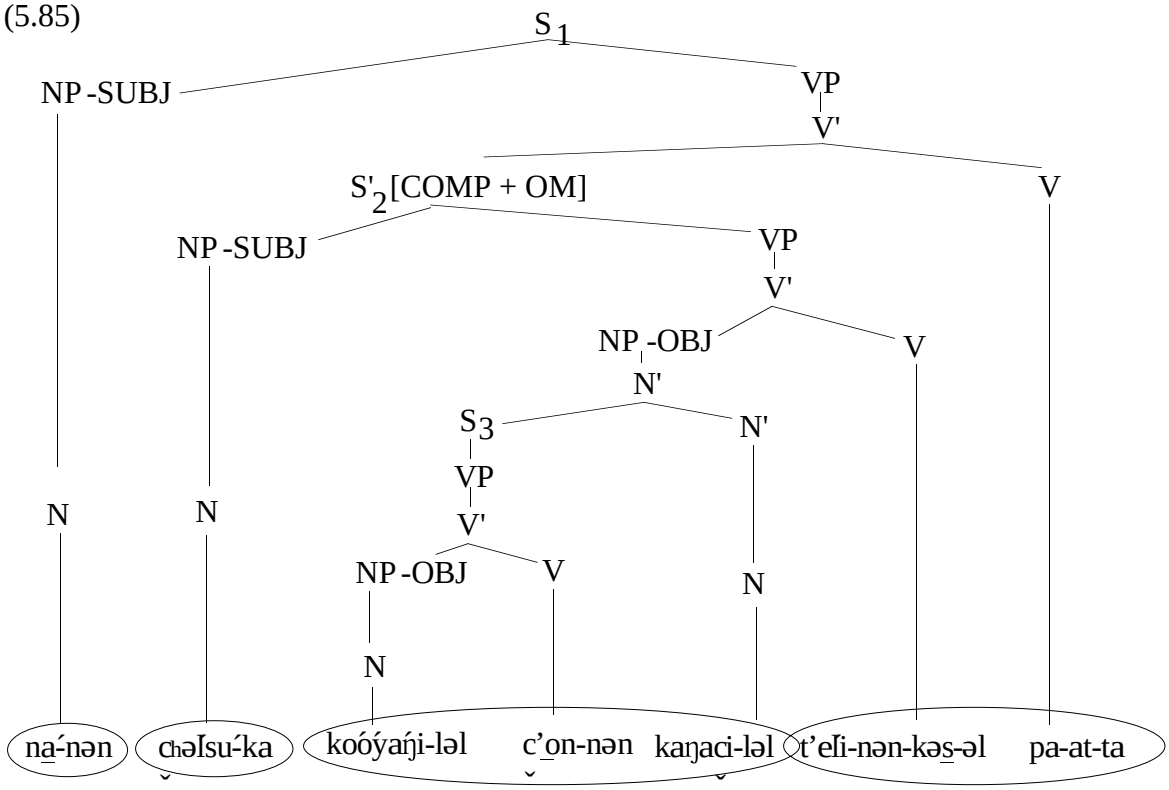
(5.84)



'puppy + OM + to beat + Relativizer + son + SM + to see + Past + Ind'
" The son who beat a puppy saw (it)"

The sentence in (5.85) is even more complex, where a relative clause S_3 modifies an object N' and the embedded sentence S_2 is in turn embedded as an object of a main clause verb. The c-command relationship does not hold among the first three words. Hence, the first two words are divided into two unary branching P-phrases. The c-command relationship holds among the next five words. These five words are divided into ternary and binary branching P-phrases due to the conspiracy of the constraints *{ω}, Parse-ω, HA_{ϕ}, and Align (ϕ, r; I, r). This phrasing is also explained by the constraints discussed so far.

(5.85)



'I + SM + Chulsoo + SM + cat + OM + to chase + Relativizer + puppy + OM + to beat + Relativizer + OM + to see + Past +Ind'
"I saw Chulsoo beat the puppy who chased a cat."

In conclusion, multi-word P-phrases can be formed only when the two constraints CC and *{XP^2} are satisfied. Otherwise, unary branching P-phrases are formed due to the higher ranked constraint Parse-ω. This phrasing is explained by the constraints and their rankings in (5.86):

(5.86) CC, Parse-ω, *{XP^2} >> *{ω} >> HA$_\phi$ >> Align (ϕ, r; I, r)

5.2.6. Phrasing under Focus

Membership in a P-phrase when a word is focused is partially determined by the phrasing that occurs in the corresponding unfocused sentences. A focused word must initiate a focused P-phrase. This generalization is captured by the constraint AlignFocusL (AlignFL) which requires the left edge of a focused word to be aligned with the left edge of a P-phrase. Due to this constraint, a focused word always occurs as the leftmost word in a focused P-phrase.

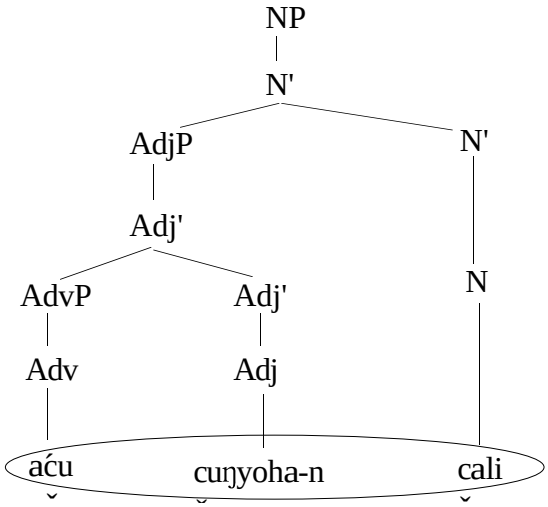
There is another strong tendency for a focused word to be followed by a non-prominent word. This tendency is explained by the constraint Align (Focus, r: Non-prominent, l) (**W**ω) which requires the right edge of a focused word to be aligned with the left edge of a non-prominent word in a P-phrase. Due to this constraint, a focused word is always followed by a non-prominent word except when the focused word is used as utterance-final. When a focused word is P-phrase-final in the corresponding sentence where it is unfocused, the focused word and the words in the following P-phrase form a single P-phrase. If the following P-phrase consists of three words, then the resulting focused P-phrase will end up with a four-word P-phrase, i.e., a focused word plus a three-word non-focused P-phrase. The constraint Ident-OO, which requires a correspondence between a non-focused P-phrase and a focused P-phrase, regulates incorporation of the words into a focused P-phrase.

5.2.6.1. Initiation of a Focused P-phrase

One of the most conspicuous effects of focus on phrasing is that focus forces the introduction of a new P-phrase boundary to the left of a focused word (G.-R. Kim

1988:192, Kenstowicz & Sohn 1996:6). Consider the example in (5.87), which is cited from G.-R. Kim 1988:191:

(5.87)



'very + to be important + Adjectival + position'
"very important position"

Spoken without giving focus to any word in (5.87), the syntactic phrase is organized into one P-phrase as the presence of one H indicates, as in {aću cuŋyoha-n cali}. Even when focus is given to the adverb *aću* 'very', no change occurs in phrasing so that the given phrase is organized into one P-phrase, as in {**aću** cuŋyoha-n cali}, where the focused word is in bold type. However, if focus is put on the adjective *cuúŋyoȟa-n* 'important', then the syntactic phrase is divided into two P-phrases as the survival of two H's indicates, as in {aću} {**cuúŋyoȟa-n** cali}. Note that a new P-phrase boundary is introduced to the left of the focused word. If focus is given to the noun *caȟi* 'position', then the given phrase is organized into the binary and unary branching P-phrases, as shown in {aću cuŋyoha-n} {**caȟi**}. Note that a new P-phrase boundary is also introduced to the left of the focused word.

The above generalization is captured by the constraint Align (Focus, l: ϕ, l), which requires the left edge of a focused word to be aligned with the left edge of a P-phrase.

(5.88) Align (Focus, l: ϕ, l) (AlignFL)

Align the left edge of a focused word with the left edge of a P-phrase.

This constraint is assumed to outrank the constraint Phrase Minimality (*{ω}) which prohibits a unary branching P-phrase. Therefore, unary branching P-phrases are forced to be formed in phrasing such as {aću} {**cuúŋyoha-n** cali} and {aću cuŋyoha-n} {**caǐi**}.

(5.89) AlignFL >> Phrase Minimality (*{ω})

As illustrated in Tableau 5.22, the given phrase is organized into two P-phrases as in {aću}{**cuúŋyoha-n** cali} when focus is given to the second word. The first and second candidates, where the left edge of a focused word is not aligned with the left edge of a P-phrase, is eliminated by the constraint AlignFL. The third candidate, where three unary branching P-phrases are constructed, is ruled out by the constraint *{ω}. The last candidate, where the left edge of a focused word is aligned with the left edge of a P-phrase, is selected as optimal although it violates *{ω} once. A violation of *{ω} is compelled by AlignFL.

Tableau 5.22
Input: /acu **cuúŋyoha-n** cali/ 'very + to be important + Adjectival + position'
"very IMPORTANT position"

	AlignFL	*{ω}	HA_{ϕ}
{aću **cuŋyoha-n** cali}	*!		*
{aću **cuŋyoha-n**} {caǐi}	*!	*	
{aću} {**cuúŋyoha-n**} {caǐi}		**!*	
☞{ačǔ} {**čuúŋyoha-n** caǐi}		*	

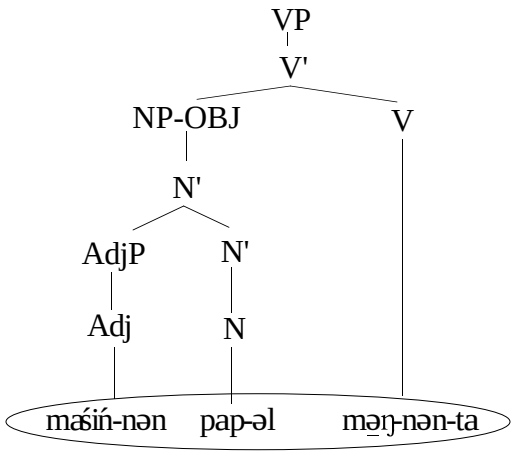
If focus is given to the third word, the given phrase is divided into binary and unary branching P-phrases, as in {aću cuŋyoha-n} {**caĭi**}. In Tableau 5.23, the first and second candidates, where the left edge of a focused word is not aligned with the left edge of a P-phrase, is ruled out by AlignFL. The third candidate, where three unary branching P-phrases are constructed, is eliminated by the constraint *{ω}. The last candidate, where the left edge of a focused word is aligned with the left edge of a P-phrase, is selected as optimal although it violates *{ω} once. A violation of *{ω} is compelled.

Tableau 5.23
Input: /acu cuúŋyoha-n **cali**/ 'very + to be important + Adjectival + position'
"POSITION which is very important"

	AlignFL	*{ω}	HA_{ϕ}
{aću cuŋyoha-n **cali**}	*!*		*
{aću} {cuúŋyoha-n **cali**}	*!		
{aču} {čuúŋyoha-n} {**caĭi**}		**!*	
☞{ačǔ cuǒyoha-n} {**caĭi**}		*	

The same effect of focus is found in verb phrases. Spoken without giving focus to any word, the syntactic phrase in (5.90) is organized into one P-phrase as the presence of one H shows.

(5.90)



'to be delicious + Adjectival + rice + OM + to eat + Present + Ind'
"eat delicious rice"

Even when focus is given to the adjective *maśiń-nən* ‘delicious’, no change occurs in phrasing so that the given syntactic phrase is organized into one P-phrase, as in {**maśiń-nən** pap-əl mə̲ŋ-nən-ta}. However, if focus is put on the object NP *paṕ-əI* ‘rice + OM’, then the given phrase is divided into two P-phrases as the presence of two H’s indicates, as in {maśiń-nən}{**paṕ-əI** mə̲ŋ-nən-ta}. A new P-phrase boundary is introduced to the left of the focused word. If focus is given to the verb *mə̲ŋ-nəń-ta* ‘to eat + Present + Ind’, then the syntactic phrase is divided into two P-phrases as in {maśiń-nən pap-əl} {**mə̲ŋ-nəń-ta**}. A new P-phrase boundary is also introduced to the left of the focused word.[10]

As illustrated in Tableau 5.24, the given phrase is organized into two P-phrases as in {maśiń-nən}{**paṕ-əI** mə̲ŋ-nən-ta} when focus is given to the second word. The first and second candidates, where the left edge of a focused word is not aligned with the left edge of a P-phrase, are eliminated by the constraint AlignFL. The third candidate, where three unary branching P-phrases are formed, is ruled out by the constraint *{ω}. The last candidate, where the left edge of a focused word is aligned with the left edge of a P-phrase, is selected as optimal although it violates *{ω} once. A violation of *{ω} is compelled.

Tableau 5.24
Input: /maśiń-nən **paṕ-əI** mə̲ŋ́-nən-ta/
‘to be delicious + Adjectival + rice + OM + to eat + Present + Ind’
“eat delicious rice (rather than something else)”

	AlignFL	*{ω}	HA_{ϕ}
{maśiń-nən **pap-əl** mə̲ŋ-nən-ta}	*!		*
{maśiń-nən **pap-əl**}{mə̲ŋ-nəń-ta}	*!	*	
{maśiń-nən}{**paṕ-əI**}{mə̲ŋ-nəń-ta}		**!*	
☞{maśiń-nən}{**paṕ-əI** mə̲ŋ-nən-ta}		*	

[10] A prelinked H in *mə̲ŋ́-nən-ta* ‘to eat + Present + Ind’ shifts to the penultimate syllable of the word. This word-internal shift is explained in Chapter 4.

If focus is given to the third word, the focused word forms a separate P-phrase, as shown in {maśiń-nən pap-əl} {**mə̲ŋ-nəń-ta**}. In Tableau 5.25, the first and second candidates, where the left edge of a focused word is not aligned with the left edge of a P-phrase, are ruled out by AlignFL. The third candidate, where three unary branching P-phrases are formed, is eliminated by the constraint *{ω}. The last candidate, where the left edge of a focused word is aligned with the left edge of a P-phrase, is selected as optimal although it violates *{ω} once. A violation of *{ω} is forced by AlignFL.

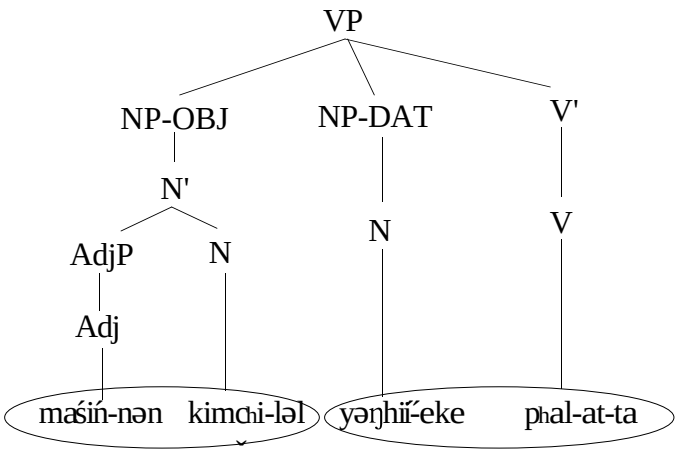
Tableau 5.25
Input: /maśiń-nən paṕ-əI **məṕ-nən-ta**/
'to be delicious + Adjectival + rice + OM + to eat + Present + Ind'
"eat (rather than drink) delicious rice"

	AlignFL	*{ω}	HA_{ϕ}
{maśiń-nən pap-əl **mə̲ŋ-nən-ta**}	*!*		*
{maśiń-nən}{paṕ-əI **mə̲ŋ-nən-ta**}	*!		
{maśiń-nən}{paṕ-əI}{**mə̲ŋ-nəń-ta**}		**!*	
☞{maśiń-nən pap-əl}{**mə̲ŋ-nəń-ta**}		*	

5.2.6.2. Incorporation of Non-prominent Words

Focus influences the words in the following P-phrase. When no focus is given to any word, the verb phrase in (5.91) is divided into two binary branching P-phrases, as shown below.

(5.91)



'to be delicious + Relativizer + Kimchee + OM + Yunghee + to + to sell + Past + Ind'
"sold delicious Kimchee to Younghee"

When focus is given to a word which is not phrase-final, focus does not affect the words in the following P-phrase. For instance, if focus is given to the first word ***maśiń-nən*** 'delicious', the focused word and the following word within the same P-phrase form a P-phrase, as shown in (5.92). Focus given to the first word does not influence the words which are in the following P-phrase.

(5.92) {**maśiń-nən** kimcʰi-ləl} {yəŋhiíˊ-eke pʰal-at-ta}

However, when focus is given to a word which is phrase-final, the focused word and the words in the following P-phrase group into a focused P-phrase, as shown in (5.93). Note that forming a new focused P-phrase induces a violation of the constraint *{XP^2} in (5.93).

(5.93) {maśiń-nən} {**kiḿcʰi-ləl** yəŋhi-eke pʰal-at-ta}

The above phenomenon is explained by the constraint Align (Focus, r: Non-prominent, l) (**W**ω) which requires the right edge of a focused word to be aligned with the

left edge of a non-prominent word. The term 'non-prominent' means 'non-H-toned'. Due to this constraint, a focused word is followed by a non-H-toned word except when a focused word is used as utterance-final. A violation of the constraint **W**ω is unavoidable when focus is given to an utterance-final word. In Chapter 6, it will be shown that tone doubling, which occurs across a word boundary within an unfocused P-phrase, is blocked within a focused P-phrase due to this constraint.

(5.94) Align (Focus, r: Non-prominent, l) (**W**ω)
Align the right edge of a focused word with the left edge of a non-prominent word in a P-phrase.

This constraint outranks the constraint *{XP^2}, and therefore the words in the following P-phrases are incorporated into a focused P-phrase as shown in (5.93) above. This phrasing incurs a violation of the constraint *{XP^2}. However, a violation of *{XP^2} is compelled by the constraint **W**ω.

(5.95) Align (Focus, r: Non-prominent, l) (**W**ω) >> *{XP^2}

Note that the constraint **W**ω is satisfied if only one word which immediately follows the focused word is incorporated into a focused P-phrase, as in *{maśiń-nən} {**kiḿcʰi-lə̀l** yəŋhi-eke} {pʰaI-aɾ́-ta}. This candidate is evaluated as less harmonious than the optimal form in (5.93) by the fact that the constraint Phrase Minimality (*{ω}) outranks HA$_\phi$. The form *{maśiń-nən} {**kiḿcʰi-lə̀l** yəŋhi-eke} {pʰaI-aɾ́-ta} incurs one more violation of *{ω}, and thus it is ruled out. Although the output in (5.93) violates HA$_\phi$ once, its violation is compelled by *{ω}.

In Tableau 5.26, the first candidate, where a focused word occurs as the rightmost word within a P-phrase, is ruled out by its violation of AlignFL and **W**ω. The second

candidate, where a focused word occurs as the leftmost word within a P-phrase and one following word is incorporated into a focused P-phrase, is eliminated by its second violation of *{ω}. The last candidate, where a focused word occurs as the leftmost word within a P-phrase and both following words are incorporated into a focused P-phrase, is selected as optimal.

Tableau 5.26
Input: maśiń-nən **kimcʰi-ləl** yəŋhii-eke pʰaɪ-aɾ-ta
'to be delicious +ᵛ Adjectival + rice + OM + to eat + Present + Ind'
"eat (rather than drink) delicious rice"

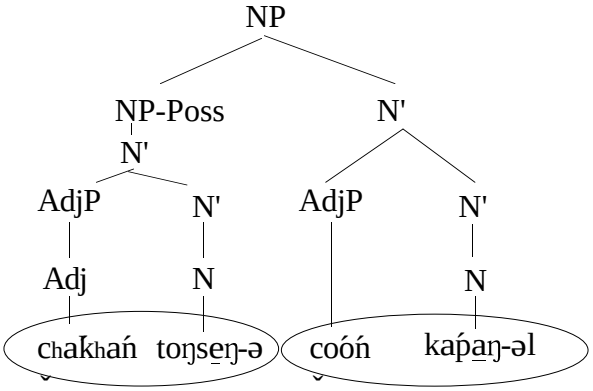
	AlignFL	**W**ω	{*XP²}	*{ω}	HA$_{\phi}$
{maśiń-nən **kimcʰi-ləl**} {yəŋhiíˊ-eke pʰal-ɐt-ta}	*!	*			*
{maśiń-nən} {**kíḿcʰi-ləl** yəŋhi-eke} {pʰaɪ-ɐɾ-ta}			*	**!	
☞ {maśiń-nən} {**kíḿcʰi-ləl** yəŋhi-eke pʰal-at-ta}			*	*	*

The constraint **W**ω also outranks the constraint C-command (CC), and therefore the words in the following P-phrases are incorporated into a focused P-phrase although this phrasing incurs a violation of the constraint CC.

(5.96) Align (Focus, r: Non-prominent, l) (**W**ω) >> C-command (CC)

When no focus is given to any words in (5.16'), the given construction is organized into two P-phrases as the presence of two H's shows. Note that one H is doubly linked to the first two syllables of the second P-phrase *coóń kaṕaŋ-əl* in (5.16').

(5.16') [AdjP + N]$_{NP\text{-}POSS}$ + [AdjP + N]$_{N'}$]



'nice + brother + Poss + good + bag + OM'
"nice brother's good bag"

However, when focus is given to the noun ***toŋseŋ́-ə***, the focused word and the two words in the following P-phrase form a focused P-phrase, as illustrated below. This phrasing is explained by the assumption that the constraint **W**ω outranks CC.

(5.97) cʰaǩʰań {**toŋseŋ́-ə** con kapaŋ-əl}

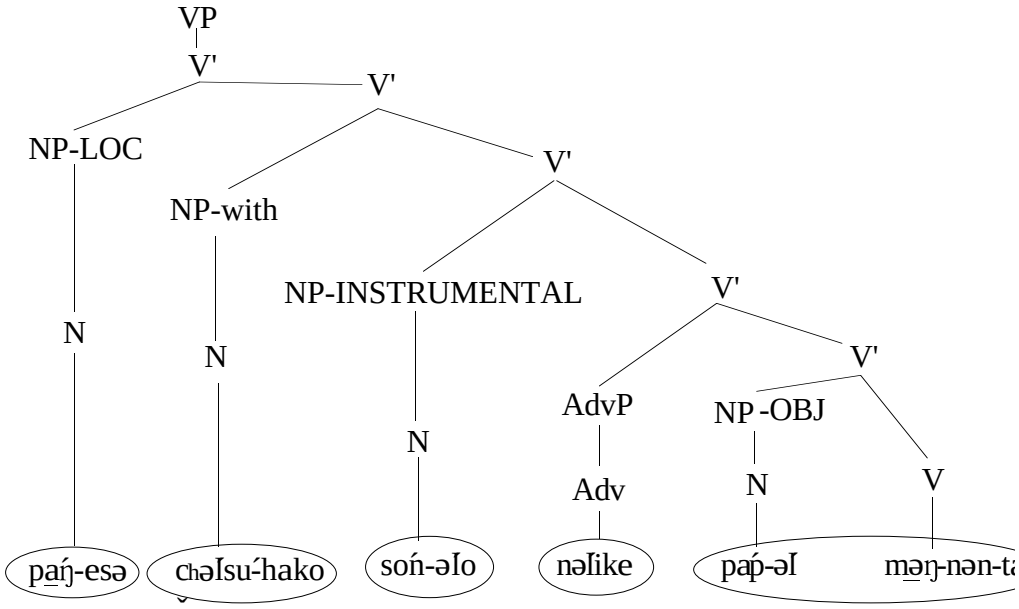
In Tableau 5.27, the first candidate, where a focused word occurs as the rightmost word within a P-phrase, is ruled out by its violation of AlignFL and **W**ω. The second candidate, where a focused word occurs as the leftmost word within a P-phrase and one following word is incorporated into a focused P-phrase, is eliminated by its second violation of *{ω}. The last candidate, where a focused word occurs as the leftmost word within a P-phrase and both following words are incorporated into a focused P-phrase, is selected as optimal.

Tableau 5.27
Input: cʰaƙʰań toŋse̲ŋ́-ə coon kapa̲ŋ́-əl ‘nice + brother + Poss + good + bag + OM’
ˇ ˇ “a nice brother's good bag”

	AlignFL	**W**ω	CC	*{ω}	HA$_{\phi}$
{cʰaƙʰań **toŋse̲ŋ́-ə**} {coóń kaṕa̲ŋ-əl}	*!	*			*
{cʰaƙʰań} {**toŋse̲ŋ́-ə** con} {kapa̲ŋ́-əl} ˇ			*	**!	
☞ {cʰaƙʰań} {**toŋse̲ŋ́-ə** con kapa̲ŋ-əl} ˇ			*	*	*

For the phrasing of sentences without focus, the three constraints C-command, *{XP^2}, and Parse-ω are inviolable. As shown in section 5.2.4, certain words are organized into unary branching P-phrases due to the conspiracy of these inviolable constraints. For instance, the c-command relationship does not hold among the first five words in (5.51'). They cannot be left unparsed due to the constraint Parse-ω. Hence, the first four words form four unary branching P-phrases.

(5.51')



‘room + at/in + Chulsoo + with + hand + with + slowly + rice + OM + to eat + Present + Ind’
“to eat rice slowly with a hand with Chulsoo in the room”

When the first word in (5.51') is focused, the focused word and the following word form a focused P-phrase, as indicated in (5.98a). Note that the third and fourth words are not affected by focus. When the second word is focused, the second and third words form a focused P-phrase, as shown in (5.98b). The first and fourth words are uninfluenced. When the third word in (5.51') is focused, the focused word and the following word form a focused P-phrase, as indicated in (5.98c). When the fourth word in (5.51') is focused, the focused word and the two words in the following P-phrase form a focused P-phrase, as indicated in (5.98d).

(5.98) a. {**paˍ́ŋ-esə** cʰəlsu-hako} {soń-əIo} {nəIike} {paṕ-əI məˍŋ-nən-ta}
b. {paˍ́ŋ-esə} {**cʰəIsú-hako** son-əlo} {nəIike} {paṕ-əI məˍŋ-nən-ta}
c. {paˍ́ŋ-esə} {**soń-əIo** nəlike} {paṕ-əI məˍŋ-nən-ta}
d. {paˍ́ŋ-esə} {cʰəIsú-hako} {soń-əIo} {**nəIike** pap-əl məˍŋ-nən-ta}

The phrasing in (5.98) is explained by the constraints discussed above. A focused word must initiate a focused P-phrase due to the constraint AlignFL. A focused word must not occur at the right edge of a P-phrase due to the constraint **W**ω. Since the constraint **W**ω outranks the constraints C-command (CC) and *{XP^2}, the word in the following P-phrase is incorporated into a focused P-phrase in (5.98a–c). A violation of CC is compelled by the constraint **W**ω.

It should be explained why only the word in the following P-phrase is incorporated into a focused P-phrase in (5.98a–c). Note that each incorporation of the following word induces a violation of the constraint CC. Since incorporation of one word satisfies the constraint **W**ω, only one word is incorporated because this phrasing incurs a minimal violation of the constraint CC.

However, in (5.98d), the two words in the following P-phrase are incorporated into a focused P-phrase. Note that the c-command relationship holds between the two

words *paʔ-əI* and *mə̲ŋ-nəʔn-ta*. Thus, one additional incorporation of the final word *mə̲ŋ-nəʔn-ta* does not induce an additional violation of the constraint CC. Therefore, the output form in (5.98d) (which incurs one less violation of the constraint *{ω}) is evaluated as more harmonious than the form in (5.99) below, where only one word is incorporated into a focused P-phrase.

(5.99) *{pa̲ʔŋ-esə} {cʰəIsuʔ-hako} {soʔn-əIo} {**nəIike** pap-əl} {mə̲ŋ-nəʔn-ta}
ˇ

The evaluation of the output forms in (5.98a) and (5.98d) are given in the following two tableaux. When focus is given to the first word, the first and the word in the following P-phrase form a focused P-phrase, as shown in Tableau 5.28. The first candidate, where the focused word occurs at the right edge of a P-phrase, is ruled out by the constraint **W**ω. The second candidate, where the first and second words form a focused P-phrase, is selected as optimal because it minimally violates the constraint CC. The next two candidates are eliminated because they incur more than one violation of the constraint CC.

Tableau 5.28
Input: pa̲ʔŋ-esə cʰəlsu-hako soʔn-əIo nəIike paʔ-əI mə̲ŋ-nən-ta
'room + at/in + Chulsoo + with + hand + with + slowly + rice + OM + to eat + Present + Ind'
"to eat rice slowly with a hand with Chulsoo in the room"

	Wω	CC	*{ω}	HA_{ϕ}
{**pa̲ʔŋ-esə**} {cʰəIsuʔ-hako} {soʔn-əIo} {nəIike} {paʔ-əI mə̲ŋ-nən-ta}	*!		****	
☞ {**pa̲ʔŋ-esə** cʰəlsu-hako} {soʔn-əIo} {nəIike} {paʔ-əI mə̲ŋ-nən-ta}		*	**	
{**pa̲ʔŋ-esə** cʰəlsu-hako son-əlo} {nəIike} ˇ {paʔ-əI mə̲ŋ-nən-ta}		**!	*	*
{**pa̲ʔŋ-esə** cʰəlsu-hako son-əlo nəlike} {paʔ-əI mə̲ŋ-nən-ta}		**!*		**

When focus is given to the fourth word, the focused word and the two words in the following P-phrase form a ternary branching P-phrase, as shown in Tableau 5.29. The first candidate, where the focused word occurs at the right edge of a P-phrase, is ruled out by the constraint **W**ω. The second candidate, where only one word in the following P-phrase is incorporated into a focused P-phrase, is ruled out by its fourth violation of the constraint *{ω}. The third candidate, where the focused word and the two words in the following P-phrase form a ternary branching P-phrase, is selected as optimal because it induces one less violation of the constraint *{ω}.

Tableau 5.29
Input: paŋ́-esə chəlsu-hako soń-əIo nəIike paṕ-əI məŋ-nən-ta
'room + at/in + Chulsoo + with + hand + with + slowly + rice + OM + to eat + Present + Ind'
"to eat rice slowly with a hand with Chulsoo in the room"

	Wω	CC	*{ω}	HA_{ϕ}
{paŋ́-esə} {chəIsu-́hako} {soń-əIo} {**nəIike**} {paṕ-əI məŋ-nən-ta}	*!		****	
{paŋ́-esə} {chəIsu-́hako} {soń-əIo} ˇ {**nəIike** pap-əl} {məŋ-nə́n-ta}		*	****!	
☞ {paŋ́-esə} {chəIsu-́hako} {soń-əIo} ˇ {**nəIike** pap-əl məŋ-nən-ta}		*	***	*

To sum up, phrasing under focus is explained by the following constraints and their ranking:

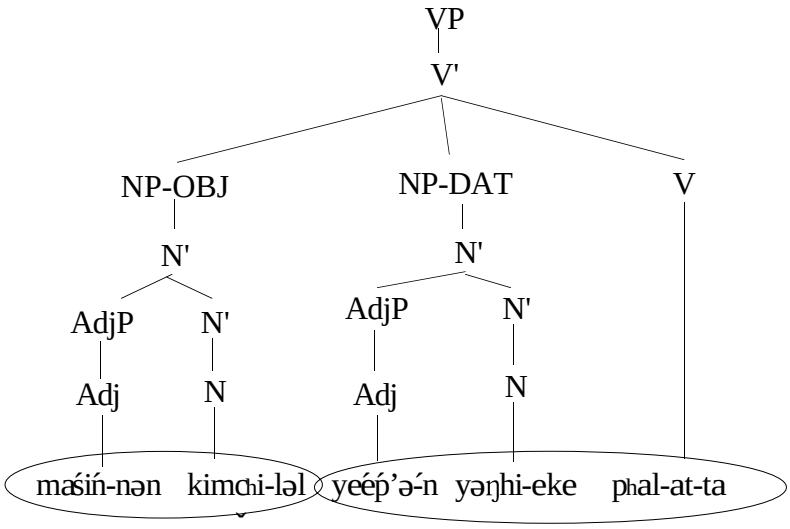
(5.100) a. AlignFL >> *{ω} in (5.89)
b. Align (Focus, r: Non-prominent, l) (**W**ω) >> CC, *{XP^2} in (5.95–6)

5.2.6.3. Ident-OO and Four-word P-phrases

The focused word and the words in the following P-phrase group into a new P-phrase regardless of the length of the following P-phrase. As discussed in the preceding

sections, a non-focused P-phrase can maximally contain three words. The verb phrase in (5.101) is grouped into two P-phrases when no focus is given to any word. Note that the second P-phrase contains three words.

(5.101)



'to be delicious + Relativizer + Kimchee + OM + pretty + Adjectival + Yunghee + to + to sell + Past + Ind'
"sold delicious Kimchee to pretty Yunghee"

When focus is given to the word ***kiḿchi-ləl*** 'Kimchee + OM' which is phrase-final, the focused word and the three words in the following P-phrase form a new P-phrase, as shown in (5.102). Note again that forming a new focused P-phrase induces a violation of the constraint C-command in (5.102). This is explained by the ranking **W**ω >> C-command.

(5.102) {maśiń-nən} {**kiḿchi-ləl** yep'ən yəŋhi-eke phal-at-ta}

When focus is given to a phrase-final word, why are all words in the following P-phrase incorporated into a new P-phrase? The constraint **W**ω can be satisfied by simply incorporating one word from the following P-phrase. In NK Korean, all words in the following phrase are incorporated into a new P-phrase.

When the following P-phrase has two words as in {maśiń-nən kimcʰi-ləl}{yəŋhiíˊ-eke pʰal-at-ta} 'sold delicious Kimchee to Younghee', it is explained by the constraint Phrase Minimality (*{ω}) why both words are incorporated into a new P-phrase. Let's consider the case where focus is given to the word ***kiḿcʰi-ləl*** 'Kimchee + OM'. If only the first word in the following two-word P-phrase is incorporated into a new P-phrase as in *{maśiń-nən}{**kimcʰi-ləl** yəŋhi-eke}{pʰaI-aɬ-ta}, the remaining word *pʰaI-aɬ-ta* will form a unary branching P-phrase, which will incur an additional violation of *{ω}. On the other hand, if both words are incorporated into a new P-phrase, the resulting phrase consists of three words as in {maśiń-nən}{**kiḿcʰi-ləl** yəŋhi-eke pʰal-at-ta}. This ternary branching P-phrase violates the constraint Hierarchical Alignment at Phrase (HAϕ). Since HAϕ is ranked lower than *{ω}, this ternary branching P-phrase will be preferred, as in {maśiń-nən} {**kiḿcʰi-ləl** yəŋhi-eke pʰal-at-ta}.

However, when the following P-phrase contains three words as in {maśiń-nən kimcʰi-ləl} {yeéṕ'əń yəŋhi-eke pʰal-at-ta} 'sold delicious Kimchee to pretty Younghee', an additional constraint is required to explain why all three words are incorporated into a new P-phrase. Consider the case where focus is given to the word ***kiḿcʰi-ləl*** 'Kimchee + OM'. If only the first word in the following three-word P-phrase were incorporated into a new P-phrase, as in *{maśiń-nən}{**kiḿcʰi-ləl** yep'ən}{yəŋhiíˊ-eke pʰal-at-ta}, the remaining two words would form a binary branching P-phrase. Thus, this form would be preferred over the real optimal form {maśiń-nən} {**kiḿcʰi-ləl** yep'ən yəŋhi-eke pʰal-at-ta}, which violates HAϕ twice. Thus, an additional constraint is required, which requires an output-output correspondence between the phrasing without focus and the phrasing under focus. See Odden 1996 for detailed discussion of Output-output Correspondence Constraints.

(5.103) Ident-OO

Words in a non-focused P-phrase must occur within the same focused P-phrase.

If we move a word out of a non-focused P-phrase, each movement incurs one violation of the constraint Ident-OO. Consider the following transformations:

(5.104) a. {AB} {CDE} => {A} {BC} {DE}
b. {AB} {CDE} => {A} {BCDE}

The first transformation moves B out of {AB} and C out of {CDE}. Thus, this incurs two violations of Ident-OO. The second transformation moves B out of {AB}, and hence induces one violation of Ident-OO. Due to this constraint, when B is focused in {AB}, B and the whole following P-phrase form a new focused P-phrase because this transformation minimally violates Ident-OO.

As already shown in Tableaux 5.22 to 5.29, the constraint AlignFL and **W**ω induce a violation of Ident-OO. Thus, it is argued that the constraint Ident-OO is outranked by AlignFL and **W**ω.

(5.105) AlignFL, **W**ω >> Ident-OO

As shown in (5.102), a four-word P-phrase, which violates Hierarchical Alignment at Phrase (HAϕ) twice, is constructed due to the constraint Ident-OO. Therefore, it is assumed that the constraint HAϕ is outranked by Ident-OO

(5.106) Ident-OO >> Hierarchical Alignment at Phrase (HAϕ)

To sum up, since the constraint AlignFL is inviolable, the focused word always initiates the focused P-phrase. Since the constraint **W**ω outranks C-command (CC) and *{XP^2}, a focused word is always followed by a non-prominent word except when focus is given to an utterance-final word. When a P-phrase-final word is focused, the words in the following P-phrase are incorporated into the focused P-phrase by the conspiracy of **W**ω and Ident-OO.

Even when the following P-phrase has three words, all of them are incorporated into a focused P-phrase, as illustrated in Tableau 5.30. Since the constraint Ident-OO compares the phrasing under focus with the phrasing without focus, the optimal phrasing without focus is first given in each row in Tableau 5.30. The first candidate, where a focused word does not occur at the left edge of the first P-phrase, is ruled out by its violation of AlignFL. The second candidate, where only one word in the following P-phrase is incorporated into a focused P-phrase, is ruled out by more severe violations of Ident-OO. The last candidate, where all three words in the following P-phrase are incorporated into a focused P-phrase, is selected as optimal because it incurs one less violation of the constraint Ident-OO.

Tableau 5.30
Input: /maśiń-nən kimchi-ləl yeéṕ'əń yəŋhii-eke phaI-aƭ-ta/
'to be delicious + Adjectival + Kimchee + OM + pretty + Yunghee + to + to sell + Past + Ind'
"sold delicious Kimchee (rather than something else) to pretty Yunghee"

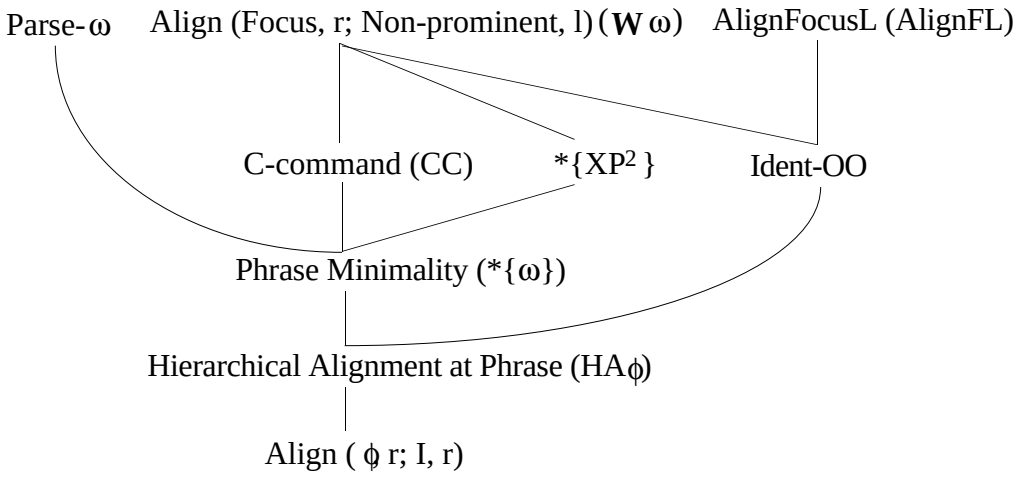
	Align FL	**W**ω	CC	Ident-OO	HAϕ
{maśiń-nən kimchi-ləl} {yeéṕ'əń yəŋhi-eke phal-at-ta} {maśiń-nən **kimchi-ləl**} {yeéṕ'əń yəŋhi-eke phal-at-ta}	*!	*	*		*
{maśiń-nən kimchi-ləl} {yeéṕ'əń yəŋhi-eke phal-at-ta} {maśiń-nən}{**kiḿchi-ləl** yep'ən} {yəŋhiíˊeke phal-at-ta}			*	**!	
{maśiń-nən kimchi-ləl} {yeéṕ'əń yəŋhi-eke phal-at-ta} ☞{maśiń-nən} {**kiḿchi-ləl** yep'ən yəŋhi-eke phal-at-ta}			*	*	**

In conclusion, a new P-phrase boundary is introduced to the left of a focused word. A focused word must be followed by a non-prominent word. Thus, when a P-phrase-final word is focused, the focused word and the words in the following P-phrase form a focused P-phrase. The following constraints and their relative ranking are required:

(5.107) a. Rankings

AlignFL >> *{ω}	in (5.89)
Align (Focus, r: Non-prominent, l) (**W**ω) >> CC, *{XP^2}	in (5.95–6)
AlignFL >> Ident-OO	in (5.105)
Ident-OO >> Hierarchical Alignment at Phrase (HAϕ)	in (5.106)

b. Relative Ranking for Phrasing



5.2.7 Stop Nasalization

Following Y.-M. Y. Cho (1987, 1990), the domain of certain segmental rules is the P-phrase in Seoul Korean. They are Obstruent Voicing, *n*-Assimilation, and Stop Nasalization. There is evidence that the phenomenon of *n*-Assimilation does not occur across a word boundary in NK Korean. For instance, /n/ in *hayá̲n pap* 'white rice' does not assimilate to the following consonant, and hence the form **hayá̲m pap* is not optimal. However, there is a chance that the domain of Obstruent Voicing is also the P-phrase in NK Korean. Voicing is not contrastive in Korean, and thus it is necessary to provide acoustic evidence for this phenomenon. I will leave this issue for future research. It will be shown in this section that the domain of Stop Nasalization is the P-phrase. Hence, this segmental rule can be used as an another diagnostic of phrasing in NK Korean.

Stops are nasalized when they are followed by nasals (Y.-M. Y. Cho 1987:337). In the sequence of [stop + Nasal], the stop consonant always occurs in the coda position due to the fact that no complex onsets are allowed in NK Korean. Korean has nine obstruent stops in UR. However, in Seoul Korean, they are neutralized into three sounds when they occur in the coda position, as illustrated in (5.108) (Sohn: 1987:263–4). Without justification, this thesis assumes that the same neutralization occurs in NK Korean.

(5.108) Neutralization

/p, p', pʰ/	----->	[p]
/t, t', tʰ/	----->	[t]
/k, k', kʰ/	----->	[k]

Among nasals, [ŋ] cannot occur at the word-initial position. Thus, only six sequences of [stop + nasal] are found in NK Korean. As indicated in (5.109), Stop Nasalization occurs across a word boundary. Note that the following examples consist of one word NP Object and a verb. Thus, each of them is organized into one P-phrase.

(5.109) a. [p + nasal] -----> [m + nasal]
paṕ mə̱ŋ́-nən-ta -----> *paḿ mə̱ŋ́-nən-ta*
'rice + to eat + Present + Ind'
"eat rice"

paṕ naḿ-ki-ta -----> *paḿ naḿ-ki-ta*
'rice + to remain + Caus + Present + Ind'
"cause rice to be left"

b. [t + nasal] -----> [n + nasal]
pəśət mə̱ŋ-nən-ta -----> *pəśən mə̱ŋ-nən-ta*
'mushroom + to eat + Present + Ind'
"eat mushroom"

pəśət nam-ki-ta -----> *pəśən nam-ki-ta*
'mushroom + to remain + Caus + Ind'
"cause mushroom to be left"

c. [k + nasal] -----> [ŋ + nasal]
tosila̱k mə̱ŋ-nən-ta -----> *tosila̱ŋ mə̱ŋ-nəń-ta*
'lunch box + to eat + Present + Ind'
"eat lunch box"

tosil̲ak naḿ-ki-ta -----> *tosil̲aŋ naḿ-ki-ta*
'lunch box + to remain + Caus + Ind'
"cause lunch box to be left"

Even though the above phenomenon occurs across a word boundary, it does not occur across a P-phrase boundary, as illustrated in (5.110). In all examples in (5.110), the c-command relationship does not hold between the first and the second words, and thus they are divided into different P-phrases. The phenomenon of Stop Nasalization never occurs across the P-phrase boundary.

(5.110) a. [p + nasal] -----> [m + nasal]
paṕ nəlike mə̲ŋ́-nən-ta -----> {paṕ}{nəlike mə̲ŋ-nən-ta}
'rice + slowly + to eat + Present + Ind'
"eat rice slowly"
paṕ molе-ye to-́oṫ-ta´ -----> {paṕ}{molе-ye to-t-ta}
'rice + sand + at + to place + Past + Ind'
"place rice on the sand"

b. [t + nasal] -----> [n + nasal]
pəśət nəlike mə̲ŋ́-nən-ta -----> {pəśət}{nəlike mə̲ŋ-nən-ta}
'mushroom + slowly + to eat + Present + Ind'
"eat mushroom"

pəśət molе-ye to-́oṫ-ta´ -----> {pəśət}{molе-ye to-t-ta}
'mushroom + sand + at + to place + Past + Ind'
"cause mushroom to be left"

c. [k + nasal] -----> [ŋ + nasal]
tosil̲aḵ nəlike mə̲ŋ́-nən-ta -----> {tosil̲aḵ}{nəlike mə̲ŋ-nən-ta}
'lunch box + slowly + to eat + Present + Ind'
"eat lunch box"
tosil̲aḵ molе-ye to-́oṫ-ta´ -----> {tosil̲aḵ}{molе-ye to-t-ta}
'lunch box + sand + at + to place + Past + Ind'
"cause lunch box to be left"

Joo-Kyung Lee (personal communication) has suggested that nasalization applies optionally between the first and second words in (5.110) in Seoul Korean. Thus, both outputs are optimal in Seoul Korean, as illustrated in (5.110').

(5.110') /pap nilike mə̲ŋ-nən-ta/ -----> *pap nilike mə̲ŋ-nən-ta*
-----> *pam nilike mə̲ŋ-nən-ta*
'rice + slowly + to eat + Present + Ind' "eat rice slowly"

However, in NK Korean, the pronunciation in (5.111) is possible only when focus is given to the first word for the following reasons. First, each of the phrases in (5.111) shows only one H, as shown in {pəśən nəlike mə̲ŋ-nən-ta} and this fact shows that the whole phrase forms one P-phrase. Second, tone doubling, which occurs across a word boundary within an unfocused P-phrase, does not occur across a word boundary in a focused P-phrase, as illustrated in *{**hiń** holaŋi}* 'white tiger'. Note that a floating H does not double across a word boundary as shown in {paḿ nəlike mə̲ŋ-nən-ta}, where the nominal stem *pap* 'rice' has a floating H in UR. Finally, a H on a word-final light syllable is retained in {**tosila̲ŋ́** nəlike mə̲ŋ-nən-ta}. In Chapter 6, it will be shown that a H on a word-final light syllable is prohibited by the constraint *WordFinalH (*WFH). However, a word-final H is retained if focus is given to the word. These two tonal facts show that focus is given to the first word in each of the phrases in (5.111). I will leave the question open whether focus is given to the first word when nasalization applies between the first two words in *pam nilike məŋ-nən-ta*.

(5.111) a. [p + nasal] -----> [m + nasal]
paṕ nəlike mə̲ŋ́-nən-ta -----> {**paḿ** nəlike mə̲ŋ-nən-ta}
"eat rice slowly"

paṕ mole-ye to-́o-t-ta´ -----> {**paḿ** mole-ye to-t-ta}
"place rice on the sand"

b. [t + nasal] -----> [n + nasal]
pəśət nəlike mə̲ŋ́-nən-ta -----> {**pəśən** nəlike mə̲ŋ-nən-ta}
"eat mushroom"

pəśət mole-ye to-́o-t-ta´ -----> {**pəśən** mole-ye to-t-ta}
"cause mushroom to be left"

c. [k + nasal] -----> [ŋ + nasal]
tosila̲k nəlike mə̲ŋ́-nən-ta -----> {**tosila̲ŋ́** nəlike mə̲ŋ-nən-ta}
"eat lunch box"

tosila̲k mole-ye to-́o-t-ta´ -----> {**tosila̲ŋ́** mole-ye to-t-ta}
"cause lunch box to be left"

As discussed in section 5.2.6, when a P-phrase-final word is focused, the focused word and the words in the following P-phrase constitute a single P-phrase. Therefore, two separate P-phrases in (5.110) above are merged into one P-phrase due to the effect of focus. Therefore, Stop Nasalization still occurs within the domain of a P-phrase in (5.111).

In conclusion, the phenomenon of Stop Nasalization occurs across a word boundary. However, it does not occur across a P-phrase boundary. This domain-sensitive phenomenon is explained by the hypothesis that the domain of Stop Nasalization is the P-phrase. Therefore, it is argued that the domain of Stop Nasalization is the P-phrase.

5.2.8 Dependent Words

A 'word' is defined as a linguistic unit which can be used in isolation. However, monosyllabic adverbs in (5.112) cannot stand by themselves.

(5.112) a. *tə* ' moré
cal ' well
ʿan ' not
c'om ' Diminutivé
ʿcham ' Emphasizef
b. *ʿtaa* ' all
təəl ' less
moon ' not

We could treat all the particles in (5.112) as prefixes, and consequently, dealt with in word-level tonology. However, they behave as words when their tonal behaviors are considered. First, they participate in phrasing as words. For instance, they behave the same as the regular adverbs like *p'aɬli* 'quickly', and *nəɬi-ke* 'slowly', as shown in (5.113). As the regular adverbs in (5.113a) begin a new P-phrase, the particles in (5.112) also do, as shown in (5.113b).

(5.113) a. {koŋpú̲-ləl} {p'aɬli he-la} "study + OM + fast + to do + Imp2"
'Do study fast.'

{paɸ́-əI} {nəIi-ke mə̲k-əla} “rice + OM + slowly + to eat + Imp2”
‘Eat rice slowly.’
b. {koŋpú̲-ləl} {tə heé-la} “study + OM + more+ to do + Imp2”
‘Do study more.’
{paɸ́-əI} {taá´ mə̲k-əla} “rice + OM + all + to eat + Imp2”
‘Eat all of rice.’

Second, in Chapters 3 and 4, it was shown that all the suffixes are toneless in UR. However, the particles in (5.112b) behave as having a floating H in UR. Thus, the H falls on the first two syllables of the phrases in (5.114a), as the floating H in the regular adverbs does, as in (5.114b).

(5.114) a. {paɸ́-əI} {taá´ mə̲k-əla} “rice + OM + all + to eat + Imp2”
‘Eat all of rice.’
{paɸ́-əI} {təəI mə̲k-əmən} “rice + OM + less + to eat + Cond”
‘if (you) eat rice less’
{paɸ́-əI} {moóń mə̲k-əmən} “rice + OM + not + to eat + Cond”
‘if (you) are obliged not to eat rice’
b. {paɸ́-əI} {cʰaƙʰa-́ke mə̲k-əmən} “rice + OM + nice + Adverbial + to eat + Cond”
ˇ ‘if (you) eat rice nicely’
{paɸ́-əI} {cəŋ́maIo mə̲k-əmən} “rice + OM + really + to eat + Imp2”
ˇ ‘if (you) really eat rice’

It is hard to explain the above two facts, assuming that the particles in (5.112) are prefixes. Thus, I argue that the particles in (5.112) are words which cannot be used in isolation. Assuming this, the phrasing in (5.113) is automatically explained. Tone doubling in (5.114) will also be automatically explained in Chapter 6.

5.3 Comparison with Previous Studies

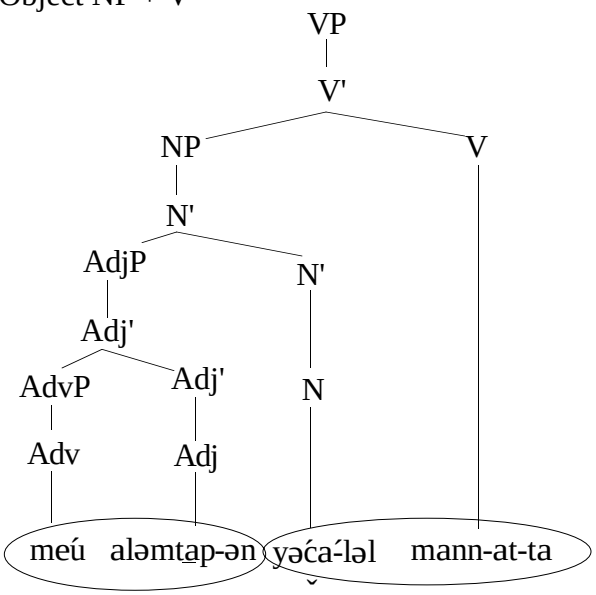
G.-R. Kim 1988:172 proposes the rules of Tone Deletion Rule Domain in (5.115) for NK Korean. The term ‘Tone Deletion Rule Domain’ means a P-phrase.

(5.115) a. In [... YP X]$_{XP}$, where X is the head of XP and YP is a complement, the sequence of YP X forms a domain for the Tone Deletion Rules.
b. Any P-word unaffected by (a) forms its own Tone Deletion Rule domain.

Kenstowicz & Sohn 1996:4 confirm G.-R. Kim's generalization that 'the phrasing domain is delimited by the left edge of XP'.

Observations made by these two previous studies are correct in general. However, both studies encounter the following problems. First, both studies deal with syntactic phrases which consist of three words maximally. Their generalizations are viable only when YP consists of less than or equal to two words. However, they encounter a problem when an additional modifier is added to YP. They would incorrectly phrase the syntactic phrase in (5.116) into one P-phrase. However, I argue that the following phrase constitute two separate P-phrases, as indicated in (5.116):

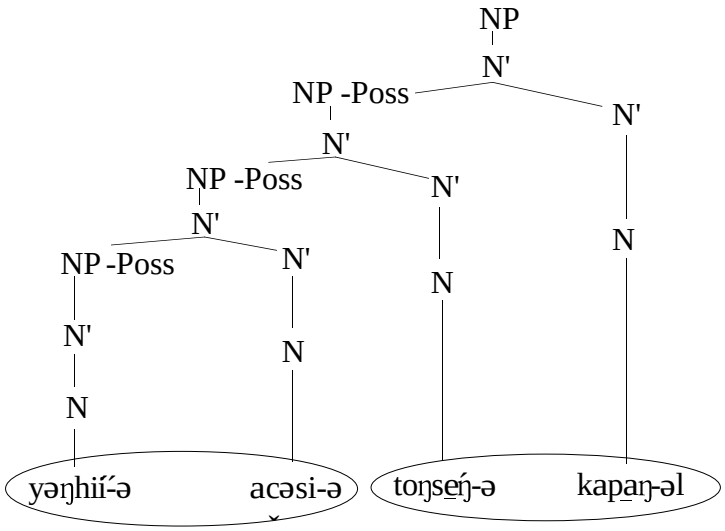
(5.116) a. Object NP + V



'very + to be beautiful + woman + OM + to meet + Past + Ind'
"met a very beautiful woman"

Second, both studies meet a problem when YP is recursive on its left side, as in (5.117). They would incorrectly phrase the syntactic phrase in (5.117) into one P-phrase. However, I argue that the following phrase constitute two separate P-phrases, as indicated in (5.117):

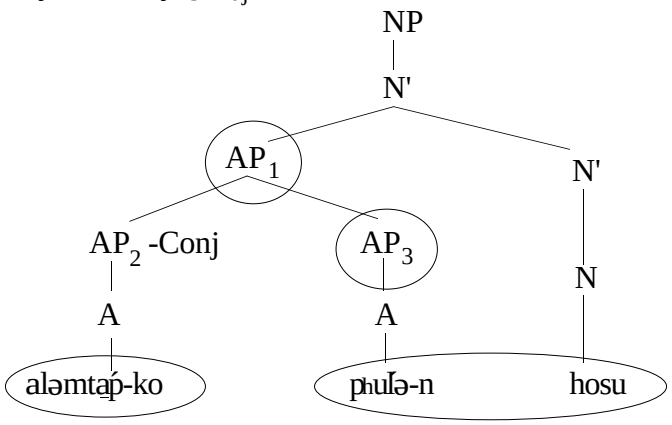
(5.117)



'Younghee + Poss + uncle + Poss + brother + Poss + bag + OM'
"Younghee's uncle's brother's bag"

Finally, both studies appear to encounter a problem with the construction in (5.118). The construction in (5.118) have a modifier which conjoins two AdjP's. This construction must be grouped into two P-phrases, as in {aləmtaˊp-ko} {pʰuɬə-n hosu}. Both studies are problematic since the phrase YP is ambiguous in the sense that it can refer to AdjP1 or to AdjP3.

(5.66') $[[AdjP_2 \ \& \ AdjP_3]_{AdjP1} \ N']$



"to be beautiful + Conj + blue + Adjectival + lake"
"beautiful and blue lake"

Considering a focused P-phrase which is used in isolation, G.-R Kim (1988:190–192) argues that a focused prosodic word begins a new P-phrase and combines with the following prosodic words within the maximal projection of the head. This observation is correct only when the focused P-phrase is used by itself. As shown in Tableau 5.24, when focus is put on the object NP *paṕ-əI* 'rice + OM', then the given phrase is organized into two P-phrases as the survival of two H's indicates as in {maśiń-nən}{**paṕ-əǏ** mə̲ŋ-nən-ta}.

However, G.-R. Kim 1988 does not examine the effect of focus on phrasing when more than one P-phrase is used together. As shown in section 5.2.6, if focus is given to a phrase-final word, the focused word and the words in the following P-phrase form a new P-phrase. This generalization is missed in G.-R. Kim 1988.

Considering a sequence of one-word P-phrases, Kenstowicz & Sohn 1996 argue that when focus is given to a word, the focused word and the word in the following P-phrase constitute a new P-phrase. This generalization is viable only for a sequence of unary branching P-phrases. Considering a sequence of multi-word P-phrases, it was shown that if focus is given to a non-final word, then the words in the following P-phrase are not influenced. The words in the following P-phrase are affected only when focus is given to a phrase-final word. This generalization is missed in Kenstowicz & Sohn 1996.