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The lexical tone system of North Kyungsang Korean

Chung, Young-Hee, Ph.D.
The Ohio State University, 1991
THE LEXICAL TONE SYSTEM
OF NORTH KYUNGSANG KOREAN

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of the Ohio State University

By
Young Hee Chung, B.A., M.A.

* * * * *

The Ohio State University
1991

Dissertation Committee:
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To My Parents
ACKNOWLEDGEMENTS

It is my pleasure to acknowledge here my gratitude to all those who helped me along the way.

I owe special thanks to the members of my committee, but first and foremost, I would like to express my deepest and sincere appreciation to David Odden, my adviser, who has first encouraged interest in the field and contributed many valuable comments and far-reaching critical insights to this dissertation. Without his patience with which he refined my vague ideas in the earlier drafts of this work, none of this would have been possible.

I also would like to express my deepest thanks to the other members of my committee, Brian Joseph and Mary Beckman, whose enlightening comments helped me to clarify many ideas of this dissertation.

Thanks are due to my fellow students. Without their presence my study here would have been less joyful. A word of thanks goes to Yong-kyoon No, Hee-rak Chae, Sookhyang-Lee, and Sun-a Jun. Their support both inside and outside of academics cannot be forgotten.

My parents and parents-in-law deserve special thanks. Without their love and support, my study would not have been possible.
Last, but certainly not the least, I thank my husband and my daughter for their love, patience, and moral support. Their presence made life more pleasant and valuable.
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Major Field: Linguistics

Studies in Phonology. Professors David Odden, Mary Beckman
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CHAPTER I
INTRODUCTION

1.1 Overview

Tone in the Korean language has not received its share of attention, compared to segmental phonology. The most significant reason for this neglect is that the standard dialect, the Seoul dialect, happens to be the one of the dialects where all historical tonal distinctions have been lost, and it is the standard dialect which gets the attention of linguists.

The richest tone systems are found in the dialects of Kyungsang and Hamkyung. The Kyungsang dialect is spoken in the south-eastern part of South Korea, and the Hamkyung dialect is spoken in the north-eastern part of North Korea.

Studies on tone in Kyungsang Korean recognize variation within the dialect according to the area where it is spoken. A major division is drawn between the northern part and the southern part of the area, thus North Kyungsang Korean and South Kyungsang Korean, respectively. This is a study of the tonal system of North Kyungsang Korean\(^1\), within a unified theoretical framework which draws together several recent developments in the theory of phonology: Autosegmental phonology (Williams (1976), Goldsmith (1976), Pulleyblank (1982)), Lexical

The contribution of this thesis is two fold: empirical and theoretical. Empirically, the present study will cover vastly more data than ever before (Ramsey, 1975, Nahara 1985, Kim, 1989). Kim (1989), which is the most extensive study on the North Kyungsang dialect so far, has not covered

1) noun inflectional suffixes sufficiently. This results in failing to capture correct generalizations about tone of nouns.
2) cases where nouns and verb stems are followed by more than one suffix. This limited coverage of data results in an incorrect and unrevealing analysis. These cases are also crucial to the issue of the cyclicity of the levels involved.
3) derivational morphology, which bears on the stratal organization of Korean tone.
4) compounds other than noun-noun compounds. This limitation of data results in failing to discover compound tone rules which are distinct from phrasal tone rules.
4) words with contour tones.
5) phrases where tone spreading occurs.

Furthermore, several tonal phenomena which have been ignored in previous work on North Kyungsang Korean will be described and analysed.
This study will show how various theoretical ideas are incorporated into a single unified framework and applied to a large and complex body of data, elucidating the tonal system of this language. The present study also provides empirical evidence regarding several details of the theories.

First, we will specify only high tone underlingly and assign low tone by default. The present analysis thus supports the underspecification theory of Pulleyblank (1986), where it is claimed that the default tone is, universally, low in a two-way tonal system. Secondly, claiming that certain units at the edges are extratonal, this study motivates extratonality and the Peripherality Condition (Pulleyblank, 1986). Thirdly, the division between the lexical component and the postlexical component, and the further division of the lexical component into several strata (or levels) is well motivated in this language. The entire lexical phonology conforms to the Strict Cycle Condition of Kiparsky (1982a,b), which protects the integrity of lexical outputs by preventing structure-changing rules from applying entirely within a lexical item which was already present in the input to the current cycle.

The dissertation is organized as follows. The first chapter includes a discussion of general characteristics of tone of North Kyungsang Korean, which is followed by a brief introduction to the structure of the language. The second chapter lays out the theories within which the present study is conducted. The discussion of tone of noun forms is given in the third chapter. Nouns are classified into variant tone nouns and invariant tone nouns. In invariant tone nouns, H invariably appears on the same mora(s), regardless of the suffixes which follow. In
variant tone nouns, the position of H varies according to the suffixes which follow. I compare these two types of nouns, and show that there is reason to believe that variant tone nouns are underlyingly toneless, as are suffixes. The asymmetrical distribution of tone patterns in trisyllabic and quadrisyllabic nouns (over 90% of them have a H on the penultimate mora) will also be discussed and explained. It is shown that extratonality, related to extraprosodicity, plays a crucial role in these nouns. Nouns with long vowel are also examined. Long vowels are always contour-toned: there are no level-toned long vowels in this language. Moreover, long vowels at the left edge of a stem are rising-toned and long vowels at the right edge are falling-toned. Extratonality will be invoked to explain this regularity.

Tone in verb forms is the topic of Chapter 4. Verb stems also classify into invariant tone stems and variant tone stems. In invariant tone stems, H appears on the same mora(s), regardless of the suffixes which follow. In variant tone stems, the position of H varies according to the suffixes which follow. With nouns, variant tone verb stems and verbal suffixes are underlyingly toneless. A discussion of verb stems with long vowels also appears: long vowels at the left edge of a verb stem are rising-toned and long vowels at the right-edge are falling-toned. This regularity is also explained by extratonality as was the case with nouns. A special attention is given to vowel shortening.

Tone in derivational morphology is discussed in Chapter 5. Chapter 6 is concerned with tone of compounds. Tone in compounds is compared and contrasted with the tone pattern of phrases. The result is the discovery of compound tone rules, which are distinct from phrasal tone rules. A brief discussion of tone at the

1.2 General Characteristics of Tone of North Kyungsang Korean

There are two distinct tone levels, namely High Tone and Low Tone. Tone is assumed to link to the mora. Furthermore, a single tone is allowed per mora. A short vowel has one mora; a long vowel has two moras. A consonant in principle does not have a mora unless it is assigned one by rule (see Chapter 4). Following Hayes (1989), I assume that onset consonants adjunct to the syllable node, and coda consonants adjoin to the mora of the preceding vowel. By way of illustration, the syllable structure of *parâm* ‘wind’, whose vowels are short, and *paâm* ‘chestnut’, whose vowel is long, are given in (1.1).

\[
\begin{array}{c}
\text{(1.1) a.} & \underline{\text{M}} \underline{\text{M}} \\
\text{p a r a m} & \underline{\text{M}} \underline{\text{M}} \\
\text{b.} & \underline{\text{M}} \\
\text{p a a m} & \underline{\text{M}} \underline{\text{M}} \\
\end{array}
\]

where $\underline{\text{M}}$ represents the syllable node and $\underline{\text{M}}$ represents the mora node.

Every word has at least one high-toned mora, but no more than two; the remaining moras are low-toned. When two moras are high-toned, the first is on the first syllable and the second is on the second syllable. Moreover, two high-toned moras always occur side by side: they cannot be separated by low-toned moras (e.g.*,hoölângi* ‘tiger’, but *hoolângi*).

In (1.2) are given some representative words of this language.
(1.2) a. Words with a One High-Toned Mora

súl ‘alcohol’ múl ‘water’
káci ‘type’ kácí ‘eggplant’
hánEl ‘sky’ parám ‘wind’
myÉnElí ‘daughter in law’ k’amáki ‘raven’
satalí ‘ladder’

b. Words with Two High-Toned Moras

tánçí ‘jug’ kúrÉm ‘cloud’
múcíge ‘rainbow’ taámpé ‘cigarette’
hoólángi ‘tiger’

There is no way to predict which mora is high-toned in a word. Tone, thus, is part of lexical information.

1.3 An Introduction to Korean
1.3.1 Sound Inventory

North Kyungsang Korean has a six-vowel system, whereas standard Korean has an eight-vowel system.

(1.3) Vowels of North Kyungsang Korean

<table>
<thead>
<tr>
<th></th>
<th>-back</th>
<th>+back</th>
</tr>
</thead>
<tbody>
<tr>
<td>-round</td>
<td>-round</td>
<td>+round</td>
</tr>
<tr>
<td>high</td>
<td>i</td>
<td>(i)</td>
</tr>
<tr>
<td>mid</td>
<td>e</td>
<td>E</td>
</tr>
<tr>
<td>low</td>
<td>(æ)</td>
<td>a</td>
</tr>
</tbody>
</table>
The vowels within parentheses are found in standard Korean, but are missing in North Kyungsang Korean. The vowel [E] in Kyungsang Korean, in fact, is a little bit higher than [E] in standard Korean. In short, [E] in Kyungsang Korean has a quality in between standard Korean [i] and [E].

North Kyungsang Korean has the following twenty consonantal segments.

(1.4) Consonants of North Kyungsang Korean

<table>
<thead>
<tr>
<th>Bilabial</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>p, p', ph</td>
<td>t, t', th</td>
<td>k, k', kh</td>
<td></td>
</tr>
<tr>
<td>Fricative</td>
<td>s, (s')</td>
<td></td>
<td>h</td>
<td></td>
</tr>
<tr>
<td>Affricate</td>
<td>c, c', ch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td>m</td>
<td>n</td>
<td>ng</td>
<td></td>
</tr>
<tr>
<td>Liquid</td>
<td>l</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glide</td>
<td>w</td>
<td>y</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sounds in parentheses are found in standard Korean, but are missing in North Kyungsang Korean. C' represents tensed consonants, C<sup>a</sup> represents aspirated consonants.

1.3.2 Segmental Phonology

I will not review all segmental phonological processes in Korean: only those relevant, directly or indirectly, to the discussions that follow will be introduced. For a detailed discussion of segmental phonology of Korean, see Kim-Renaud (1974), Ahn (1985), and Sohn (1987) among others.
1.3.2.1 Consonantal Phonology

Nasal assimilation is the process by which a consonant assimilates to the nasality of the following nasal sounds. So, the underlying form /mEk-na/ ‘eat?’, where mEk- is the verb stem meaning ‘eat’ and -na is the interrogative verbal suffix, becomes [mEng-na] on the surface. Also, the noun form /kuk-mengkuro/ ‘like soup’, where kuk is the noun meaning ‘soup’ and -mengkuro is the noun suffix meaning ‘like’, becomes [kung-mengkuro] on the surface.

Neutralization is a process by which obstruents in the syllable coda are neutralized and become [t]. So, for example, the underlying form /los/ ‘clothes’ when followed by the suffix /cocha/ ‘even’ becomes [ot-cocha] ‘even clothes’.

1.3.2.2 Vowel Phonology

Initial vowels of certain suffixes alternate between [E] and [a] according to the final vowel of the preceding stem. If the stem final vowel is [i], [e], [E], or [u], the initial vowel of those suffixes becomes [E]. If the stem vowel is [o] or [a], the suffix initial vowel becomes [a]. So, for example, the past tense suffix is realized as -Es after the stem mEk- ‘to eat’ or sik- ‘to get cold’: mEk-Et-ta ‘ate’, sik-Et-ta ‘got cold’. On the other hand, the past tense suffix is realized as -as after the stem mak- ‘to block’ or sok- ‘to be deceived’: e.g. mak-at-ta ‘blocked’, sok-at-ta ‘was deceived’. This process is called Vowel Harmony.

Not all suffixes exhibit this alternation. For example, the honorific suffix does not show the alternation: it is [Esi] regardless of the vowel quality of the preceding stem: e.g. mEk-Esi-n-ta ‘eat (honorific)’, mak-Esi-n-ta ‘block (honorific)’.
Suffixes which are subject to Vowel Harmony could be distinguished from those not subject to it in terms of the underlying representation. Thus, suffixes which undergo Vowel Harmony are assumed to have /a/ as the initial vowel underlyingly, while those that do not are assumed to have /E/ as the initial vowel underlyingly. And it is the underlying vowel /a/ which undergoes Vowel Harmony.²

Deletion is a process by which the suffix-initial vowel E is deleted when the vowel is immediately preceded by a vowel-final stem: e.g. cap-Esi-n-ta ‘catch (honorific)’ vs. ka-si-n-ta ‘go (honorific)’. Deletion applies before Vowel Harmony, and this explains the apparent violation of Deletion in forms like cu-Et-ta ‘gave (give -past tense-mood marker)’. The suffix vowel E in this form is not deleted, since when Deletion applies, the initial vowel of the past suffix is [a] (i.e./-as/), which changes to [-Et] as the result of the application of Vowel Harmony.

Vowel Simplification simplifies a sequence of two identical vowels which arises through putting morphemes together. So, the underlying /ca-at-ta/ ‘slept’ becomes [catta] on the surface.

1.3.3 Morphology

Korean, which is an agglutinating language, is rich in inflectional morphology; very little derivational morphology is observed. And most affixes are suffixes.
1.3.3.1 Noun Morphology

Nouns are followed by one case suffix when they occur in a sentence.\textsuperscript{6} Uninflected nouns can occur as a citation form or as a short answer to questions. Case suffixes indicate syntactic relations to other words in a sentence. So, for example, the noun hakseng ‘student’ is followed by the nominative suffix -i when it is the subject of a sentence (e.g. *hakseng-i ka-n-ta* ‘a student is going’, where *hakseng* means ‘student’ and *ka-n-ta* means ‘going’).

In (1.5) are listed various case suffixes.

(1.5) Case Suffixes\textsuperscript{7}

\begin{itemize}
\item[-i (or -ka)]  \textit{‘nominative’}
\item[-(l)El] \textit{‘accusative’}\textsuperscript{8}
\item[-(n)En] \textit{‘topic marker’}
\item[-(E)lo] \textit{‘to, with’}
\item[-hanthe] \textit{‘to (person)’}
\item[-mankhEm] \textit{‘as much as’}
\item[-mengkuro] \textit{‘like’}
\item[-eke] \textit{‘to (person)’}
\item[-hako] \textit{‘with’}
\item[-(E)losE] \textit{‘as (person’s position)’}
\item[-(y)a] \textit{‘vocative’}
\item[-(i)lang] \textit{‘with (person)’}
\end{itemize}

\begin{itemize}
\item[-k’esE] \textit{‘nominative (honorific)’}
\item[-(k)wa\textsuperscript{9}] \textit{‘and’}
\item[-esE] \textit{‘in or at’}
\item[-chElEm] \textit{‘like’}
\item[-potaa] \textit{‘than’}
\item[-e] \textit{‘on, to’}
\item[-Ey] \textit{‘/possessive’}
\item[-kachi] \textit{‘like’}
\item[-tElE] \textit{‘to (person)’}
\item[-k’aci] \textit{‘up to’}
\item[-puthE] \textit{‘from’}
\end{itemize}
There is another group of suffixes which can follow a noun. The function of these suffixes is not to indicate syntactic relations but to delimit the meaning of a preceding expression. For this reason, they are sometimes called "delimiters". For example, the noun nE ‘you’ may be followed by the delimiter suffix -cocha ‘even’, producing nE-cocha ‘even you (nominative or accusative)’.

(1.6) Delimiters

<table>
<thead>
<tr>
<th>Suffix</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>-cocha</td>
<td>‘even’</td>
</tr>
<tr>
<td>-man</td>
<td>‘only’</td>
</tr>
<tr>
<td>-do</td>
<td>‘as well’</td>
</tr>
<tr>
<td>-k’aci</td>
<td>‘including’</td>
</tr>
<tr>
<td>-mada</td>
<td>‘each’</td>
</tr>
<tr>
<td>-puthE</td>
<td>‘starting from’</td>
</tr>
<tr>
<td>-(i)na</td>
<td>‘if any’</td>
</tr>
<tr>
<td>-macE</td>
<td>‘even’</td>
</tr>
<tr>
<td>-kyEnyEng</td>
<td>‘let alone’</td>
</tr>
</tbody>
</table>

More than one "delimiter" can follow a noun as far as the semantics allows it: e.g. nE-cocha-do ‘even you as well’.

"Delimiters" follow case suffixes other than the nominative, the accusative and the possessive: e.g. nE-chElEm-man ‘only like you’, where chElEm ‘like’ is a case marker. The nominative, the accusative and the possessive suffix on the other hand follow "delimiters": e.g. nE-man-i ‘only you (nominative)’. However, the nominative and the accusative suffix (but not the possessive suffix) do not usually appear after a delimiter. Hence, for example, nE-man can be interpreted either as a nominative case or as an accusative case.

Besides case suffixes and "delimiters", we have the plural suffix -tEl, and the honorific suffix -nim: e.g. chek-tEl ‘books’, sEnseng-nim ‘teacher (honorific)’. These two suffixes appear before both "delimiters" and case suffixes: e.g. sEnseng-
nim(tEl)-chElEm-man ‘only like the teacher (honorific)’.

1.3.3.2 Verbal Morphology

A verb stem cannot occur alone: it must at least be followed by a tense suffix and a mood suffix. An honorific suffix and a formal suffix may follow a verb stem. Verbal suffixes occur in a particular sequence: Stem-Honorific-Tense-Formal-Mood.

The honorific suffix is */-Esi/: e.g. mEk-Esi-n-ta ‘eat (honorific)’, where the suffix -n is the present tense suffix, and the suffix -ta is the declarative mood suffix. After a vowel-final stem, the honorific suffix is -si due to the deletion of the suffix-initial [E]: e.g. po-si-n-ta ‘see (honorific)’.

There are three tenses marked: present, past, and future. The present tense suffixes is *-nEn* or *-n*. -nEn occurs after a consonant, -n after a vowel: e.g. mEk-nEn-ta ‘eat’ versus po-n-ta ‘see’. The past suffix is *-as*, which has the variant -Es due to Vowel Harmony. -as occurs after a stem with [o] or [a] as the final vowel (e.g. po-at-ta ‘saw’); -Es occurs after a stem which ends in [i], [u], [e], or [E] (e.g. mEk-Et-tas ‘ate’, sik-Et-ta ‘got cold’). The future suffix is */-kesi/ e.g. po-ket-ta ‘will see’, mEk-ket-ta ‘will eat’.

Besides these three simple tenses, there are two complex tenses which are formed by combining simple tense suffixes: the remote past formed by reduplicating the past tense suffix, and the past future (or future perfect) formed by a sequence of the past and the future tense suffixes. mEk-Es-Es-ta ‘had eaten’ is an example of the remote past, and mEk-Et-ket-ta ‘will have eaten’ is an example of
the future perfect.

There is a group of verb stems which do not require the present tense suffix in the present. Verb stems in this group usually describe qualities, like adjectives in English (e.g. *yep'E- 'to be pretty', *kiil-ta 'to be long'). For this reason, these verb stems are often called "adjectival" verbs or "stative" verbs. To illustrate, compare the verb stem *po- 'to see' with *yep'E- 'to be pretty'. *po- 'to see', which is not an "adjectival verb", requires the present suffix -n, in the present: e.g. *po-n-ta 'see', where -ta is the declarative mood marker. In contrast, *yep'E- 'to be pretty', which is an "adjectival" verb, does not require the present suffix in the present: e.g. *yep'E-ta 'is pretty', not *yep'E-n-ta. The other tense suffixes, the past and the future, on the other hand, can follow "stative" verbs (e.g. *yep'E-t-ta 'was pretty', *yep'E-ket-ta 'will be pretty').

The formal suffix is -sEmni after a consonant, and -mni after a vowel: e.g. *mEk-sEmni-ta 'eat (formal)' versus *po-mni-ta 'see (formal)'. The formal suffix cannot cooccur with the present tense suffix. So, *po-nEn-sEmni-ta 'see (formal)' is not allowed; instead, *po-mni-ta 'see (formal)' is the correct form.

There are many mood suffixes. Among them are declarative -ta, propositive -ca, interrogative -na and -k'a, apperceptive -kuna, imperative -ala and -kEla 13, propositive -so, retrospective -tEla, connective -ko, adversative -(E)na, projective -tolok, conditional -(E)myEn, simultative -(E)myEnsE, adjectival (or adnominal) -nEn, -(E)n, and -(E)t 14.

Below in (1.7) are given various forms of the stem *mEk- 'to eat' and *cu- 'to give' to illustrate combinations and ordering of these morphemes.
### (1.7) mEk- 'to eat'

<table>
<thead>
<tr>
<th>Stem</th>
<th>Honorific-Tense-Formal-Mood</th>
</tr>
</thead>
<tbody>
<tr>
<td>mÉk</td>
<td>Esi Et sEmni ta</td>
</tr>
<tr>
<td>mÉk</td>
<td>Esi ket sEmni ta</td>
</tr>
<tr>
<td>mÉk</td>
<td>Esi mni ta</td>
</tr>
<tr>
<td>mÉk</td>
<td>Esi Et ta</td>
</tr>
<tr>
<td>mÉk</td>
<td>Esi ket ta</td>
</tr>
<tr>
<td>mÉk</td>
<td>Esi n ta</td>
</tr>
<tr>
<td>mÉk</td>
<td>Et sEmni ta</td>
</tr>
<tr>
<td>mÉk</td>
<td>ket sEmni ta</td>
</tr>
<tr>
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</tr>
<tr>
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<td>Et ta</td>
</tr>
<tr>
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<td>két ta</td>
</tr>
<tr>
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<td>nÉn ta</td>
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<tr>
<td>mÉk</td>
<td>Ela</td>
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<tr>
<td>mÉk</td>
<td>kÉla</td>
</tr>
<tr>
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<td>Eso</td>
</tr>
<tr>
<td>mÉk</td>
<td>Esi tolok</td>
</tr>
<tr>
<td>mÉk</td>
<td>tòlok</td>
</tr>
<tr>
<td>mÉk</td>
<td>myEnsE</td>
</tr>
<tr>
<td>mÉk</td>
<td>EmyEnsE</td>
</tr>
<tr>
<td>mÉk</td>
<td>Esi na</td>
</tr>
</tbody>
</table>

### (1.8) cu-

<table>
<thead>
<tr>
<th>Stem</th>
<th>Honorific-Tense-Formal-Mood</th>
</tr>
</thead>
<tbody>
<tr>
<td>cu</td>
<td>sí Et sEmni ta</td>
</tr>
<tr>
<td>cu</td>
<td>sí ket sEmni ta</td>
</tr>
<tr>
<td>cu</td>
<td>sí mni ta</td>
</tr>
<tr>
<td>cu</td>
<td>sí Et ta</td>
</tr>
<tr>
<td>cu</td>
<td>sí ket ta</td>
</tr>
<tr>
<td>cu</td>
<td>sí n ta</td>
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<tr>
<td>cu</td>
<td>Et sEmni ta</td>
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<td>cu</td>
<td>ket sEmni ta</td>
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<td>Et ta</td>
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<td>tòlok</td>
</tr>
<tr>
<td>cu</td>
<td>sí myEnsE</td>
</tr>
<tr>
<td>cu</td>
<td>myEnsE</td>
</tr>
<tr>
<td>cu</td>
<td>sí na</td>
</tr>
<tr>
<td>cu</td>
<td>na</td>
</tr>
</tbody>
</table>
1.3.4 Syntax

The basic word order of Korean is SOV, with the complement to the left of the head in all types of phrases.

\[(1.9)^{16}\]

\[
S \quad \begin{array}{c}
\text{NP} \\
\text{VP} \\
\text{N} \\
\text{PP} \\
\text{NP} \\
\text{V}
\end{array}
\]

ne-ka Mary-hanthe sakwa-lel cu-Et-ta

I-nom. Mary-to apple-accu. gave

'I gave an apple to Mary'

Specifiers are on the left.

\[(1.10)\]

\[
\begin{array}{c}
\text{Det} \\
\text{NP} \\
\text{AP} \\
\text{N}
\end{array}
\]

ne se ot

my new clothes

'my new clothes'

Usually in the spoken form of the language, the object noun of transitive verbs do not carry the accusative marker -(i)El. Hence, a more natural form of the sentence given above in (1.9) would be ne-ka Mary-hanthe sakwa cu-Et-ta 'I gave an apple to Mary'.
Notes

1. Even in the North Kyungsang dialect, there is variation according to the area where it is spoken. The data of the present study is based on the dialect which is spoken in the Daegu area.

2. Kim (1989) does not agree to the existence of contour tones other than those derived by contraction of vowels.

3. Prepausally, all high-toned moras fall. So, the restriction of one tone per one mora does not hold postlexically.

4. There is no consensus on the number of vowels among Korean phonologists. The eight-vowel system has been proposed by K.O. Kim (1978) and Sohn (1987) among others.

5. In standard Korean, where there is a distinction between the vowel [E] and the vowel [i], [i] is the vowel which undergoes the deletion, and [E] is the vowel which undergoes Vowel Harmony. As I pointed out before, these two vowels have merged to the vowel [E] in Kyungsang Korean.

6. Usually, object nouns of transitive verbs do not carry any case marker.

7. There is no consensus on the status of these particles. They are usually called "case markers", which does not commit to any specific category. I treat them as suffixes since they exhibit the same phonological behaviour as other suffixes, among other things. For example, palatalization, which occurs only between a word and a suffix, not between words (see Ahn 1984), is observed to occur between a word and these particles. Also, these particles exhibit the same tonal behavior as other suffixes such as verbal suffixes. For morphological and/or syntactic behaviors of these particles, see Kuh (1988) and No (1991).

8. There is a group of noun inflectional suffixes whose initial vowel alternates with zero. Generally, the vowel-initial variant occurs after a consonant, the consonant-initial variant occurs after a vowel.

9. -kwa is used after a consonant, -wa is used after a vowel.

10. The status of the delimiters is also not clear: there is no consensus on their exact category. I treat them as suffixes, since they appear inside the case suffixes listed in (1.5).

11. The alternation of the stem-final consonant of the past suffix between [s] and [t] is due to neutralization. See the discussion of phonology in 1.3.2.1

12. The deletion of the initial vowel of the past suffix in yep'E-t-ta 'was pretty' is due to the simplification of a sequence of two identical vowels.
13. The imperative suffix -Ela is more commonly used in the standard dialect, while -kEla is more common in the Kyungsang dialect. The suffixes with the initial vowel parenthesized alternate between 0 and E according to the preceding sound. If a preceding sound is a consonant, the form with the vowel E occurs; if a preceding sound is a vowel, the form without the vowel E occurs.

14. -(n)iEn is for the present tense, -(E)n is for the past tense, and -(E)l is for the future tense.

15. As argued earlier in the discussion of segmental phonology of Korean, the initial vowel E of the past suffix -Et is not deleted after a vowel-final stem even when preceded by a vowel, since the underlying form of the past suffix is /-as/-Es is the result of the application of Vowel Harmony. Providing that the deletion applies before Vowel Harmony, the reason why the initial vowel of the past suffix -Et is not deleted after a vowel-final stem is clear. It is because at the moment deletion applies, the initial vowel of the past suffix is not [E], but [a]. And it is the vowel [E] that is subject to deletion.

16. The phrase structure of Korean is assumed to be configurational.
CHAPTER II
THEORETICAL FRAMEWORK

The present study is conducted within a unified framework which draws together several recent developments in the theory of phonology: autosegmental phonology (Williams (1971), Goldsmith (1976), Pulleyblank (1983)), Lexical Phonology (Kiparsky (1982a,b), Mohannan (1982)), underspecification (Kiparsky (1982a,b), Archangeli (1985), Pulleyblank (1986)), and extraprosodicity (Hayes (1982), Pulleyblank (1986), Ito (1986a)).

The purpose of this chapter is to lay out the theories employed in the present study, putting special emphasis on the ideas which are crucial to the discussions that follow.

2.1 Lexical Phonology

In early stages of generative grammar (e.g. Chomsky and Halle 1968), there was no provision for morphology. The way morphemes are put together to form words was not considered to be distinct from the way words are put together to form sentences. Hence, word structure and sentence structure were handled in the same module of the grammar, namely syntax. The output of the syntactic component provided an input to the phonological component.
With ‘Remarks on Nominalization (1970)’, a new view of morphology appeared. Chomsky proposed that certain regular relationships between words could be expressed in terms of ‘lexical rules’ and these rules were different in nature from the syntactic rules. Halle (1973) undertook to further investigate the principles governing word-structure and added a new module, the word formation component to the grammar as part of the lexicon. Siegel (1979) suggested that the morphological module of the grammar consisted of ordered sub-modules called ‘levels’, and some phonological rules such as stress rules may apply within one of these levels. In Siegel’s model, therefore, the lexicon is used to express certain phonological processes as well. Pesetsky (1979) extended the notion of level-ordering, making phonological rules apply in the lexicon after every morphological operation. This idea was adopted by Kiparsky and Mohannan and has been developed into the theory of Lexical Phonology.

2.1.1 Level Ordering

The basic concept of lexical phonology is that the lexicon consists of several ordered levels or strata which are the domains of certain phonological rules as well as morphological rules. A model of the Korean lexicon was proposed by Ahn (1985) based on segmental phonology as well as morphology.¹

(2.1) Stratum 1: Sub-Compounding

2: Co-compounding
3: Derivation
4: Inflection
Tonal phenomena of North Kyungsang Korean provide additional evidence for the division between inflection and derivation: there are certain tonal rules which apply in the derivational level but do not apply in the inflectional level and vice versa. For example, it will be shown that Stem-Tone Deletion applies in the derivational stratum, but not in inflectional and compounding strata. The division of compounding from other processes of word formation is also supported by tonal phenomena: there are tonal rules which only apply to compounds (e.g. Compound Rule 1 and 2). However, no tonal evidence is found for the separation between sub-compounding and co-compounding.

2.1.2 Cyclicity

Phonological rules not only may apply to the output of every word formation process within the lexicon (lexical application or lexical rules) but also may apply after words are combined into sentences in the syntax (postlexical application or postlexical rules). And it is claimed that lexical rules (or lexical application of rules) have different properties than postlexical rules (postlexical application of rules). Among those properties are cyclicity and the Strict Cycle Condition, which play an important role in the discussions that follow.

In the earlier theory of lexical phonology (Kiparsky 1982 a,b Mohannan 1982), all lexical rules (or all lexical strata) were assumed to be cyclic, while postlexical rules were assume to be non-cyclic. The cyclicity of lexical rules falls out from the inherent property of lexical phonological rules, which apply in the lexicon after each morphological operation, the output then being fed into a further
layer of morphological derivation.

Recent work by Mohannan and Mohannan (1984) and Halle and Mohannan (1985), however, have argued, based on Malayalam and English phonology, that lexical strata may be non-cyclic, so it is necessary to specify for each stratum whether it is cyclic or noncyclic. In the present study, I argue that the output of each morphological rule forms the domain for phonological rules to the extent that the output can occur as an independent word. Otherwise, phonological rules cannot apply until all those morphological rules required to derive an independent word have applied. In short, phonological rules apply to each and every derived word which can occur as an independent word (Chapter 4).

2.1.3 The Strict Cycle Condition and the Elsewhere Condition

Closely linked to the issue of cyclicity is the issue of the Strict Cycle Condition. The Strict Cycle Condition has first been proposed by Mascaro (1976), who claimed that the class of rules which exhibit the ‘derived-environment-only’ behavior is the class of cyclic rules.

(2.2) Strict Cycle Condition

a. Cyclic rules apply only to derived representations.

b. Def.: A representation X is derived with respect to rule R in cycle j iff X meets the structural analysis of R by virtue of a combination of morphemes introduced in a cycle j or the application of a phonological rule in cycle j.
Kiparsky (1982a,b), questioning the inherent connection between cyclicity and the restriction to derived environment (the Strict Cycle Condition), argues that the Strict Cycle Condition does not have to be stipulated as an autonomous principle in the theory of grammar; rather, it is deducible from the Elsewhere Condition.

The Elsewhere Condition (Kiparsky 1982a) states that when two rules whose application produces distinct outputs compete for the same strings, the more specific rule takes applicational precedence over the less specific one.

(2.3) Elsewhere Condition (Kiparsky 1982a)

Rules A and B in the same component apply disjunctively to a form X iff:

(i) The structural description of A properly includes the structural description of B

(ii) The result of applying A to X is distinct from applying to X. In that case, A is applied first, and if it takes effect, B is not applied.

The basic point of Kiparsky’s argumentation is that the blocking of cyclic rules in nonderived environments effected by the Strict Cycle Condition directly follows from the Elsewhere Condition under the assumption that every lexical entry constitutes an identity rule whose structural description is the same as its structural change (e.g. \textit{param} \rightarrow \textit{param}).

One consequence of these claims is that every lexically listed form is in a disjunctive ‘elsewhere’ relation with other phonological rules which have the effect of creating a distinct change, since the structural description of lexical identity rules
properly includes the structural description of any other phonological rules. Consequently the more specific lexical identity rule will preclude application of any other more general phonological rules.

The success of this proposal crucially depends on knowing what constitutes lexically listed forms and what constitutes "distinct" outputs. In most cases, both underlying forms and cyclic outputs, but not the outputs of individual rules in the middle of a cycle, are identified as lexically listed forms. The notion of "distinctness" is another problem. Kiparsky (1982a), although he did not explicitly say it, seems to count two outputs as "distinct" if they have contradictory feature specifications (e.g. in the output of one rule a segment has [+F], but has [-F] in the output of the other rule) or contradictory metrical structure.

Since non-derived forms function as lexical identity rules, they would, according to the Elsewhere Condition, preclude application of any other phonological rule which would have the effect of creating a distinct change. In contrast, derived forms are precisely those which are not identical to some lexical entry and which therefore function as lexical identity rules, thus do not preclude application of other phonological rules.

Deriving the effects of the Strict Cycle Condition from the Elsewhere Condition provides a principled explanation for the application of certain cyclic rules in non-derived environments. It has been observed that syllabification rules and stress assignment rules (not all of them, though) apply in non-derived environments even though they are cyclic rules. This apparent violation of the Strict Cycle Condition can be explained by the Elsewhere Condition. The crucial
observation here is that there are fundamental distinction between structure-building rules such as stress and syllabification rules, and structure-changing rules, which actually change feature values or disrupt previously erected structure. Rules which build structure rather than altering it do not produce output "distinct" from their inputs in that they do not change feature values or disrupt previously erected structure. Hence, structure-building rules are not subject to disjunctive relations with lexical entries (lexical identity rules) on which they operates on, since, according to the Elsewhere Condition, two rules whose application produces distinct outputs are in a disjunctive relation.

The present analysis will show that the Strict Cycle Condition as implemented by the Elsewhere Condition is crucial in order to account for a variety of tonal phenomena of this language (Chapter 3.1.8). Particularly, showing that the application of certain extratonality rules in non-derived environments is crucial in order to account for certain tonal phenomena, I will argue that extratonality rules are structure-building rules (Chapter 3.3).

Closely related to the issue of structure-building rules is the issue of whether structure-building rules create a derived environment, so allow structure-changing rules to apply to otherwise non-derived forms. In the present work, I will argue that structure-building rules such as extratonality rules creat a derived environments (Chapter 3.3).
2.2 Autosegmental Phonology

In the standard linear theory (Chomsky and Halle, 1968) phonological representations consist of a linear arrangement of segments and boundaries. Segments are conceived of as unordered sets of features. The inappropriateness of such a linear representation has been recognized in areas such as tone among others. The study of tonal phenomena has revealed that tone often acts independently of segmental units: tone can 'spread' over several tone-bearing segments, tone can exist without any segment associated with it (floating tone), tones remain when the corresponding tone-bearing segments are deleted (tone stability), rules can affect the segmental string without affecting the tonal melody and vice versa. It is clear that these tonal phenomena are hard to account for if tonal and segmental features form an integrated whole as assumed in SPE.

In the theory of Autosegmental Phonology (Williams 1971, Goldsmith 1976) the standard one-tiered representation is split up into several tiers, each constituting a linear arrangement of segments. Segments in different tiers are linked to each other by association lines that indicate how they are to be coarticulated. Within this theory, tones are represented on a separate tier, independently from segmental features. Such a representation of tones yields natural accounts for the tonal phenomena which were problematic to linear theory.

Since the autosegmental theory does not require that there should be an equal number of segments on each tier, the existence of a tone lacking a segmental tier is well predicted within this theory. Also if tones and segments are really independent, it should be possible for rules to refer to one tier without affecting the
other tier. The fact that rules may operate on one level disregarding other levels explains why tonal rules often have 'unbounded' effects. Tone stability also automatically follows from the the theory, where tones are independent of segments.

Certain areas of autosegmental theory, however, have proven especially controversial, among them the principles used for linking tiers in non-rule-governed situations (or Association Conventions).

2.2.1 Association Convention

The question of how association lines come into being and what principles govern the wellformedness of multi-tiered representations has been one of the central issues of autosegmental theory.

As a first approximation to answering this problem, Williams (1971) proposed a left-to-right mapping rule which assigned tones to syllables. He assumed that if the mapping procedure ran out of tones before all syllables had been assigned a tone, then the last tone would automatically be assigned to all remaining syllables in the relevant domain. On the other hand, if the procedure ran out of syllables before tones had been assigned, Williams assumed that the multiple assignment of more than one tone to a single syllable could only result from a language specific rule.

Goldsmith (1976), on the other hand, proposes the following Wellformedness Condition:
(2.4) Well-formedness Condition

1. Each tone is associated with at least one segment
2. Each segment is associated with at least one tone
3. Association lines do not cross

A crucial difference between the proposal of Williams (1971) and that of Goldsmith (1976) is concerned with the cases where there are more tones than tone-bearing units: Goldsmith (1976) would link more than one tone to a single tone-bearing unit, whereas the account of Williams (1971) would not unless the grammar of the language includes a stipulation to that effect. Both approaches, however, share the assumption that a single tone can be linked to more than one tone bearing units (automatic spreading).

Williams' position is supported by Clements and Ford (1979) as well as Halle and Vergnaud (1982), who argued that multiple linkings of tones to a single tone bearing unit come about only by language-specific rules.

Claiming that not only multiple linkings of tones to a single tone-bearing unit come about only by language-specific rules, but also multiple linkings of a single tone to more than one tone-bearing unit also occur only as the result of language-specific rules, Pulleyblank (1986) argues against automatic spreading of a single tone onto more than one tone bearing unit. According to him, unassociated tone bearing units will get tone either by language particular rules or by default.

In this study, I adopt the Association Convention proposed by Pulleyblank (1986).
(2.5) Association Conventions

Map a sequence of tones onto a sequence of tone-bearing units,

i. in a one-to-one relation

ii. from left to right

(2.6) Well-formedness Condition

Association lines do not cross.

Another issue that relates to the Association Conventions is when they apply. The basic approach that has been adopted with respect to this issue since Goldsmith (1976) is that the conventions apply whenever possible throughout the derivation. An alternative I suggest in the present study is to assume that they apply before any language-specific rules.

2.2.2 Prelinking

It is generally agreed that certain exceptions to the strictly left-to-right (or right-to-left) autosegmental linkings predicted by universal (or language-specific) Association Conventions can be accounted for by prelinking a particular autosegment to a particular tone-bearing unit.

In the present analysis, tones are prelinked to tone bearing units in the lexical entries for certain nouns and verb stems. Stems which have a H on a single mora and do not exhibit tonal alternations when followed by suffixes are assumed to have a prelinked H. For example, the nouns *hānEl* ‘sky’ and *myÉnEii* ‘daughter in law’, which do not exhibit tonal alternations, have a prelinked H on the first mora; the verb *mānna-ta* ‘to meet’, which does not show tonal alternations, has a
prelinked H on the first mora.

2.3 Underspecification

Under the theory of underspecification developed by Kiparsky (1982a,b), Archangeli (1984), Pulleyblank (1986) and others, features or feature values predictable on either universal or language particular grounds are not specified in underlying representations.

One of the major issues of this theory is concerned with determination of redundant features. Asymmetry has been proposed as one possible criterion in determining which features are specified underlyingly and which features are unspecified. For example, it seems that epenthesis of a vowel consistently is realized as a single vowel quality in a given language. Underspecification theory explains this consistency by assuming that epenthesis inserts a totally featureless timing position, which is phonetically realized as the least marked vowel, by assigning default feature values to this empty slot (Archangeli 1984).

Underspecification is not a theory solely for segmental features. Tonal features could also be underspecified. Pulleyblank (1986), on the basis of evidence from tonal systems, has provided strong support for a theory where unmarked feature specifications are supplied by universal defaults rules. Attending to the asymmetry between H and L in a two-way tonal system, between H and L on the one hand, and M on the other hand in a three-way tonal system, he proposed that the default tone is, universally, L in a two-way tonal system, M in a three-way tonal system.
To give an example of asymmetry between H and L, in Margi stems and suffixes can bear either H or L tones as follows:

(2.7) a. ta + ba —> tábá
    H    H
    cook    to cook all

b. na + da —> nádà
    H    L
    give me    give me

c. mbu + ngÉri —> mbúngÉri
    L    H
    sew on to    to sew on to

d. ptsa + 'ya —> ptsà'ya
    L    L
    roast us    roast us

Stems can be toneless, in which case their tone is determined by the tone of the suffix.

(2.8) a. mÉl + ia —> mÉliá
    H
    make    to make (ready)

b. hÈr + da —> hÈrdà
    L
    bring me    bring me

Similarly, if a suffix is toneless, then it acquires its tonal specification from the stem.

(2.9) a. tsa + ri —> tsáří
    H
    beat    to knock at

b. nÈ + ri —> nÈří
    L
    say    to tell a person
Crucial evidence for the default L comes from the case where a toneless stem is put together with a toneless suffix. In such cases the stem and the suffix surface with L-tones throughout.

(2.10) a. hya + ani ---> hyànî
   raise raise! wake!

b. fa + ri ---> fari
   take (many) take (many)! (pp. 124-125, Pullyblank 1986)

Evidence for the default M is provided by the tonal phenomena in Yoruba and Yala that toneless vowels end up with a M-tone (see Pullyblank 1986). North Kyungsang Korean is a two-way tonal system: a mora can be either H or L. In the present analysis, only H tones are specified underlyingly and L tones are assigned by default rules.

2.4 Extratonicity and Extraprosodicity

Extra-tonality has been developed by Pulleyblank (1986) as an extension to tone of extra-metricality proposed for stress by Hayes (1982). Recent work on stress systems (e.g. Hayes 1980, 1982, Harris 1983) has shown that certain constituents on the periphery of a stress domain should be excluded from consideration when applying stress rules. Such constituents have been labeled 'extrametrical', and they are subject to the Peripherality Condition which is formalized by Harris as follows.

(2.11) Peripherality Condition

\[ X / \underline{Y} \]

\[ [+ex] \rightarrow [-ex] \]
where $Y$ is not zero and $D$ is the domain of the stress rules.

Pulleyblank (1986) proposes that the same notion is applicable in tone systems. A constituent at the edge of a tonal domain may be 'invisible' for the purposes of tonal rules (Pulleyblank 1986, p89). Such constituents, which are referred to as extratonal are subject to a generalized version of the Peripherality Condition. The evidence for extra-tonality and the Peripherality Condition comes from the tonal behavior of the suffixed object pronouns of Margi. Certain pronouns (e.g. 1st person pronoun $da$) are always L. Lexically, they can be represented as bearing a L-tone. Of interest is the tonal behavior of the other object pronouns (e.g. 3rd person pronoun $nyi$): their tone varies depending on the context: "the tone is low if the object pronoun is at the end of a word-group and nothing follows. If, however, something follows, the tone of the object pronoun is the same as the tone of the previous syllable" (Hoffman 1963, p. 75). The examples Pulleyblank gives to illustrate this fact are:

$$(2.12) \begin{align*}
\text{a. } & \text{á} + \text{lÈbá} + \text{nyi} + r \quad \text{nda} \rightarrow \text{díÈbányir} \quad \text{nda} \\
& \text{past lead him past they they escorted him} \\
\text{b. } & \text{lÈbá} + \text{nyi} \rightarrow \text{lÈbányi} \\
& \text{lead him lead him!} \quad (p.199, \text{Pulleyblank 1986})
\end{align*}$$

In (2.12a), the pronoun $-nyi$ is not phrase-final. In (2.12b), $-nyi$ is L because it is phrase-final. The rule which is crucial to the discussion of the examples in (2.12) is Tone Spreading.

$$(2.13) \text{Tone Spreading} \quad \begin{array}{c}
n \\
T
\end{array}$$
If there are free tone-bearing units after the application of the Association Convention, then Tone Spreading spreads a linked tone onto toneless vowels to the right. The fact that the object -nyi in (2.12a) receives a tonal specification from the syllable to the left indicates application of Tone Spreading. Now the problem is: why does it not also apply in phrase-final position (2.12b)? The answer to this question, Pulleyblank argues, lies in assuming that the object pronoun is extra-tonal in this case. That is, Tone Spreading is inapplicable in (2.12b) because -nyi is extra-tonal. -nyi in (2.12a), on the other hand, is followed by another suffix, thus loses its extra-tonality by the Peripherality Condition. This explains the application of Tone Spreading in (2.12a).

The question of when extratonality is lost has not been explicitly discussed in the literature. Certainly, it must be lost somewhere in the postlexical level. Ito (1986a) proposes that extraprosodicity is universally turned off at the postlexical level. If extratonality is a subtype of extraprosodicity, Ito’s proposal would extend to extratonality. However, it turns out that the analysis of certain tonal phenomena of Margi by Pulleyblank crucially depends on the existence of extratonality at the postlexical level. The tonal phenomena in question involves the spreading rule in (2.13). Pulleyblank argues that Spreading (2.13) and the Peripherality Condition apply postlexically as well as lexically.

(2.14) [ná + nyi] [sùlài] [ànÉ Màlá]

'give' him shilling to Mala
The output of (2.14) is nányí sùlài ànÉ Málá ‘give Mala a shilling’. (p.201, Pulleyblank 1986) What is interesting about this form is that -nyi, which is lexically extratonal, is H, indicating that Tone Spreading has spread the H of na onto -nyi. Compare this with the form lÉbányí ‘lead him!’: -nyi is L in this form. Pulleyblank explains this difference by saying that the extratonality of -nyi is lost in nányí sùlài ànÉ Málá since it is followed by a word, and so is no longer on the periphery of a domain. As a result, the H of na can spread to it. However, for Tone Spreading to be applicable to the intermediate form ná nyí sùlái ànÉ málá, tone spreading itself must be postlexical. The extratonality of -nyí in the prepausal form lÉbányí, on the other hand, is retained since it is still on the periphery of a domain. Hence, Tone Spreading cannot spread H of na onto -nyí. This is why -nyí in this form is L. Since tone spreading is postlexical, and since tone spreading cannot apply to -nyí in this form because -nyí is extratonal, it follows that extratonality is retained postlexically.

It thus remains to be tested whether extratonality is retained postlexically unlike extraprosodicity or whether instead the tonal phenomena in question from Margi might be analysed in some other way. The choice between the two will depend on empirical considerations. In the present analysis of North Kyungsang Korean, certain units on the periphery of a domain are claimed to be extratonal. However, there is no solid evidence showing that these extratonal units are also extraprosodic (i.e. ignored by metrical rules and/or syllabification rules) except for one case, namely nouns of three or more syllables. These nouns are interesting because of their asymmetries: most of them have a H on the penultimate mora, and
end in the vowel $i$. Relating the tonal asymmetry to the segmental asymmetry, I argue that extraprosodic segments are extratonal, but not the other way round.
Notes

1. The organization of the lexicon by Ahn (1986) is largely based on phonological grounds. When it comes to the morphological side, there are certain facts which this model fails to account for. For example, both derivation and inflection turn out to feed the compounding process, contrary to what is predicted by the present model. The first example is the case where a compound is fed by inflection, the second example is the case where compound is fed by derivation. For a detailed discussion, see Sohn (1987).

2. Recent work casts doubts on the proposed different properties, since there are several cases found where postlexical rules show many properties of lexical rules. For discussions of this issue, see Kaisse (1987), Odden (1989) and Hayes (1989).

3. A similar suggestion was made in Brame (1974).
CHAPTER III
TONE OF NOUNS

The purpose of this chapter is to account for the tone of nouns. In the first section, disyllabic nouns are discussed. A discussion of mono-syllabic nouns appears in section 2, which is followed by a discussion of nouns of three or more syllables in section 3. Section 4 is concerned with nouns with long vowel. Section 5 considers the cyclicity of the noun inflection level.

3.1 Disyllabic Nouns

Uninflected di-syllabic nouns exhibit three tone patterns- HL, HH, and LH.

(3.1)

a. LH hánEl ‘sky’
b. HH kúrÉm ‘cloud’
c. LH parán ‘wind’

When followed by suffixes, nouns with the tone pattern LH, that is, nouns whose H is on the final mora (parán ‘wind’) undergo a tonal alternation. When followed by suffixes such as -hanhe ‘to’, -cocha ‘even’ or -mengkuro ‘like’, the noun stem bear no H; instead a H appears on the suffixes as shown in (3.2a). When followed by suffixes such as -i ‘nominative’, -man ‘only’ or -eke ‘to’, a H
appears on the stem-final mora as shown in (3.2b).

(3.2)  a. parám  ‘wind’
       param-hánthe  ‘to the wind’
       param-mengkuro  ‘like the wind’
       param-cócha  ‘even the wind’

b. parám-i  ‘wind-nominative’
       parám-man  ‘only the wind’
       parám-eké  ‘to the wind’

In contrast, nouns in other tone patterns do not exhibit tone alternations when followed by suffixes. In (3.3) is given a noun in the tone pattern HL followed by various suffixes, and in (3.4) is displayed a noun in the tone pattern HH followed by various suffixes.

(3.3)  hánEl  ‘sky’
       hánEl-i  ‘sky-nominative’
       hánEl-man  ‘only the sky’
       hánEl-esE  ‘in the sky’
       hánEl-hánthe  ‘to the sky’
       hánEl-cocha  ‘even the sky’
       hánEl-mengkuro  ‘like the sky’

(3.4)  kûrÉm  ‘cloud’
       kûrÉm-i  ‘cloud-nominative’
       kûrÉm-man  ‘only cloud’
       kûrÉm-esE  ‘in cloud’
       kûrÉm-hánthe  ‘to cloud’
       kûrÉm-chElÉm  ‘like cloud’
       kûrÉm-mengkuro  ‘like cloud’

In comparing the examples in (3.2) with those in (3.3) and (3.4), we find that tone in the latter, unlike tone in the former, is invariant regardless of the suffix which follows. So, hánEl ‘sky’ invariably has a H on the first mora, regardless of the suffix which follows; kûrÉm ‘cloud’ invariably has the first two moras high-toned, regardless of the suffix which follows. We will henceforth refer to nouns with H on a single, non-final stem mora (e.g. hánEl ‘sky’) as Invariant Tone Class I nouns,
nouns with two high-toned moras (e.g. kûrÉm 'cloud') as Invariant Tone Class II nouns. On the other hand, nouns with a single H on the final mora of their uninflected forms (e.g. parám 'wind'), which exhibit alternations in tone when followed by suffixes, are referred to as Variant Tone Class nouns.

3.1.1 Variant Tone Class Nouns

Variant Tone Class nouns are discussed first. All and only noun stems with final H in isolation (in uninflected forms) are Variant Tone Class nouns. When followed by suffixes, they exhibit tone alternations: that is, before certain suffixes, noun stems bear no H but a H appears on the suffixes. Before other suffixes, a H appears on the final mora of stems.

(3.5) parám

\begin{tabular}{ll}
(a) & \parám-i & 'wind (nom.)' \\
  & \parám-El & 'wind (accusative)' \\
  & \parám-do & 'the wind also' \\
  & \parám-man & 'only the wind' \\
  & \parám-En & 'the wind (topic)' \\
  & \parám-esE & 'in the wind' \\
  & \parám-ilang & 'with the wind' \\
(b) & \parám-chÉlEm & 'like the wind' \\
  & \parám-cócha & 'even the wind' \\
  & \parám-hánthe & 'to the wind' \\
  & \parám-mánkhEm & 'as much as the wind' \\
  & \parám-mengkúro & 'like the wind'
\end{tabular}

In (3.5) are displayed various inflected forms of the noun parám 'wind'. In the forms in (3.5a), a H appears on the stem-final mora. In the forms in (3.5b) a H appears on the suffix. The same tone alternation is exhibited by all Variant Tone Class nouns (that is, the nouns which have a H on the stem-final mora of the uninflected form), regardless of whether they are consonant-final or vowel-final.
An examination of the above examples in (3.5) and (3.6) reveals an interesting regularity: a H appears on the penultimate mora of the entire form if the stem is immediately followed by consonant-intial suffixes (e.g. parám-man 'only the wind', param-chÉlEm 'like the wind'). On the other hand, if the suffix which immediately follow a stem is vowel-intial a H appears on the stem-final mora (e.g. parám-i 'wind (nom.)', parám-esE 'in the wind').

Consideration of a wider range of suffixes confirms this observation. In (3.7), stems are immediately followed by vowel-intial suffixes. We see that a H appears on the stem-final mora. In (3.8) the same stems are immediately followed
by consonant-initial suffixes. Note that a H appears on the penultimate mora of the entire form.

(3.7)

<table>
<thead>
<tr>
<th>a. parám-Ey</th>
<th>‘wind (possessive)’</th>
<th>b. tali-Ey</th>
<th>‘legs (poss.)’</th>
</tr>
</thead>
<tbody>
<tr>
<td>parám-a’</td>
<td>‘wind! (vocative)’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>parám-eke</td>
<td>‘to the wind’</td>
<td>talí-eke</td>
<td>‘to legs’</td>
</tr>
<tr>
<td>parám-Elö²</td>
<td>‘with the wind’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>parám-ina</td>
<td>‘wind (accu.)’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(3.8)

<table>
<thead>
<tr>
<th>a. parám-tEl</th>
<th>‘wind (pl.)’</th>
<th>b. tali-tEl</th>
<th>‘legs’</th>
</tr>
</thead>
<tbody>
<tr>
<td>parám-nim</td>
<td>‘wind (honorific)’</td>
<td>tali-nim</td>
<td>‘legs (hono.)’</td>
</tr>
<tr>
<td>parám-kwa</td>
<td>‘wind and’</td>
<td>tali-wa³</td>
<td>‘legs and’</td>
</tr>
<tr>
<td>param-potá</td>
<td>‘than the wind’</td>
<td>tali-potá</td>
<td>‘than the wind’</td>
</tr>
<tr>
<td>param-káchí</td>
<td>‘like the wind’</td>
<td>tali-káchí</td>
<td>‘like legs’</td>
</tr>
<tr>
<td>param-k’áci</td>
<td>‘including the wind’</td>
<td>tali-k’áci</td>
<td>‘including legs’</td>
</tr>
<tr>
<td>param-háko</td>
<td>‘with the wind’</td>
<td>tali-háko</td>
<td>‘with legs’</td>
</tr>
<tr>
<td>param-púthE</td>
<td>‘from the wind’</td>
<td>tali-púthE</td>
<td>‘from legs’</td>
</tr>
<tr>
<td>param-máda</td>
<td>‘each wind’</td>
<td>tali-máda</td>
<td>‘each leg’</td>
</tr>
<tr>
<td>param-tÉlE</td>
<td>‘to the wind’</td>
<td>tali-tÉlE</td>
<td>‘to a leg’</td>
</tr>
<tr>
<td>param-mácE</td>
<td>‘even the wind’</td>
<td>tali-mácE</td>
<td>‘even a leg’</td>
</tr>
</tbody>
</table>

This regularity requires an explanation. (This regularity becomes more salient and remarkable when it comes to verb forms. See Chapter 4.) Unfortunately, no previous analyses of Kyungsang tone even mentions this regularity, let alone explaining it. Before looking at previous analyses, I first present my analysis and then compare it with others.

3.1.1.1 An Analysis

The analysis I propose here, it will be shown, explains this regularity in a systematic way. The crucial fact about the tone of Variant Tone Class stems is that the position of H is totally predictable, on the basis of the syllabicity of the initial segment of the suffix which immediately follows the stem: a H appears on the
penultimate mora of the entire form if the suffix is consonant-initial; otherwise, a H appears on the stem-final mora. Thus, we do not need tonal information about stems and suffixes in order to predict the position of H in these stems.

I therefore propose that Variant Tone Class nouns, as well as suffixes, are inherently toneless. The surface high-tone of inflected forms is the result of a rule which inserts a H in a toneless string.

(3.10) H-insertion (HI)

\[ \emptyset \rightarrow H / X [\_\_\_] Y, \text{ where } X,Y = 0 \]

This inserted H associates with certain free moras by language-specific rules.

3.1.1.2 Consonant-initial Suffixes

I first account for the tone of the stems which are followed by consonant-initial suffixes. As noted above, when a stem is followed by consonant-initial suffixes, a H appears on the penultimate mora of the entire form. One might want to propose that the penultimate H is the result of the application of a rule which links the H inserted by H-insertion (3.10) to the penultimate mora, which would be as follows.

(3.11) Penultimate Linking

\[
\begin{array}{c}
M & M \\
\end{array}
\]

H

Even though this rule predicts the penultimate tone in a straightforward way, I do not adopt this rule since this rule is allowed to count segments. It is the standard assumption that phonological rules (or, more generally, rules) do not count segments. Once we allow rules to count segments, we would expect phonological
rules to link a tone to the fourth or the fifth segment from the end or from the beginning. There are no such rules found cross-linguistically.\(^4\)

Rather, I propose the penultimate H in these forms is the result of the application of a rule, Final Linking (3.11), which links the H inserted by H-insertion (3.10) to the final mora.

(3.12) Final Linking (FL)

\[
\begin{align*}
M & \mid \\
\mid & \\
H
\end{align*}
\]

This rule associates a free H to the final mora. Final Linking, however, would not derive the correct forms as illustrated in (3.13).

(3.13) a. param-do b. param-chElEm

\[
\begin{align*}
\text{param-do} & \mid \text{param-chElEm} \\
\text{H} & \mid \text{H} \\
\mid & \\
\mid & \\
\text{H} & \mid \text{H} \\
\text{*param-dô} & \mid \text{*param-chElÉm}
\end{align*}
\]

The noun *param* ‘wind’ as well as the suffixes -do ‘also’ and -chElEm ‘like’ are inherently toneless. HI (3.10) inserts a H in these forms, since there is no tone within the domain. The inserted H would associate with the final mora of the forms by FL (3.12), deriving the incorrect forms *param-dô, *param-chElÉm, instead of the correct forms param-do, and param-chElEm respectively.

How can we derive the correct forms param-do ‘also the wind’ and param-chElEm while holding to FL (3.12)? In other words, how can FL associate the inserted H with the penultimate mora, not with the final mora? The solution to this problem lies in extratonicity.
3.1.1.3 Extratonality

Extratonality has been developed by Pulleyblank (1986) as an extension to tone of extrametricality proposed for stress by Hayes (1982). A constituent at the edge of a tonal domain may be 'invisible' for the purposes of tonal rules. Such constituents, which are referred to as extratonic, are subject to a generalized version of the Peripherality Condition. (For more discussion of extratonality, see Chapter 2.)

(3.14) Peripherality Condition

\[ X \quad / \quad Y \]_0

\[ [+ex] \quad \rightarrow \quad [-ex] \]

Now, let us consider how extratonality can solve the problem raised above, that the inserted H appears on the penultimate mora. The solution, I argue, lies in assuming that the final mora of suffixes is extratonic.

(3.15) Suffix Extratonality (SET)

\[ M \quad \rightarrow \quad [+ex] / \quad \text{suffix} \]

With the final mora of suffixes extra-tonal, FL (3.12) would associate the free H to the phonetically penultimate mora because the phonetically final mora is invisible to this rule. For illustration, the derivations of param-do 'wind as well' and param-chÉlEm 'like the wind' are given in (3.16). We place parentheses around an entire syllable to indicate that its mora is extrametrical.

(3.16) param | param

| param-do | param-chÉlEm | suffixation |
| param-(do) | param-chE(lEm) | SET |
| param-(do) | H | HI |

| H | H |
The noun *param* 'wind', as well as the suffixes *-do* 'as well' and *-chElEm* 'like', is underlyingly toneless. Extratonicity makes the final mora of the suffixes extra-tonal. HI (3.10) inserts a H in these form because there is no tone in them. The FL (3.12) links the H to the final mora, which is penultimate phonetically because the phonetically final mora is invisible.

Toneless moras are assigned low tone by a default rule at the end of derivation.

(3.17) Default Tone Assignment (DT)

Assign low tone to a toneless mora.

Extratonicity is assumed to be lost at the postlexical level, without argumentation. (For more discussion, refer to the discussion of extratonicity in Chapter 2.)

3.1.1.4 Vowel-Initial Suffixes

The analysis so far explains the tone of stems followed by consonant-initial suffixes (e.g. *pará-m-do* 'the wind as well', *param-chElEm* 'like the wind'). The tone of stems followed by monosyllabic vowel-initial suffixes (e.g. *pará-m-i* 'wind (nom.,)') is also correctly predicted by the analysis proposed so far, since in this case the stem-final mora happens to be the penultimate mora of the entire form. The tone of the forms where stems are followed by vowel-initial polysyllabic suffixes (e.g. *pará-m-eke* 'to the wind'), however, cannot be predicted correctly by this analysis. When followed by such suffixes, Variant Tone Class noun stems have
a H on the final mora (e.g. *parám-eke ‘to the wind’, *parám-ilang ‘with the wind’), which is not the penultimate mora of the entire form. The analysis so far, however, would incorrectly derive *param-éke ‘to the wind’ and *param-ilang ‘with the wind’ as illustrated in (3.18).

(3.18) param-eke param-ilang

<table>
<thead>
<tr>
<th>param-e(ke)</th>
<th>param-i(lang)</th>
<th>SET (3.15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
<td>HI (3.10)</td>
</tr>
<tr>
<td>param-e(ke)</td>
<td>param-i(lang)</td>
<td>FL (3.12)</td>
</tr>
<tr>
<td>H</td>
<td>H</td>
<td></td>
</tr>
</tbody>
</table>

*param-éke *param-ilang surface form

The suffixes -eke ‘to’ and -ilang ‘with’, as well as the stem param ‘wind’, are inherently toneless. SET (3.15) makes the final mora of the suffixes extratonal. HI inserts a H, and this H associates with the final mora, which is phonetically penultimate. The derived forms are incorrect forms: the high-tone incorrectly occurs on the penultimate mora. The correct forms have a H on the stem-final mora (e.g. *parám-eke ‘to the wind’, *parám-ilang ‘with the wind’).

There are various ways to get around this problem. One is to assume that vowel-initial poly-syllabic suffixes are made extratonal in their entirety (henceforth, "extratonality analysis"). FL (3.12), since the entire suffix is invisible, would associate the H with the stem-final mora. This solution, however, violates the Peripherality Condition because not only the final mora of suffixes, but also the penultimate mora, which is not a peripheral unit on the tonal tier, is made extratonal. According to the Peripherality Condition, only a unit at the edge of a domain
can be extratonal.

An alternative is to assume that vowel-initial poly-syllabic suffixes are in fact composed of a sequence of more than one suffix (henceforth, the "suffix sequence analysis"). For example, the suffix -esE 'in' is the combination of the suffix -e 'to' and the suffix -sE 'in'. On the first cycle, the suffix -e attaches to a noun (e.g. param-e 'to the wind'). To this string, HI inserts a H. With the final mora being made extra-tonal by SET, this H associates with the stem-final mora by FL, since it is the left-most available mora, giving param.e. On the next cycle, the suffix -sE 'in' attaches. To this form, however, neither HI (3.10) nor FL applies, since it has a linked H. By way of illustration, the derivation of param-esE 'in the wind' is given in (3.19).

(3.19) param
   1st cycle
   param-e       suffix attachment
   param-(e)     SET
   param-(e)     HI
   H
   param-(e)     FL
   H

   2nd cycle
   param-(e)-sE  suffix attachment
   H
   parám-e-sE
Along the same line, the suffix -eke ‘to’ might be assumed to be composed of a sequence of the suffix -e ‘to’ and -ke ‘to (?)’.

How about the suffixes such as -ilang ‘with’, ina ‘accusative’, and -Elo ‘with’? A special property of these suffixes is that their initial vowel alternates with zero: -ilang appears after a consonant, -lang appears after a vowel (e.g. parám-ilang ‘with (accompanying) the wind’ vs. poll-lang ‘with barley’); -ina appears after a consonant, -na appears after a vowel (e.g. parám-ina ‘the wind-accusative’ vs. poll-na ‘barley-accusative’); -Elo appears after a consonant, -lo appears after a vowel (e.g. parám-Elo ‘with (instrumental) the wind’ vs. poll-lo ‘with barley’).

There are two ways to account for the alternation in these suffixes: one is in terms of epenthesis, and the other is in terms of deletion. In the epenthesis analysis, -lang, -na, and -lo are taken as underlying forms, and the vowel i or E is inserted if these suffixes are preceded by a consonant. Providing that the epenthetic vowel is inserted after application of FL (3.12), the surface tone of the forms with these suffixes would be a natural consequence of the analysis.

(3.20) param  param
   param-lang  param-lo  suffix attachment
   param-(lang) param-(lo) SET
   param-(lang) param-(lo) HI
   H       H
   param-(lang) param-(lo) FL
   |       |      H       H
   param-i(lang) param-E(lo) Epenthesis
   |       |      H       H
The word *param* 'wind', as well as the suffixes *-lang* 'with' and *lo* 'with', is inherently toneless. A H is inserted. The inserted H associates with the final mora of the noun because it is the right-most mora after SET applied and made the mora of the suffix extra-tonal. After the association of the free H, Epenthesis applies, inserting *i* or *E*.

One of the problems of the epenthesis analysis is that it results in two different epenthetic vowels, *i* and *E*. Since it is generally the case that the epenthesis of a vowel consistently results in a single vowel quality in a given language, having two epenthetic vowels is problematic. However, there is one case reported with two epenthetic vowels: Sudanese Arabic, according to Kenstowicz, is such a language. Given two epenthesis vowels, the value of an epenthetic vowel simply must be stipulated for each suffix concerned, since it is not predictable from surrounding segments.

In the deletion analysis, on the other hand, *-ilang*, *-Ena* and *-Elo* are taken as underlying forms, and the vowels *i* and *E* are deleted after another vowel across a morpheme boundary. The advantage of the deletion account is that it not only avoids the problems of having two epenthetic vowels, but it also correctly accounts for an analogous alternation in verbal suffixes. The deletion analysis still does not correctly predict the surface tone of the forms with these suffixes (e.g. *parám-ilang*, *parám-ina*, *parám-Elo*) as is illustrated in (3.21).

\[
\begin{array}{ccc}
\text{(3.21) } & \text{param-ilang} & \text{param-Elo} \\
\text{param-}i(lang) & \text{param-}E(lo) & \text{SET} \\
\text{param-}i(lang) & \text{param-}E(lo) & \text{HI} \\
\text{H} & \text{H} & \text{H}
\end{array}
\]
Within the deletion analysis, the suffix -lang ‘with’ has [i] initially and the suffix -lo ‘with’ has [E] initially in underlying representations. The inserted H would associate, by FL, with the right-most available mora, which is the penultimate mora due to the extratonality of the final mora by SET. The result is the incorrect forms *param-ilang and *param-Élo.

The solution to the problem of vowel-initial poly-syllabic suffixes (or vowel-initial suffixes in general), which is adopted here, assumes that H tone of these forms is the result of the application of a rule which links a free H to the stem-final mora if the stem is immediately followed by a vowel.

(3.22) Pre-Vocalic Docking (PVD)
\[
\begin{array}{c}
M \quad [M \\
| \quad [r \quad H
\end{array}
\]

where r stands for root node. Since only a vowel can be a mora (in other words, only vowels can bear a mora), this rule will link a H to the stem-final mora only if the stem is immediately followed by a vowel-initial suffix.

Pre-Vocalic Docking (3.22), applied before FL, derives the correct surface forms.

(3.23) param-ilang \quad param-Elo
\[
\begin{array}{c}
\text{param-i(lang)} \quad \text{param-E(lo)} \\
H \quad H
\end{array}
\]
The suffixes *-ilang* ‘with (accompanying)’ and *-Elo* ‘with (instrumental), toward’, as well as *param* ‘wind’, are inherently toneless. Extra-tonality makes the right-most mora extratonal. A H is inserted by HI (3.10). The H associates with the stem-final mora because the stem is immediately followed by a vowel.

A further advantage of this analysis is that it also explains a peculiar tonal fact about verb forms. We will briefly consider this problem here (a full discussion of verbal tones is found in Chapter 4). Some verb stems, analogous to Variant Tone Class nouns, have a H on the final mora when the stems are immediately followed by a vowel-initial suffix; otherwise, a H appears on the penultimate mora of the entire form. Thus, for instance, in *mÉk-Esi-ket-sEmni-ta* ‘eat-honorific-future-style-declarative’, where *mEk-* is a verb stem, the stem is immediately followed by a vowel-initial suffix, and a H appears on the stem-final mora just as it does in nouns. In *mEk-ket-sEmnl-ta* ‘eat-future-style-declarative’, on the other hand, the verb stem is not immediately followed by a vowel-initial suffix, so a H appears on the penultimate mora of the entire form. The analysis which postulates Pre-Vocalic Docking (3.22) turns out to account successfully for this tonal alternation of verb forms. To illustrate this, the derivations of *mÉk-Esi-ket-sEmni-ia* ‘will eat (honorific, formal)’, where the stem is immediately followed by a vowel-initial suffix, and *mEk-ket-sEmnl-ta* ‘will eat (honorific, formal)’, where the stem is immediately followed by a consonant-initial suffix, are given in (3.24).
(3.24) a. mEk-Esi-ket-sEmni-ta  
   mEk-Esi-ket-sEmni-(ta)  
   mEk-Esi-ket-sEmni-ta  
   H  
   mEk-Esi-ket-sEmni-ta  
   NA  
   H  
   mEk-Esi-ket-sEmni-ta  
   mEk-ket-sEmni-ta  

b. mEk-ket-sEmni-ta  
   mEk-ket-sEmni-(ta)  
   SET  
   mEk-ket-sEmni-(ta)  
   HI  
   mEk-ket-sEmni-(ta)  
   NA  
   PVD  
   mEk-ket-sEmni-ta  
   mEk-ket-sEmni-ta  

The verb stem *mEk-* ‘eat’ is assumed to be inherently toneless. HI inserts a H, which associates with the stem-final mora in (3.24a) because the stem is immediately followed by a vowel. The free H in (3.24b), on the other hand, associates to the right-most available mora by FL.

The other two alternatives, the "extratonality analysis" and the "suffix sequence analysis", cannot account for tone of verb forms as successfully as the present analysis. Consider the first proposal, where vowel-initial poly-syllabic suffixes were made extra-tonal in their entirety to predict the H on the stem-final mora. Along the same line, this analysis would make all the suffixes, for instance, *Esi-ket-sEmni-ta* in *mEk-Esi-ket-sEmni-ta* ‘will eat (honorific, formal)’ extra-tonal in order to predict a H on the stem-final mora.

(3.25) mEk-Esi-ket-sEmni-ta  
   mEk-(Esi-ket-sEmni-ta)  
   Extra-tonality  
   mEk-(Esi-ket-sEmni-ta)  
   HI  
   mEk-(Esi-ket-sEmni-ta)  
   H
This analysis cannot hold, since it violates the Peripherality Condition, which says that only a unit at the edge of a domain can be extratonal.

The second proposal, namely "the suffix sequence analysis" is also doomed to fail. In this proposal some of vowel-initial poly-syllabic suffixes would be assumed to be composed of a sequence of two suffixes; others, which show the alternation between a vowel and null, are analysed as a single suffix, and the alternation between a vowel and null is explained either in terms of epenthesis or in terms of deletion. Along the same line, verbal suffixes would be analysed as composed of a sequence of suffixes. For instance, mÉk-Esi-ket-sEmni-ta 'will eat (honorific, formal)' is analysed as having four suffixes -Esi 'honorific', -ket 'future', -sEmni 'formal', and -ta 'declarative'. Such an analysis of verb form cannot derive correct surface forms. On the first cycle, the suffix -Esi 'honorific' attaches. To this string a H is inserted by H-insertion, and the inserted H associates with the right-most mora, which is phonetically the penultimate mora due to Extra-tonality as seen below.

(3.26) mEk-                      UF
    mEk-Esi                      suffixation
    mEk-E(si)                    SET
    mEk-E(si)                    HI
    H                           FL
    mEk-E(si)                    FL
    H
3.1.1.5 The Strict Cycle Condition and Uninflected Nouns

Now let us turn to uninflected nouns. Uninflected nouns can serve as a base for further inflectional affixation or by themselves they can occur as independent words. Consider what would happen if HI applies to uninflected noun stems before suffixes are attached. HI would insert a H in these forms, and the inserted H would associate with the final mora of uninflected nouns. Then, suffixes are attached, deriving an incorrect form, as shown in the derivation of param-chÉiEm "like the wind" in (3.27).

(3.27) [param] UF
   [param] HI
   H
   [param] FL
   H
   param-chElEm Affixation
   H
*parám-chELEm

How can we block HI from applying to noun stems (that is, uninflected forms)? The solution lies in the Elsewhere Condition (henceforth, EC).

According to the EC, if two rules which perform incompatible changes compete for the same strings, the more specific rule takes applicational precedence over the less specific one (see Chapter 2.1). Every lexical entry, according to Kiparsky (1982a,b), constitutes an identity rule whose structural description is the same as its structural change. Uninflected stems (e.g. /param/ 'wind'), which are lexically listed forms, thus, constitute identity rules (e.g. param -> param), whose structural description properly includes the structural description of HI (3.10), which is repeated in (3.28).

(3.28) H-insertion

\[ \emptyset \rightarrow H / [_____] \]

The Elsewhere Condition blocks HI from applying to uninflected stems like /param/ since the output of identity rules and HI (3.10) are "distinct" in that the first rule specifies no H tone for the forms for which the second rule specifies a H. Tone is part of underlying information in this language, and so forms with no H and forms with a H are distinct in that they have contradictory feature specifications (see the definition of "distinct" given in Chapter 2.1. They enter into a disjunctive relation and a more specific rule, uninflected stems (e.g. /param/) applies over a more general rule, HI (3.10). This explains why HI (3.10) does not apply to uninflected stems.
HI (3.10), however, is free to apply to derived inputs such as $[[\text{param}]-\text{chElEm}]$, because they do not constitute lexical entries at the stratum where HI applies: they are neither underlying forms nor cyclic outputs. Rather, they are outputs of an individual rule in the middle of a cycle. (Recall from the discussion in Chapter 2.1.3 that both underlying forms and cyclic outputs, but not the outputs of individual rules in the middle of a cycle, are identified as lexically listed forms.)

If HI (3.10) is blocked from applying to uninflected nouns, then from where does $H$ of uninflected nouns (that is, nouns in isolation like $\text{parám}$ ‘wind’) come? The answer is: it also comes from the application of HI (3.10), but in a different component, that is, the postlexical component. One of the assumptions of Lexical Phonology is that a phonological rule can apply both lexically and postlexically. HI (3.10), I assume, is one such rule whose domain is both the lexicon and the post-lexical phonology. Although the application of HI to uninflected nouns is prohibited by the Elsewhere Condition, its postlexical application to such forms is not prohibited, since only rules in the same component enter in the disjunctive ‘elsewhere’ relation with each other. HI (3.10) applying in the postlexical component is not in the same component as lexically listed forms (lexical entries), which are listed in the lexicon.

For the reasons mentioned above, HI (3.10) can apply to uninflected nouns at the postlexical level. The inserted $H$ associates with the final mora of the form by FL.

(3.29) In the postlexical component

\[
\begin{array}{c}
\text{param} \\
\text{param} \\
H \\
\end{array}
\]

HI (3.10)
Below in (3.30) are listed some Variant Tone Class nouns.

(3.30)  | 'wind' | 'burglar' | 'barley' | 'dust' | 'leg' | 'urine' | 'autumn' | 'roof' | 'fist' | 'knee' | 'deer' | 'potato' | 'attic' | 'salt' | 'button' | 'herbs' | 'kitchen' | 'Korean socks' | 'hill' | 'tree' | 'knot' | 'beasts' | 'village' | 'face' | 'yard' | 'shadow' | 'heart' | 'whale' | 'pot' | 'pepper'

param  | FL (3.12)

I
H

3.1.1.6 A Comparison with Previous Analyses

While I intend my arguments to hold against the entire range of previous analyses of Variant Tone Class nouns (Ramsey 1977, Nahara 1985, Kim 1989), I will concentrate primarily on Kim’s (1989) analysis, which is couched in the underspecification framework of Pulleyblank (1986). In Kim’s analysis, as in other previous analyses, the tone of Variant Tone Class nouns (e.g. parám ‘wind’) is accounted for by the interaction between tone of stems and tone of suffixes (i.e. in terms of tonal sandhi rules). So, variant noun stems are analysed as having a pre-linked H onto the final mora. The fact that these nouns do not bear H when followed by certain suffixes (e.g. param-cócha ‘even the wind’, param-mengkúro ‘like the wind’) is the result of two assumptions. First, suffixes such as -cocha
‘even’ and -mengkuro ‘like’ (in other words, suffixes before which stems do not bear a H) have a pre-linked H on the suffixal mora which surfaces as high-toned. Second, there is a rule which deletes a linked H on the stem-final mora if it is followed by another linked H, as in (3.31).

(3.31) Pre-linked H-deletion (PHD)

\[
\text{H} \rightarrow \emptyset / (N) N + (N) N (N) #
\]

(\text{p.58, Kim 1989})

where N represents the nucleus. This rule would delete a prelinked H on the stem-final mora if the H is followed by another linked H, with a single mora allowed to separate the two H’s. This rule thus would derive the forms param-cócha ‘even the wind’ and param-mengkuro ‘like the wind’ as in (3.32).

(3.32) param-cocha param-mengkuro UR

\[
\begin{array}{c|c|c}
\text{H} & \text{H} & \text{H} \\
\hline
\text{param-cocha} & \text{param-mengkuro} & \text{PHD}
\end{array}
\]

The crucial properties of Kim’s analysis are:

- parám ‘wind’ has a pre-linked H onto the final mora.
- The suffixes, cocha ‘even’ and mengkuro ‘like’ have a pre-linked H on the first mora and the second mora respectively.
- When these suffixes attach to the stem parám ‘wind’, the H on the final mora of the stem is deleted, since it is followed by another linked H.

The suffixes before which nouns stems have a H on the final mora (e.g. parám-i ‘wind-nominative), on the other hand, are assumed to be toneless. This explains why the stems have a H on the final mora before these suffixes: that is, a H on
the final mora of stems is not followed by another linked H, hence Pre-linked H-deletion does not apply.

(3.33) param-i UF
    | H
    param-i surface form
    | H

Kim’s analysis has serious drawbacks which prevent a successful account of these alternations. One of the problems is the indeterminacy which arises in choosing underlying representation of the suffixes before which stems have a H (e.g. param-i ‘wind-nominative’). These suffixes are, in Kim’s analysis, assumed to have no H underlyingly. It turns out, however, that this is not the only possible underlying representation for these suffixes. Kim also requires a rule, called H-deletion which deletes a H preceded by another H, whether the H’s are prelinked or not.

(3.34) H-deletion (p.49, Kim 1989)
    H -------> Θ / H _________

This rule accounts for the tone of Invariant Tone Class I (and Invariant Tone Class II nouns) followed by suffixes such as hänEl-chElEm ‘like the sky’. The noun stem hanEl ‘sky’ has a prelinked H on the first mora, and the suffix -chElEm ‘like’ has a prelinked H on the first mora. On the surface, only the H of the stem survives. This surface tone is derived by deleting the H of the suffix by H-deletion.

Given the H-deletion rule, a floating H for suffixes such as -i ‘nominative’ would produce exactly the same result, as shown in the derivation of param-i ‘wind-nominative’ in (3.35).
This alternative account of the suffix -i 'nominative', which is entirely consistent with the rules assumed by Kim, has the following properties:

- The suffix -i 'nominative' is assumed to have a floating H.
- H-deletion deletes the floating H, since it is preceded by another H.

Hence, the choice between a floating H and no H in the underlying representation of such suffixes is arbitrary. Kim however does not notice this problem.15

A further problem of this analysis is that it results in inexplicable asymmetries in the underlying representations of suffixes. Kim assumes that the suffixes before which variant tone class stems have a H (e.g. parám-i 'wind (nom.)') have no underlying H as shown in (3.36a). In contrast, the suffixes before which variant stems have no H (e.g. param-chÉlEm 'like the wind') have a prelinked H on the mora which surface as high-toned as shown in (3.36b).

(3.36) Underlying Representations of Suffixes

(a)  
/-i/ 'nominative'       /-El/ 'accusative'  
/-man/ 'only'           /-do/ 'as well'  
/-(n)En/ 'topic'        /-eke/ 'to'  
/-(E)lo/ 'to'           /-(i)lang/ 'with'
In (3.36) are given underlying representations of various suffixes within Kim’s analysis. In fact, Kim only deals with three suffixes -i ‘nominative’, -chElEm ‘like’, and potaa ‘than’. Underlying representation of the rest suffixes are my conjectures based on her analysis. As we can see, the underlying representations in (3.36) show inexplicable asymmetries. First, suffixes with no underlying H would be all either vowel-initial or monosyllabic; suffixes with a pre-linked H are all consonant-initial and poly-syllabic. Second, any suffix which has an underlying H always link the H to the penultimate mora. These asymmetries in underlying representations of suffixes are inexplicable: there is no reason why there should be, for instance, no vowel-initial or mono-syllabic suffixes with an underlying H; there is also no reason why suffixes should have a H only on the penultimate mora. As we have seen, in the analysis proposed here, these asymmetries are given a principled explanation: they are a result of the application of rules such as Final Linking.
(3.12) and the Pre-Vocalic Docking (3.22) (see Chapter 3.1.1).

3.1.2 Invariant Tone Class I Nouns

Invariant Tone Class I nouns have a single high-toned mora whose position is invariant regardless of the suffix which follows. In (3.37) are given examples of Invariant Tone Class I nouns followed by various suffixes.

(3.37)

\[
\begin{array}{ll}
\text{a. h\text{"a}nEi 'sky'} & \text{b. c\text{"o}ngi 'paper'} \\
\text{h\text{"a}nEi-i 'sky (nominative)'} & \text{c\text{"o}ngi-ka 'paper (nominative)'} \\
\text{h\text{"a}nEi-do 'the sky also'} & \text{c\text{"o}ngi-do 'paper also'} \\
\text{h\text{"a}nEi-esE 'in the sky'} & \text{c\text{"o}ngi-esE 'in the paper'} \\
\text{h\text{"a}nEi-ch\text{"e}lEm 'like the sky'} & \text{c\text{"o}ngi-ch\text{"e}lEm 'like the paper'} \\
\text{h\text{"a}nEi-cocha 'even the sky'} & \text{c\text{"o}ngi-cocha 'even the paper'} \\
\text{h\text{"a}nEi-mengkuro 'like the sky'} & \text{c\text{"o}ngi-mengkuro 'like the paper'} \\
\end{array}
\]

When uninflected, h\text{"a}nEi 'sky' and c\text{"o}ngi 'paper' have a high-toned initial mora. When followed by a suffix, there is no tonal change: the high tone remains on the stem-initial mora. The tone of Invariant Tone Class I nouns can be accounted for in a straightforward way if we assume that the mora which surfaces as high-toned has a prelinked H, as shown in (3.38).

(3.38) a. h\text{"a}nEi 'sky' \quad b. c\text{"o}ngi 'paper' \\

\[
\begin{array}{l}
\text{I} \\
\text{H} \\
\text{I} \\
\text{H} \\
\end{array}
\]

Given this underlying representation, the tone of Invariant Tone Class I nouns, either uninflected (e.g. h\text{"a}nEi 'sky') or inflected (e.g. h\text{"a}nEi-i 'sky (nominative)') , is a natural consequence: that is, their surface tone is identical to their underlying tone, as shown in the derivation of h\text{"a}nEi-i 'sky (nom)' in (3.39).

(3.39) h\text{"a}nEi-i \quad \text{U} \\

\[
\begin{array}{l}
\text{I} \\
\text{H} \\
\end{array}
\]
hánEl-i

The noun *hánEl* ‘sky’ has a H linked to the first mora. The suffix -i ‘nominative’ is inherently toneless.

Some Tone Class I nouns are given in (3.40).

(3.40) Invariant Tone Class I Nouns

<table>
<thead>
<tr>
<th>Noun</th>
<th>Meaning</th>
<th>Noun</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>hánEl</td>
<td>‘sky’</td>
<td>cóngi</td>
<td>‘paper’</td>
</tr>
<tr>
<td>cáli</td>
<td>‘place’</td>
<td>móre</td>
<td>‘sand’</td>
</tr>
<tr>
<td>mÉli</td>
<td>‘head’</td>
<td>míyEk</td>
<td>‘sea weed’</td>
</tr>
<tr>
<td>kúrÉm</td>
<td>‘oil’</td>
<td>úli</td>
<td>‘barn’</td>
</tr>
<tr>
<td>tôma</td>
<td>‘cutting board’</td>
<td>káwi</td>
<td>‘scissors’</td>
</tr>
<tr>
<td>kúlì</td>
<td>‘copper’</td>
<td>nôre</td>
<td>‘song’</td>
</tr>
<tr>
<td>nèil</td>
<td>‘tomorrow’</td>
<td>nápi</td>
<td>‘butterfly’</td>
</tr>
<tr>
<td>kÉwi</td>
<td>‘goose’</td>
<td>pÉEsEt</td>
<td>‘mushroom’</td>
</tr>
<tr>
<td>sóli</td>
<td>‘sound’</td>
<td>pyÉluk</td>
<td>‘lice’</td>
</tr>
<tr>
<td>cháca</td>
<td>‘walnut’</td>
<td>káci</td>
<td>‘kind’</td>
</tr>
<tr>
<td>múli</td>
<td>‘flock’</td>
<td>núli</td>
<td>‘nest’</td>
</tr>
<tr>
<td>kínchì</td>
<td>‘pickled cabbage’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ékke</td>
<td>‘shoulder’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hÉli</td>
<td>‘waist’</td>
<td>mánEl</td>
<td>‘garlic’</td>
</tr>
<tr>
<td>nápAL</td>
<td>‘bugle’</td>
<td>kÉphum</td>
<td>‘bubble’</td>
</tr>
</tbody>
</table>

3.1.3 Invariant Tone Class II Nouns

Invariant Tone Class II nouns have H on their first two moras, both when uninflected and when followed by suffixes.

(3.41)a.kúrÉm  ‘cloud’  b.táncì  ‘jug’

<table>
<thead>
<tr>
<th>Form</th>
<th>Meaning</th>
<th>Form</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>kúrÉm-i</td>
<td>‘cloud (nom.)’</td>
<td>táncì-ka</td>
<td>‘jug (nominative)’</td>
</tr>
<tr>
<td>kúrÉm-do</td>
<td>‘even clouds’</td>
<td>táncì-do</td>
<td>‘even a jug’</td>
</tr>
<tr>
<td>kúrÉm-eke</td>
<td>‘to clouds’</td>
<td>táncì-eke</td>
<td>‘to a jug’</td>
</tr>
<tr>
<td>kúrÉm-chÈlEm’like clouds’</td>
<td>táncì-chÈlEm’like a jug’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kúrÉm-cocha ‘even clouds’</td>
<td>táncì-cocha ‘even a jug’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kúrÉm-mengkuro ‘like clouds’</td>
<td>táncì-mengkuro ‘like a jug’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There are various ways to account for tone of Tone Class III nouns. One of them is to assume that the first two moras are pre-linked to a H as in (3.42).

\[
\begin{align*}
\text{(3.42) a. } & \text{ kurEm} \quad \text{b. } \text{tanci} \\
& \begin{array}{c}
/ & / \\
H & H
\end{array}
\end{align*}
\]

An alternative is to assume that they have a prelinked H on the first mora, and it spreads rightward.

\[
\text{(3.43) Spreading}
X \begin{array}{c}
[M \ M] \\
\text{T}
\end{array}
\]

So, \text{kurÉm} 'cloud' would be derived as in (3.44).

\[
\begin{align*}
\text{(3.44) kurEm} & \text{ UF} \\
& \begin{array}{c}
/ \\
H
\end{array}
\end{align*}
\]

\[
\text{kurEm} \text{ Spreading} \\
\begin{array}{c}
/ \\
H
\end{array}
\]

This analysis, however, is not tenable, since, as one might have noticed, it assigns the same underlying representation for Invariant Tone Class I nouns and Tone Class II nouns. Recall that \text{hánEl} 'sky', which is Invariant Tone Class I, also has a prelinked H on the first mora. Spreading (3.43), then, would incorrectly apply to \text{hánEl} 'sky', deriving the incorrect form, \text{*hánÉl}.

A further alternative, the one which is adopted here, is to assume that Invariant Tone Class II nouns have a floating H underlyingly. (The reason for adopting this analysis over the analysis where the H is doubly linked in underlying representation will become clear when it comes to mono-syllabic nouns.) The floating H associates with the initial mora by the Association Conventions.
(3.45) The Association Conventions (AC)

Map a sequence of tones onto a sequence of tone-bearing units,

(a) in a one-to-one relation

(b) from left to right

A floating H associates with the left-most mora by the Association Conventions. The H on the left-most mora then spreads to the following mora to the right.

(3.46) Spreading

\[
\begin{array}{ccc}
M & M & \\
| & & \\
T & & \\
\end{array}
\]

Spreading spreads the H on the left-most mora to the following mora to the right.

In (3.47) are given the derivations of \( \text{kûrÉm-ève} \) ‘to the cloud’ and \( \text{kûrÉm-chElEm} \) ‘like the cloud’.

(3.47) (a) \( \text{kurEm-eke} \) (b) \( \text{kurEm-chElEm} \)

\[
\begin{array}{ccc}
H & H & AC \\
\text{kurEm-eke} & \text{kurEm-chElEm} & \\
| & | & \\
H & H & \\
\text{kurEm-eke} & \text{kurEm-chElEm} & \text{Spreading (3.46)} \\
| & | & \\
H & H & \\
\end{array}
\]

The noun \( \text{kûrÉm} \) ‘cloud’ has a floating H underlingly; the suffix \( \text{chElEm} \) ‘like’ is toneless. The AC (3.45) associates the floating H with the left-most mora. The linked H spreads to the following mora to the right.

As expected, the Association Conventions (3.45) applies before language-specific rules such as Pre-Vocalic Docking (3.22) and FL (3.12). Otherwise, incorrect forms would be derived, as shown in (3.48) and (3.49).
In (3.48), the underlying floating H would dock to the stem-final mora by Docking (3.22), because the stem is immediately followed by a vowel, deriving an incorrect form.

The noun *kurEm ‘cloud’ has a floating H, and -*chElEm ‘like’ is toneless. SET (3.15) makes the final mora of the suffix extratonal. FL would associate the floating H to the righ-most visible mora, deriving incorrect forms.

Spreading (3.46) is blocked from applying to the forms with a prelinked H on the initial mora like *hânEl ‘sky’ by the Elsewhere Condition (or the Strict Cycle Condition), since they form non-derived environments (lexically listed form). Non-derived forms constitute identity rules (e.g. *[hânEl] ---> *[hânEl]) whose structural description properly includes the structural description of Spreading. Since the output of the identity rule and Spreading is distinct in that the first specifies H only
on the first mora, but the second one specifies a H on the first two moras, they enter into a disjunctive relation and the more specific rule, namely lexical identity rules for applies over a more general rule, Spreading (3.46).

Spreading, however, is free to apply to derived inputs such as kurEm ‘cloud’, where the H on the initial mora is not a prelinked one as in hánEl ‘sky’, but derives by the Association Conventions, as shown in (3.50).

(3.50) kurEm
  H

kurEm    AC
  |   
  H

Below in (3.51) are listed some Invariant Tone Class II nouns.

(3.51) Invariant Tone Class II Nouns
kurEm    ‘cloud’   táncí    ‘jug’
kErín    ‘picture’  cángnán ‘play’
cánchí   ‘party’    sékkí    ‘straw rope’
kórEm    ‘pus’      núcú     ‘who’
áppá     ‘daddy’    nálké    ‘wing’
kócip    ‘stubbornness’ óppá  ‘older brother’
cákí    ‘self’     móré     ‘the day after tomorrow’

3.1.3.1 A Comparison with Previous Analyses

Kim (1989) also assumes an underlying floating H for Invariant Tone Class II nouns. The difference between her analysis and the one proposed here lies in the mechanics of deriving the surface form from this underlying representation. In her analysis, two rules are posited to derive surface forms: Floating H-Linking, which associates a floating H with all free moras in the domain, and Third-H Delinking, which delinks the H from all moras except the first two.
(3.52) Floating H-Linking (p44, Kim 1988)
\[
\begin{array}{c}
\# \ N \ N_0 \\
\backslash \ /
\end{array}
\]
\[H\quad \text{where N is nucleus.}\]

(3.53) Third-H Delinking (p51, Kim 1988)
\[
\begin{array}{c}
\# \ N \ N \ N_0 \\
\backslash \ /
\end{array}
\]
\[H\quad \text{Third-H Delinking}\]

The derivation of \(\text{kürÉm-i} \) 'cloud (nominative)' is given in (3.54).

(3.54) \(\text{kürEm-i}\)
\[
\begin{array}{c}
H \\
\text{kürEm-i} \\
\backslash \ /
\end{array}
\]
\[H \quad \text{Floating H-linking}\]
\[
\begin{array}{c}
H \\
\text{kürEm-i} \\
\backslash \ /
\end{array}
\]
\[H \quad \text{Third-H Delinking}\]

The floating H associates with all free moras in the domain. Third-H Delinking delinks H from all moras except the first two.

There are insurmountable theoretical and empirical problems with this analysis. First, rules such as Floating H-Linking, that is, rules which associate a free tone with all free tone bearing units, necessarily non-iterative in the domain are unattested in any other language. In addition to that, this rule involves a simultaneous, non-local linking of H to an unbounded string of vowels. This violates the fundamental constraint that rules operate on single segments. A similar criticism can be leveled against Third H Delinking: this rule involves simultaneous, non-local delinking of H.
3.2 Monosyllabic Nouns

All mono-syllabic words are high-toned on the surface. They are classified into two groups, according to their behavior when followed by suffixes. In the first group, the first two moras are high-toned, regardless of the suffix which follows as in (3.55a). In the second group, a single mora is high-toned, and the position of the H varies according to the suffix which follows as in (3.55b).

(3.55)  
\begin{align*}
\text{a. mül} & \quad \text{'water'} & \text{b. súl} & \quad \text{'alcohol'} \\
múl-i & \quad \text{'water (nom.)'} & \text{súl-i} & \quad \text{'alcohol (nom.)'} \\
múl-Én & \quad \text{'water (topic)'} & \text{súl-En} & \quad \text{'alcohol (top.)'} \\
múl-dó & \quad \text{'water also'} & \text{súl-do} & \quad \text{'alcohol also'} \\
múl-mán & \quad \text{'only water'} & \text{súl-man} & \quad \text{'only alcohol'} \\
múl-ÉsE & \quad \text{'in water'} & \text{súl-ÉsE} & \quad \text{'in alcohol'} \\
múl-ilang & \quad \text{'with water'} & \text{súl-ilang} & \quad \text{'with alcohol'} \\
múl-chÉlEm & \quad \text{'like water'} & \text{sul-chÉlEm} & \quad \text{'like alcohol'} \\
múl-cócha & \quad \text{'even water'} & \text{sul-cócha} & \quad \text{'even alcohol'} \\
múl-mánkhEm & \quad \text{'as much as water'} & \text{sul-mánkhEm} & \quad \text{'as much as alcohol'} \\
múl-ménkuro & \quad \text{'like water'} & \text{sul-ménkuro} & \quad \text{'like alcohol'}
\end{align*}

In the case of mül ‘water’, the first two moras of the construction, if there are two, are high-toned, regardless of the suffix which follows. This is exactly the same tone pattern exhibited by Invariant Tone Class II disyllabic nouns (e.g. kúrÉm ‘cloud’). Because of this similarity, this group of mono-syllabic nouns will be assigned to Invariant Tone Class II.

In the case of súl ‘alcohol’, on the other hand, only one mora is high-toned, whether the noun is uninflected (nouns in isolation) or inflected (nouns followed by suffixes). The position of the H, however, varies according to the suffix which follows: a H appears on the stem-final mora if the suffix is vowel-initial (e.g. súl-ÉsE ‘in alcohol’, súl-i ‘alcohol (nominative)’); a H appears on the penultimate mora.
of an inflected form if the suffix is consonant-initial (e.g. *sul-chÉlEm* 'like alcohol', *súl-man* 'only alcohol'). Note that the same alternation is exhibited by Variant Tone Class di-syllabic nouns (e.g. *parám* 'wind'). This group of monosyllabic nouns, hence, will be assigned to Variant Tone Class.

### 3.2.1 Invariant Tone Class II Monosyllabic Nouns

There are two possible ways to account for the tone of Tone Class II monosyllabic nouns. One is to assume that they have a linked H as in (3.56).

\[
(3.56) \quad \text{mul} \\
| \\
H
\]

The tone of inflected forms (e.g. *mul-i* 'water (nom)') results from spreading the linked H rightward by Spreading (3.46).

\[
(3.57) \quad \text{mul} \quad \text{Underlying Representation} \\
| \\
H \\
\text{mul-i} \quad \text{suffixation} \\
| \\
H \\
\text{mul-i} \quad \text{Spreading} \\
| / \\
H
\]

An alternative is to assume that these nouns have a floating H underlyingly. This floating H associates with the left-most mora by the AC (3.45), then spreads rightwards.
As far as mono-syllabic nouns are concerned, the first analysis is as good as the second. Consideration of mono-syllabic and di-syllabic nouns together, however, leads us to prefer the second analysis over the first because the first analysis cannot provide a unified underlying representation for Invariant Tone Class II nouns. That is, if monosyllabic nouns are assumed to have a pre-linked H on the initial mora, there is no way for Invariant Tone Class II nouns (monosyllabic and disyllabic nouns) to have a unified underlying representation, since disyllabic nouns, as pointed out in the discussion of disyllabic nouns, cannot have a pre-linked H on a single mora: they would, in such an analysis, be indistinguishable from Invariant Tone Class I nouns with initial H. In contrast, the second analysis allows a unified underlying representation for Invariant Tone Class II nouns, that is, a floating H for monosyllabic and disyllabic stems.

Turning to the derivation of mûl-i ‘water (nom.)’, note that the suffix -i ‘nominative’ is not extratonal, so the H spreads to it. This is unexpected considering that SET (3.15) makes the final mora of a suffix extratonal. If it were extratonal, we would derive the incorrect form *mûl-i, since the final vowel of the suffix

\[(3.58) \text{mul} \quad \text{UF} \]
\[
\text{mul} \quad \text{H}
\]
\[
\text{mul} \quad \text{AC}
\]
\[
\text{mul-i} \quad \text{suffixation}
\]
\[
\text{mul-i} \quad \text{Spreading}
\]
\[
\text{mul-i} \quad \text{Spreading}
\]

\[
\text{H} \quad \text{H}
\]

\[
\text{H} \quad \text{H}
\]
would be not visible to the spreading rule.

One way to get around this problem is to assume that assignment of extratonicity applies after Spreading (3.46). Since only toneless moras can be extratonic, the suffix \( i \) ‘nominative’, after the spreading rule has applied, cannot be extratonic.

(3.59) \[
\begin{array}{l}
\text{mul} \\
\quad H \\
\text{mul} \\
\quad | \\
\quad H \\
\text{mul-i} \\
\quad | \\
\quad H \\
\end{array}
\]

\text{suffixation}

\text{Spreading}

\text{NA}

\text{SET}

In (3.60) are listed some Invariant Tone Class II monosyllabic nouns.

(3.60) Invariant Tone Class II Monosyllabic Nouns

\[
\begin{array}{lll}
múl & \text{‘water’} & \text{cán} & \text{‘cup’} & \text{nún} & \text{‘eye’} \\
móm & \text{‘body’} & \text{páp} & \text{‘meal’} & \text{só} & \text{‘cow’} \\
cí & \text{‘rat’} & \text{póm} & \text{‘spring’} & \text{pál} & \text{‘foot’} \\
són & \text{‘hand’} & \text{khó} & \text{‘nose’} & \text{cúl} & \text{‘string’} \\
sál & \text{‘rice’} & \text{thóng} & \text{‘box’} & \text{kí} & \text{‘ear’} \\
i p & \text{‘mouth’} & \text{thóp} & \text{‘saw’} & \text{khál} & \text{‘knife’} \\
cÉl & \text{‘temple’} & \text{k’úm} & \text{‘dream’} & \text{cán} & \text{‘sleep’} \\
nám & \text{‘other people’} & & & & \\
chúm & \text{‘dance’} & \text{pyÉk} & \text{‘wall’} & \text{cé} & \text{‘ash’} \\
pé & \text{‘boat’} & \text{né} & \text{‘self’} & \text{ché} & \text{‘sifter’} \\
phế & \text{‘gang’} & \text{phí} & \text{‘blood’} \\
\end{array}
\]
3.2.2 Variant Tone Class Monosyllabic Nouns

On the ground that Variant Tone Class monosyllabic nouns exhibit the same tonal alternation as Variant Tone Class disyllabic nouns, the same underlying representation is assumed for them, that is, no underlying tone. HI (3.10) inserts a H, which associates with the right-most available mora, which is phonetically the penultimate mora (because the final mora is invisible due to SET (3.15)). In (3.61) below is given the derivation of sūl-i 'alcohol (nominative)'.

(3.61) sul UF
    sul-i suffixation
    sul-(i) SET
    sul-(i) HI

    sul-(i) FL
    | H

Note that spreading (3.46) does not apply to the output of FL in (3.61). The failure of Spreading requires an explanation in the case of sūl-i 'alcohol (nominative)' just as it did in the case of hânEl 'sky'. However, unlike the case of hânEl 'sky', non-derived environment restriction does not explain this problem, because sūl-i is a derived form in that it is morphologically complex and, furthermore, its H derives by the application of HI, SET, and FL. The answer lies in the order of rules. It has been shown in the discussion of Invariant Tone Class II monosyllabic nouns (e.g. múl-i 'water (nom.)') that Spreading (3.46) applies before SET (3.15). Since SET applies before FL, Spreading automatically precedes FL. Hence, by the time FL
produces the form $súl-i$, which satisfies the structural description of Spreading. Spreading has already passed by (that is, FL counterfeeds Spreading in $súl-i$ 'alcohol (nominative)'). This is why Spreading does not apply to $súl-i$.

### 3.3 Nouns of Three or More Syllables

Nouns of three of more syllables are particularly interesting because of the following two facts: most of them end in the vowel $i$, and have a H on the penultimate mora. In this section, such nouns are considered, with a focus on the asymmetries. It will be shown that extraprosodicity and extratonality are crucial in order to account for these asymmetries.

#### 3.3.1 Trisyllabic Nouns

Uninflected tri-syllabic nouns exhibit four tone patterns: HLL, LHL, HHL, and LLH. (Remember that nouns with a long vowel are not considered in this section. They are discussed in the next section.)

(3.62) myÉnEli apÉci mücíge satalí

'daughter in law' 'father' 'rainbow' 'ladder'

Analogous to the case of disyllabic nouns (e.g. $páram$ 'wind'), only trisyllabic nouns with a stem-final H, that is the pattern LLH (e.g. $satalí$ 'ladder'), undergo tonal alternations when followed by suffixes: a H appears on the stem-final mora if the stem is immediately followed by a vowel-initial suffix as shown in (3.63a). If the stem is immediately followed by a consonant-initial suffix, a H appears on the penultimate mora of the entire form as shown in (3.63b).
Note that this alternation is exactly the same as that exhibited by Variant Tone Class disyllabic (e.g. *parám* ‘wind’) and monosyllabic nouns (e.g. *súl* ‘alcohol’). Based on this similarity, trisyllabic nouns with the pattern LLH, that is, tri-syllabic nouns with a H on the final mora in isolation are also assigned to the Variant Tone Class. The analysis proposed for Variant Tone Class disyllabic and monosyllabic can also account for trisyllabic Variant Tone Class nouns. Thus, we assume, as is the case of other Variant Tone Class nouns (e.g. *parám* ‘wind’, *súl* ‘alcohol’), that they are inherently toneless. The H of these nouns comes from HI (3.10). The inserted H associates with the right-most available mora by FL. The right-most available mora is phonetically the final mora in uninflected nouns like *satalí* ‘ladder’, while it is phonetically the penultimate mora in inflected forms like *satalí-ka* ‘ladder (nom.)’, since in inflected forms the phonetically right-most mora (e.g. *-ka*) is invisible due to SET (3.15). For illustration, the derivations of *satalí* ‘ladder’ and *satalí-chÉlEm* ‘like a ladder’ are given in (3.64).

(3.64) satalí satalí
    satalí-chÉlEm suffixation

<table>
<thead>
<tr>
<th>Form</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.satalí-esE</td>
<td>‘in a ladder’</td>
</tr>
<tr>
<td>satalí-ekE</td>
<td>‘to a ladder’</td>
</tr>
<tr>
<td>satalí-Ey</td>
<td>‘a ladder (possessive)’</td>
</tr>
<tr>
<td>b.satalí-ka</td>
<td>‘ladder (nom.)’</td>
</tr>
<tr>
<td>satalí-nEn</td>
<td>‘ladder (topic)’</td>
</tr>
<tr>
<td>satalí-do</td>
<td>‘a ladder also’</td>
</tr>
<tr>
<td>satalí-IEl</td>
<td>‘ladder (acc.)’</td>
</tr>
<tr>
<td>satalí-chÉlEm</td>
<td>‘like a ladder’</td>
</tr>
<tr>
<td>satalí-cócha</td>
<td>‘even a ladder’</td>
</tr>
<tr>
<td>satalí-k’áci</td>
<td>‘including a ladder’</td>
</tr>
<tr>
<td>satalí-káchi</td>
<td>‘like a ladder’</td>
</tr>
<tr>
<td>satalí-potáa</td>
<td>‘than a ladder’</td>
</tr>
<tr>
<td>satalí-mengkúro</td>
<td>‘like a ladder’</td>
</tr>
</tbody>
</table>
Since *satali* 'ladder' is an uninflected (underived) form, HI is blocked from applying to it in the lexicon by FL. At the postlexical level, however, this rule can apply to this form without violating the Elsewhere Condition (see Chapter 3.1.8 for a discussion concerning this issue).

Note in the above that the inserted H does not associate with the first mora by the AC (3.45), since the AC applies before HI, which is a language-specific rule.

In (3.65) are given all trisyllabic nouns in LLH that I have found.

(3.65) Trisyllabic Nouns in LLH

- *satali* ‘ladder’
- *cintalle* ‘azalea’
- *mintelle* ‘dandelion’
- *tosilak* ‘lunch’

In contrast, trisyllabic nouns in the other tone patterns (that is, HLL, HHL, LHL) do not exhibit tonal alternations when followed by suffixes. In (3.66) is presented a noun in the tone pattern HLL followed by various suffixes.
(3.66) myÉnEli  
myÉnEli-ka  ‘daughter in law’
myÉnEli-nEn  ‘daughter in law (topic)’
myÉnEli-do  ‘daughter in law also’
myÉnEli-lEl  ‘daughter in law (acc.)’
myÉnEli-eke  ‘to a daughter in law’
myÉnEli-chElEm  ‘like a daughter in law’
myÉnEli-cocha  ‘a daughter in law also’
myÉnEli-k’aci  ‘including a daughter in law’
myÉnEli-kachi  ‘like a daughter in law’
myÉnEli-potáa  ‘than a daughter in law’
myÉnEli-mengkuro  ‘like a daughter in law’

Trisyllabic nouns in the pattern HLL, just as Invariant Tone Class I nouns do (e.g. hânEl ‘sky’), have a single high-toned mora whose position is invariant regardless of the suffixes which follow. Hence, trisyllabic nouns in the pattern HLL are assigned to Invariant Tone Class I. The H of these nouns is assumed to be a prelinked one as is the case of other Invariant Tone Class I nouns.

In (3.67) are given all trisyllabic nouns in HLL I have found.

(3.67) Tri-syllabic Nouns in HLL

myÉnEli  ‘daughter in law’  ácime  ‘aunt’
kámai ~ kamái  ‘straw sack’
kÉpuki  ‘turtle’
kámulchi  ‘mullet’

Turning to nouns in the HHL pattern, we display a noun in the pattern HHL followed by various suffixes in (3.68).

(3.68) múcige  ‘rainbow’
múcige-ka  ‘rainbow (nom.)’
múcige-nEn  ‘rainbow (topic)’
múcige-do  ‘rainbow also’
múcige-lEl  ‘rainbow (acc.)’
múcige-esE  ‘in a rainbow’
múcige-ke  ‘to a rainbow’
múcige-chElEm  ‘like a rainbow’
múcige-cocha  ‘a rainbow also’
múcige-k’aci  ‘including rainbow’
mûcige-kachi 'like a rainbow'
mûcige-potaa 'than a rainbow'
mûcige-mengkuro 'like a rainbow'

Tri-syllabic nouns in the pattern HHL have H on their first two moras, regardless of the suffixes which follow, as Invariant Tone Class II disyllabic (e.g. kûrÉm 'cloud') and monosyllabic nouns (e.g. mûl-l 'water (nom.)') do. Because of this similarity, trisyllabic nouns in the pattern HHL are assigned to Invariant Tone Class II. The surface tone of these nouns can be derived in the same way as proposed for other Invariant Tone Class II nouns (e.g. kûrÉm 'cloud', mûl 'water'). Invariant Tone Class II trisyllabic nouns have a floating H underlingly as other Invariant Tone Class II nouns do. The floating H associates with the first mora by the AC (3.45). Spreading spreads the H to the following mora on the right, as shown in the derivation of mûcîge 'rainbow' in (3.69).

(3.69) mucîge
UF

H

mucîge
AC

| AC
H

mucîge
Spreading

| Spreading
H

All Invariant Tone Class II trisyllabic nouns I have found are given in (3.70).

(3.70) Tone Class II Trisyllabic Nouns
mûcîge 'rainbow' nákÉne ~ nákÉne 'wanderer'
sÉk'âle 'rafter'~ sÉk'âle ólépi 'older brother'

We now turn to the nouns in the LHL pattern. In (3.71) is given one of these nouns followed by various suffixes.
Trisyllabic nouns in the tone pattern LHL have a single high-toned mora whose position is invariant regardless of the suffixes which follow just as Invariant Tone Class nouns do (e.g. myÉnEli 'daughter in law'). These nouns could thus be assigned to Invariant Tone Class I. However, on the assumption that nouns of the same tonal class share the same characteristics of their underlying representation, nouns in the LHL pattern cannot be assigned to this tonal class, since, as shown in the next section, there is reason to believe that trisyllabic nouns in the LHL pattern are underlingly toneless.

3.3.2 Asymmetries in Trisyllabic Nouns

Since trisyllabic nouns in the LHL pattern have a H on the second mora invariably, regardless of the suffixes that follow, it might appear that assuming a prelinked H on the second mora can account for these nouns. Such an analysis, however, would create an asymmetry in underlying representations. That is, the majority of trisyllabic nouns would end up having a prelinked H on the second mora, since most of trisyllabic nouns in this language exhibit the LHL pattern as shown in the list in (3.72)
(3.72) Trisyllabic Nouns in LHL

k'amáki 'raven'  koyángi 'cat'  puÉNi 'owl'
khok'téi 'elephant'  kekúli 'frog'  kilÉki 'dove'
k'ek'téi 'lark'  p'Ek'úli 'cuckoo'  wekáli 'heron'
pyEngáli 'chick'  olchéngi 'tadpole'  patúki 'spotted dog'
piítükí 'pigeon'  tük'Epi 'frog'  tulúmi 'crane'
olp'émi 'owl'  k'atúli 'pheasant hen'
camcáli 'dragon fly'
met'úki 'grasshopper'  tok'épi 'goblin'
talphéngi 'snail'  mechúli 'quail'  nEkúli 'badger'
sigáli 'lice egg'  pEntéki 'pupa'  mangáci 'colt'
kangáci 'puppy'  songáci 'calf'  tagnáki 'donkey'
toksúli 'eagle'  hangáli 'jar'  milúchi 'dried sardin'
t'aóki  pec'ángi 'grass hopper'
pot'áli 'package'  sokhúli 'basket'  pakúni 'basket'
.cumuí 'pocket'  sapáli 'bowl'  akingi 'furnace'
tecípi 'bowl'  pocéki 'small wrapping cloth'
akáli 'mouth(vulgar)'  pakáci 'dipper'  k'Eptéki 'cover'
toláci 'bell flower'  mináli 'parsley'
pheléngi 'a Chinese flower'  apÉsi 'father'
EmÉni 'mother'  acÉsi 'uncle'  akási 'lady'
halmÉni 'grand mother'  siléki 'waste'
ukÉci 'dried cabbage'  mutÉki 'bunch'
k'ócéi 'rod'  maktéki 'rod'  k'oktéki 'top'
k'othúli 'clue'  t'akáli 'lid'  ipháli 'small leaf'
mongtúli 'bat'  sonáki 'shower'  sucépi 'a kind of dish'
nulúngci 'scorched rice'  samáki 'mole'
mungthéki 'bunch'  nutÉki 'ragged clothes'
tegáli 'head'  tothóli 'acorn'  pEpÉli 'mute'
t'tutáki 'wrapper'  olgámi 'trap'  c'angpékí 'peak'
posfúki 'bowl'  pangmái 'rod'  kósíke 'scissors'
olói 'thread'  yEtÉliÉmi 'pimple'  kotÉliÉmi 'icicle'
mongtúi 'rod'  solóki 'black-eared kite'

Nouns in the LHL pattern by far outnumber those in the other tone patterns. Considering the fact that the distribution of tone patterns in disyllabic and monosyllabic nouns is equal, this asymmetrical distribution of tone patterns is an unexpected one, and requires an explanation. The analysis assuming a prelinked H on the second mora of these nouns cannot explain this asymmetry, since there is no a priori reason why a form with a H pre-linked on the second mora should be the
dominant underlying representation in trisyllabic nouns.

In addition to the fact that most trisyllabic nouns exhibit the LHL pattern, these nouns exhibit another interesting asymmetry, namely most of them end in the vowel \(i\). These two observations about trisyllabic nouns raise the following questions: why do most trisyllabic nouns exhibit the tone pattern LHL (the pattern with a H on the penultimate mora), not, say, HLL, HHL, or LLH? Is there any connection between the fact that most trisyllabic nouns exhibit the LHL pattern on the one hand, and the fact that most of them end in the vowel \(i\) on the other hand?

The answers to these questions, I argue, go as follows. Compared to other disyllabic and monosyllabic nouns, trisyllabic (underived) nouns are few in number: they number less than two hundred. Since they are few in number, tonal distinctions are not as salient as in monosyllabic and disyllabic nouns, which form the majority of nouns. As a result, tri-syllabic nouns can lose underlying tonal distinctions with no ensuing ambiguity. They tend to lose their underlying tonal distinctions, merging with toneless nouns.

Why do trisyllabic nouns become toneless? There is no principled answer to this question. However, it seems to be a fact that contrastive properties tend to be neutralized in favor of the non-contrastive value in many languages, especially in longer words. A toneless representation is a less marked tonal representation.

Toneless trisyllabic nouns would receive a H by HI, and the inserted H would associate with the final mora of these noun by FL (3.12). This, however, would not derive the correct forms.
(3.73) apEci  UR
         apEci  HI
              H
         apEci  FL
              H
   *apEci

apEci ‘father’ is underlying toneless. HI (3.10) inserts a H, which associates to the
final mora. Note that the final mora cannot be made extratonal by SET (3.15),
since the rule assigns extratonality only to the final mora of a suffix. The solution
to this problem lies in noting a striking asymmetry between monosyllabic and
disyllabic nouns on the one hand, and trisyllabic nouns on the other hand in the
quality of the final segment: most trisyllabic nouns end in the vowel i, whereas
disyllabic and monosyllabic nouns end in any segment.

3.3.3 Extraprosodicity and Extratonality

The fact that most trisyllabic nouns (and, as will be seen later, all
quadrisyllabic nouns) ends in the vowel i requires an explanation. I argue that it is
a result of the fact that the final mora of polysyllabic (more than two syllables)
nouns is extraprosodic.

(3.74) Extraprosodicity (EP)

\[
M \quad \rightarrow \quad [+ex] / M \quad M
\]

Combined with the Peripherality Condition (3.14), this rule will make a domain-
final mora extraprosodic iff it is preceded by more than one mora.
One might have noticed that the extraprosodicity rule, as formulated above, counts moras, in violation of the assumption that phonological rules are not allowed to count segments. We can avoid such an undesirable consequence if we state the rule in terms of foot structure. Specifically, if we assume that a single dimoraic foot is constructed at the left edge of the word. Then, a final mora which is not inside a foot (hence trisyllabic and longer) becomes extratonal. That way, we do not have to count moras.

Extraprosodic moras will be ignored by syllabification rules. Thus, for example, the syllable structure of *apÉci* ‘father’ would look like (3.75).

\[
\begin{array}{c}
(3.75) \\
S & S \\
| & \\
M & M & (M)_{ax} \\
| & | & | \\
ap & E & c & i
\end{array}
\]

Only two syllable nodes will be built over this word, since the final mora is invisible to syllabification rules, and there is no syllable which does not have a nucleus vowel.

Extraprosodic moras are likely to carry less contrastive material. Hence, the chances are that they would end up being the least marked vowels. [i], I argue, is the least marked vowel for the word (particularly poly-syllabic word)-final position.

My argument for choosing [i] is as follows. The vowels [E] and [i] are the least marked vowels in this language, since they are the vowels which are deleted or epenthesized. For example, the suffix -*lang* ‘with’ alternates with -*ilang*: -*lang* appears after a consonant, -*lang* appears after a vowel; the suffix -*lo* ‘to’ alternates with -*Elo*: -*Elo* appears after a consonant, -*lo* appears after a vowel. Between these
two vowels, the vowel [E] rarely occurs in word-final position, particularly disyllabic word final position. In contrast, the vowel [i] seems to freely occur at word-final position of both monosyllabic and disyllabic words (e.g. *ki* ‘flag’, *cangmi* ‘rose’). For this reason, [i] is chosen as the least marked quality for the final vowel of polysyllabic words. This explains why most trisyllabic nouns end in the vowel [i].

Returning to the problem of deriving the penultimate H in trisyllabic nouns like *apÉci* ‘father’, we now see the solution is at hand. Since the final mora is extraprosodic, it cannot be assigned a tone under the assumption that extraprosodic moras are extratonal (but not the other way round). In (3.76) is given the derivation of *apÉci* ‘father’.

\[
\begin{align*}
(3.76) & \quad \text{a p É c i} & \quad \text{UR} \\
& \quad \text{a p É c (i)} & \quad \text{Extraprosodicity (3.74)} \\
& \quad \text{a p É c (i)} & \quad \text{HI (3.10)} \\
& \quad \text{H} & \\
& \quad \text{a p É c (i)} & \quad \text{FL (3.12)} \\
& \quad \text{H} & \\
\end{align*}
\]

The noun *apÉci* ‘father’ is inherently toneless. Extraprosodicity (3.74) makes the final vowel i extraprosodic, and so extratonal. HI inserts a H, which associates with the final mora, which is phonetically the penultimate mora, since the final mora is extratonal.²⁶

Extraprosodicity (3.74), which plays an important role in polysyllabic nouns, has independent motivation. Before discussing it, we will consider evidence supporting the analysis of trisyllabic nouns proposed here.
The evidence, I argue, comes from the facts about variant tone patterns. There are some trisyllabic nouns which show variant tone patterns: kamai ‘straw sack’ ~ kamai, nakēne ‘wanderer’ ~ nakēne. An important observation about variant tone pattern is that the alternation is between LHL and some other tone pattern: we never find alternations between HHL and LLH, or between HLL and LLH and so on. Provided that variant forms are nothing but an old form and an innovating form competing with each other, what would be the implication of the observation that the variation is between LHL and some other tone pattern? It implies, I propose, that the process of eliminating underlying tone is still going on in trisyllabic nouns. Thus, the LHL pattern, which is the innovating one resulting from eliminating underlying tone, is in a competition with some other tone pattern which is an old one. The tone pattern does not alternate between, for instance, HLL and HHL, since a change which is going on is eliminating underlying tone, so consequently introducing the LHL pattern.

Let us think about how an analysis which assumes a prelinked H on the second mora for trisyllabic nouns in the LHL pattern as was done in previous analyses (e.g. Kim (1989)) would explain the fact about variant tone patterns. The only explanation such an analysis can provide for the fact about variant tone patterns would be that the LHL pattern is becoming the dominant tone pattern in trisyllabic nouns. However, this does not explain anything: it does not provide the reason why the LHL pattern is becoming the dominant tone pattern in trisyllabic nouns, and it does not predict that LHL should be selected as that pattern over HLL or HHL.
3.3.4 Evidence for Extraprosodicity

The claim that the final mora of nouns of three or more syllables is extraprosodic, so is not dominated by a syllable node, has an independent motivation. An examination of these nouns reveals another peculiar thing: the final *i* is rarely preceded by a consonant cluster. There are only two such words as far as I know: *pitúki* ‘pigeon’ and *nulúngci* ‘scorched rice’, where [ng] represents a single sound, a velar nasal.

Nothing in the grammar of this language prevents consonant clusters from occurring in that position: word-medial consonant clusters are common in disyllabic words (e.g. *tanchú* ‘button’, *cimsÉng* ‘animal’, *kúksi* ‘noodle’, *kímchi* ‘pickled vegetable’, *cângnán* ‘play’, *cânchl* ‘party’). Such rarity of consonant clusters, therefore, requires an explanation. The explanation, I argue, comes from the fact that the final vowel of these nouns is extraprosodic. Since extraprosodic vowels are not syllabified (are not dominated by a syllable node), consonant(s) immediately preceding it will syllabify with the preceding vowel, ending up in the coda of the preceding syllable, as illustrated in the word *apÉci* ‘father’ in (3.77).

(3.77) $\begin{array}{c}
\text{I} \\
\text{a} \\
\text{p} \\
\text{E} \\
\text{c} \\
\text{E} \\
\text{i}
\end{array}$

If there is a consonant cluster before the final *i*, only the first one will syllabify with the preceding vowel, since only one consonant is allowed in the coda of a syllable. The resulting syllable structure would be as follows:

(3.78) $\begin{array}{c}
\text{I} \\
\text{p} \\
\text{i} \\
\text{t} \\
\text{u} \\
\text{l} \\
\text{k} \\
\text{i}
\end{array}$
In this structure, the last two segments do not belong to a syllable. In other words, the last two segments are extraprosodic. Considering that only peripheral units can be extraprosodic, this syllable structure is quite marked. Since it is marked, it would rarely occur. This explains the rare occurrence of consonant clusters before the final $i$.

There is another interesting fact about trisyllabic (and quadrisyllabic) nouns, which give evidence for final vowel extraprosodicity. The fact in question is that there are no trisyllabic (and quadrisyllabic) words where the final $i$ is preceded by the consonant [t] or [th], whereas it is freely preceded by any other consonant. This is peculiar, considering that in monosyllabic and disyllabic nouns [t] and [th] freely precedes the vowel [i] (e.g. *cant* 'grass', *til* 'back', *mongii* 'rod', *thi* 'flaw').

The most obvious explanation for the absence of [t] and [th] in this position is the application of palatalization, which changes [t] and [th] to [c] and [ch] before [i]. If application of palatalization is the reason for the absence of [t] and [th], final $i$ should be one introduced by rules, phonological or morphological, since palatalization, which is a lexical rule, only applies in derived environments. (For a detailed discussion of palatalization in Korean, see Ahn (1985).)

This does not mean that the final $i$ in these words is introduced by morphological processes. Underspecification theory interacting with the extraprosodicity provides a solution to this problem. As discussed above, the final vowel $i$ of trisyllabic (and quadrisyllabic) nouns is extraprosodic, so is the least marked vowel. The least marked segments, according to underspecification theory, will not have a full feature specification: they will be underspecified underlyingly. I
assume, hence, that the final vowel i is specified as [-back] underlyingly. Redundancy rules will fill in missing features for i, creating a derived environment with respect to palatalization. This explains the absence of [t] and [th] in these words, thus supporting final vowel extraprosodicity in nouns of three or more syllables.

3.3.5 Extraprosodicity as a Structure-Building Rule

The application of Extraprosodicity (3.74) to uninflected trisyllable nouns is crucial in deriving nouns in the LHL pattern as seen in the derivation of apÉci 'father' in (3.79).

(3.79) apÉci UF
     apÉ(ci)   EP (3.74)
     apÉ(ci)   HI (3.10)
     H
     apÉ(ci)   FL (3.12)
     H

The application of EP (3.74) to an uninflected stem appears to violate the Elsewhere Condition, since uninflected nouns, which are nonderived forms, function as lexical identity rules, precluding application of any other phonological rule which would have the effect of creating a distinct change. The solution lies in the recognition of a fundamental distinction between structure-building rules such as stress and syllabification rules, and structure-changing rules, which actually change feature values or disrupt previously erected metrical structure. According to the EC, two rules in the same component apply disjunctively iff the result of applying one
to a form is distinct from applying the other to the form. Rules which build
structure rather than altering it do not produce outputs distinct from their inputs in
that they do not change feature values or disrupt previously erected metrical
structure. Therefore, they are not in a disjunctive relation to the identity rule. This
provides an explanation for the possibility of applying structure-building rules in
non-derived environments.

EP (3.74) is clearly a structure-building rule, since what it does is to build a
structure which does not preexist in any underlying form. Its application to a
non-derived form, therefore, does not violate the Elsewhere Condition.

The application of EP (3.74), on the other hand, seems to create a derived
environment, since HI (3.10), which is subject to the Strict Cycle, applies to
otherwise non-derived forms, that is, to uninflected nouns as in (3.78). (Recall that
HI is blocked from applying to uninflected words (e.g. parám ‘wind’, súl ‘alcohol’.
see 3.1.1.6). This, hence, can be taken as evidence supporting the claim that
structure-building rules create ‘derived environments’.29

3.3.6 Quadrisyllabic Nouns

In this section, quadrisyllabic nouns are discussed. It will be shown that the
facts about quadrisyllabic nouns provide further support for the analysis proposed
for the LHL pattern of trisyllabic nouns. It is interesting to observe that
quadrisyllabic nouns exhibit only one tone pattern LLHL, that is a penultimate H.30

(3.80) Quadrisyllable Nouns31

| tulumáki | ‘coat’  | thukupáli | ‘pot’ |
| mikkuláci | ‘minou’  | pulkasáli | ‘star fish’ |
| nokocíli | ‘lark’   | acumúi   | ‘mam’  |
When followed by suffixes, the position of H does not vary as shown in (3.81).

(3.81)  

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>tulumáki</td>
<td>‘coat’</td>
<td>tulumáki-ka</td>
<td>‘coat (nom.)’</td>
</tr>
<tr>
<td>tulumáki-nEn</td>
<td>‘coat (topic)’</td>
<td>tulumáki-do</td>
<td>‘coat also’</td>
</tr>
<tr>
<td>tulumáki-man</td>
<td>‘only a coat’</td>
<td>tulumáki-chElEm</td>
<td>‘like a coat’</td>
</tr>
<tr>
<td>tulumáki-cocha</td>
<td>‘even a coat’</td>
<td>tulumáki-mengkuro</td>
<td>‘like a coat’</td>
</tr>
</tbody>
</table>

Another interesting fact about quadrisyllabic nouns is that they all end in the vowel *i*. The same questions as were raised about trisyllabic nouns will be likely to be raised: why do quadrisyllabic nouns all end in the vowel *i*? Why do they all exhibit the LLHL tone pattern? Is there any relationship between the fact that all quadrisyllabic nouns exhibit the LLHL pattern on the one hand, and the fact that all quadrisyllabic nouns end in the vowel *i* on the other hand?

The answer given for trisyllabic nouns also works for quadrisyllabic nouns. First, all quadrisyllabic nouns end in the vowel *i* because the final vowel of these nouns is extraprosodic. The extraprosodic vowel ends up in the vowel [i] since [i] is the least marked vowel for this position. Furthermore, they all exhibit penultimate H tone pattern, namely LLHL, since they are underlyingly all toneless. The reason why they are all underlying toneless is that since quadrisyllabic nouns are quite few, tonal distinctions are not as salient as they are in monosyllabic and disyllabic nouns, which form the majority of nouns. As a result, quadrisyllabic nouns are most likely to lose underlying tonal distinctions, and merged to toneless
nouns, which are the less marked underlying tonal representation. HI (3.10) will insert a H in these toneless forms, which associates with the right-most available final mora, which is phonetically the penultimate due to the extraprosodicity (or extratonality) of the final mora. The derivation of *tulumáki* 'overcoat' is given in (3.82).

(3.82) tulumaki UF

<table>
<thead>
<tr>
<th>tulumak(i)</th>
<th>EP (3.74)</th>
</tr>
</thead>
<tbody>
<tr>
<td>tulumak(i)</td>
<td>HI (3.10)</td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td>tulumak(i)</td>
<td>FL (3.12)</td>
</tr>
<tr>
<td></td>
<td>H</td>
</tr>
</tbody>
</table>

Note that the analysis proposed for trisyllabic nouns with the pattern LHL provides as enlightening explanation for quadrisyllabic nouns. This constitutes supporting evidence for the present analysis.

Before wrapping up the discussion of quadrisyllabic nouns, let us consider how Kim’s analysis would account for quadrisyllabic nouns. These nouns, I conjecture, probably will be analysed as having a prelinked H on the penultimate mora. (Kim does not provide an analysis of these nouns.)

This analysis fails to explain the following facts. First, it cannot explain why it is the penultimate mora that receives the prelinked H. Secondly, it cannot explain the parallelism between trisyllabic nouns and quadrisyllabic nouns: they both end in the vowel *i* in most cases and have a H on the penultimate mora. The present analysis proposed here, as we have seen, provide a principled explanation for these facts.
3.4 Nouns with Long Vowel

In this section, nouns with long vowel are examined. The crucial facts about such nouns are:

(i) Long vowels only appear at the edges, left and/or right, of a noun stem: there are no long vowels in stem-medial position.

(ii) Long vowels mostly occur at the left edge of stem: as far as I know, there are fewer than ten noun stems with a long vowel at the right edge. So, nouns like mâti ‘joint’, makhê ‘the youngest’, udôông ‘Japanese noodle, muûndû ‘leper’ are quite rare. Nouns with a long vowel at the left edge, in contrast, are numerous, as seen in the list (3.86) below.

(iii) Long vowels always have either rising tone or falling tone.

(iv) The distribution of rising and falling tone is predictable: long vowels at the left edge of a stem have a rising tone, and long vowels at the right edge have a falling tone. In monosyllabic noun stems, with only one exception (âà ‘kid’), long vowels have a rising tone.

Below in (3.84) are listed nouns with a long vowel.

(3.84) (i) Monosyllable

<table>
<thead>
<tr>
<th>Noun</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>pâám</td>
<td>‘chestnut’</td>
</tr>
<tr>
<td>pâäl</td>
<td>‘drapery’</td>
</tr>
<tr>
<td>màál</td>
<td>‘speech’</td>
</tr>
<tr>
<td>àúm</td>
<td>‘bud’</td>
</tr>
<tr>
<td>kèé</td>
<td>‘dog’</td>
</tr>
<tr>
<td>tââl</td>
<td>‘trouble, mask’</td>
</tr>
<tr>
<td>péém</td>
<td>‘snake’</td>
</tr>
<tr>
<td>âà</td>
<td>‘child’</td>
</tr>
<tr>
<td>sèé</td>
<td>‘bird’</td>
</tr>
<tr>
<td>sôóm</td>
<td>‘cotton’</td>
</tr>
<tr>
<td>kîif</td>
<td>‘big box’</td>
</tr>
<tr>
<td>tôôl</td>
<td>‘stone’</td>
</tr>
<tr>
<td>kôông</td>
<td>‘ball’</td>
</tr>
<tr>
<td>nîí</td>
<td>‘you’</td>
</tr>
<tr>
<td>cûûng</td>
<td>‘Buddhist priest’</td>
</tr>
<tr>
<td>kûûl</td>
<td>‘cave, oyster’</td>
</tr>
<tr>
<td>kûûl</td>
<td>‘cave, oyster’</td>
</tr>
<tr>
<td>tôôl</td>
<td>‘stone’</td>
</tr>
</tbody>
</table>
(ii) Disyllable
sàárm ‘man’ tàámpè ‘cigarette’
cáángsú ‘vendor’ kááma ‘palanquin’
piígé ‘pillow’ këémi ‘ant’ páanggü ‘fart’
hóópák ‘pumpkin’ múúnddí ‘leper’ tééći ‘pig’
pòóći ‘vagina’ cáácí ‘penis’
sùúpák ‘watermelon’ cóólp ‘gloves’ cóolí ‘sift’
mòóké ‘a kind of soapberry’ cÉÉmsú ‘lunch’
matú ‘joint’ udóóng ‘noodle’ maknéé ‘the youngest’

(iii) Trisyllable
hóóléí ‘tiger’ kÉÉmÉli ‘leech’ máánuła ‘wife’
sááthúli ‘dialect’ kóókúma ‘sweet potato’
ciÉngi ‘worm’ ÉÉngtÉngi ‘hip’ wóónsungi ‘monkey’
kúúlÉngi ‘snake’ sóóngchúngi ‘caterpillar’

It is interesting to observe that long vowels are never followed by an
obstruent sound in the same syllable. So, for instance, there are no long-voweled
monosyllabic nouns which end in an obstruent sound. Also in disyllabic and
trisyllabic nouns, the first segment of a consonant cluster following a long vowel, if
there is one, is always a sonorant (e.g. cÉÉmsú ‘lunch’, tàámpè ‘cigarette’). However, the converse does not hold true. That is, it is not the case that a vowel
which is followed by a sonorant within the same syllable is always long: there are
short vowels which are followed by a sonorant within the same syllable. (e.g. pám
‘night’, múl ‘water’, cóngi ‘paper’). Consequently, the distribution of long vowel is
not predictable unless we take the construct “contour tone” to be primitive, in
which case vowel length could be derived on the basis of tonal information. Here I
assume that vowel length is primitive, and contour tones are derived by rules.
3.4.1 Asymmetrical Distribution of Long Vowels

We turn to the generalizations in (3.83), and discuss them one by one. We begin with the first generalization that long vowels occur only at stem edges. Such a skewed distribution of long vowels could be just an accident, or a result of a language-specific restriction, or a result of application of rules. It cannot be a result of application of rules since the distribution of long vowels and short vowels is not totally predictable: short vowels as well as long vowels occur at stem-edges. Stem-medially, on the other hand, only short vowels occur. But, we cannot assume that stem-medial short vowels are derived from long vowel, since they do not alternate with long vowels in any environment, so are analysed as underlying short vowels (according to the Alternation Condition).\textsuperscript{35} I attribute such a skewed distribution of long vowel to a language-specific stipulation which allows long vowels only at stem-edges. I believe, however, that such an asymmetrical distribution of long vowels has a historical explanation.

We have observed that there are no long level-toned vowels in this language. Furthermore, long vowels shorten when they become level-toned. Thus, the long vowel in chèèsò 'vegetable' and kàâké 'store' shortens in the compound chesòkake 'vegetable store'. I therefore propose that the absence of long vowels in stem-medial position is a historical result of application of the rule which shortens level-toned long vowels.\textsuperscript{36}

(3.85) Level-Toned Vowel Shortening (LTS)
With Shortening (3.85) posited, all we need to show in order to explain the absence of long vowels in stem-medial position is that a long vowel at such position would always be level-toned, in contrast to a long vowel at the edges, which would be contour-toned. A long vowel in medial position is always level-toned, I argue, because it has a single tone bearing unit. Since a tone bearing unit can bear only a single tone, it follows that long vowels in medial position are always level-toned. Now the question is how a long vowel in medial position comes to have a single tone bearing unit in contrast to ones at the edges, which have two tone bearing units. The solution comes from the theory of the tone bearing unit proposed by Odden (1988). In this theory, each syllable licences a tonal node, as is illustrated in (3.86).

(3.86) Syllable Licensing

```
  $  \\
   |  \\
  x  where x is tonal node (or tone bearing unit)
```

There is second rule which licenses an additional tonal node in bimoraic syllables to the right of the existing tonal nodes as follows:

(3.87) Long Vowel Licensing

```
  M   M  \\
  \   /  $  \\
  / \   \\
  x  x
```

This rule is not universal: some languages might have this rule, others might not.\(^7\)

An additional tonal node may also be licensed by position (Positional Licensing), so for example a word-final or a word-initial syllable, even though it is
short, may have an additional tonal node; a phrase-final or phrase-initial short syllable may have an extra tonal node, and so on. Positonal Licensing seems to be restricted to domain edges; thus, it is not possible for a word-medial syllable to licence an additional tonal node unless it is long. It follows that a language cannot get short contours only on syllable medial position.

A slight modification of Long Vowel Licensing and Positional Licensing would assign two tone nodes to a long vowel at the edges, and one tone node otherwise.

(3.88) Modified Positional Licensing (MPL)

Add an additional tonal node to the right hand of the existing root node in a long syllable only at the word edge, right or left.

Modified Positional Licensing could be considered as a hybrid of Long Vowel Licensing and Positional Licensing. This rule will add an additional tonal node to a long vowel at the edges, but not to one in medial position, as illustrated in (3.91) with a hypothetical word saatiimoo.

(3.89) /saatiimoo/

\ / \ /\ /\ /\ \\
$ $ $ $ \\
| | | |
\ x x x \\

\ / \ /\ /\ /\ \\
$ $ $ $ \\
/ \ | | \ \\
\ x x x x
Since only a single tone is allowed per tonal node, a medial long vowel, which has a single tone node, will always be level-toned. Since it is always level-toned, it will always be subject to Shortening (3.85). Long vowels at the edges, in contrast, have two tone nodes, so may have a contour tone if the tone nodes have different tonal values, that is, one has Low and the other has High. Contour-toned long vowels are not subject to Shortening, and so remain long. This might be the historical reason for the restriction of long vowels to the stem-edges in the synchronic grammar. Throughout this paper, unless otherwise required, we refers to the mora as the tone bearing unit for expository convenience, although it is actually the tonal node that bears a tone. This will not affect our discussion significantly.

The second generalization that long vowels appear more often at the left edge could be just an accident or might have some historical explanation. One possible historical explanation goes like this. Due to the tendency for contrastive material to appear on the left rather than on the right in a word, long vowels at the left might have a greater chance to have a H, which is non-default tonal value, than those at the right hand. As a result, long vowels at the left hand would have a higher probability of being contoured toned, while those at the right would have a higher probability of being low-toned, and would be subject to Shortening (3.85). This might have contributed to the scarceness of long vowels at the right edge of a stem. A second factor, I conjecture, is that prepausal vowels generally lengthen phonetically, so the phonetic contrast between long and short vowels would become less salient, so vowel length in a final syllable would be more likely to neutralize.
3.4.2 Contour Tone and Extratoningality

The third generalization, that only long vowels have a contour tone, naturally follows from the fact that only one tone is allowed per mora (tone bearing unit), short vowels have only one mora, and long vowels have two moras. The fourth generalization, that rising tones always occur at the left edge of a stem and falling tones always occur at the right edge of a stem, can be explained by extratoningality interacting with the Peripherality Condition.

As with extrametricality, only units on the periphery of a domain can be extratonal (see the discussion of extratoningality in Chapter 2.) If a rule assigns extratoningality to moras, the Peripherality Condition (3.14) would predict that the leftmost mora of a left-edge long vowel and the rightmost mora of a right-edge long vowel can be extratonal, as illustrated in (3.90).

\[(3.90)\] Long Vowel Extratoningality (LET)

\[
\begin{align*}
\$ & \longrightarrow \$ \\
/ & \ \ \ \ / & \ \ \\
[ & M & M & \{(M) & M \\
\$ & \longrightarrow \$ \\
/ & \ \ \ \ / & \ \\
M & M & ] & M & (M) & ]
\end{align*}
\]

where parenthesized moras represent extratonal moras.

Since the peripheral mora of a long vowel is made extratonal (that is, the leftmost mora of a left-edge long vowel, and the rightmost mora of a right-edge long vowel), long vowels at the left edge become rising-toned if there is a H (underlyingly or inserted) associating with free moras. Similarly, long vowels at the right edge become falling-toned.
This is why rising tones appear only at the left edge, and falling tones appear only at the right edge. In the next sections, we show how the tone of nouns with a long vowel is actually derived.

The last observation in (3.83), that long vowels in mono-syllabic noun stems are all rising-toned except one, will be discussed later in section 4, where falling tones are discussed. We now turn to the analysis of rising-toned nouns.

3.4.3 Nouns with a Rising Tone

Long vowels at the left edge are rising-toned. Furthermore, a rising tone is always followed by a high-toned mora, if the form is polysyllabic.

(3.92) a. pàăm   b. sàâram   c. hòólângi

‘chestnut’  ‘man’  ‘tiger’

In mono-syllabic nouns, a long vowel is rising-toned, that is, the first mora is low-toned and the second mora is high-toned. In polysyllabic nouns, a long vowel is rising-toned, and the mora which immediately follows the long vowel is always
When followed by a suffix, the second and the third mora of both monosyllabic and polysyllabic stems are invariably high-toned in all cases, as in (3.93).

(3.93) a. páám  ‘chestnut’
   pàám-i  ‘chestnut (nom.)’
   pàám-Éy  ‘chestnut (poss.)’
   pàám-dó  ‘chestnut also’
   pàám-mán  ‘only a chestnut’
   pàám-ésÉ  ‘in a chestnut’
   pàám-chÉlEm  ‘like a chestnut’
   pàám-cocha  ‘even a chestnut’
   pàám-méngkuro  ‘like a chestnut’

b. sàârám  ‘man’
   sàârám-i  ‘man (nom.)’
   sàârám-do  ‘man also’
   sàârám-man  ‘only a man’
   sàârám-chÉlEm  ‘like a man’
   sàârám-cocha  ‘even a man’
   sàârám-méngkuro  ‘like a man’

c. hôôlângi  ‘tiger’
   hôôlângi-ka  ‘tiger (nom.)’
   hôôlângi-do  ‘tiger also’
   hôôlângi-man  ‘only a tiger’
   hôôlângi-Éy  ‘tiger (poss.)’
   hôôlângi-ekte  ‘to a tiger’
   hôôlângi-chÉlEm  ‘like a tiger’
   hôôlângi-cocha  ‘even a tiger’
   hôôlângi-méngkuro  ‘like a tiger’

Nouns with a long vowel at the left edge behave similar to Invariant Tone Class II nouns (e.g. múl  ‘water’, kûrÉm  ‘cloud’, múcîge  ‘rainbow’), in that two consecutive moras are invariably high-toned, as seen in the examples of Tone Class II nouns in (3.94).

(3.94) a. múl  ‘water’
   múl-i  ‘water (nom.)’
   múl-dó  ‘water also’
<table>
<thead>
<tr>
<th>Noun</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>múl-mán</td>
<td>'only water'</td>
</tr>
<tr>
<td>múl-Éy</td>
<td>'water(poss.)'</td>
</tr>
<tr>
<td>múl-ésE</td>
<td>'in water'</td>
</tr>
<tr>
<td>múl-chÉlEm</td>
<td>'like water'</td>
</tr>
<tr>
<td>múl-cócha</td>
<td>'even water'</td>
</tr>
<tr>
<td>múl-méngkuro</td>
<td>'like water'</td>
</tr>
<tr>
<td>b. kúrÉm</td>
<td>'cloud'</td>
</tr>
<tr>
<td>kúrÉm-i</td>
<td>'cloud (nom.)'</td>
</tr>
<tr>
<td>kúrÉm-do</td>
<td>'cloud also'</td>
</tr>
<tr>
<td>kúrÉm-man</td>
<td>'only clouds'</td>
</tr>
<tr>
<td>kúrÉm-Éy</td>
<td>'cloud (nom.)'</td>
</tr>
<tr>
<td>kúrÉm-chÉlEm</td>
<td>'like clouds'</td>
</tr>
<tr>
<td>kúrÉm-cocha</td>
<td>'even clouds'</td>
</tr>
<tr>
<td>kúrÉm-méngkuro</td>
<td>'like clouds'</td>
</tr>
<tr>
<td>c. múcige</td>
<td>'rainbow'</td>
</tr>
<tr>
<td>múcige-ka</td>
<td>'rainbow (nom.)'</td>
</tr>
<tr>
<td>múcige-do</td>
<td>'rainbow also'</td>
</tr>
<tr>
<td>múcige-man</td>
<td>'only rainbow'</td>
</tr>
<tr>
<td>múcige-Éy</td>
<td>'rainbow (poss.)'</td>
</tr>
<tr>
<td>múcige-chÉlEm</td>
<td>'like a rainbow'</td>
</tr>
<tr>
<td>múcige-cocha</td>
<td>'even a rainbow'</td>
</tr>
<tr>
<td>múcige-méngkuro</td>
<td>'like a rainbow'</td>
</tr>
</tbody>
</table>

The only difference between these long voweled nouns and Invariant Tone Class II nouns is that in the former, the high-toned moras are the second and the third, while in the latter the first and the second moras are high-toned. However, if the first mora is ignored in long vowel nouns (since it is extratonal by Long Vowel Extratonality (3.90)), then long voweled nouns and Invariant Tone Class II nouns exhibit exactly the same tone pattern: the first and second moras are invariably high-toned. This argues that rising-toned nouns (that is, nouns with a left-edge long vowel) have a floating H just as Invariant Tone Class II nouns do. (The underlying tone of Invariant Tone Class II nouns was discussed in Chapter 3.1.2).

By way of illustration, the derivation of sàârám-i 'man (nom.)' is given in (3.95).
The noun *sārām* 'man' is assumed to have a floating H underlyingly. The first mora of a long vowel is rendered extratonal by LET (3.90). The AC (3.45) links the floating H to the initial mora, which is phonetically the second mora because the phonetically first mora is extratonal. The linked tone spreads to the following mora to the right by Spreading (3.46). Extratonality is lost at the postlexical level and free moras are assigned low tone by the postlexical default rule.

Nouns (and verbs) with a left-edge long vowel all have a floating H, and they exhibit the same tone pattern, namely the second and the third moras are high-toned and the rest are low-toned. The underlying tone of these nouns therefore need not be specified in the lexicon, since it is predictable. The floating H of these nouns, hence, is introduced by the rule in (3.96).

\[
(3.96) \text{Long Vowel H-insertion (LVH)}
\]

\[
\begin{array}{c}
\text{\$} \\
/ \\
\end{array}
\]

\[
[ M \quad M ]
\]

\[
\emptyset \longrightarrow \text{H}
\]
There is little argument for this rule instead of underlyingly specifying forms with an initial long vowel with a redundant floating H other than predictability.

### 3.4.5 Nouns with a Falling Tone

Long vowel at the right edge of a stem is falling-toned. There are few nouns with a long vowel at the right edge. In (3.98) are listed all such nouns I could find in this language.

<table>
<thead>
<tr>
<th>(3.97) Falling-toned Nouns</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ñà  'kid'</td>
<td>maknéê</td>
<td>'the youngest'</td>
</tr>
<tr>
<td>matû  'joint'</td>
<td>uđôông</td>
<td>'Japanese noodle'</td>
</tr>
<tr>
<td>mongtû  'rod'</td>
<td>sanåå</td>
<td>'man'</td>
</tr>
<tr>
<td>kasináå  'girl'</td>
<td>káå</td>
<td>'he (or she)'</td>
</tr>
<tr>
<td>muûndû  'leper'</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As seen in the examples in (3.97), noun stems with a right edge long vowel, except for one words (that is, muûndû 'leper'), exhibit the same tone pattern: the long vowel is falling-toned and the rest moras are all low-toned. In short, they have a H on the penultimate mora. (The word muûndû 'leper' will be discussed later.) When followed by a suffix, no tonal change occurs, as seen in (3.98).

<table>
<thead>
<tr>
<th>(3.98) a. maknéê</th>
<th>'the youngest'</th>
</tr>
</thead>
<tbody>
<tr>
<td>maknéê-ka</td>
<td>'the youngest (nom.)'</td>
</tr>
<tr>
<td>maknéê-do</td>
<td>'the youngest also'</td>
</tr>
<tr>
<td>maknéê-man</td>
<td>'only the youngest'</td>
</tr>
<tr>
<td>maknéê-eke</td>
<td>'to the youngest'</td>
</tr>
<tr>
<td>maknéê-chEIEEm</td>
<td>'like the youngest'</td>
</tr>
<tr>
<td>maknéê-cocha</td>
<td>'even the youngest'</td>
</tr>
<tr>
<td>maknéê-mengkuu</td>
<td>'like the youngest'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(3.98) b. uđôông</th>
<th>'Japanese noodle'</th>
</tr>
</thead>
<tbody>
<tr>
<td>uđôông-i</td>
<td>'Japanese noodle (nom.)'</td>
</tr>
<tr>
<td>uđôông-do</td>
<td>'Japanese noodle also'</td>
</tr>
<tr>
<td>uđôông-man</td>
<td>'only Japanese noodle'</td>
</tr>
<tr>
<td>uđôông-eke</td>
<td>'to Japanese noodle'</td>
</tr>
<tr>
<td>uđôông-chEIEEm</td>
<td>'like Japanese noodle'</td>
</tr>
</tbody>
</table>
udoông-cocha 'even Japanese noodle'
udoông-mengkuro 'like Japanese noodle'

For these nouns, I assume, as with the LHL patterned tri-syllabic nouns (e.g. *apÉci* 'father'), that they are underlingly toneless. The H of these nouns comes from HI (3.10) (which is also the source of the H of LHL patterned trisyllabic nouns like *apÉci* 'father', and Variant Tone Class nouns like *parám* 'wind'), not from LVH (3.96), since LVH applies only to nouns with a long vowel at the left edge. The inserted H associates with the final mora of a stem, which is phonetically the penultimate mora of a stem, since the phonetically final mora is rendered extratonal by LET (3.90). This is seen in the derivation of *maknéè* 'the youngest'.

\[
\begin{align*}
(3.99) \text{maknee} & \quad \text{UF} \\
\text{makne(e)} & \quad \text{LET}(3.90) \\
\text{makne(e)} & \quad \text{HI} (3.10) \\
\text{makne(e)} & \quad \text{FL} (3.12) \\
\end{align*}
\]

The H which is inserted by HI (3.10) does not associate with the initial mora by AC (3.45) since the AC applies before HI (Recall that the Association Conventions apply before language-specific rules. Also see Chapter 3.1.10). The application of HI (3.10) does not violate the Elsewhere Condition (or the Strict Cycle Condition), since application of extratonality rules creates a derived environment (see Chapter 3 regarding extratonality rules and their ability to creat a derived environment.) The derivation of a suffixed form is essentially a continuation, as seen in the derivation of *maknéè-chElEm* 'like the youngest' in (3.100).
We now return to the word *muundii* 'leper'. This word has a long vowel at both the right edge and the left edge. Interestingly, this word behaves like nouns with a left-edge long vowel (e.g. *taâmpé* 'cigarette') in that the first two moras excluding the initial extratonic mora (due to LET (3.90)) are high-toned. This word, thus, is derived as in (3.101).

(3.101) *muundii*  

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UR</td>
<td></td>
</tr>
<tr>
<td>muundii</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td>(mu)undi(i)</td>
<td>LET (3.90)</td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td>(mu)undi(i)</td>
<td>AC (3.45)</td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td>(mu)undi(i)</td>
<td>Spreading (3.46)</td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td>NA</td>
<td>HI (3.10)</td>
</tr>
</tbody>
</table>

(3.100) *maknee*  

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UF</td>
<td></td>
</tr>
<tr>
<td><em>makne(e)</em></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td><em>makne(e)</em></td>
<td>LET (3.90)</td>
</tr>
<tr>
<td><em>makne(e)</em></td>
<td>HI (3.10)</td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td><em>makne(e)</em></td>
<td>FL (3.12)</td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td><em>makne(e)</em>-chElEm</td>
<td>suffixation</td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td><em>maknee-chElEm</em></td>
<td>Peripherality Condition</td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
</tbody>
</table>
The reason why this word shows the same tone pattern as noun with a left-edge long vowel, not as nouns with a right-edge long vowel, is obvious. It is because a long vowel at the left edge triggers a particular tone insertion rule, namely LVH (3.96), which applies quite early in the derivation. In contrast, a long vowel at the right-edge does not trigger any particular rules. Thus, the pattern of left-edge long vowels will take precedence over that for right-edge long vowels.

Finally, let us consider the question of why a long vowel in mono-syllabic nouns is rising-toned in most cases. In principle, a long vowel in a monosyllabic word can be interpreted as one at the right edge of a stem equally as well as one at the left edge. The fact that most of long vowel monosyllabic words are rising-toned, however, seems to suggest that left-edge peripherality is assigned first. So, for example, the word kèé ‘dog’, for example, will become (ke)e, not ke(e) since the left-edge peripherality is assigned first. Since a H cannot associate with extratonal moras, (ke)e ‘dog’ would surface as kēé. This explains why most monosyllabic long voweled nouns are rising-toned. The falling toned words, âa ‘kid’ and kâa ‘he (or she), are exceptions to left-edge extratonality. This is why falling-toned monosyllabic nouns are rare: it is because such nouns are lexical exceptions to left-edge extratonality.39

3.5 Cyclicity of Noun Inflection Level

The examples so far have considered nouns followed by no more than one suffix. In fact, nouns in Korean can be followed by any number of suffixes, as long as the semantics allows it. Consideration of the tone of nouns followed by
more than one suffix reveals the cyclicity of the level where these suffixes are
attached. Consider the tone of the following examples. H appears on the same
position regardless of whether there is only one suffix or more than one.

(3.102) hânEl
  i. hânEl-chElEm
      hânEl-chElEm-man
      hânEl-chElEm-do
      hânEl-chElEm-En
      hânEl-chElEm-man-En
  ii. hânEl-esE
      hânEl-esE-man
      hânEl-esE-puthE
  iii. hânEl-man
      hânEl-man-i

The first example in each set of data is a noun followed by a single suffix; the
remaining examples contain more than one suffix. Note that a H appears on the
same position regardless of whether there is only one suffix or more than one: that
is, tone is not affect by the number of suffixes. This is true not only for Invariant
Tone Class I nouns like hânEl ‘sky’, but also for all nouns, regardless of tone class
and length. In (3.103) are given Invariant Tone Class II nouns: in (3.103a) are
given various form of a disyllabic stem, in (3.103b) are given various forms of a
monosyllabic stem, in (3.103c) are various forms of a trisyllabic stem.

(3.103)a. kûrÈm
  i. kûrÈm-chElEm
      kûrÈm-chElEm-man
      kûrÈm-chElEm-do
      kûrÈm-chElEm-En
      kûrÈm-chElEm-man-En
  ii. kûrÈm-esE
      kûrÈm-esE-man
      kûrÈm-esE-puthE
  iii. kûrÈm-man
      kûrÈm-man-i
In all the examples, the first two moras are high-toned regardless of whether there is one suffix or more than one.

In (3.104) are given Variant Tone Class nouns. In (3.104a) are given various forms of a disyllabic stem, in (3.104b) are given various forms of a monosyllabic stem, in (3.104c) are given various forms of a trisyllabic stem. Note that the position of H with one suffix is kept, regardless of the number of suffixes.

(3.104)a. parám

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>param-chÉlEm</td>
</tr>
<tr>
<td></td>
<td>param-chÉlEm-do</td>
</tr>
<tr>
<td></td>
<td>param-chÉlEm-En</td>
</tr>
<tr>
<td></td>
<td>param-chÉlEm-man-En</td>
</tr>
<tr>
<td>ii.</td>
<td>parám-esE</td>
</tr>
<tr>
<td></td>
<td>parám-esE-man</td>
</tr>
<tr>
<td></td>
<td>parám-esE-puthE</td>
</tr>
<tr>
<td>iii.</td>
<td>parám-nim</td>
</tr>
<tr>
<td></td>
<td>parám-nim-i</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>b.</td>
<td>múl</td>
</tr>
<tr>
<td>i.</td>
<td>múl-chÉlEm</td>
</tr>
<tr>
<td></td>
<td>múl-chÉlEm-man</td>
</tr>
<tr>
<td></td>
<td>múl-chÉlEm-do</td>
</tr>
<tr>
<td></td>
<td>múl-chÉlEm-En</td>
</tr>
<tr>
<td></td>
<td>múl-chÉlEm-man-En</td>
</tr>
<tr>
<td>ii.</td>
<td>múl-ésE</td>
</tr>
<tr>
<td></td>
<td>múl-ésE-man</td>
</tr>
<tr>
<td></td>
<td>múl-ésE-puthE</td>
</tr>
<tr>
<td>iii.</td>
<td>múl-mán</td>
</tr>
<tr>
<td></td>
<td>múl-mán-i</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>c.</td>
<td>múcige</td>
</tr>
<tr>
<td>i.</td>
<td>múcige-chÉlEm</td>
</tr>
<tr>
<td></td>
<td>múcige-chÉlEm-man</td>
</tr>
<tr>
<td></td>
<td>múcige-chÉlEm-do</td>
</tr>
<tr>
<td></td>
<td>múcige-chÉlEm-En</td>
</tr>
<tr>
<td></td>
<td>múcige-chÉlEm-man-En</td>
</tr>
<tr>
<td>ii.</td>
<td>múcige-esE</td>
</tr>
<tr>
<td></td>
<td>múcige-esE-man</td>
</tr>
<tr>
<td></td>
<td>múcige-esE-puthE</td>
</tr>
<tr>
<td>iii.</td>
<td>múcige-man</td>
</tr>
<tr>
<td></td>
<td>múcige-man-i</td>
</tr>
</tbody>
</table>

'water'
'like water'
'only like water'
'like water also'
'like water (topic)'
'only like water (topic)'
'in water'
'only in water'
'from in water'
'only water'
'only water (nom.)'

'rainbow'
'like a rainbow'
'only like a rainbow'
'even like a rainbow'
'like a rainbow (topic)'
'only like a rainbow (topic)'
'in a rainbow'
'only in a rainbow'
'from a rainbow'
'only a rainbow'
'only a rainbow (nom.)'

'wind'
'like the wind'
'like the wind also'
'like the wind (topic)'
'only like the wind (topic)'
'in the wind'
'only in the wind'
'from the the wind'
'wind (honofific)'
'wind (honofific) (nom.)'
As these examples show, the position of H with one suffix is kept, regardless of the number of suffixes. That is, the position of H is determined by the first suffix: the remaining suffixes do not affect the position of H at all.

This is not surprising in the case of Invariant Tone Class I nouns like ħänEl ‘sky’ and Invariant Tone Class II nouns like kûrÉm ‘sky’. Since the H of Tone Class I nouns is prelinked, there is no way for the following suffixes, however many there may be, to affect the position of the high tone, as illustrated in (3.105).

\[(3.105)\text{hanEl-chElEm} \quad \text{hanEl-chElEm-man} \quad \text{hanEl-chElEm-man-En} \]

\[\begin{array}{ccc}
| & H & |
\end{array} \quad \begin{array}{ccc}
| & H & |
\end{array} \quad \begin{array}{ccc}
| & H & |
\end{array}\]

In Tone Class II nouns, since the surface tone is derived from an underlying floating H by the AC (3.45) and Spreading (3.46), there is no way for the suffixes
other than the first one to affect the high tone, if it affects it at all, as shown in (3.106).

(3.106) kurEm mul UF
   H        H

   kurEm  mul  AC
   \     /   \  /
   H H H

   kurEm-chElEm-man  mul-chElEm-man  suffixation
   \ / \ /    \ / \ /
   H H H

   kurEm-chElEm-man  mul-chElEm-man  Spreading
   \ / \ /    \ / \ /
   H H H

In the case of kurEm ‘cloud’, no suffixes are involved in Spreading. In the case of mul ‘water’, only the first suffix is involved in Spreading.

When it comes to parâm ‘wind’, however, the fact that only the first suffix affects tone does not follow from anything we assumed about Variant Tone Class nouns so far. Rather, we would get different results depending on whether suffixes are attached all at once, or one by one cyclically intermingled with phonological rules. If suffixes were assumed to attach all at once, so phonological rules apply across-the-board, incorrect forms would be derived as illustrated in the derivation of param-chElEm-man ‘only like the wind’ in (3.107)

(3.107) param

   param-chElEm-man  suffixation
   param-chElEm-man  HI (3.10)
   \ /  \  /
   H H H

   param-chElEm-(man)  SET (3.15)
In this derivation, suffixes attach all at once, and tonal rules apply across-the-board. The result is the incorrect form *\textit{param-chElÉm-man}.

If suffixes are assumed to attach one by one and tonal rules apply cyclically, then the correct form is derived.

\begin{align*}
(3.108) \text{param} & \quad \text{UF} \\
& 1\text{st Cycle} \\
\text{param-chElEm} & \quad \text{suffixation} \\
\text{param-chElEm} & \quad H \quad \text{HI (3.10)} \\
\text{param-chE(lEm)} & \quad \text{SET (3.15)} \\
\text{param-chE(lEm)} & \quad H \quad \text{FL (3.12)} \\
& \quad | \\
& \quad H \\
& 2\text{nd Cycle} \\
\text{param-chE(lEm)} & \quad H \\
\text{param-chE(lEm)-man} & \quad \text{suffixation} \\
& \quad | \\
& \quad H \\
\text{param-chElEm-man} & \quad \text{Peripherality Condition (3.15)} \\
& \quad | \\
& \quad H \\
\text{NA} & \quad \text{HI (3.10)}
\end{align*}
param-chElEm-(man)  SET (3.15)

| H |

param-chElEm-man

On the first cycle, a H is inserted by HI (3.10). The inserted H associates with the right-most available mora, which is phonetically the penultimate due to the extratonality of the phonetically right-most mora. On the second cycle, another suffix attaches. HI can no longer apply, since there is already a H in the domain.

The tone of Variant Tone Class nouns thus provides evidence for the cyclicity of the level of noun inflection.
Notes

1. The vocative suffix is -ya after vowel-final stems like tali ‘leg’.

2. After vowel-final stems, the suffix -Elo ‘with’ and the suffix -ina ‘accusative’ become -lo and -na, respectively.

3. There are two variants for this suffix: kwa and wa. kwa is used after a consonant, and wa, after a vowel.

4. This claim needs to be tested further.

5. -e ‘to’ is used in hakkyo-e kayo ‘I am going to school’, where hakkyo means ‘school’, and kayo means ‘be going’. -sE ‘in, at’ is used in hakkyo-sE kongpu heyo ‘I am studying at school’, where kongpu means ‘study’ and heyo means ‘be doing’.

6. The suffix -ke ‘to’ is rarely used in the standard Korean. I have observed, however, that this suffix replaces the suffixes -k’e ‘to’, which is one of the suffixes meaning ‘to’, in the speech of the old generation.

7. Epenthesis is clearly a morphologically conditioned rule, which inserts a vowel between two consonants across a morpheme boundary because there is no phonological explanation for why a vowel is to be inserted at the morpheme boundary in this case. A syllable-based account is not available. Since the Korean syllable inventory includes CVC and CV, the underlying forms of /iparam-lang/ and /iparam-lo/, for instance, are well-formed syllabically. The segment-based account is also not available. Since any consonant can be followed by any consonant (e.g. chimlyak ‘invasion’, where m is followed by l, sEpli ‘destiny’, where p is followed by l), /iparam-lang/ and /iparam-lo/, for instance, are well-formed segmentally. The epenthesis rule which is responsible for the alternation of these suffixes needs to be constrained in such a way that a vowel is inserted not between any two consonants, but between a consonant and l or n because other consonant-initial suffixes do not show such an alternation: e.g. param-chÉlEm ‘like the wind’. When it comes to verbal suffixes, however, this epenthesis rule gives wrong forms because it is not possible to predict on the phonetic ground which suffixes alternate and which do not. So for example, the interrogative suffix -na does not alternate between an initial vowel and zero: e.g. mak-na ‘block-interrogative’, ka-na ‘go-interrogative’. The putative suffix -na, which has the same phonological form as the interrogative suffix, on the other hand, alternates between an initial vowel and zero: e.g. mak-Ena ‘block-putative’, ka-na ‘go-putative’. Deletion only can account for the alternation of verbal suffixes. Given this fact about verbal suffixes, it is not clear whether we must abandon the epenthesis analysis altogether, or keep the epenthesis analysis for nouns only.
8. I quote this from Sohn (p.69, 1987).

9. The deletion process is also morphologically conditioned: there is no phonological explanation for why the vowels should be deleted after another vowel, since the sequence of a vowel plus i or ë is common in Korean: ai ‘child’; nui ‘older sister’. The sequence of a vowel plus ë is also common: maEm ‘heart’, coEn ‘advice’.

10. As pointed out in note 6, some verbal suffixes show the alternation between ë and null (e.g. mEk-Ena ‘eat-putative, ka-na ‘go-putative’); some other suffixes do not show such an alternation (e.g. mEk-na ‘eat-interrogative’, ka-na ‘go-interrogative’). Since it is not predictable which suffixes exhibit this alternation based on phonological environments, an epenthesis analysis cannot explain this alternation. Only a deletion analysis can explain the difference between these two groups of suffixes.

11. This rule correctly will apply to both vowel-final stems and consonant-final stems. There is nothing in the structural description of this rule to prevent that, since nothing is mentioned about the segment which would precede the vowel-initial suffix.

12. A similar point is made in Halle and Mohanan (1985). They make an interesting point that a stress rule might be structure-building in one language, but initially structure-changing in another language, such as Sanskrit, where accents must be specified in underlying representations.

13. As far as the tone of nouns is concerned, this rule as formulated applies correctly. However, when it comes to compounds (and verbs), this rule needs to be modified in such a way that any number of moras are allowed to intervene between the two H’s. (Kim uses this rule to derive the tone of compound nouns and verb forms too.) For instance, consider the compound kkot-satali ‘flower ladder’. The underlying form of this compound in her analysis would be:

\[
\text{kkot-satali} \\
\text{H H}
\]

In order to derive the surface form, the linked H of kkot needs to be deleted. However, this rule as formulated in her analysis cannot delete the H because the two H’s are separated by more than one mora. Kim does not consider this problem, since she only deal with compounds whose members are either monosyllabic or disyllabic. A similar difficulty is encountered in verb forms, which will be discussed in Chapter 4.

14. It is not clear whether she assumes that all suffixes before which noun stems have a H on the final mora are toneless: the nominative suffix -i is the only suffix she discusses in the group. Since she does not explicitly say something about them, I assume that she analyses the suffixes before which noun stems have a H on the final mora in the same way as the nominative suffix -i, namely underlyingly toneless.

15. The indeterminacy concerning the underlying representations of certain suffixes might not seriously undermine Kim’s analysis.
Goldsmith's original Association Convention would allow such a spreading rule:

Goldsmith Association Convention (1976)

a. Map a sequence of tones onto a sequence of tone-bearing units,
   i. from left to right
   ii. in a one-to-one relation.

b. Left-over tones are assigned to the last tone bearing units.

c. The last tone spreads to remaining untoned tone-bearing units on right.

Halle and Vergnaud (1982) and Pulleyblank (1986), among others, argue that the clauses (b) and (c) are no longer true.

This is often referred to as the "single node constraint". One might suggest to interpret this rule as iterative. In fact, Johnson (1970a) and Howard (1972) proposed that simultaneous application can be interpreted as iterative application. Iterative application of this rule, however, cannot spread H onto all the vowels in the domain, but only to the mora to the second vowel because of the word initial boundary symbol in the structural description of the rule.

Nouns of three or more syllables are primarily native Korean words. Except for compounds, Sino-Korean nouns are rarely trisyllabic or quadrisyllabic. Nouns of more than four syllables are rare.

We are concerned only with simple (underived) nouns here: derived nouns (by derivation and/or compounding) are excluded from the discussion.

As for cintallé 'azalea' and mintellé 'dandelion', it looks like they are compounds or derived forms, since they share -te(a)lle 'wild garlics'. The problem of such an analysis lies in dealing with the remaining part, that is, cin- and min-. To take them as independent nouns or suffixes is not well-motivated, since their meanings are not clear, and their distribution is, to my knowledge, limited to these two words.

To the right of the tilde is an alternative pronunciation.

Nouns of three syllables with a long initial vowel exhibit the tone pattern LHHL. These nouns number more than those of the HLL, the LLH, and of the HHL types, but are far less than those of the LHL type. A list of such nouns is:

| keuulEngi | ‘snake’ | hoólángi | ‘tiger’ |
| woónsúngi | ‘monkey’ | caángtóli | ‘hammer’ |
| EÉngtÉngi | ‘butt’ | ciilÉngi | ‘worm’ |
| uúilEngi | ‘snail’ | kÉÉmÉli | ‘leech’ |
| maánula | ‘wife’ | saátúli | ‘dialect’ |
| soongchúngúgi | ‘caterpillar’ | poócóke ~ pocóke ‘dimple’ |
| ciilÉngi | ‘worm’ |

Nouns with long vowel are discussed later in this chapter.
23. To take one example, in Kimatuumbi, quadrisyllabic nouns have only three possible tone patterns, and only two common ones, though thorewise there are n+1 patterns for n-syllable words. See Odden (1985).

24. As argued in note 24, some trisyllabic words can be analysed as a stem plus a suffix. The final mora of these words will be made extratcnnal by SET. The majority of trisyllabic and quadrisyllabic words, however, cannot be analysed as a stem plus a suffix.

25. Some trisyllabic words in the above list could be analysed as a stem plus a derivational suffix. Consider kekůli ‘frog’, k’ek’óli ‘lark’, kilÈki ‘gull’, puÈngi ‘owl’, p’Ek’úki ‘cuckoo’. It is quite obvious that the final -i in these words is a derivational suffix meaning "one", "person", or "a living thing". This suffix (I will call this suffix "agentive" suffix) attaches to onomatopoeic words (e.g. p’Ek’uk ‘sound of cuckoo’ + -i \(\rightarrow\) p’Ek’uki ‘cuckoo’) and to "stative" verb stems (e.g. yEEp’E- ‘to be pretty + -i \(\rightarrow\) yEEp’Eni ‘pretty person’). There is another group of trisyllabic nouns which could be analysed as a stem plus a derivational suffix: mangâci ‘colt’ (mal ‘horse’ + -aci), songâci ‘calf’ (so ‘cow’ + -adi), pakâci ‘dipper’ (pak ‘pumpkin’ + -adi) and mokâd ‘neck’ (mok ‘neck’ + -adi). These words share -aci, which could be a diminutive suffix. For the rest trisyllabic (and all quatri-syllabic words), the source of the final -i is not clear.

26. One of the predictions of Extraprosodicity is that trisyllabic (and quadrisyllabic) nouns can never have a H on the final mora. There are apparent counter examples, that is, satali ‘ladder’, cintallé ‘azalea’ and mintÈlli ‘dandelion’. They would be treated as exceptions.

27. In fact, there is no strong evidence showing which variant is the innovative and which one is the old. I take the LHL pattern as the innovative one based on the fact that the variation is between LHL and some other tone pattern: LHL \(-\) HLL, LHL \(-\) HHL. We never find the variation between, say, HHL and HLL. If the LHL pattern were the old, then some other tone patterns, namely HLL, and HHL would be the innovative. This would result in various innovative forms, which is undesirable considering that innovation tends to occur in a single direction.

28. It is controversial whether the application of redundancy rules, which is one type of structure-building rules, creates a derived environment. Here, I assume that their application creates a derived environment.

29. The issue concerning whether structure-building rules create a derived environment is still under debate. In earlier versions of Kiparsky’s model (1982), the application of a structure-building rule could create a derived environment and allow structure-changing rules to apply to otherwise non-derived forms. Kiparsky (1985), however, says that mere application of, say, stress assignment does not sufficiently alter a string to license a cyclic rule. (For a detailed discussion, refer to Kiparsky (1985)) Clements, however, pointed out that the proper application of various cyclic rules in
Klamath (Clements and Keyser 1983) depends on the ability of syllable-structure assignment to create derived environments.

30. The word *hâlâpEci* ‘grandfather’ appears to be an exception to this claim. In fact, this word can be analysed as a compound derived from the adjective *han* ‘big’ and *apÉci* ‘father’. (The sound [n] of the first member changes to [l].) Therefore, the claim holds true for (short-voweled) simple (underived) quadrisyllabic nouns.

31. As far as I can see, no quadrisyllabic words listed here can be analysed as a stem plus a suffix.

32. Verbs with long vowel will be discussed in Chapter 4.

33. Every H is phonetically implemented as falling tone prepausally, even on short vowels. This is a postlexical process, so will be discussed in Chapter 8, where tone at the postlexical level is investigated.

34. There are minimal pairs involving vowel length: *pàâm* ‘chestnut’ vs. *pâm* ‘night’, *nùûn* ‘snow’ vs. *nûn* ‘eye’, *pàâl* ‘blinds’ vs. *pâl* ‘foot’ and so on. So, the vowel length is contrastive.

35. The Alternation Condition (Kiparsky 1968, 1973): Obligatory neutralization rules cannot apply to all occurrences of a morpheme. The general effect of this condition is to limit the "abstractness" of underlying representations to cases motivated by phonological alternations.

36. As shown later in this chapter, nouns with rising tone have a floating H which is predictable by a rule. Thus, *chèésô* ‘vegetable’ and *kàâkè* ‘store’ both have a floating H. Compound rules which are relevant here are H-deletion, which deletes a H preceded by another H, and Compounding Docking, which docks a floating H on the final mora of the first member of a compound. Thus, the derivation of *chesôkake* ‘vegetable store’ looks like the following.

```
[cheeso] [kaake] UF
[cheeso] [kaake] LVH
H H compounding
[[cheeso] [kaake]] H-deletion
H
[[cheeso] [kaake]] Compounding Docking
```

H
After the L tone default rule has applied, this compound has the following representation:

\[
\text{[cheeso] [kaake]} \quad \text{Default L-insertion}
\]

\[
\begin{array}{ccccccc}
\text{L} & \text{L} & \text{H} & \text{L} & \text{L} & \text{L}
\end{array}
\]

Since the long vowels in *cheeso* and *kaake* are level-toned (low toned), Shortening shortens these vowels, deriving *chesókake*.

37. Languages where long vowels in non-edge position can be contour-toned have this rule. In contrast, languages where long vowels in non-edge position are never contour-toned do not have this rule.

38. In fact, we will see that this floating H is predictably inserted by rule.

39. It might be possible to analyse *áá* ‘kid’ and *káá* ‘he or she’ as disyllabic, since there is no phonological and/or morphological evidence for the monosyllabicity of these words. I analysed these words as monosyllabic for the following two reasons. First, since there is falling-toned disyllabic stems, there is no reason not to expect falling-toned monosyllabic stems. It would be not convincing to analyses all falling toned long vowels as a sequence of two syllables. Second, we have, it will be shown, several falling-toned monosyllabic verb stems. Any attempt to analyses them as disyllabic stems would not gain us anything.
CHAPTER IV

TONE OF VERBS

The purpose of this chapter is to investigate tonal regularities and alternations in verb forms. In section 1, the tone of Invariant Tone Class verbs is discussed. The second section discusses Invariant Tone Class II verbs. Variant Tone Class verbs are discussed in section 3. In section 4, the present analysis is compared with previous analyses. External evidence for the present analysis is considered in section 5. Section 6 discusses "irregular-tone" verbs and the relationship between tone and segments. The cyclicity/noncyclicity of the verbal inflection level is discussed in section 7. Section 8 is concerned with verbs with long vowels.

Verb stems can be divided into two major groups: Variant Tone Class verb stems and Invariant Tone Class verb stems. Variant stems exhibit tonal alternation when followed by suffixes; invariant stems do not. Invariant stems in turn can be classified into Invariant Tone Class I verb stems and Invariant Tone Class II verb stems. Invariant Tone Class I stems have one high-toned mora, which is in the stem. In Invariant Tone Class II stems, the first two moras are high-toned. This classification of verb stems thus is parallel to that of noun stems.
4.1 Invariant Tone Class I

In Invariant Tone Class I stems, one mora, which is in the stem, is invariably high-toned, regardless of the suffixes which follow. In (4.1) I give an inflectional paradigm of mánna-ta ‘meet’. We see that the first mora is consistently H-toned.

(4.1) (a)
mánna-ta 'meet'

<table>
<thead>
<tr>
<th>Declarative</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mínna si Et sEmni ta</td>
<td>'met (hono.form.)'</td>
</tr>
<tr>
<td>mínna si ket sEmni ta</td>
<td>'will meet (hono.form.)'</td>
</tr>
<tr>
<td>mínna si mni ta</td>
<td>'meet (hono. form.)'</td>
</tr>
<tr>
<td>mínna si Et ta</td>
<td>'met (hono.)'</td>
</tr>
<tr>
<td>mínna si ket ta</td>
<td>'will meet (hono.)'</td>
</tr>
<tr>
<td>mínna si n ta</td>
<td>'meet (hono.)'</td>
</tr>
<tr>
<td>mínna t sEmni ta</td>
<td>'met (form.)'</td>
</tr>
<tr>
<td>mínna ket sEmni ta</td>
<td>'will meet (form.)'</td>
</tr>
<tr>
<td>mínna mni ta</td>
<td>'meet (form.)'</td>
</tr>
<tr>
<td>mínna t ta</td>
<td>'met'</td>
</tr>
<tr>
<td>mínna ket ta</td>
<td>'will meet'</td>
</tr>
<tr>
<td>mínna n ta</td>
<td>'meet'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interrogative</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mínna si Et sEmni k'a</td>
<td>'did you meet (hono.form.)?'</td>
</tr>
<tr>
<td>mínna si ket sEmni k'a</td>
<td>'will you meet (hono. form.)?'</td>
</tr>
<tr>
<td>mína si mni k'a</td>
<td>'do you meet (hono.form.)?'</td>
</tr>
<tr>
<td>mína si Et na</td>
<td>'did you meet (hono.)?'</td>
</tr>
<tr>
<td>mína si ket na</td>
<td>'will you meet (hono.)?'</td>
</tr>
<tr>
<td>mína si na k'a</td>
<td>'do you meet (hono.)?'</td>
</tr>
<tr>
<td>mínna t sEmni k'a</td>
<td>'did you meet (form.)?'</td>
</tr>
<tr>
<td>mína ket sEmni k'a</td>
<td>'will you meet (form.)?'</td>
</tr>
<tr>
<td>mínna mni k'a</td>
<td>'do you meet (form.)?'</td>
</tr>
<tr>
<td>mína t na</td>
<td>'did you meet?'</td>
</tr>
<tr>
<td>mína ket na</td>
<td>'will you meet?'</td>
</tr>
<tr>
<td>mína n na</td>
<td>'do you meet?'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Apperceptive</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>mína si Es kuna</td>
<td>'you met (hono.)!'</td>
</tr>
<tr>
<td>mína si ket kuna</td>
<td>'you will meet (hono.)!'</td>
</tr>
<tr>
<td>mína si mEn kuna</td>
<td>'you meet (hono.)!'</td>
</tr>
<tr>
<td>mína t kuna</td>
<td>'you met!'</td>
</tr>
<tr>
<td>mína ket kuna</td>
<td>'you will meet (hono.)!'</td>
</tr>
<tr>
<td>mína nEn kuna</td>
<td>'you meet (hono.)!'</td>
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<td>----------------</td>
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</tr>
<tr>
<td>mánna</td>
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<tr>
<td>mánna</td>
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<tr>
<td>Simultative</td>
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<tr>
<td>mánna si</td>
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<tr>
<td>Projective</td>
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</tr>
<tr>
<td>mánna tolok</td>
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<tr>
<td>Adversative</td>
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<tr>
<td>mánna si Es</td>
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</tr>
<tr>
<td>mánna si ket</td>
<td></td>
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<tr>
<td>mánna si na’</td>
<td></td>
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<tr>
<td>mánna s</td>
<td></td>
</tr>
<tr>
<td>mánna kes</td>
<td></td>
</tr>
<tr>
<td>mánna si na’</td>
<td></td>
</tr>
<tr>
<td>mánna</td>
<td></td>
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</tbody>
</table>

In (4.2) I give an inflectional paradigm of kalÉchi-ta ‘teach’. We see that the second syllable is consistently H-toned.

(4.2)
kalÉchi-ta

<table>
<thead>
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<th></th>
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<th>Declarative</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>kalÉchi si Et</td>
<td>sEmni</td>
<td>ta</td>
<td></td>
<td>‘taught (hono.form.)’</td>
</tr>
<tr>
<td>kalÉchi si ket</td>
<td>sEmni</td>
<td>ta</td>
<td></td>
<td>‘will teach (hono.form.)’</td>
</tr>
<tr>
<td>kalÉchi si mni</td>
<td>ta</td>
<td>‘teach (hono.form.)’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi si Et</td>
<td>ta</td>
<td>‘taught (hono.)’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi si ket</td>
<td>ta</td>
<td>‘will teach (hono.)’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi si n</td>
<td>ta</td>
<td>‘teach (hono.)’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi Et sEmni</td>
<td>ta</td>
<td>‘taught (form.)’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi ket sEmni</td>
<td>ta</td>
<td>‘will teach (form.)’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi mni</td>
<td>ta</td>
<td>‘teach (form.)’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi Et</td>
<td>ta</td>
<td>‘taught’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi ket</td>
<td>ta</td>
<td>‘will teach’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi n</td>
<td>ta</td>
<td>‘teach’</td>
<td></td>
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<thead>
<tr>
<th></th>
<th></th>
<th>Interrogative</th>
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<tbody>
<tr>
<td>kalÉchi si Et</td>
<td>sEmni</td>
<td>k’a</td>
<td></td>
<td>‘did you teach (hono.form.)?’</td>
</tr>
<tr>
<td>kalÉchi si ket</td>
<td>sEmni</td>
<td>k’a</td>
<td></td>
<td>‘will you teach (hono.form.)?’</td>
</tr>
<tr>
<td>kalÉchi si mni</td>
<td>k’a</td>
<td>‘do you teach (hono.form.)?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi si Et</td>
<td>na</td>
<td>‘did you teach(hono.)?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kalÉchi si ket</td>
<td>na</td>
<td>‘will you teach (hono.)?’</td>
<td></td>
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</tr>
<tr>
<td>kalÉchi si</td>
<td>na</td>
<td>‘do you teach?’</td>
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</tr>
<tr>
<td>kalÉchi Et sEmni</td>
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<td>‘did you teach (form.)?’</td>
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<tr>
<td>Verb Stem</td>
<td>Suffix</td>
<td>Derivation</td>
<td>Translation</td>
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<tr>
<td>kalÉchi</td>
<td>ket</td>
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<td>na</td>
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<td>'do you teach?'</td>
<td></td>
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<td>si</td>
<td>Et kuna</td>
<td>'you taught (hono.)!'</td>
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</tr>
<tr>
<td>kalÉchi</td>
<td>si</td>
<td>ket kuna</td>
<td>'you will teach (hono.)!'</td>
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</tr>
<tr>
<td>kalÉchi</td>
<td>si</td>
<td>nEn kuna</td>
<td>'you teach (hono.)!'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>Et</td>
<td>kuna</td>
<td>'you taught!'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>ket</td>
<td>kuna</td>
<td>'you will teach!'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>nEn</td>
<td>kuna</td>
<td>'you teach!'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>kEla</td>
<td></td>
<td>'teach!'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>la</td>
<td></td>
<td>'teach!'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>si</td>
<td>myEnsE</td>
<td>'while teaching (hono.)'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>myEnsE</td>
<td></td>
<td>'while teaching'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>si</td>
<td>tolok</td>
<td>'in order to teach (hono.)'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>tolok</td>
<td></td>
<td>'in order to teach'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>si</td>
<td>Es Ena</td>
<td>'though taught (hono.)'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>si</td>
<td>ke Ena</td>
<td>'though will teach (hono.)'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>si</td>
<td>na Ena</td>
<td>'though teach (hono.)'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>Es</td>
<td>Ena</td>
<td>'though taught'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>kes</td>
<td>Ena</td>
<td>'though will teach'</td>
<td></td>
</tr>
<tr>
<td>kalÉchi</td>
<td>na</td>
<td></td>
<td>'though teach'</td>
<td></td>
</tr>
</tbody>
</table>

One mora in these stems is invariably high-toned, regardless of the suffixes which follow.

We notice a parallelism between Invariant Tone Class I verb stems and Invariant Tone Class I nouns like háneEl ‘sky’: in both cases, one stem mora is invariably high-toned (see Chapter 3.1). Given this similarity, the tone of Invariant Tone Class I verb stems will be given the same analysis as was given to Invariant Tone Class I nouns: the invariably high-toned is assumed to have a pre-linked H. And verbal suffixes, like noun suffixes, are assumed to have no inherent H. The surface tone pattern of Tone Class I verb stems arises directly by combining the underlying representation of the stem and the suffixes, as shown in the derivation...
of mánna-si-Et-ta ‘met (hono.)’ in (4.3).

(4.3) manna

\[
\begin{array}{ccc}
\text{manna-si-Et-ta} & \text{suffixation} \\
\end{array}
\]

Note that suffixes are added all at once on one cycle, not one by one cyclically as are noun suffixes, though it is not apparent at this point that this property is crucial. This difference between verbal suffixes and noun suffixes will be discussed later in this chapter. In (4.4) are listed various Invariant Tone Class I verb stems in the citation form.

(4.4) Tone Class I Verb Stems

\[
\begin{array}{ll}
máña-ta & \text{‘to meet’} \\
kàńchi-ta & \text{‘to take out of water’} \\
káli-ta & \text{‘to veil’} \\
kálí-ta & \text{‘to veil’} \\
tálli-ta & \text{‘to run’} \\
t’áli-ta & \text{‘boils down’} \\
káli-ta & \text{‘to veil’} \\
héngku-ta & \text{‘to rinse’} \\
míchi-ta & \text{‘to become insane’} \\
c’ôli-ta & \text{‘to boil down’} \\
\end{array}
\]

Various inflected forms of some of the verb stems above are given in (4.4).

(4.5) a. tálli-ta ‘to run’

tálli-ket-ta ‘will run’
tálli-n-ta ‘run’
tálli-si-n-ta ‘run (hono.)’
tálli-myEnsE ‘while running’
tálli-na ‘run?’

b. míchi-ta ‘to get mad’
míchi-ket-ta ‘will get mad’
míchi-n-ta ‘get mad’
míchi-si-n-ta ‘get mad (hono.)’
míchi-myEnsE ‘while getting mad’
míchi-na ‘get mad?’

There are no monosyllabic Invariant Tone Class I verb stems. Also it appears there are not any consonant-final verb stems in this tone class.
4.2 Invariant Tone Class II

4.2.1 An Analysis

In invariant Tone Class II stems, the first two moras are invariably high-toned, regardless of the suffixes which follow. An inflectional paradigm of the verb stem *sum-ta* ‘to hide’ is given in (4.6).

(4.6) (a)

<table>
<thead>
<tr>
<th>(4.6)</th>
<th>(a)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>sum-ta</em></td>
<td>Declarative</td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
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<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
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<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Et</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>két</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Et</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>két</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(4.6)</th>
<th>(a)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>sum-ta</em></td>
<td>Interrogative</td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Et</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>két</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Et</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>két</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(4.6)</th>
<th>(a)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>sum-ta</em></td>
<td>Imperative</td>
</tr>
<tr>
<td><em>sum</em></td>
<td></td>
</tr>
<tr>
<td><em>sum</em></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(4.6)</th>
<th>(a)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>sum-ta</em></td>
<td>Apperceptive</td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Esī</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>Ét</em></td>
</tr>
<tr>
<td><em>sum</em></td>
<td><em>két</em></td>
</tr>
</tbody>
</table>
súm nÉn kuna 'hide!'

Simultative
súm Ési myEnsE 'while hiding (hono.)'
súm ÉmyEnsE 'while hiding'

Projective
súm Ési tolok 'in order to hide (hono.)'
súm tólōk 'in order to hide'

Adversative
súm Ési Et Ena 'though hid (hono.)'
súm Ési ket Ena 'though will hide (hono.)'
súm Ési na 'though hiding (hono.)'
súm Ét Ena 'though hid'
súm két Ena 'though will hide'
súm Éna 'though hiding'

In (4.6) are displayed various inflected forms of the disyllabic verb stem t'Éná-ta 'to leave'. We see that the first two moras are consistently H-toned.

(4.7) t'Éná-ta

Declarative

t'Éná si Et sEmni ta 'left (hono.form.)'
t'Éná si ket sEmni ta 'will leave (hono.form.)'
t'Éná si mni ta 'leave (hono.form.)'
t'Éná si Et ta 'left (hono.)'
t'Éná si ket ta 'will leave (hono.)'
t'Éná si n ta 'leave (hono.)'
t'Éná t sEmni ta 'left (form.)'
t'Éná ket sEmni ta 'will leave (form.)'
t'Éná mni ta 'leave (form.)'
t'Éná t ta 'left'
t'Éná ket ta 'will leave'
t'Éná n ta 'leave'

Interrogative

t'Éná si Et sEmni k'a 'left (hono.form.)?'
t'Éná si ket sEmni k'a 'will leave (hono.form.)?'
t'Éná si mni k'a 'leave (hono.form.)?'
t'Éná si Et na 'left (hono.)?'
t'Éná si ket na 'will leave (hono.)?'
t'Éná si na 'leave (hono.)?'
t'Éná t sEmni k'a 'left (form.)?'
t'Éná ket sEmni k'a 'will leave (form.)?'
t'Éná mni k'a 'leave (form.)?'
t'Éná t na 'left?'
t'Éná ket na 'will leave?'
t'Éná na 'leave?'
<table>
<thead>
<tr>
<th>Stem</th>
<th>Imperative</th>
<th>Apperceptive</th>
<th>Simultative</th>
<th>Projective</th>
<th>Adversative</th>
</tr>
</thead>
<tbody>
<tr>
<td>t'Éná</td>
<td>kEla</td>
<td>t'Éná si Et</td>
<td>t'Éná si myEnsE</td>
<td>t'Éná si Es</td>
<td>t'Éná si</td>
</tr>
<tr>
<td>tÉná</td>
<td>la</td>
<td>t'Éná si ket</td>
<td>t'Éná si myEnsE</td>
<td>t'Éná si tolok</td>
<td>t'Éná</td>
</tr>
<tr>
<td>t'Énà</td>
<td>leave!</td>
<td>'ah, he left (hono.)!'</td>
<td>'while leaving (hono.)'</td>
<td>'in order to leave (hono.)'</td>
<td>'though he left (hono.)'</td>
</tr>
<tr>
<td>t'Énà la</td>
<td>leave!</td>
<td>'ah, he will leave (hono.)!'</td>
<td>'while leaving'</td>
<td>'in order to leave'</td>
<td>'though he will leave (hono.)'</td>
</tr>
<tr>
<td>t'Énà si Et kuna</td>
<td>'ah, he left!'</td>
<td>'ah, he leaves (hono.)!'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t'Énà si ket kuna</td>
<td>'ah, he will leave!'</td>
<td>'ah, he leaves!'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t'Énà si nEn kuna</td>
<td>'ah, he leaves (hono.)!'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t'Énà t kuna</td>
<td>'ah, he left!'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t'Énà ket kuna</td>
<td>'ah, he will leave!'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t'Énà nEn kuna</td>
<td>'ah, he leaves!'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In both of these stems, the first two moras, whether they are both in the stem or one is in a stem and the other is in a suffix, are invariably high-toned. Again there is a parallelism between Invariant Tone Class II verb stems and Invariant Tone Class II nouns (e.g. kûrÉm 'cloud'): in both cases, the first two moras are invariably high-toned. Given this parallelism, Invariant Tone Class II verb stems, like Invariant Tone Class II nouns, are assumed to have a floating H underlingly. This floating H associates with the first mora by the AC (3.45). This linked H then spreads to the following mora to the right by Spreading (3.46), as shown in the derivation of súm-Ési-ket-ta 'will hide (hono.)' in (4.7).
4.2.2 Vowel-Final Monosyllabic Stems

Vowel-final monosyllabic stems of Tone Class II exhibit an unexpected tonal alternation: when immediately followed by a vowel-initial suffix, only the first mora is high-toned, rather than the first two as expected of Tone Class II verb stems. This is seen below in the inflectional paradigm of phi-ta 'to bloom'. Forms with a post-stem vowel-initial suffix are marked with V.

\[
\begin{array}{ll}
(4.9) \text{(a)} & \text{so-} \\
\text{Declarative} & \text{'to shoot'} \\
V \text{ só } & \text{ at sEmni } \text{ tā}^6 \quad \text{ 'shot(form.)'} \\
& \text{ só } \text{ két sEmni } \text{ tā} \quad \text{ 'will shoot (form.)'} \\
& \text{ só } \text{ mí } \text{ tā} \quad \text{ 'shoot (form.)'} \\
V \text{ só } & \text{ á } \text{ tā} \quad \text{ 'shot'} \\
& \text{ só } \text{ két } \text{ tā} \quad \text{ 'will shoot'} \\
& \text{ só } \text{ n } \text{ tā} \quad \text{ 'shoot'} \\
\text{Interrogative} & \\
V \text{ só } & \text{ at sEmni } \text{ k'a} \quad \text{ 'shot(form.)?'} \\
& \text{ só } \text{ két sEmni } \text{ k'a} \quad \text{ 'will shoot (form.)?'} \\
& \text{ só } \text{ mí } \text{ k'a} \quad \text{ 'shoot (form.)?'} \\
V \text{ só } & \text{ at } \text{ na} \quad \text{ 'shot?'} \\
& \text{ só } \text{ két } \text{ na} \quad \text{ 'will shoot?'} \\
& \text{ só } \text{ ná} \quad \text{ 'shoot?'} \\
\text{Imperative} & \\
& \text{ só } \text{ kÉla} \quad \text{ 'shoot!' } \\
V \text{ só } & \text{ ala} \quad \text{ 'shoot!' } \\
\text{Apperceptive} & \\
V \text{ só } & \text{ at kuna} \quad \text{ 'ah, (he) shot'} \\
& \text{ só } \text{ két kuna} \quad \text{ 'ah, (he) will shoot!'} \\
\end{array}
\]
sô nÉn kuna ‘ah, (he) shoots’

sô tölōk ‘in order to shoot’

The same tonal alternation is exhibited by the stem chú-tá ‘to dance’: we see that only the first mora is high-toned when the stem is immediately followed by a vowel-initial suffix; otherwise, the first two moras are consistently high-toned.

Again, forms with a post-stem vowel-initial suffix are marked with V.

(4.10) chú-tá ‘to dance’

<table>
<thead>
<tr>
<th></th>
<th>Declarative</th>
<th>Interrogative</th>
</tr>
</thead>
<tbody>
<tr>
<td>chú sì Et sÉmni ta</td>
<td>‘danced (hono. form.)’</td>
<td>chú sì Et sÉmni k’a</td>
</tr>
<tr>
<td>chú sì ket sÉmni ta</td>
<td>‘will dance (hono. forma.)’</td>
<td>chú sì ket sÉmni k’a</td>
</tr>
<tr>
<td>chú sì mni ta</td>
<td>‘dance (hono. form.)’</td>
<td>chú sì mni k’a</td>
</tr>
<tr>
<td>chú sì Et ta</td>
<td>‘danced (hono.)’</td>
<td>chú sì Et na</td>
</tr>
<tr>
<td>chú sì ket ta</td>
<td>‘will dance (hono.)’</td>
<td>chú sì ket na</td>
</tr>
<tr>
<td>chú sì n ta</td>
<td>‘dance (hono.)’</td>
<td>chú sì n na</td>
</tr>
<tr>
<td>V chú Et sÉmni ta</td>
<td>‘danced (form.)’</td>
<td>V chú Et sÉmni k’a</td>
</tr>
<tr>
<td>V chú ket sÉmni ta</td>
<td>‘will dance (form.)’</td>
<td>V chú ket sÉmni k’a</td>
</tr>
<tr>
<td>V chú mni ta</td>
<td>‘dance (form.)’</td>
<td>V chú mni k’a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Imperative</th>
<th>Simultative</th>
</tr>
</thead>
<tbody>
<tr>
<td>chú kÈla</td>
<td>‘dance!’</td>
<td>chú sì myÉnsÈ</td>
</tr>
<tr>
<td>V chú Ela</td>
<td>‘dance!’</td>
<td>chú sì myÉnsÈ</td>
</tr>
</tbody>
</table>
When the stems are immediately followed by a consonant-initial suffix, the first two moras are high-toned as expected of Invariant Tone Class II stems. When the stems are immediately followed by a vowel-initial suffix, however, the first mora alone is high-toned, which is unexpected of Invariant Tone Class II stems. Focusing on the fact that two moras abut when vowel-final stems are immediately followed by a vowel-initial suffix, I claim that the unexpected tone alternation is a result of a rule which fuses two "strictly" adjacent moras into one syllable. Two moras are "strictly" adjacent if the segments associated with the moras occur next to each other.

(4.11) Syllable Fusion

(4.12) Syllable Fusion cannot fuse two moras which are separated by a consonant into a
single syllable, due to the ban on crossing association lines. Thus, for example, the moras of *so* and *kE* in *so-kEla* ‘shoot!’ cannot be fused into a single syllable.

\[(4.13)* \$ \$ \$ \]

\[\text{M} / \text{M} \ M \ M \]

\[\text{l} \text{l} \text{l} \]

\[\text{s} \ o- \ k \ E \ l \ a\]

As a result of the application of Resyllabification, two high-toned moras can occur in the same syllable, as illustrated in the derivation of *so-ala* ‘shoot!’ in (4.13).

\[(4.14) \text{so} \quad \text{UF}\]

\[\text{H}\]

\[\text{so} \quad \text{AC (3.45)}\]

\[\text{l}\]

\[\text{H}\]

\[\text{so-ala} \quad \text{suffixation}\]

\[\text{l}\]

\[\text{H}\]

\[\text{so-ala} \quad \text{Spreading (3.46)}\]

\[\text{l} / \]

\[\text{H}\]

\[\$ \$ \quad \text{Syllable Fusion (4.10)}\]

\[\text{\textbackslash} \text{l}\]

\[\text{so-a la}\]

\[\text{\textbackslash} / \]

\[\text{H}\]

The verb stem *so* ‘to shoot’ is Invariant Tone Class II. Hence, it has a floating H underlyingly. This floating H associates with the first mora by the AC (3.45). This linked H spreads to the following mora to the right by Spreading (3.46). Syllable Fusion applies, syllabifying the first two high-toned moras into one syllable. However, we independently know that two high-toned moras are not allowed in one syllable to occur in this language (see the discussion of contour tones in Chapter 3.4, where it is argued that level-toned long vowels are not allowed in this
language).

Such an ill-formed tonal structure may be resolved either by deleting one mora (Shortening) or by delinking H from one of the tautosyllabic moras (Delinking). The first resolution, as we know, is adopted in the case of long vowels, and the second is used in tautosyllabic high-toned moras which result from Syllable Fusion (4.11).

(4.15) Delinking

\[ \begin{array}{c}
\text{M} \\
\text{M}
\end{array} \]

Delinking (4.15), applying to the output of Syllable Fusion leaves only the first mora high-toned, as illustrated in (4.16).

(4.16) $\begin{array}{c}
\text{H} \\
\text{s o a l a}
\end{array}$ output of Syllable Fusion

\[ \begin{array}{c}
\text{H} \\
\text{s o a l a}
\end{array} \]

Delinking (4.15), thus, interacting with Syllable Fusion (4.11), explains the unexpected tonal alternation of vowel-final stems of Tone Class II.

One of the predictions of Syllable Fusion (4.11) and Delinking (4.15) is that no long vowels can be level-toned. This prediction is, as we know, correct: all long vowels in this dialect are contour-toned, either rising-toned or falling-toned.

In (4.17) are listed some Tone Class II verb stems in the citation form.
(4.17) Tone Class II Verb Stems

sûm-tá 'to hide'  kál-tá 'to grind'
khî-ta 'to draw'  cêlî-ta 'to enjoy'
cêgêp-ta 'to be merry'  t'ū-tá 'play (chess)'
c'í-tá 'to steam'  chi-tá 'to hit'
t'â-tá 'to pick'  k'â-ta 'to peel'
k'ê-tá 'to extinguish'  t'ê-tá 'to float'
phû-tá 'to dip out'  só-tá 'to shoot'
chû-tá 'to dance'  sú-tá 'to cook'
phi-tá 'to bloom'  thâ-tá 'to burn'
sê-tá 'to write'  kî-tá 'to crawl'
k'û-tá 'to dream'  phi-tô 'to bloom'
hî-tá 'to be white'

Some representative inflected forms of some of verb stems in (4.17) are given in (4.18).

(4.18) a. phi-tá 'to bloom'
phi-n-tá 'bloom'
phi-kêla 'bloom!'
phi-nâ 'bloom?'
phi-êla 'bloom!'
phi-êta 'bloomed'
b. k'û-tá 'to dream'
k'û-n-tá 'dream'
k'û-kêla 'dream!'
k'û-nâ 'dream?'
k'û-êla 'dream!'
k'û-êta 'dreamed'
c. t'â-tá 'to pick'
t'â-n-tá 'pick'
t'â-kêla 'pick!'
t'â-nâ 'pick?'
t'â-lâ 'pick!'
t'â-tâ 'picked'

The last two examples in (4.18c) need to be elaborated. In these forms the suffixes which immediately follow the stem are not vowel-initial, due to a process by which a sequence of two identical vowels is simplified. Two moras are high-toned in these forms, since Spreading (3.46) applies after identical vowel simplification has applied.
The output of Spreading in (4.19) is not subject to Syllable Fusion (4.11), since there is a consonant between the two moras. Delinking (4.15), hence, does not apply here.

Interesting gaps are found in the list of Tone Class II verb stems in (4.16). First, consonant-final monosyllabic stems are rare in Tone Class II (e.g. sùm-tá 'to hide', kâl-tá 'to grind'). Moreover, even these two forms have a variant with a long initial vowel (e.g. sùûm-tá, kàâl-tâ). Why does this gap exist? A partial answer to this gap emerges from the observation that most sonorant-final monosyllabic stems have a long initial vowel (this will become clear in the discussion of long-voweled verb stems). Since verb (not nouns) stem-final sonorants trigger vowel lengthening, it would be hard to find short-voweled monosyllabic verb stems which end in a sonorant. This, however, does not explain why it is also hard to find obstruent-final monosyllabic stems in this group. This could be an accidental gap.

Second, vowel-final monosyllabic Tone Class II verb stems begin with either a tensed sound (e.g. k'û-tá 'to peel'), an aspirated sound (e.g. chî-tá 'to hit'), or [s] (e.g. sÉ-tá 'to write') with one exception (e.g kl-tá 'to crawl'); furthermore, none are
sonorant or vowel-initial. It is not the case, however, that verb stems with one of those sound as the onset consonant are all Tone Class II: many such stems are found in Variant Tone Class (e.g. *t'í-ta* ‘to run’, *phí-ta* ‘to spread’). That is, there is no one-to-one correspondence between the onset consonant and tone pattern. It is, therefore, difficult to set up any direct relationship between the quality of the onset consonant and tone of these stems. This issue will be returned to in section 7.

4.3 Variant Tone Class

4.3.1 Tone Pattern

In Invariant Tone Class verb stems one mora is high-toned. The position of H, however, varies according to the suffixes which immediately follow the stem. When the stem is immediately followed by a vowel-initial suffix, the stem-final mora is high-toned. Otherwise, the penultimate mora of the entire verb form is high-toned. In (4.20) is given an inflectional paradigm of the monosyllabic consonant-final variant Tone Class verb stem, *mÉk- ‘to eat’.*

\begin{verbatim}
(4.20) mÉk-ta

<table>
<thead>
<tr>
<th>Declarative</th>
<th>Interrogative</th>
</tr>
</thead>
<tbody>
<tr>
<td>mÉk Esi Et sEmni ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk Esi ket sEmni ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk Esi mni ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk Esi Et ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk Esi ket ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk Esi n ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk Et sEmni ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk ket sEmní ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk sEmní ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk Et ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk két ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
<tr>
<td>mÉk nÉn ta</td>
<td>mÉk Esi Et sEmni k'a</td>
</tr>
</tbody>
</table>

Declarative: ‘to eat’

Interrogative: ‘ate (hono. form.)’

\end{verbatim}
We see that the stem-final mora is high-toned when the stem is immediately followed by a vowel-initial suffix (e.g. mÉk-Esi-mni-ta. ‘eat (hono.form.)’, mÉk-Et-sEmni-ta. ‘ate (form.)’, mÉk-EmyEnsE. ‘while eating’); otherwise, the penultimate mora of the whole form is high-toned (e.g. mEk-két-ta. ‘will eat’, mEk-ket-kúna. ‘ah, will eat!’, mEk-tólók. ‘in order to eat’).
In (4.21) is given the inflectional paradigm of the polysyllabic variant Tone Class stem *p'eât-ta* ‘to take away’.

(4.21) p'eâts-ta | ‘to take away’
---|---

**Declarative**
- p'eâs Esi Et sEmni ta
- p'eâs Esi ket sEmni ta
- p'eâs Esi n ti ta
- p'eâs at sEmni ta
- p'eat ket sEmni ta
- p'eat al sEmni ta
- p'eâs at ta
- p'eat két ta
- p'eat nÉn ta

**Interrogative**
- p'eâs Esi Et sEmni k'a
- p'eâs Esi ket sEmni k'a
- p'eâs Esi n ti k'a
- p'eâs at sEmni k'a
- p'eat ket sEmni k'a
- p'eat al sEmni k'a
- p'eâs at k'a
- p'eat két k'a
- p'eat nÉn k'a

**Imperative**
- p'eat kÉla
- p'eâs ala

**Apperceptive**
- p'eâs Esi Et kuna
- p'eâs Esi ket kuna
- p'eâs Esi nÉn kuna
- p'eâs at kuna
- p'eat ket kúna
- p'eat nÉn kúna

**Simulative**
- p'eâs Esi myEnsE
- p'eâs EmyEnsE

**Connective**
- p'eâs Esi ko
- p'eâs ko
We see that the stem-final mora is high-toned when the stem is immediately followed by a vowel-initial suffix (e.g. *p'eâs-at-ta* ‘took away’, *p'eâs-ala* ‘take away’); otherwise, the penultimate mora of the whole form is high-toned (e.g. *p'eat-két-ta* ‘will take away’, *p'eat-nÉn-ta* ‘take away’).

In (4.22) are listed some Invariant Tone Class verb stems.

(4.22) Tone Class III Verb Stems

<table>
<thead>
<tr>
<th>Stem</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>p'eât-ta</em></td>
<td>‘to take away’</td>
</tr>
<tr>
<td><em>hElE-ta</em></td>
<td>‘to flow’</td>
</tr>
<tr>
<td><em>nolât-ta</em></td>
<td>‘to be yellow’</td>
</tr>
<tr>
<td><em>kapyÊp-ta</em></td>
<td>‘to be light’</td>
</tr>
<tr>
<td><em>malÉ-ta</em></td>
<td>‘to be dry’</td>
</tr>
<tr>
<td><em>kulÉ-ta</em></td>
<td>‘to roll’</td>
</tr>
<tr>
<td><em>mÉk-ta</em></td>
<td>‘to eat’</td>
</tr>
<tr>
<td><em>cúk-ta</em></td>
<td>‘to die’</td>
</tr>
<tr>
<td><em>mák-ta</em></td>
<td>‘to block’</td>
</tr>
<tr>
<td><em>káp-ta</em></td>
<td>‘to pay’</td>
</tr>
<tr>
<td><em>sÉk-ta</em></td>
<td>‘to mix’</td>
</tr>
<tr>
<td><em>cÉk-ta</em></td>
<td>‘to write down’</td>
</tr>
<tr>
<td><em>náp-ta</em></td>
<td>‘to be high’</td>
</tr>
<tr>
<td><em>nÉlp-ta</em></td>
<td>‘to be wide’</td>
</tr>
<tr>
<td><em>tát-ta</em></td>
<td>‘to close’</td>
</tr>
<tr>
<td><em>mút-ta</em></td>
<td>‘to bury’</td>
</tr>
<tr>
<td><em>mÉc-ta</em></td>
<td>‘to stop’</td>
</tr>
<tr>
<td><em>núp-ta</em></td>
<td>‘to lie down’</td>
</tr>
<tr>
<td><em>Ép-ta</em></td>
<td>‘to carry a person on the back’</td>
</tr>
<tr>
<td><em>íp-ta</em></td>
<td>‘to wear’</td>
</tr>
<tr>
<td><em>mÉp-ta</em></td>
<td>‘to be hot’</td>
</tr>
<tr>
<td><em>sik-ta</em></td>
<td>‘to wash’</td>
</tr>
<tr>
<td><em>mÉp-ta</em></td>
<td>‘to be hateful’</td>
</tr>
<tr>
<td><em>kip-ta</em></td>
<td>‘to be deep’</td>
</tr>
<tr>
<td><em>cil-ta</em></td>
<td>‘to be muddy’</td>
</tr>
<tr>
<td><em>pEs-ta</em></td>
<td>‘to undress’</td>
</tr>
<tr>
<td><em>ké-ta</em></td>
<td>‘to fold’</td>
</tr>
<tr>
<td><em>phi-ta</em></td>
<td>‘to spread’</td>
</tr>
<tr>
<td><em>t'í-ta</em></td>
<td>‘to run’</td>
</tr>
<tr>
<td><em>thí-ta</em></td>
<td>‘to splash’</td>
</tr>
<tr>
<td><em>mé-ta</em></td>
<td>‘to tie’</td>
</tr>
<tr>
<td><em>sÉ-ta</em></td>
<td>‘to stop’</td>
</tr>
<tr>
<td><em>cÉ-ta</em></td>
<td>‘to carry things on the back’</td>
</tr>
<tr>
<td><em>k'É-ta</em></td>
<td>‘to break’</td>
</tr>
<tr>
<td><em>f-ta</em></td>
<td>‘to carry on the head’</td>
</tr>
</tbody>
</table>

Various inflected forms of some verb stems in (4.22) are given in (4.23).

(4.23) a. *hElE-ta* ‘to flow’

hElE-két-ta ‘will flow’
Notice the parallelism between the tone pattern of Variant Tone Class verb stems and that of Variant Tone Class nouns like paräm ‘wind’: in both cases, the stem-final mora is high-toned when the stem is immediately followed by a vowel-initial suffix; otherwise, the penultimate mora of the entire form is high-toned.

Various inflected forms of the noun paräm ‘wind’ are given in (4.24) for comparison.

(4.24) paräm
paräm-i ‘wind (nominative)’
paräm-esE ‘only in the wind’
paräm-do ‘wind as well’
param-chÉlEm ‘only like the wind’
param-côcha ‘even the wind’
param-mengkúro ‘like the wind’
Given this similarity, the tone pattern of Variant Tone Class verb stems is
given the same analysis as that for Variant Tone Class nouns: variant verb stems,
like variant noun stems, are inherently toneless. The stem-final H in these stems is
the result of HI (3.10) and Pre-Vocalic Docking (3.22); the penultimate H, on the
other hand, is the result of HI (3.10), SET (3.15), and FL (3.12), as illustrated in
the derivations of mÉk-Esi-n-ta ‘eat (honorific)’ and mEk-nÉn-ta ‘eat’ below in
(4.25).

(4.25) mEk- mEk-
    mEk-Esi-n-ta mEk-nEn-ta  suffixation
    mEk-Esi-n-(ta) mEk-nEn-(ta) SET (3.15)
    mEk-Esi-n-(ta) mEk-nEn-(ta) HI (3.10)    H    H
    mEk-Esi-n-(ta) NA PVD (3.22)  
    | H
    NA mEk-nEn-(ta) FL (3.12)  
    | H
    mÉk-Esi-n-ta mEk-nÉn-ta

A H is inserted by HI (3.10) in these forms, since they are toneless. The inserted
H docks to the stem-final mora in mEk-Esi-n-ta ‘eat (honorific)’ by Docking (3.22),
which docks the H to the stem-final mora, since the stem is immediately followed
by a vowel. When the stem is immediately followed by a consonant as in mEk-
nÉn-ta ‘eat’, the inserted H rather associates by FL (3.12) with the right-most
available mora, which is phonetically the penultimate due to the extratonicity of the
phonetically final mora.

The observation of the list of Variant Tone Class verb stems in (4.21) reveals an interesting asymmetry, namely vowel-final Variant Tone Class verb stems all end in either [i], [e], or [E]: no stems in this class end in [a], [o], or [u]. If we take [E] to be a central vowel, the regularity can be stated in this way: vowel-final Variant Tone Class verb stems all end in a back vowel. We will return to this issue in section 5, where "irregular-tone" verb stems are discussed.

### 4.3.2 Vowel-Final Stems and Evidence for E-Deletion over E-Insertion

The analysis so far predicts a H on the stem-final mora either if the stem is immediately followed by a vowel-initial suffix or if the stem-final mora happens to be the penultimate mora of the entire form. Vowel-final verb stems of the Variant Tone Class, however, appear to contradict this prediction, since in these verb stems a H appears on the stem-final mora which is not the penultimate mora of the entire form, if the stem is immediately followed by certain apparently consonant-initial suffixes such as -si ‘honorific’ and -myEnsE ‘while’. In (4.26) is given an inflectional paradigm of the vowel-final variant verb stem t’i-ta ‘to run. We see that the stem-final mora which is not the penultimate mora of the entire form is high-toned when the stem is immediately followed by certain apparently consonant-initial suffixes. Such forms are marked with "V".

<table>
<thead>
<tr>
<th>(4.26) t’i-ta</th>
<th>Declarative</th>
<th>‘to run’</th>
</tr>
</thead>
<tbody>
<tr>
<td>V t’i si Et sEmni ta</td>
<td>‘ran (hono.form.)’</td>
<td></td>
</tr>
<tr>
<td>V t’i si ket sEmni ta</td>
<td>‘will run (hono.form.)’</td>
<td></td>
</tr>
<tr>
<td>V t’i si mni ta</td>
<td>‘run (hono. form.)’</td>
<td></td>
</tr>
<tr>
<td>V t’i si Et ta</td>
<td>‘ran (hono.)’</td>
<td></td>
</tr>
<tr>
<td>V t’i si ket ta</td>
<td>‘will run (hono.)’</td>
<td></td>
</tr>
</tbody>
</table>
The same pattern is found in the verb *ké-ta* 'to fold'.

\[(4.27)\] ke-

### Declarative

<table>
<thead>
<tr>
<th>V</th>
<th>ke si Et sEmni</th>
<th>ta</th>
<th>'folded (hono. form.)'</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>ke si ket sEmni</td>
<td>ta</td>
<td>'will fold (hono. form.)'</td>
</tr>
<tr>
<td>V</td>
<td>ke si mni</td>
<td>ta</td>
<td>'fold (hono.form.)'</td>
</tr>
<tr>
<td>V</td>
<td>ke si Et</td>
<td>ta</td>
<td>'folded (hono.)'</td>
</tr>
<tr>
<td>V</td>
<td>ke si ket</td>
<td>ta</td>
<td>'will fold (hono.)'</td>
</tr>
<tr>
<td>V</td>
<td>ke si n</td>
<td>ta</td>
<td>'fold (hono.)'</td>
</tr>
<tr>
<td>ke</td>
<td>Et sEmni</td>
<td>ta</td>
<td>'folded (form.)'</td>
</tr>
<tr>
<td>ke</td>
<td>ket sEmni</td>
<td>ta</td>
<td>'will fold (form.)'</td>
</tr>
<tr>
<td>ke</td>
<td>mni</td>
<td>ta</td>
<td>'fold (form.)'</td>
</tr>
<tr>
<td>ke</td>
<td>Et</td>
<td>ta</td>
<td>'folded'</td>
</tr>
<tr>
<td>ke</td>
<td>ket</td>
<td>ta</td>
<td>'will fold'</td>
</tr>
<tr>
<td>Verb</td>
<td>Note</td>
<td>Meaning</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>ké na 'fold'</td>
<td>Retrospective</td>
<td>'I remember he has folded'</td>
<td></td>
</tr>
<tr>
<td>ké Et tÉla</td>
<td>‘I remember he would fold’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ke ket tÉla</td>
<td>‘I remember he was folding’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interrogative</td>
<td>V ké si Et sEmni k’a</td>
<td>‘folded (hono.form.)?’</td>
<td></td>
</tr>
<tr>
<td>V ké si ket sEmni k’a</td>
<td>‘will fold (hono. form.)?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V ké si mni k’a</td>
<td>‘fold (hono. form.)?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V ké si Et na</td>
<td>‘folded (hono.)?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V ké si ket</td>
<td>‘will fold (hono.)?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V ké si</td>
<td>‘fold (hono.)?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ké Et sEmni k’a</td>
<td>‘folded (form.)?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ke ket sEmni k’a</td>
<td>‘will fold (form.)?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ke mni k’a</td>
<td>‘fold (form.)?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ké Et na</td>
<td>‘folded?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ke két</td>
<td>‘will fold?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ké na</td>
<td>‘fold?’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propositive</td>
<td>ké so</td>
<td>‘please fold’</td>
<td></td>
</tr>
<tr>
<td>Imperative</td>
<td>ke kÉla</td>
<td>‘fold!’</td>
<td></td>
</tr>
<tr>
<td>ké Ela</td>
<td>‘fold!’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retrospective</td>
<td>V ké si tÉla</td>
<td>‘I remember he was folding (hono.)’</td>
<td></td>
</tr>
<tr>
<td>ke tÉla</td>
<td>‘I remember he was folding’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apperceptive</td>
<td>ké Et kuna</td>
<td>‘ah, folded!’</td>
<td></td>
</tr>
<tr>
<td>ke ket kúna</td>
<td>‘ah, will fold!’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ke nEn kúna</td>
<td>‘ah, folding!’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simultative</td>
<td>V ké myEnsE</td>
<td>‘while folding’</td>
<td></td>
</tr>
<tr>
<td>Connective</td>
<td>ké ko</td>
<td>‘fold and’</td>
<td></td>
</tr>
<tr>
<td>Projective</td>
<td>ke tôlok</td>
<td>‘in order to fold’</td>
<td></td>
</tr>
<tr>
<td>Adversative</td>
<td>ké Es Ena</td>
<td>‘though folded’</td>
<td></td>
</tr>
<tr>
<td>ke kes Ńa</td>
<td>‘though will fold’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ké na</td>
<td>‘though fold’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the stem is followed by -si ‘honorific’, and -myEnsE ‘while’, the stem-final mora is high-toned. In short, these suffixes act as if they are vowel-initial,
since -si ‘honorific’ and -myEnsE ‘while’ assign a H to the stem-final mora like vowel-initial suffixes. This behavior is not so surprising, considering that these suffixes have a E-initial variant after a consonant-final stem. So, for instance, -si ‘honorific’ has the vowel-initial variant -Esi after a consonant (e.g. mÉk-Esi-n-ta ‘eat (honorific)’, t'l-si-n-ta ‘run (honorific)’); -myEnsE ‘while’ has the vowel-initial variant -EmyEnsE after a consonant (e.g. mÉk-EmyEnsE ‘while eating’, t'l-myEnsE ‘while folding’). (Also see the data in (4.20).) If these suffixes have the initial vowel E underlyingly, and we delete this vowel later in the derivation, then the reason for their behaving like a vowel-intial suffix is obvious. All that is required is that the relevant tone rule, Pre-Vocalic Docking (3.22), applies prior to deletion of the vowel E. (This rule ordering follows from the Elsewhere Condition, which says that a more specific rule takes precedence over a more general rule. Compare Pre-Vocalic Rule and E-deletion. We see that the former is more specific than the latter.) In (4.28) is given the E-Deletion rule, which deletes the suffix vowel E after a stem-final vowel.

(4.28) E-Deletion

\[ E \rightarrow \emptyset / V \]

The form t'í-si-n-ta ‘run (honorific)’ thus is derived as in (4.28).

(4.29) t'í-

<table>
<thead>
<tr>
<th>Form</th>
<th>Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>t'í-Esi-n-ta</td>
<td>suffixation</td>
</tr>
<tr>
<td>t'í-Esi-n-(ta)</td>
<td>SET (3.15)</td>
</tr>
<tr>
<td>t'í-Esi-n-(ta)</td>
<td>HI (3.10)</td>
</tr>
</tbody>
</table>

H
HI (3.10) inserts a H in the form, since it is toneless. The inserted H docks to the stem-final mora by PVD, since the stem is immediately followed by a vowel. After PVD, E-Deletion deletes the vowel [E] of the suffix -Esi 'honorific'.

One might wonder why the suffix-initial [E] is not deleted in the forms like t'l-Et-ta 'ran'. It is because the initial vowel of the past suffix is the one which is subject to Vowel Harmony, whereas the initial vowel of -Esi 'honorific' and -EmyEnsE 'while' is not. As pointed out earlier, the past suffix is subject to Vowel Harmony whereas the honorific suffix -Esi and the suffix -EmyEnsE 'while' are not, since underlyingly the past suffix is /-at/. When the deletion rule applies, the initial vowel of the past suffix is [a] because Vowel Harmony applies after Deletion (4.28). This is why the initial vowel of the past suffix is not deleted even after a vowel.

The tone alternation of vowel-final Variant Tone Class stems are thus given a systematic account under the assumption that suffixes which alternate between the initial E and zero have the initial E underlyingly. In contrast, if these suffixes were assumed to lack the initial vowel E underlyingly, and if we insert the vowel later, then the tonal alternation of Variant Tone Class verb stems cannot be given a systematic account. Under the insertion assumption, we have to explain why the
suffixes alternating between zero and initial E behave differently from non-alternating consonant-initial suffixes with respect to tone. So, for instance, why does the stem final mora have a H in *t'i-myEnsE* 'while running' and *t'i-si-tolok* 'in order to run (honourific)', but not in *t'i-tolok* 'in order to run' and *t'i-két-ta* 'will run'. There is no solution to this problem under the insertion assumption.

The issue of whether the alternation between the initial E and zero has to be accounted for in terms of E-deletion or E-insertion has been the subject of much literature in Korean phonology. In spite of the fact that the issue is well discussed, there is no consensus on this issue yet. Here, I have provided evidence in support of E-deletion over E-insertion from tone alternations of Variant Tone Class verb stems by showing that E-deletion allows a systematic account of the tone alternation of these verb stems.

4.4 Previous Accounts of Tone of Verb Forms

Most previous analyses of tone of Kyunsang Korean focus on tone in nouns, neglecting verb forms. Kim (1989), as far as I know, is the only work where tone of verb forms is considered, even though briefly.

In Kim (1989), the tone of verb forms is given the same analysis as for nouns. As in the analysis of nouns, every verb stem is assigned an underlying H, linked or floating. So, Tone Class I verb stems (e.g. *mánn-á-ta* ‘to meet’, *kalÉchi-ta* ‘to teach’) have a pre-linked H on the mora which surfaces as high-toned. Tone Class II verb stems (e.g. *t'Éná-ta* ‘to leave’, *súm-tá* ‘to hide’, *phí-tá* ‘to bloom’) have a floating H, which ends up associating with the first two moras (see Chapter
3.1.1.5). Variant Tone Class verb stems (e.g. *mÉk-ta* ‘to fold’, *hElÉ-ta* ‘to flow’) have a pre-linked H on the final mora of the stems. Suffixes are assigned a H, prelinked or floating, or no H underlyingly as seen in (4.30).

(4.30) Underlying Representation of Verbal Suffixes (p. 67, Kim)

<table>
<thead>
<tr>
<th>Indicative</th>
<th>connegative</th>
<th>adversative</th>
</tr>
</thead>
<tbody>
<tr>
<td>/-ta/</td>
<td>/-ko/</td>
<td>/-Ena/</td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infinitive</th>
<th>Efffective</th>
<th>Retrospective</th>
</tr>
</thead>
<tbody>
<tr>
<td>/-e/</td>
<td>/-Eni/</td>
<td>/tEla/</td>
</tr>
<tr>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perfective</th>
<th>Prospective</th>
<th>Past</th>
</tr>
</thead>
<tbody>
<tr>
<td>/-En/</td>
<td>/El/</td>
<td>/Es/</td>
</tr>
<tr>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Future</th>
<th>Present</th>
<th>Formal</th>
</tr>
</thead>
<tbody>
<tr>
<td>/-kes/</td>
<td>/nEn/</td>
<td>/sEmni/</td>
</tr>
<tr>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>/tolok/</th>
<th>/EmyEnsE/</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

The form *pet-két-ta* ‘will take off clothes’, for instance, would be derived in the following way. The stem *pEs-* ‘to undress’ has a prelinked H on the stem-final mora. The suffix *-kes* ‘future’ has a prelinked H, and the suffix *-ta* ‘indicative’ is toneless. The underlying representation of this form thus would look like the following:

(4.31) /pEs-kes-ta/  
|     |     |
| H   |     |

Prelinked H Deletion (3.30), which is repeated in (4.32), deletes a H linked to the stem-final mora if there is another linked H following it.
Pre-linked H-Deletion (p.58 Kim 1989)

\[ H \rightarrow 0 / \# (N) N + (N) N (N) \# \]

where N, which is the tone bearing unit, represents the syllable nucleus.

This rule would delete the H of the stem *pEs-* ‘to undress’ in */pEs-kes-ta/*, since it is followed by a linked H of the suffix -kes ‘future’.

(4.33) /pEs-kes-ta/

\[ pEs-kes-ta \]

The form *pÉs-Ena* ‘though undressing’, on the other hand, would be derived by H-deletion (3.33), which is repeated in (4.34).

(4.34) H ----> Θ / H ______

This rule deletes a H when there is another H preceding it, as seen in (4.34).

(4.35) /pEs-Ena/

\[ pEs-Ena \]

Kim’s analysis has several shortcomings which prevent a successful account of tone alternations in verb forms. One of them is that it generally deals with verb forms with a maximum of two suffixes (e.g. *pEt-nÉn-ta* ‘undress’, *pÉs-Et-ta* ‘undressed’): verb forms longer than this are rarely examined. So, for instance, verb forms like *pEs-ket-sEmnt-ta* ‘will undress (formal)’, and *pÉs-Esi-n-ta* ‘undress (honorific)’ do not get much attention. This limited coverage of data does not force
consideration of the full range of data, hence the rule does not capture correct generalizations about tone of verb forms. This leads to wrong and unrevealing analyses.

Let us consider how forms with more than two affixes would be accounted for within Kim’s analysis. Let us take pÉt-ket-sEmni-ta ‘will undress (formal)’ as an example. The underlying form would be

\[(4.36) /pÈs-ket-sEmni-ta/ \]

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

This underlying form satisfies the structural description of Pre-linked H deletion (4.32) in its maximal expansion.\(^{17}\)

\[(4.37) \# pÈs-ket-sEmni-ta \# UR \]

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

\[
\begin{array}{|c|c|c|c|c|c|}
\hline
 & N & N + N & N & N & # \\
\hline
\end{array}
\]

The rule (4.32) thus would delete the prelinked H of -ket, deriving pÉt-ket-sEmni-ta. To this derived form the rule (4.32) cannot apply again, since the structural description of the rule is not satisfied in that there are more than one moras between the two H’s. H-deletion then would apply to this form, delete the second H. The result is the incorrect form *pÉt-ket-sEmni-ta ‘will undress’.

\[(4.38) pÈt-ket-sEmni-ta \quad \text{output of Prelinked-H Deletion} \]

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

\[
\begin{array}{|c|}
\hline
 pÈt-ket-sEmni-ta \quad \text{H-Deletion (4.34)} \\
\hline
\end{array}
\]

\[
\begin{array}{|c|}
\hline
 \text{*pÉt-ket-sEmni-ta} \\
\hline
\end{array}
\]
If we modify Prelinked H-deletion (4.32) in such a way that no word boundaries appear on both ends, then the form in question, namely *pEt-ket-sEmni-ta* ‘will undress’ could be derived. With the rule modified, all that seems to be required to get the surface form is to assume that the modified Prelinked-H deletion rule applies iteratively left to right.

(4.39) Modified Prelinked-H Deletion

\[
H \rightarrow 0 / (N) N + (N) N (N) \\
| \quad | \\
\_ \quad H
\]

At the first application of the rule, the H of the stem *pEs-* would be deleted. At the second application, the H of the suffix -*kes* would be deleted as seen in (4.40)."\n
(4.40) /pEs-ket-sEmni-ta/  
\[
| \quad | \quad | \\
H \quad H \quad H
\]

\[
\text{pEs-ket-sEmni-ta}  \\
| \quad | \\
H \quad H
\]

\[
\text{pEs-ket-sEmni-ta}  \\
| \\
H
\]

(4.41) /pEs-kes-Ena/  
\[
| \quad | \quad | \\
H \quad H \quad H
\]

Even such a modification cannot solve all the problems: there are still some surface forms which cannot be derived. Consider forms such as *pEt-kes-Éna* ‘though I will undress’. This form would have the following underlying representation in Kim’s analysis.
Prelinked H deletion, either in the original version or in the modified version, would delete the H of the stem *pEs- because it is on the stem-final and followed by another linked H. H-deletion (4.33) then would delete the floating H of Ena, deriving an incorrect form *pEt-kés-Ena, rather than the correct form pEt-kEs-Èna ‘though (I) will undress’.

(4.42) /pEs-kes-Ena/ UF
   | H H H

pEs-kes-Ena Prelinked H deletion (4.31) or (4.38)
   | H H

pEs-kes-Ena H-deletion (4.34)
   | H

*pEt-kés-Ena

As far as I can see, there is no way to derive the correct form within Kim’s analysis.

Further problems with this analysis are found in the underlying representations of suffixes. See the underlying representations of verbal suffixes in (4.30). Kim assumes that the suffixes -ta ‘indicative’ and -ko ‘connective’ are toneless, while all vowel-initial suffixes like -Ena ‘adversative’ and -Eni ‘effective’ have a floating H. The choice between no underlying H and a floating H, however, turns out to be arbitrary. A floating H for -ta ‘indicative’ and -ko ‘connective’, and no underlying H for vowel-initial suffixes would also derive correct surface forms, as shown in the derivations of pÉt-ko ‘undress and’ and pÉs-Ena ‘though undress’ in (4.43) and (4.44) respectively. In (4.43a) the suffix -ko ‘connective’ has no
underlying H, while in (4.43b) it has a floating H.

\[(4.43) \quad (a) \text{pEs-ko} \quad (b) \text{pEs-ko} \quad \text{UF} \]
\[
\begin{align*}
\text{H} & \quad \text{H} \\
\text{H} & \quad \text{H} \\
\text{NA} & \quad \text{pEs-ko} \\
\text{H} & \quad \text{H}
\end{align*}
\]

\[\text{pEs-ko} \quad \text{pEs-ko} \]

We see that the two different underlying representations for the suffix -ko 'connective' derive exactly the same surface form.\(^{19}\)

The same problem arises for the suffix -Ena 'adversative'.

\[(4.44) \quad (a) \text{pEs-Ena} \quad (b) \text{pEs-Ena} \quad \text{UF} \]
\[
\begin{align*}
\text{H} & \quad \text{H} \\
\text{H} & \quad \text{H} \\
\text{pEs-Ena} & \quad \text{NA} \\
\text{H} & \quad \text{H}
\end{align*}
\]

\[\text{pEs-Ena} \quad \text{pEs-Ena} \]

In (4.44a) the suffix -Ena 'adversative' has a floating H as in Kim's analysis. In (4.44b) the suffix has no H. We see that different underlying representations for the suffix derive exactly the same surface form. This shows that there is an indeterminacy in the choice between a floating H and no underlying H.

A further problem in Kim's analysis is that the underlying representations of suffixes given in this analysis have the same inexplicable asymmetries as we found in the underlying representations of noun suffixes. First, all vowel-initial suffixes have a floating H (e.g. -Eni 'effective', -Ena 'adversative', -Es 'past'). Second, consonant-initial suffixes, if they are polysyllabic or are fortuitously always
followed by other suffixes (cannot be the final suffix in verb forms), have a prelinked H. Moreover, it happens that the H is always prelinked on the penultimate mora of a suffix, if the suffix is the final suffix of verb forms. Otherwise, the H is linked on the final mora. So, for example, sEmni ‘formal’, -nEn ‘present’, and -kes ‘future’, which are always followed by the indicative suffix -ta in verb forms, have a H on the final mora. In contrast, -tEla ‘retrospective’, which occurs finally in verb forms, has a prelinked H on the penultimate mora.

These asymmetries are unexplained in Kim’s analysis. There is no reason why vowel-initial suffixes cannot have a prelinked H; there is also no reason why a prelinked H has to occur on the penultimate mora but only in suffixes which cannot be followed by any other suffixes (that is, the final suffix in verb forms). As we have seen, no such asymmetries are created in the analysis proposed here.

4.5 External Evidence For the Present Analysis

One of the crucial observations made in the present analysis about the alternation of Variant Tone Class verb stems is that a H appears on the stem-final mora when the stem is immediately followed by a vowel-initial suffix as in mÉk-Es-Emni-ta ‘ate (formal)’. This observation, as we know, also holds for Variant Tone Class noun stems: a H appears on the stem-final mora when the stem is immediately followed by a vowel-initial suffix as in parám-esEo ‘in the wind, parám-Elo ‘with the wind’. There is evidence for the psychological reality of this process in children’s speech.
One of the characteristics of children’s speech, as I observe it, is that the vowel E is added to every consonant-initial suffix when it is preceded by a consonant-final stem, even when the suffix does not have the vowel-initial variant in adult speech. So, for example, children say mÉk-EnEn-ta ‘eat’ and mÉk-Eket-ta ‘will eat’ instead of the adult forms mEk-nÉn-ta ‘eat’ and mEk-két-ta, respectively. What is interesting about the children’s speech is the position of H. In the children’s speech the stem-final mora is high-toned when it is followed by a pseudo epenthetic vowel [E] (e.g. mÉk-EnEn-ta ‘eat’, mÉk-Eket-ta ‘will eat’), while in adults’ speech the corresponding forms have the penultimate mora high-toned (e.g. mEk-nÉn-ta ‘eat’, mEk-két-ta ‘will eat’).

This phenomenon of stem-final H in children’s speech could be evidence for the process by which a stem-final mora gets a H when the stem is immediately followed by a vowel. But, it might also be possible to reanalyse this phenomenon of children’s speech in such a way that all Variant Tone Class verb stems get stem-final H in children’s speech. As a way to get more convincing evidence for the process, I tested some adult native speakers of North Kyungsang Korean with pseudo-[E] epenthized forms. Interestingly, they put a H on the stem-final mora in these forms, as was formed in children’s speech.

How could Kim’s analysis account for the tone of the children’s forms and the tested adult forms? Within her analysis, there is no other way but to assume that the underlying tone of suffixes changes as a result of adding an initial vowel. So, for example, the suffix -nEn ‘present’, which has a linked H, loses its linked H and comes to have a floating H when the initial vowel [E] is added, -EnEn. mÉk-
EnEn-ta ‘eat’, thus, would be derived as in (4.45a) in Kim’s analysis. For comparison, the derivation of the corresponding adult form mEk-nÉn-ta ‘eat’ is given in (4.45b).

\[
\begin{align*}
(4.45) \quad & a. m\text{Ek-EnEn-ta} & b. m\text{Ek-nEn-ta} & \text{UR} \\
& H & H & H & H \\
& NA & m\text{Ek-nEn-ta} & \text{PHD (4.32)} \\
& H & H \\
& m\text{Ek-EnEn-ta} & NA & \text{H-deletion (4.34)} \\
& H & H \\
\end{align*}
\]

The assumption that underlying tone changes due to the addition of an initial vowel is nothing but an ad hoc stipulation. This requires an explanation why the addition of an initial vowel affect underlying tone, that is, the relationship between an initial vowel and underlying tone.

In contrast, in the analysis proposed here, the tone of the children’s forms (pseudo-[E] forms) is an automatic result of a phonological rule, namely Pre-vocalic Docking (3.22), which links a H on the stem-final mora when the stem (Variant Tone Class verb stem) is immediately followed by a vowel. So, since the stem is immediately followed by a vowel in the form mÉk-EnEn-ta ‘eat’, a H appears on the stem-final mora. This fact about the children’s speech and the tested adult forms thus is evidence for the psychological reality of the regularity of placement of the H on the verb stems in these cases.
4.6 "Irregular-Tone" Verb Stems

4.6.1 The Tone Pattern

There is a group of verb stems which cannot be assigned to any of the three tone classes introduced above. These stems have the first two moras high toned, which is the pattern of Invariant Tone Class II verb stems, when they are immediately followed by certain suffixes (e.g. -si ‘honorific’, -nEn ‘present’, -mni ‘formal’, -na ‘interrogative’, -kEla ‘imperative’, and -so ‘propositive’). Otherwise, one mora is high-toned, and the position of H varies according to the suffix which immediately follows a stem. When a stem is immediately followed by a vowel-initial suffix (both underlyingly vowel-initial suffixes and surface vowel-initial suffixes), the stem-final mora is high-toned; otherwise, the penultimate of the entire form is high-toned, which is the pattern of Variant Tone Class verb stems. In the examples in (4.46), the first two moras are high-toned as if they are Invariant Tone Class II verb stems.

(4.46) cú-ta 'to give'
cú sī Es sEmni ta 'gave (hono.form.)'
cú sī ket sEmni ta 'will give (hono.form.)'
cú sī mni ta 'give (hono.form.)'
cú sī ket ta 'will give (hono.)'
cú sī n ta 'give (hono.)'
cú sī na 'though give (hono.)'
cú sī ko 'give (hono.) and'
cú mni ta 'give (formal)'
cú n tá 'give'
cú ná 'give?'
cú kEla 'give!'
cú só 'Please give'

In contrast, in the examples in (4.47) only one mora is high-toned and the position of H is predictable: when the stem is immediately followed by a vowel-
initial suffix, the stem-final mora is high-toned; otherwise, the penultimate of the entire form is high-toned as in Variant Tone Class stems.

\[(4.47) \text{cú Et sEmni ta} \quad \text{\textquoteleft gave (form.)\textquoteright} \]
\[(4.47) \text{cu ket sEmní ta} \quad \text{\textquoteleft will give (form.)\textquoteright} \]
\[(4.47) \text{cú Et ta} \quad \text{\textquoteleft gave\textquoteright} \]
\[(4.47) \text{cu két na} \quad \text{\textquoteleft will give ?\textquoteright} \]
\[(4.47) \text{cú Et na} \quad \text{\textquoteleft gave?\textquoteright} \]
\[(4.47) \text{cu Ela} \quad \text{\textquoteleft give!\textquoteright} \]
\[(4.47) \text{cú myEnsE} \quad \text{\textquoteleft while giving\textquoteright} \]
\[(4.47) \text{cú ko} \quad \text{\textquoteleft give and\textquoteright} \]
\[(4.47) \text{cu tólok} \quad \text{\textquoteleft in order to give\textquoteright} \]
\[(4.47) \text{cú na} \quad \text{\textquoteleft though give\textquoteright} \]

The verb stems listed in (4.48) exhibit exactly the same tone alternations as the verb stem \text{cú-ta} \text{"to give"}.

\[(4.48) \text{\"Irregular-Tone\" Verb Stems} \]
\[(4.48) \text{cú-ta \text{"give"} cá-ta \text{"to sleep"} } \]
\[(4.48) \text{nú-ta \text{"to defacate" pó-ta \text{"to see"} } \]
\[(4.48) \text{tú-ta \text{"place"} ká-ta \text{"to go"} } \]
\[(4.48) \text{há-ta \text{"to do"} ná-ta \text{"to be born"} } \]
\[(4.48) \text{ó-ta \text{"to come"} } \]

To show that, some representative inflected forms of these verb stems are given in (4.49).

\[(4.49) \text{a. cá-ta \quad \text{"to sleep"} } \]
\[(4.49) \text{Invariant Tone Class II Pattern} \]
\[(4.49) \text{cú-sí-n-ta \quad \text{"give (hono.)"} } \]
\[(4.49) \text{cú-mnî-ta \quad \text{"give (formal)"} } \]
\[(4.49) \text{cú-kÉla \quad \text{"give!"} } \]
\[(4.49) \text{Variant Tone Class Pattern} \]
\[(4.49) \text{cú-Ela \quad \text{"give!"} } \]
\[(4.49) \text{cu-ket-sEmnî-ta \quad \text{"will give (formal)"} } \]
\[(4.49) \text{cú-ko \quad \text{"give and\textquoteright} } \]

\[(4.49) \text{b. pó-ta \quad \text{"to see"} } \]
\[(4.49) \text{Invariant Tone Class II Pattern} \]
\[(4.49) \text{pó-sí-n-ta \quad \text{"see (hono.)"} } \]
\[(4.49) \text{pó-mnî-ta \quad \text{"see (formal)"} } \]
\[(4.49) \text{pó-kÉla \quad \text{"see!"} } \]
Variant Tone Class Pattern

pó-ala 'see!'
po-ket-sEmnī-ta 'will see (formal)'
pó-ko 'see and'

c. há-ta 'to do'

Invariant Tone Class II Pattern

há-sī-n-ta 'do (hono.)'
há-mnī-ta 'do (formal)'
há-kēla 'do!'

Variant Tone Class Pattern

há-la 'do!'
ha-ket-sEmnī-ta 'will do (formal)'
há-ko 'do and'

There are no poly-syllabic stems in this group. More interestingly, stems in this group all end in the back vowel [a], [o] or [u]. Furthermore, no stem in this group begins with an aspirated sound (except [h]), tensed sound or the consonant [s]. These regularities become interesting considering the regularities found in Variant Tone Class stems and Invariant Tone Class II verb stems. Recall that Variant Tone Class verb stems never end in the vowel [a], [o], and [u] (see Chapter 4.3). Thus, "irregular-tone" verb stems are in a complementary relationship with Variant Tone Class verb stems regarding the quality of the final vowels. Also recall that Invariant Tone Class II monosyllabic verb stems always begin with an aspirated sound, a tensed sound, or [s] (see Chapter 4.2.2). Thus, "irregular-tone" verb stems is in a complementary relationship with Invariant Tone Class II verb stems regarding the initial sounds (except [h], which is found in both "irregular" stems and Invariant Tone Class II stems.)

Could these complementarities between tone classes be just an accident? Is there a reason for them? A possible explanation for the complementarities will be considered below.
We now return to the tone pattern of irregular verb stems, and consider possible analyses of it. The first thing to do is to determine the underlying tone of these stems. We clearly see that postulating either a floating H or no underlying H will fail. Assuming no underlying H would predict that every inflected form has one high-toned mora. Then, forms like \textit{pó-sl-n-ta} ‘see (hono.)’ and \textit{pó-mnl-ta} ‘see (formal)’, that is forms where two moras are high-toned, would be problems. Assuming a floating H, on the other hand, would predict that the first two moras are high-toned unless the stem is immediately followed by a vowel (due to Syllable Fusion (4.11) and Delinking (4.15); see Chapter 4.2.2). Then, forms like \textit{po-tólôk} ‘in order to see’, \textit{po-két-ta} ‘will see’, that is forms where one mora is high-toned even when the stem is followed by a consonant-initial suffix, would be problematic.

How could we solve this problem? There are two different ways to tackle this problem: one is in terms of rule (“rule approach”) and the other is in terms of underlying form (“suppletion approach”).

In the "suppletion approach" we assume that these "irregular-tone" verb stems have double underlying representations: one with a floating H like Tone Class II, and the other with no H like the invariant Tone Class. The choice between these two underlying forms is determined by the suffix which immediately follows the stem. Thus, suffixes such as \textit{-sí} ‘honorific’ and \textit{-mni} ‘formal’ opt for the one with a floating H; suffixes such as \textit{-ket} ‘future’ and \textit{-ko} ‘connective’ opt for the one with no H. One of the shortcomings of this approach is that it fails to capture the generalization that the stems which have double underlying representations all end in [u], [o], or [a], and begin with a plain consonant (not tensed, not aspirated,
nor [s]). In this approach, the stems which have double underlying representations are an arbitrary group.

In the "rule approach", however, "irregular-tone" verb stems are assumed to have a floating H like Invariant Tone Class II stems. Then, why do they not exhibit the same tone pattern as other Invariant Tone Class II stems? In other words, why do they not have two high-toned moras as other Invariant Tone Class II verb stems do? Why do certain forms have a single high-toned mora? As we know, not all single high-toned forms are problems. Those where the stem is immediately followed by a vowel-initial suffix, such as pōat-ta 'saw' and pō-ala 'see!', are expected to have only the first mora high-toned with a floating H, due to Syllable Fusion (4.11) and Delinking (4.15) (see Chapter 4.2.2). Consequently, under the floating H assumption, the problem narrows down to forms such as po-ket-sEmni-ta 'will see (formal)', po-két-ta 'will see', pó-myEnsE 'while seeing', pó-ko 'see and', po-t6lok 'in order to see', and pó-na 'though see'.

In order to derive these forms from a floating H, I assume that these forms are exceptions to the AC (3.45). So, the AC would not link a floating H to the initial mora in these forms. The floating H of these forms then will be linked by the next available association rule, which is Final Linking (3.12). The association Convention would associate the floating H to the right-most available mora, which is phonetically the penultimate, due to the extratonality of the phonetically final mora (by SET (3.15)). Thus, the form cu-ket-sEmni-ta 'will give' would be derived like the following:
160

(4.50) cu-ket-sEmni-ta
    H
NA
    AC (3.45)
NA
    Spreading (3.46)
cu-ket-sEmni-(ta)
    H
    SET (3.15)
cu-ket-sEmni-(ta)
    FL (3.12)
    H

cu-ket-sEmní-ta

Now, the only remaining problem is how to incorporate into the grammar the exceptional property of these forms regarding to the AC (3.45). Making use of a diacritic mark for exceptionality might appear to be promising. The difficulty with this approach is that we cannot mark "irregular-tone" stems [-AC], since "irregular-tone" stems undergo the AC in some environments (e.g. pō-sī-n-ta 'see (honorific)'). Nor we can mark suffixes such as -ket 'future' and -tolok 'projective' as exception to the AC, since these suffixes trigger exceptional behavior with respect to the AC only when they immediately follow the stem (e.g. pō-sī-ket-ta 'see (honor.)' vs. po-kēt-ta 'will see'). The whole form cannot be marked as exception in the lexicon, since they are not entries of the lexicon.

An alternative is to modify the AC, so that this rule does not apply to "irregular" verb stems if the suffix which immediately follows the stem is -ket 'future', -mni 'formal', -ko 'connective' -myEnsE 'simultative' -tolok 'projective', or -na 'adversative'. However, the Association Conventions is universal: they are not allowed to be modified for an individual language.25
Rather than modifying the AC (3.45), I propose to add a rule which deletes a H from the initial mora when the stem is mono-syllabic, and begins with a plain consonant, and is followed by the suffixes such as -ket 'future', -mni 'formal', -ko 'connective' -myEnsE 'simultative' -tolok 'projective', or -na 'adversative'.

(4.51) Delinking²⁴

\[
\begin{array}{c}
\begin{array}{c}
\$ \\
[M]_{\text{stem}} + \\
\times + \\
H
\end{array}
\begin{array}{c}
\text{adversative} \\
\text{projective} \\
\text{future} \\
\text{formal} \\
\text{connective} \\
\text{simultative}
\end{array}
\end{array}
\]

where x is a plain consonant (not tensed, nor aspirated, nor [s]). One of the advantages of postulating this rule is that it at least captures the generalization that "irregular-tone" verb stems are not an arbitrary group: they share certain phonological properties.

The form cu-ket-stEmni-ta 'will give' therefore will be derived like the following:

(4.52) cu-ket-stEmni-ta

\[
\begin{array}{c}
\begin{array}{c}
\text{H} \\
\text{H} \\
\text{H} \\
\text{H}
\end{array}
\begin{array}{c}
\text{UR} \\
\text{AC (3.45)} \\
\text{Delinking (4.51)} \\
\text{Spreading (3.46)} \\
\text{SET (3.15)} \\
\text{FL (3.12)}
\end{array}
\end{array}
\]
The function of delinking is to undo what the AC does to "irregular" verb stems which are followed by certain suffixes. As seen in the derivation in (4.51) above, Delinking (4.50) must apply right after the AC (3.45). If it applied after Spreading (3.46), the correct forms cannot be derived, as illustrated in (4.52).

\[(4.53) \ \text{cu-ket-sEmni-ta} \quad \text{UR} \]
\[\text{cu-ket-sEmni-ta} \quad \text{AC (3.45)} \]
\[\quad \text{t} \quad \text{H} \]
\[\text{cu-ket-sEmni-ta} \quad \text{Spreading (3.46)} \]
\[\quad \text{t} / \quad \text{H} \]
\[\text{cu-ket-semni-ta} \quad \text{Delinking (4.51)} \]
\[\quad / \quad \text{H} \]
\[*\text{cu-két-sEmni-ta} \]

Now, let us think about the implications, if any, of the complementarities between tonal classes. First, consider the complementarity between "irregular" verb stems and Variant Tone Class verb stems. The fact that "irregular-tone" verb stems (which have a floating H in the proposed analysis) all end in [a], [o], or [u] and vowel-final Variant Tone Class verb stems (no underlying H) all end in [i], [e], or [E] could be taken as an indication that the vowels [a], [o], and [u] are more reluctant to lose lexical tone than [i], [e], [E] which have already lost their underlying tone and been shifted to Variant Tone Class.

We turn to the complementarity between Tone Class II monosyllabic vowel-final stems and "irregular" verb stems regarding the initial sound. The fact that there are no "irregular-tone" stems which begin with a tensed consonant, an
aspirated consonant, or [s] could be related to the observation that in Chon Nam
Korean a syllable with one of those sounds as the onset is high-toned phrase-
initially (Jun 1989). Since these sounds (aspirated sounds, tensed sound, and [s])
have a tendency to make the following vowel high-toned, no stem which begins
with one of these sounds is subject to Delinking (4.51).

4.7 Level of Verbal Suffixation

4.7.1 Noncyclicity of Verbal Suffixation

As one might have noticed in all of the derivations above, verbal suffixes
attach to a verb stem all at once on a single cycle. In this respect, verbal suffixes
are different from noun suffixes, which have been argued to attach one by one
cyclically (see Chapter 3.5).

If verbal suffixes attached one by one cyclically, as is the case with noun
suffixes, incorrect forms would be derived. To illustrate, let us see what would be
the result of a cyclic attachment of verbal suffixes in the form mEk-ket-sEmni-ta
'will eat (formal)'. The stem mEk-, which is Variant Tone Class, has no underlying
tone. On the first cycle, the suffix -ket 'will' would attach to derive mEk-ket-.
Relevant phonological rules, HI (3.10), SET (3.15), and FL (3.12) would apply,
deriving mÉk-ket-. On the second cycle, the suffix -sEmni would attach, deriving
mÉk-ket-sEmni-. There is no phonological rule which would apply to this form. On
the third cycle, the suffix -ta attaches, deriving *mÉk-ket-sEmni-ta.

(4.54) mEk-

mEk-ket suffixation
The incorrect cyclic derivation of *mÉk-ket-sEmni-ta ‘will eat (formal)’ is in every respect parallel to the correct cyclic derivation of Variant Tone Class noun stems sán-tEl-k'aci-do ‘even including mountains’. In short, cyclic application is correct for nouns, but not for verbs.

In contrast, the across-the-board attachment of verbal suffixes derives the correct form as shown in (4.55).
In this context, the following question remains to be addressed: why do noun suffixes attach cyclically, while verbal suffixes attach all at once? This difference, I argue, stems from the different properties of these two types of affixes. In the case of nouns, the forms derived by the attachment of each suffix can occur as an independent word. So, for instance, in deriving the noun form sán-tEml-k'aci-do ‘even including mountains’, the intermediate derived forms, sán-tEml ‘mountains’, sán-tEml-k’aci ‘including mountains’ can occur as independent words. In contrast, in verb forms, the intermediate derived forms cannot occur as independent words. So, for instance, in deriving the verb form mEk-ket-sEmnl-ta ‘will eat (formal)’, the intermediate forms, mEk-ket, mEk-ket-sEmnl, cannot occur by themselves: they are not independent words. Providing that only forms which can occur as independent words can be cyclic domains as proposed in Brame (1974), the reason is clear why nouns suffixes attach cyclically, while verb suffixes attach all at once: it is because forms derived at each cycle by the cyclic attachment of affixes can occur as independent words in the case of nouns but not in the case of verbs. And it is independent words that can be the domain of phonological rules.
4.7.2 Further Evidence

The crucial point in the above argument is that only independent words can be the domain of phonological rules. This claim receives its further support in verb forms in verb complement clauses. Verb forms in verb complement clauses are marked by the complementizer -ko at the end of the verb form. So, for instance, in the sentence Māry-ka mEk-két-ta-ko mal he-s-ta 'Mary said that she would eat', where mEk-két-ta-ko means 'that she will eat' and mal he-s-ta means 'said', the verb form in the complement clause is marked by the complementizer -ko.²⁵

What makes verb forms of the complement clauses particularly interesting is the position of H: a H appears on the suffix -ket. The analysis proposed so far, however, would incorrectly predict H on the penultimate mora of the entire form, deriving the incorrect form *mEk-ket-tâ-ko as shown in (4.55).

(4.56) mEk-ket-ta-ko UP
    mEk-ket-ta-ko HI (3.10)
    H

* mEk-ket-ta-ko

The stem mEk- 'to eat' is in the Variant Tone Class, so has no underlying H. HI (3.10) inserts a H, which associates with the final mora, phonetically the penultimate due to the extratonicality of the phonetically final mora by SET (3.15). So, the derivation above proceeds according to previously well-motivated
assumptions, yet the derived form is incorrect.

The solution to this problem lies in the claim that independent words form the domain of phonological rules. What is assumed incorrectly in the derivation of \( mEk-ké-ta-ko \) 'that she would eat' in (4.56) is that all suffixes attach all at once. This is not the correct way to attach these suffixes, since the intermediately derived form \( mEk-ké-ta \) 'will eat' can occur as an independent word, so can be a cyclic domain. In other words, since \( mEk-ket-ta \) can occur as an independent word, it can be a domain of phonological rules before it gets the complementizer -ko on the next cycle.

(4.57) \( mEk-\)

1st cycle

\[
\begin{align*}
mEk-ket-ta & \quad \text{sufffixation} \\
mEk-ket-ta & \quad \text{HI (3.10)} \\
mEk-ket-(ta) & \quad \text{SET (3.15)} \\
mEk-ket-(ta) & \quad \text{FL (3.12)} \\
\mid & \quad \text{H} \\
2nd \ cycle & \\
mEk-ket-(ta)-ko & \quad \text{sufffixation} \\
\mid & \quad \text{H} \\
mEk-ket-ta-ko & \quad \text{Peripherality Condition (3.14)} \\
\mid & \quad \text{H} \\
mEk-két-ta-ko & \\
\end{align*}
\]

On the first cycle the suffixes -ket 'future' and -ta 'declarative' attach. Relevant
phonological rules, namely HI (3.10), SET (3.15) and FL (3.12) apply to derive mEk-két-ta ‘will eat’. On the next cycle, the complementizer -ko attaches, deriving mEk-két-ta-ko. Relevant phonological rules, namely the Peripherality Condition (3.14) and SET (3.15), would apply, which does not affect tone at all. This produces the correct form mEk-két-ta-ko ‘that (she) will eat’.

We have shown how the difference between the ability to occur as independent words or not affect tone. This gives further support to the argument for the across-the-board attachment of verbal suffixes in the previous section.

4.8 Verb Stems with Long Vowel and Contour Tones

Long vowels in verb stems show the same distributional restrictions as are found in noun stems:

(i) They can occur only at the edges, left and right of a stem. Excluding derived stems, verb stems with a long vowel at the right edge are fewer in number than those with a long vowel at the left edge.

(ii) A long vowel at the left edge is rising-toned (e.g. kÉÉtÉl-ta ‘to help’), and a long vowel at the right edge is falling-toned (e.g. ponéè-ta ‘to send’).

As is the case of nouns, most mono-syllabic stems with a long vowel are rising-toned (e.g. pùül-tâ ‘to blow’, ùúl-tá ‘to cry’).

The first restriction (i), as we recall from the discussion of nouns with a long vowel, is attributed to a language-specific stipulation which allows long vowels only at stem-edges. The second restriction has been shown to be a result of the Peripherality Condition (3.14) on extratonality. (See Chapter 3.4)
In (4.58) are listed various verb stems with a long vowel in the citation forms.

(4.58) Verb Stems with a Long Vowel

(a) Rising-Toned

<table>
<thead>
<tr>
<th>Stems</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>see-tá</td>
<td>'to be strong'</td>
</tr>
<tr>
<td>miil-tá</td>
<td>'to push'</td>
</tr>
<tr>
<td>sEÉl-tá</td>
<td>'to cut'</td>
</tr>
<tr>
<td>k'EEl-tá</td>
<td>'to drag'</td>
</tr>
<tr>
<td>pâlp-tá</td>
<td>'to tread'</td>
</tr>
<tr>
<td>siín-tá</td>
<td>'to put on (shoes)'</td>
</tr>
<tr>
<td>siÉlm-tá</td>
<td>'to be young'</td>
</tr>
<tr>
<td>kEEt-tá</td>
<td>'to walk'</td>
</tr>
<tr>
<td>siîp-tá</td>
<td>'to chew'</td>
</tr>
<tr>
<td>iis-tá</td>
<td>'to connect'</td>
</tr>
<tr>
<td>uús-tá</td>
<td>'to laugh'</td>
</tr>
<tr>
<td>kEEtEl-ta</td>
<td>'to help'</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) Falling-toned

(i) Non-derived Stems

<table>
<thead>
<tr>
<th>Stems</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>céè-ta</td>
<td>'to measure'</td>
</tr>
<tr>
<td>ponéè-ta</td>
<td>'to send'</td>
</tr>
<tr>
<td>machùù-ta</td>
<td>'to order'</td>
</tr>
<tr>
<td>sollù-ta</td>
<td>'to lean'</td>
</tr>
<tr>
<td>Elù-ta</td>
<td>'to gather in the eyes'</td>
</tr>
<tr>
<td>thEllù-ta</td>
<td>'to be incorrect'</td>
</tr>
<tr>
<td>kyEllù-ta</td>
<td>'to have a pain'</td>
</tr>
</tbody>
</table>

(ii) Derived Stems

<table>
<thead>
<tr>
<th>Stems</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>putichû-ta</td>
<td>'to be hit'</td>
</tr>
<tr>
<td>c'allù-ta</td>
<td>'to be cut'</td>
</tr>
<tr>
<td>collù-ta</td>
<td>'to be sleepy'</td>
</tr>
<tr>
<td>milùù-ta</td>
<td>'to postpone'</td>
</tr>
<tr>
<td>millù-ta</td>
<td>'to be pushed'</td>
</tr>
<tr>
<td>pakhû-ta</td>
<td>'be digged into'</td>
</tr>
<tr>
<td>allù-ta</td>
<td>'to inform'</td>
</tr>
<tr>
<td>t'EElù-ta</td>
<td>'to be shaky'</td>
</tr>
<tr>
<td>poù-ta</td>
<td>'to be seen'</td>
</tr>
</tbody>
</table>
4.8.1 Vowel Shortening

4.8.1.1 Vowel Shortening and "Mora-Bearing" Consonants

Long vowels in the stem final syllable of the verb, either rising-toned or falling-toned, are shortened when the stem is immediately followed by vowel-initial suffix. This holds true for all long-voweled stems. As an illustration, inflected forms of the stems *ùûl* ‘to cry’ are given in (4.59). Shortened forms are marked with "S".

<table>
<thead>
<tr>
<th>(4.59)</th>
<th>uûl-tá</th>
<th>Declarative</th>
<th>to cry</th>
</tr>
</thead>
<tbody>
<tr>
<td>uù sí Et sÉmni ta &quot;</td>
<td>'cried (hono.form.)'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uû sí ket sÉmni ta</td>
<td>'will cry (hono.form.)'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uû sí mni ta</td>
<td>'cry (hono.form.)'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uû sí Et ta</td>
<td>'cried (hono.)'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uû sí ket ta</td>
<td>'will cry (hono.)'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uû sí n ta</td>
<td>'cry (hono.)'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S uûl Et sÉmni ta</td>
<td>'cried (form.)'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uûl ket sÉmni ta</td>
<td>'will cry (form.)'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uû mni ta</td>
<td>'cry (form.)'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S uûl Et ta</td>
<td>'cried'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uûl ket ta</td>
<td>'will cry'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uû n tá</td>
<td>'cry'</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Interrogative

| uû sí Et sÉmni k’a | 'cried (hono.form.)?' |
| uû sí ket sÉmni k’a | 'will cry (hono.form.)?' |
| uû sí mni k’a | 'cry (hono.form.)?' |
| uû sí Et na | 'cry (hono.)?' |
| uû sí ket na | 'will cry (hono.)?' |
| uû sí na | 'cry (hono.)?' |
| S uûl Et sÉmni k’a | 'cried(form.)?' |
| uûl ket sÉmni k’a | 'will cry (form.)?' |
| uû mni k’a | 'cry (form.)?' |

Imperative

| S uûl Ela | 'cry!' |
| uûl kÉla | 'cry!' |

Apperceptive

| uû sí Et kuna | 'ah!, cried (hono.)!' |
| uû sí ket kuna | 'ah!, will cry (hono.)!' |
| ùú sí nÈn   | kuna   | ‘ah!, (he)cries(hono.)!’ |
| S ùú Et     | kuna   | ‘ah!, cried!’            |
| ùú ké t     | kuna   | ‘ah!, will cry!’         |
| ùú nÈn      | kuna   | ‘ah!, (he) cries!’       |

Simultative

| ùú Et       | myÉnsÉ | ‘while crying’           |

Connetive

| ùú kó       |       | ‘cry and’                |

Adversative

| ùú ná       |       | ‘though cries’           |

Examples of a stem with final falling tone are given in (4.60). Shortened forms are marked with "S".

(4.60) ponéè-

| ponéè sì Et sÈmni ta  | ‘sent(hono. form.)’ |
| ponéè sì ket sÈmni ta | ‘will send (hono.form.)’ |
| ponéè sì mni ta       | ‘send (hono. form.)’  |
| ponéè sì Et ta        | ‘sent(hono.)’        |
| ponéè sì ket ta       | ‘will send(hono.)’   |
| ponéè sì n ta         | ‘send (hono.)’       |

S poné Et sÈmni ta | ‘sent (past, form.)’ |
ponéè ket sÈmni ta | ‘will send’          |
ponéè mni ta       | ‘send (form.)’       |

S poné Et ta       | ‘sent (past)’        |
ponéè ket ta       | ‘will send’          |
ponéè n ta         | ‘send’               |

Interrogative

| ponéè sì Et sÈmni k’a | ‘sent(hono. form.)?’ |
| ponéè sì ket sÈmni k’a| ‘will send (hono.form.)?’ |
| ponéè sì mni k’a      | ‘send(hono. form.)?’  |
| ponéè sì Et na        | ‘sent (hono.)?’      |
| ponéè sì ket na       | ‘will send(hono.)?’  |
| ponéè sì n na         | ‘send (hono.)?’     |

S poné Et sÈmni k’a | ‘sent (form.)’      |
ponéè ket sÈmni k’a | ‘will send (form.)?’ |
ponéè mni k’a       | ‘send (form.)?’     |

S poné Et na        | ‘sent?’              |
ponéè ket na        | ‘will send?’         |
ponéè na            | ‘send?’              |

Imperative

| S poné Él     | ‘send’            |
| ponéè kÉl    | ‘send!’           |
The long vowels in the stems *uûl-* ‘to cry’ and *ponée-* ‘to send’ are shortened when the stems are immediately followed by a vowel.\(^7\)

A long vowel which is not in a stem-final syllable, however, is not shortened even when the stem is immediately followed by a vowel. So, for example, the long vowel in the stem *kÊÉtÉl-* ‘to cross’ is not shortened even when the stem is immediately followed by a vowel.

(4.61) kÊÉtÉl-ta ‘to help’
   kÊÉtÉ si Et sEmni ta ‘helped (hono.form.)’
   kÊÉtÉ Et sEmni ta ‘helped (form.)’
   kÊÉtÉ ket sEmni ta ‘will help (form.)’
   kÊÉtÉ Ela ‘help!’
   kÊÉtÉ kEla ‘help!’

Thus, only a stem-final long vowel is shortened.

There are, however, a few verb stems whose final long vowels are not subject to shortening. All such verb stems that I have found are listed in (4.61).

(4.62) Verb Stems not Subject to Shortening
   caâk-tá ‘to be small’
   kùûlk-tá ‘to be thick’
   màánh-tá ‘to be many’
   kôód-tá ‘to be beautiful’
   côoh-tá ‘to be good’
   cEÉk-ta ‘to be small’
   sEÉlp-tá ‘to be sad’
   EÉps-ta ‘to not exist’
To illustrate, various inflected forms of some stems in (4.62) are given in (4.63).

(4.63) a. caâk-ta  ‘is small’
     caâk-sÉmni-ta  ‘is small (formal)’
     caâk-kÉt-ta  ‘will be small’
     caâk-at-ta  ‘was small’
     caâk-Éna  ‘though (it) is small’

     b. kuûlk-tá  ‘is thick’
     kuûlk-sÉmni-ta  ‘is thick (formal)’
     kuûlk-kÉt-ta  ‘will be thick’
     kuûlk-Ét-ta  ‘was thick’
     kuûlk-Éna  ‘though (it) is thick’

     c. coõh-tá  ‘is good’
     coõh-sÉmni-ta  ‘is good (formal)’
     coõh-kÉt-ta  ‘will be young’
     coõh-át-ta  ‘was young’
     coõh-Éna  ‘though (it) is good’

A comparison of these stems with those in (4.58), which are subject to shortening, reveals an interesting regularity. The stems in (4.58) end in a sonorant, an obstruent which alternates with a sonorant or zero (so-called (segmentally) irregular verb stems). So, for example, the stem kÉl-tá ‘to walk’ has an alternant form kÉl- before a vowel-initial suffix: e.g kÉl-Ét-ta ‘walked’. (uûs-tâ ‘to smile’ and paâlp-tâ ‘to tread’ are exceptions: they do not alternate with a sonorant even in standard Korean.) On the other hand, the stems in (4.62) end in an obstruent which does not alternate with a sonorant. (koõp-tá ‘to be pretty’ is the exception: it alternates with a sonorant, so koõw-at-ta ‘was pretty’.)

At this point, the following questions should be raised: why is shortening affected by the quality of stem-final consonants at all? What is the connection between shortening and stem-final consonants? As an answer to these questions, I
propose that the final consonants of verb stems whose final vowel is shortened before a vowel bear a mora: otherwise, consonants bear no mora. So, the syllable structure of the stems *kill* - 'to be long' and *kilp* - 'to patch', which undergo shortening before a vowel, would look like the following:

(4.64) a. $ \begin{array}{c} / \backslash \\ M \text{M} \\ / \backslash \\ k \text{i} \text{l} \end{array} $  

b. $ \begin{array}{c} / \backslash \\ M \text{M} \\ / \backslash \\ k \text{i} \text{p} \end{array} $  

The stem-final consonants as well as the vowel is assigned a mora. The long vowels in the surface forms of these stems are the result of phonetic implementation. In other words, at the postlexical level, there is a resyllabification rule (4.65) (a phonetic implementation rule) which spreads the vowel segment to the mora of the following consonants. This will derive a long vowel on the surface.

(4.65) Resyllabification (Postlexical)

$ \begin{array}{c} / \backslash \\ M \text{M} \\ / \backslash \\ x \text{y} \end{array} $  

The application of this rule will change the structures in (4.64) to those in (4.66).

(4.66) a. $ \begin{array}{c} / \backslash \\ M \text{M} \\ / \backslash \\ k \text{i} \text{l} \end{array} $  

b. $ \begin{array}{c} / \backslash \\ M \text{M} \\ / \backslash \\ k \text{i} \text{p} \end{array} $  

Stranded consonants adjoin to the preceding mora (Hayes, 1990). Since the vowel $i$ is associated with two moras in both (4.66a) and (4.66b), it will be realized as long.
In contrast, final consonants of long-voweled stems which are not subject to shortening (e.g. \textit{cEÉk-tá} 'to be small') do not bear a mora. So, for example, the syllable structure of the stem \textit{cEÉk-} 'to be small', which is not subject to shortening, would look like the following:

\[(4.67) \quad \frac{\text{M}}{\text{M}} \quad \frac{\text{k}}{\text{E}}\]

Given this distinction between two kinds of stem-final consonants (one is mora-bearing consonants versus non-mora-bearing consonants) we can explain why some stems are subject to shortening but others are not. Stems which are subject to shortening either end in a vowel or end in a mora-bearing consonant. When these stems are immediately followed by a vowel, a sequence of three "strictly" adjacent moras (moras are "strictly" adjacent if the segments which are associated with the moras occur next to each other) would be created, as seen in the stem \textit{kiìl-} 'to be long' followed by a vowel-initial suffix \textit{-Et} 'past'.

\[(4.68) \quad \frac{\text{M}}{\text{M}} \quad \frac{\text{M}}{\text{Et}}\]

In contrast, stems which are not subject to shortening all end in a non-mora bearing consonant. When these stems are immediately followed by a vowel, a sequence of three consecutive, "strictly" adjacent moras does not arise, as seen in the stem \textit{caâk-} 'to be small' followed by the vowel-initial suffix \textit{-Et} 'past'.
There is no sequence of three "strictly" adjacent moras in (4.68), since there is [k] between the segment associated with the second mora (which is [a]) and the segment associated with the third mora (which is [E]).

Since shortening applies only to a sequence of three "strictly" adjacent moras, it is clear why shortening does not apply in *caâk-at-ta* ‘was small’, while it applies in *kil-Et-ta* ‘was long’. It is because in the former there is no sequence of three "strictly" adjacent moras, whereas in the latter there is such a sequence.

The shortening rule can be formalized as follows:

(4.70) Shortening

\[
\begin{array}{c}
\$ \\
M & M & M \\
r & r
\end{array}
\]

where r represents root node. This rule literally states that the left-most mora of a stem-final long vowel is deleted if the stem is immediately followed by a mora, and the segments which are associated with these moras are adjacent to each other. Note that Shortening deletes the left-most mora instead of the right-most of the long vowel. The reason for this will become clear when the tonal change which accompanies the shortening is discussed in section 4.8.2.

Shortening (4.70) cannot not apply to the cases where the stem-final consonants bear no mora, as well as to the cases where stems are followed by a
consonant-intial suffix, since in both of these cases segments which are associated with the moras are not adjacent to each other, as seen below in (4.71).

\[
\begin{align*}
\text{(4.71) a.} & \quad \text{\$ \quad \text{\$} \quad \text{\$} \\
\text{b.} & \quad \text{\$ \quad \text{\$} \quad \text{\$} \\
\end{align*}
\]

In (4.71a) the final consonant of the stem bears a mora, but the stem is followed by a consonant-intial suffix. In (4.71b) the final consonant of the stem bear no consonant, and the stem is followed by a vowel-initial. That is, in both cases, we see that there is no sequence of three "strictly" adjacent moras. This is the correct prediction: stem-final long vowels do not shorten in these cases.

Let us turn to the long-voweled stems with final consonant-clusters such as cÉḻm- 'to be young', saálm- 'to boil' and paâlp-tá 'to tread'. These stems undergo shortening when immediately followed by a vowel.

\[
\begin{align*}
\text{(4.72) a.} & \quad \text{cÉḻm-tá} \quad \text{'to be young'} \\
& \quad \text{cÉḻm-Et-ta} \quad \text{'was young'} \\
& \quad \text{cÉḻm-Eni} \quad \text{'because (he) is young'} \\
\text{b.} & \quad \text{saálm-tá} \quad \text{'to boil'} \\
& \quad \text{saálm-at-ta} \quad \text{'boiled'} \\
& \quad \text{saálm-Eni} \quad \text{'because (he) boils something'} \\
\text{c.} & \quad \text{paâlp-tá} \quad \text{'to tread'} \\
& \quad \text{pâlp-at-ta} \quad \text{'treaded'} \\
& \quad \text{pâlp-Eni} \quad \text{'because (he) treads'}
\end{align*}
\]

The problem with these stems concerns how to represent these consonant clusters, so that Shortening (4.70) applies to these stems. There are two possible ways to represent the consonant clusters of long-voweled stems. The first is to assume that the first consonant of the two bears a mora. Under this assumption, the syllable
structure of these three stems (cEÉlm- ‘to be young’, saâlm- ‘to boil’, and paâlp- ‘to tread’) would look like the following:

\[(4.73)\]

<table>
<thead>
<tr>
<th>a. $</th>
<th>b. $</th>
<th>c. $</th>
</tr>
</thead>
<tbody>
<tr>
<td>(/)</td>
<td>(/)</td>
<td>(/)</td>
</tr>
<tr>
<td>/M M/</td>
<td>/M M/</td>
<td>/M M/</td>
</tr>
<tr>
<td>(/)</td>
<td>(/)</td>
<td>(/)</td>
</tr>
<tr>
<td>c E l m</td>
<td>s a l m</td>
<td>p a l p</td>
</tr>
</tbody>
</table>

The first consonant of the clusters bears a mora. The second consonant adjoins to the preceding mora.

When these stems are followed by a vowel-final suffix, there arises no sequence of three "strictly" adjacent moras, as seen in (4.70), where these stems are followed by the vowel-intial suffix -Et ‘past’.

\[(4.74)\]

<table>
<thead>
<tr>
<th>a. $</th>
<th>b. $</th>
<th>c. $</th>
</tr>
</thead>
<tbody>
<tr>
<td>(/)</td>
<td>(/)</td>
<td>(/)</td>
</tr>
<tr>
<td>/M M/</td>
<td>/M M/</td>
<td>/M M/</td>
</tr>
<tr>
<td>(/)</td>
<td>(/)</td>
<td>(/)</td>
</tr>
<tr>
<td>c E l m</td>
<td>s a l m</td>
<td>p a l p</td>
</tr>
</tbody>
</table>

The second segment of the consonant clusters syllabifies with the following vowel due to the onset maximal principle (Selkirk, 1982) or Universal Core Syllable condition (Ito, 1986a). As a result, the segments which are associated with the second and the third mora are not adjacent to each other: [p] intervenes between
the two segments. Since there is no sequence of three "strictly" adjacent moras in these forms, Shortening (4.70) could not apply to these forms. So, the first assumption incorrectly predict that Shortening (4.70) cannot apply to these forms.

An alternative is to assume that the second consonant bears a mora. This will give the following syllable structure for the stems.

(4.75) a. $ b. $ c. $

\[
\begin{array}{cccc}
\text{M} & \text{M} & \\text{M} & \text{M} \\
\text{c} & \text{E} & \text{l} & \text{m} \\
\text{p} & \text{a} & \text{l} & \text{p}
\end{array}
\]

In these structures, the second consonant of the clusters bears a mora, and the first consonant adjoins to the preceding mora. When these stems are followed by a vowel-initial suffix, a sequence of three "strictly" adjacent moras arises, as illustrated in (4.76), where these stems are followed by the vowel-initial suffix -Et 'past'.

(4.76) a. $ b. $ c. $

\[
\begin{array}{cccc}
\text{M} & \text{M} & \text{M} & \text{M} \\
\text{c} & \text{E} & \text{l} & \text{m} \\
\text{s} & \text{a} & \text{l} & \text{m} \\
\text{p} & \text{a} & \text{l} & \text{p}
\end{array}
\]
The structures in (4.76) satisfy the structural description of Shortening (4.69) in that there is a sequence of three "strictly" adjacent moras. So Shortening (4.70) will apply, deriving the correct forms.

Finally, Shortening (4.70) correctly predicts that the long vowel in \(k\text{E\text{E}}t\text{E}t\text{-ta}\) ‘helped’ is not shortened. Shortening (4.70) does not apply in this form because no sequence of "strictly" adjacent moras arises across the stem boundary.

\[
\begin{array}{ccc}
\$ & \$ & \$ \\
M & M & M \\
E & t & E \text{l}t \text{a}
\end{array}
\]

4.8.1.2 Arguments for "Mora-Bearing" Consonants

There is a phenomenon which argues for the assumption that final consonants of long-voweled stems which are subject to shortening bear a mora. The phenomenon in question is the alternation of "irregular" (in the segmental sense) verbs. This phenomenon is not as salient in Kyungsang Korean as in other dialects, including standard Korean. For this reason, I will use examples from the standard dialect. There are three major groups of "irregular" verbs: p-irregular, t-irregular, and s-irregular among others.

T-irregular verb stems exhibit an alternation between stem-final [t] and [r]. The r-variant occurs before a vowel-intial suffix: otherwise, the t-variant occurs: e.g. \(k\text{Et-ta}\) ‘to walk’, \(k\text{Et-ko}\) ‘walk and’, \(k\text{Et-ket-ta}\) ‘will walk’ vs. \(k\text{Er-Et-ta}\) ‘walked’, \(k\text{Er-Esi-n-ta}\) ‘walk (hono.)’, \(k\text{Er-Ena}\) ‘though (he) walks’. T-regular stems, on the other hand, do not show alternations: they are always t-final: \(k\text{Et-ta}\) ‘to pull up’,
‘pull up and’, *kEt-Et-ta* ‘pulled up’, *kEt-Esi-n-ta* ‘pull up (hono.)’. Note that both t-irregular stems and t-regular stems have a short vowel in the standard dialect. This is to be expected since the standard dialect does not have a length contrast. However, in North Kyungsang Korean, where there are length contrasts, t-irregular stems have a long vowel, whereas t-regular stems have a short one: e.g. *kEÉt-tâ* ‘to walk’ vs *kÉt-ta* ‘to pull up’. As we know, the verb stem *kEÉt-ta* ‘to walk’ is one of the verb stems which are subject to shortening: e.g. *kEÉt-tá* ‘to walk’, *kEÉt-kó* ‘walk and’ vs *kÉr-Et-ta* ‘walked’, *kÉr-Eni* ‘because (he) walks’. The analysis proposed so far hence would predict that [t] in *kEÉt*- ‘to walk’ bears a mora. In contrast, the [t] in the regular stem *kÉt*- ‘to pull up’ bears no mora. Thus, irregular stem-final [t] and regular stem-final [t] are distinguished in terms of the existence of mora: mora-bearing [t] alternates with [r], whereas “non mora bearing” [t] does not.

We turn to p-irregular stems. P-irregular stems exhibit the alternation between a final-p variant and a final-w variant. The w-variant occurs before a vowel; otherwise, the p-variant occurs: e.g. *kip-ta* ‘to patch’, *kip-ko* patch and’, *kip-ket-ta* ‘will patch’ vs. *kiw-Et-ta* ‘patched’, *kiw-Esi-n-ta* ‘patch (hono.), *kiw-Ela* ‘patch!’. P-regular stems, in contrast, show no alternation: e.g.*kup-ta* ‘to crouch’, *kup-ko* ‘crouch and’, *kup-ket-ta* ‘will crouch’, *kup-Et-ta* ‘crouched’, *kup-Eni* ‘because (it) crouches’. Note again that both p-regular and p-irregular stems have a short vowel in the standard dialect, where there is no length contrast. However, in North Kyungsang Korean, we observe that P-irregular stems have a long vowel, while p-regular stems have a short vowel: e.g. *kip-tâ* ‘to patch’ vs. *kúp-ta* ‘to crouch’. The
stem kiîp-tâ ‘to patch’ is subject to shortening: e.g. kiîp-tâ ‘to patch’, kiîp-ko ‘patch and’ vs. kîp-Et-ta ‘patched’, kîp-Ela ‘patch!’. Hence, the analysis proposed so far would predict that the [p] of p-irregular stems bears a mora. In contrast, the [p] of P-regular stems bear no mora. Now, the distinction between the irregular [p] and the regular [p] is obvious: the former bears a mora, but the latter bears no mora. This explains the different behaviour of the two [p]’s.

A similar argument is provided by s-irregular verb stems. S-irregular verb stems show the alternation between a t-variant and a zero-variant: the zero-variant occurs before a vowel-initial suffix: otherwise, the t-variant occurs: e.g. cit-ta ‘to build’, cit-ko ‘build and’, cis-ket-ta ‘will build’ vs ci-Et-ta ‘built’, ci-Ela ‘build!’, ci-Eni ‘because (he) builds’. S-regular stems on the other hand show no such alternation: e.g. pis-ta ‘to comb’, pis-ko ‘comb and’, pis-ket-ta ‘will comb’, pis-Et-ta ‘combed’, pis-Ela ‘comb!’, pis-Eni ‘because (he) combs’. Notice again that both s-irregular stems and s-regular stems have short vowel in the standard dialect. This is to be expected since the standard dialect has no length contr. In North Kyungsang Korean, however, we find that s-irregular verbs have a long vowel, and they are subject to shortening: e.g. ciït-tâ ‘to build’, ciït-kô ‘build and’, ciït-kêt-ta ‘will build’ vs ci-Eni ‘because (he) builds’. So, the final [s] in these stems is predicted to have a mora. In contrast, s-regular stems have a short vowel: e.g. pis-ta ‘to comb’, pis-ko ‘comb and’, pis-Ela ‘comb!’, pis-Et-ta ‘combed’. The final [s] in these stems bear no mora. Thus, irregular stem-final [s] and regular stem-final [s] are distinguished in terms of the "mora-bearing" ability: the former bears a mora, but the latter bears no mora.
This, I argue, sheds light on the explanation of the alternation of irregular verb stems. Many analyses of irregular verb stems (Ahn, 1985, Sohn 1897) assume that these stems have a long vowel even though standard Korean does not have length contrasts. In the present analysis, we do not have to assume that irregular verb stems have a long vowel. All we need to say is that the final consonants of irregular verb stems bear a mora. This mora will be deleted (postlexically) later in the dialects including standard Korean where there are no vowel length contrasts. In other words, there is no phonetic implementation rule (4.65) in such dialects.

It, however, must be pointed out that this kind of argument is not found for all stem-final consonants which are assumed to bear a mora. Take, for example, the stem *uûs-tâ* ‘to laugh’. The analysis so far would predict that the final consonant of this stem bears a mora since the preceding long vowel shortenes before a vowel. And since the final consonant bears a mora, we would expect that it would exhibit the alternation of s-irregular stems. However, this stem does not show the alternation of s-irregular verb stems either in North Kyungsang Korean and in any other dialect. (This stem might be treated as an exception to the irregular stem alternation.)

### 4.8.2 Shortening and Tone

We see in the examples in (4.60) that shortening of a rising-toned long vowel (that is, a long vowel at the left edge) accompanies a change in tone. With long vowel in a stem, two moras, the second and the third, are high-toned (e.g.*úûl-kêt-ta* ‘will cry’). With a shortened vowel, only one mora, the first, is high-toned.
(e.g. úl-Et-ta ‘cried’). Shortening (4.70), however, does not explain the tone change in these verb stems.

In order to account for the tone change accompanying vowel shortening, we first need to determine the underlying tone of stems with a rising tone. On the grounds that these verb stems exhibit the same tone pattern as nouns with a rising tone (in both cases the second and the third moras are high-toned: e.g. sàârâm ‘man’), which we analysed as having no underlying H-tone, verb stems with a rising tone are also assumed to be underlyingly toneless (see Chapter 3.4). The high tone in these forms is, as we discussed in Chapter 3.4, the result of the application of LVH (3.97), which inserts a H if there is a long vowel at the left edge of a toneless domain. The inserted H associates with the left-most available mora by the AC (3.45). The left-most available mora is phonetically the second from the left, since the phonetically left-most mora is rendered extratonal by LET (3.90). The linked H spreads to the following mora to the left by Spreading (3.46), as seen in the derivation of úúl-két-ta ‘will cry’ in (4.78).

\[
\begin{array}{l}
(4.78) \text{uul-} & \text{UF} \\
\text{uul-ket-ta} & \text{suffixation} \\
\text{uul-ket-ta} & \text{LVH (3.97)} \\
\underline{\text{H}} & \\
\text{(u)ul-ket-ta} & \text{LET (3.90)} \\
\underline{\text{H}} & \\
\text{(u)ul-ket-ta} & \text{AC (3.45)} \\
\underline{\text{H}} & \\
\text{(u)ul-ket-ta} & \text{Spreading (3.46)} \\
\underline{\text{H}} & \\
\end{array}
\]
uûl-két-ta

We turn now to the forms with a shortened vowel. In shortened forms, only the first mora is high-toned: e.g. úl-Et-ta 'cried'. How could vowel shortening affect tone in this way?

The analysis proposed so far can explain the tonal change accompanying the vowel shortening in a straightforward way: this is a natural consequence of the application of Shortening (4.69) and Syllable Fusion (4.11). After Shortening deleted the left-most mora of the long vowel, we have two "strictly" adjacent moras which are high-toned across the morpheme boundary, as illustrated in the derivation of úl-Et-ta 'cried' in (4.79).

\[
\begin{array}{c}
(4.79) \text{uul-} \\
\text{uul-Et-ta} \\
\text{H} \\
\text{(u)ul-Et-ta} \\
\text{H} \\
\text{(u)ul-Et-ta} \\
\text{H} \\
\text{\textbackslash} \\
\text{\textbackslash} \\
\text{M M M}$ $ \\
\text{\textbackslash} \\
\text{\textbackslash} \\
\text{M M M M} \\
\text{\textbackslash} \\
\text{\textbackslash} \\
\text{(u) l- E t-t a} \\
\text{\textbackslash} \\
\text{\textbackslash} \\
\text{H} \\
\end{array}
\]

UF suffixation
LVH (3.97)
LET (3.90)
AC (3.45)
Spreading (3.46)
Note that the output of the application of Shortening satisfies the structural description of Syllable Fusion (4.11): there are two "strictly" adjacent moras across the morpheme boundary. Syllable Fusion will fuse the two "strictly" adjacent moras into a single syllable. The result is two high-toned moras in a single syllable. Delinking (4.15) will apply, delinking the second H.

If Shortening (4.69) deleted the right-most mora of the long vowel, rather than the left-most one, the tone of shortened forms could not be derived in a straightforward way. Below in (4.81) is given the output of a shortening rule which deletes the right-most mora.
Such a shortening rule would delete the mora of the stem-final consonant. As a result, the stem-final consonant [l] does not bear a mora, so it will lose the H (only mora can bear a tone). Consequently, the stem-final consonant will syllabify with the following syllable. Note that in the structure of (4.81) the two moras across the morpheme boundary are not "strictly" adjacent: the consonant [l] intervenes the segments which associate with the two moras. Hence, neither Syllable Fusion nor Delinking applies. The result is an incorrect form *ul-Et-ta. Thus, a shortening rule which deletes the right-most mora of a long vowel cannot derive the tone of shortened forms directly.

4.8.3 A Comparison with Previous Accounts

Kim (1988) also notices the tone change which accompanies vowel shortening. Her analysis, however, has several shortcomings. The differences between her analysis and mine stems from the different assumed underlying representations for stems with a rising tone. She assumes that these stems have a floating H underlingly, whereas, as we have seen, in my analysis they are underlingly toneless. A H is inserted by rule.

A floating H in Kim's analysis associates with the first two tone bearing units (the nucleus is the tone bearing unit in her analysis) by Floating H-Linking
(3.52) and Third H Delinking (3.53), which are repeated in (4.82) and (4.83)

(4.82) Floating H-Linking (p.44, Kim 1989)

\[
\begin{array}{c}
# \quad N \quad N_0 \\
| \quad / \\
H
\end{array}
\]

where N represents nucleus.

(4.83) Third-H Delinking

\[
\begin{array}{c}
# \quad N \quad N \quad N_0 \\
\backslash | \quad / \\
H
\end{array}
\]

The form "*will cry*", for instance, would be derived as follows. (In her analysis, all long vowels are treated as being level-toned both phonologically and phonoetically, a point with which I do not agree. However, this does not affect the argument here.)

(4.84) uul- UF

\[
\begin{array}{c}
uul-ket-ta \\
| \\
H \quad H \\
uul-ket-ta \\
H
\end{array}
\]

suffixation

H-Deletion (3.33)

\[
\begin{array}{c}
uul-ket-ta \\
\backslash | \quad / \\
H \\
uul-ket-ta \\
/ \\
H
\end{array}
\]

Floating H-Linking (4.82)

Third H-Delinking (4.83)

The stem *uul-* 'to cry' has a floating H underlyingly. This associates with free nucleuses in the form. Third H Delinking (4.83) delinks the H from all nuclei
except the first two.\textsuperscript{36}

Given this underlying representation, namely a floating H, there is no way for vowel shortening to directly affect the tone of shortened forms, regardless of when it applies during the derivation, as shown in the derivation of $\acute{u}\acute{l}$-$E$t-$t$-$a$ 'cried' in (4.85a) and (4.85b). In the first case, Shortening applies quite early in the derivation, and in the second case it applies quite late. In either case, incorrect forms are derived.

(4.85) a. uul-
\[
\begin{array}{c}
uul-\text{Es-ta} \\
H
\end{array}
\]
\[
\begin{array}{c}
H \\
H \\
H-H \\
H
\end{array}
\]
Sufffixation  
H-Deletion (3.33)  
Vowel Shortening  
Floating H-Linking (4.82)  
Third-H Delinking (4.83)  

b. uul-
\[
\begin{array}{c}
uul-\text{Es-ta} \\
H
\end{array}
\]
\[
\begin{array}{c}
H \\
H \\
H
\end{array}
\]
Sufffixation  
H-Deletion
Kim resolves this problem by positing a rule which deletes the floating H when the initial long vowel of a stem is shortened.

(4.86) Floating H-Deletion (p. 78, Kim 1988)

\( H \rightarrow \theta / \rightarrow \)

where - means empty slot.

This rule literally states that a floating H is deleted when the domain initial branching nucleus has a linking line with a vacant slot in the skeletal tier. The intention of this rule is to delete a floating H if the stem initial vowel has been shortened. This rule, as we can see, crucially depends on the stipulation that shortening of a vowel leaves an association line and an empty slot behind (see p.77, Kim (1989)). We will discuss this stipulation later.

The H of shortened forms, according to her, comes from the following suffix. The floating H of the following suffix links to the stem-final syllable across the morpheme boundary by Floating H-Linking II.
(4.87) Floating H-Linking II (p.78, Kim)

\[
\text{[H}
\#
\text{[N] [N (N)] #}
\]

where N represents nucleus.

Since shortening occurs only when a stem is immediately followed by a vowel-initial suffix, and vowel-initial suffixes all have a floating H in her analysis (an unexplained correlation, as we have seen. See Chapter 4.4), Floating H-Linking II (4.87) would derive the tone of shortened forms, as shown in the derivation of úl-Es-ta 'cried' in (4.88).

(4.88) uul-

\[
\begin{array}{l}
\text{uul-Es-ta} \\
\text{H [H]}
\end{array}
\]

\text{Suffixation}

\[
\begin{array}{l}
\text{ul-Es-ta} \\
\text{H [H]}
\end{array}
\]

\text{Vowel Shortening}

\[
\begin{array}{l}
\text{ul-Es-ta} \\
\text{[H]}
\end{array}
\]

\text{Floating H Deletion (4.86)}

\[
\begin{array}{l}
\text{ul-Es-ta} \\
\text{[H]}
\end{array}
\]

\text{Floating H-Linking (4.87)}

úl-Et-ta

The most serious problem of this analysis is the stipulation that shortening leaves an association line and an empty skeletal slot behind. This stipulation does not follow from the standard assumption about association lines. It is generally assumed that if a unit is deleted, the association line associated with it is also deleted, since association lines are not autosegmental units whose presence is independent of units on tiers. Association lines, it is generally agreed, represents
temporal simultaneity of associated units. Hence, if there are no units to be linked, there is no association line. In this context, Kim's stipulation is theoretically anomalous.

Her theory also lacks empirical support. The theory which allows association lines to dominate empty skeletal slots is vastly more powerful than the one which does not: such a theory would allow structures like the following:

\[
\begin{align*}
N \quad N &= N \quad N \\
\quad \quad \quad \quad \downarrow \quad \downarrow \\
&\quad \quad V \quad \quad \quad \quad V
\end{align*}
\]

In fact, the number of structures which Kim's theory allows would be infinite. This is a very undesirable consequence, since there is no human language which requires such distinctions in the internal structure of the nucleus. The only evidence for her theory of association lines is that it is seemingly necessary to explain the problem of tone of shortened forms. But as we have seen, there is an alternative way to account for the facts, hence her theory cannot be accepted.

No such stipulations are required in the alternative analysis proposed here. In the proposed analysis, tone of shortened forms is a natural consequence of the application of independently motivated rules: Syllable Fusion (4.11) and Delinking (4.15).

### 4.8.4 Verb Stems with a Falling Tone

A long vowel at the right edge of a verb stem is falling-toned. This follows directly from two facts: that one mora of a long vowel is made extratonal, and that the Peripherality Condition allows only domain-peripheral unit (the right-most mora
in this case) to be extratonal.

Excluding derived verb stems, verb stems with a falling tone number less than twenty in all (all such stems I could find are listed in (4.60ai)). Even among non-derived stems, many of them could be viewed as derived ones. In all these stems we can identify a base and a suffix. Thus, they formally look very much like derived stems. So, for example, in *machûu-ta* 'to order' we can identify the verb stem *mác-ta* 'to be correct'; in *solî-ta* 'to lean', we can identify the stem *soól-tá* 'to be cramped'; in *talûu-ta* 'to lean', we can identify the stem *taâl-tá* 'to be cramped'; in *tEli-ta* 'to be manipulat' we can identify the stem *taâl-tá* 'to become hot'; in *tEli-ta* 'to be incorrect' we can identify the stem *tEli- 'to twist'. The problem with such an analysis lies in relating the meaning of the base form and the meaning of the derived form. It is not easy to derive the meaning of the whole word from the meaning of the base form. For the present purpose, I will assume that they are non-derived stems.

When falling-toned verb stems are followed by suffixes, there is no tonal change at all: H remains on the same position as seen in (4.60). When a falling-toned long vowel is shortened, there is no tonal change involved, not like those with a rising tone. This holds true for both non-derived stems and derived stems.

Since H invariably appears on the same position in these stems, I assume that they simply have a prelinked H on the mora which surfaces as high-toned. (The tone of derived stems will be discussed in more detail in Chapter 5.)

\[
\begin{array}{c}
\text{(4.90) pone(e)-} \\
| \\
\text{H} \\
\text{pone(e)-ket-ta} \\
| \\
\text{H} \\
\end{array}
\]
Given this underlying representation, the reason is clear why Shortening (4.70) does not accompany a tonal change in these stems. It is because these stems have a prelinked H and a prelinked H cannot be affected by vowel length: vowel length may affect tone, only in case the verb stem have no underlying H. The derivation of the form poné-Et-ta ‘sent’ is given in (4.91).

(4.91) pone(e)-
    !
    H

pone(e)-Et-ta suffixation
    !
    H

ponee-Et-ta Peripherality Condition (3.14)
    !
    H

pone-Et-ta Shortening (4.70)
    !
    H

poné-Et-ta

The tonal phenomena of falling-toned stems is thus given a systematic explanation within the present analysis.
Notes

1. The interrogative suffix k'a is used only with the formal suffix sEmni or mni. Otherwise, the interrogative suffix na is used.

2. The present suffix does not cooccur with the interrogative suffix na.

3. The apperceptive suffix kuna does not cooccur with the formal suffix sEmni or mni.

4. The present suffix has variants, nEn after a vowel, and n. Before the apperceptive suffix kuna, however, the present suffix invariably has the form nEn.

5. The suffixes used in subordinate clauses do not require the present suffix nEn or n in the present tense.

6. A sequence of two vowels may optionally be subject to deletion and compensatory lengthening. So, só-ala ‘shoot!’ may become sââla, due to deletion and compensatory lengthening.

7. The suffix initial vowel [E] is not deleted, since when the deletion applies, this vowel is [a]. [a] changes to [E] later by Vowel Harmony.

8. The same phenomenon is observed in Invariant Tone Class II noun stems. When vowel-final invariant tone class II noun stems are followed by a vowel-initial suffix, only the first moras is high-toned, not the first two moras. For example, phi ‘blood’ is invariant Tone Class II (e.g. phi-chÉlEm ‘like blood’, phi-kâ ‘bolld (nom.)’, phi-mán ‘only blood’) When followed by vowel-initial suffixes, only the first mora is high-toned: e.g. phi-esE ‘in the blood’.

9. Syllable Fusion is distinct from the process of deletion accompanied by compensatory lengthening, pointed out in note 6 in that there is no segment deleted in the former, whereas a vowel is deleted in the latter. It also needs to be pointed out that Syllable Fusion applies after the deletion process where the suffix initial [E] is deleted after a vowel-final stem. For example, the form só-sí-n-ta ‘shoot (hono.)’ has the underlying form /so-Esi-n-ta/. Deletion applies before Resyllabification, deriving [so-si-n-ta]. To this output, Syllable Fusion cannot apply, since there is no sequence of two strictly adjacent moras. A very similar process is proposed for Kikuyu in Clements (1983).

10. See Hayes (1989) for crossing association lines in the moraic syllable structure.

11. The imperative suffix and the past suffix are those which are subject to Vowel Harmony. Thus, the initial vowel of these suffixe alternates between [E] and [a] according to the preceding vowel quality.
12. The stem-final [E] is deleted before a vowel-initial suffix. The occurrence of two [I]'s could be a result of the deletion. For more discussion, see Kim-Renaud (1974) and Sohn (1987).

13. The stem-final consonant alternates between [t] and [s] due to neutralization.

14. There is no solid evidence for taking [E] as central vowel. If [E] is back vowel, a difficulty arises in explaining why it does not behave like other back back vowels, but behaves together with non-back vowels.

15. In the phonology of standard Korean, this is referred to as i-deletion or i-insertion. In Kyungsang Korean, i and E have merged to E, so the same phenomenon is termed as E-deletion. For detailed discussions of the issue of i-deletion or i-insertion, refer to Kim-Renaud (1982), Y.S. Kim (1985), Sohn (1987) among others.

16. The two suffixes -tolok ‘in order to’ and -EmyEnsE ‘while’ are added by me. These underlying representations are from speculation based on Kim’s analysis.

17. Chomsky and Halle (1968) interpret a rule with a parenthetical notation as a schema that abbreviates elementary subrules, which are disjunctively ordered.

18. In Kim (1989), pEs-sEmni-ta ‘undress (formal)’ has LHHL. Along the same line, pEs-ket-sEmni-ta ‘will undress (formal)’ would have the tone LHHHL. This is not true in my dialect. To derive the tone, she adds two rules, one is Spreading, which spreads the H of sEmni to all free tone bearing units to the left. The other is Dissociation, which delinks a H from the initial tone bearing unit. Anyhow, this does not affect my argument against her analysis at all.

19. The indeterminacy which arises in choosing the underlying representation of these suffixes might not seriously undermine Kim’s analysis.

20. These forms are observed in the speech of children in the age of three to six and even seven. The data are taken from my own child, who is around six years old. She has been using these pseudo-[E] forms since she was three.

21. The data are taken from the speech of my own child when she was four and a half. She was brought up in Daegu until she was four and was speaking the Daegu dialect when I observed this form.

22. One might say the tone of the tested adult forms are due to an analogy to the existing forms. However, the boundary between analogy and rules is not clear-cut. In generative grammar, analogy could easily be transferred to rules.

23. Even if we are allowed to modify the Association Conventions, it is not easy to modify as we desire it. In order to incorporate the notion "irregular" verb stems into the rule, we exploit the fact that "irregular" verb stems are in a complementary relationship with Invariant Tone Class II monosyllabic verb stems with respect to the initial sound: the latter only begin with tensed sounds, aspirated sounds, and [s],
whereas the former never begin with one of those sounds. ([h] is exceptional in that stems of both classes can have [h] as an initial sound.) However, we cannot directly modify the AC (3.44) in such a way that it does not apply when the initial consonant is not tensed, aspirated or [s], since it would then incorrectly not link a floating H to the initial mora even in Invariant Tone Class polysyllabic stems such as  kéll-ta ‘to draw’, céllk-ta ‘to enjoy’, cékÉp-ta ‘to be joyful’, 6lí-ta ‘to cut with scissors’, which have a plain (not tensed, not aspirated, nor [s]) initial consonant. (Recall that only Invariant Tone Class II monosyllabic nouns always begin with tensed sounds, aspirated sounds, or [s]. Disyllabic stems in this group do not show such regularity.)

24. This rule does not delete the initial H of Invariant Tone Class stems like mánna-ta ‘to meet’, since there is no monosyllabic verb stems in this group (see Chapter 4.1). Delinking (4.51) applies only when a verb stem is monosyllabic.

25. The complementizer -ko is a suffix, not a separate word since it cannot occur alone.

26. The stem-final consonant [l] is deleted before [s] and [n]. For a detailed discussion of the deletion, see Kim-Renaud (1974).

27. When shortening applies, suffixes such as -si ‘honorific’ (l-Esi/ underlyingly) and -myEnsE ‘while’ (l-EmyEns/ underlyingly) have already lost its initial vowel due to Deletion, which deletes the suffix initial [E] after a vowel.

28. Some of the obstruents do not alternate with a sonorant in North Kyungsang Korean. However, in other dialects including standard Korean all of them alternate with a sonorant.

29. Cases where consonants are assigned a mora by rule are not rare cross-linguistically. Latin is one such language. For more discussion, see Hayes (1989).

30. The alternation between [t] and [r] of t-irregular stems is observed in North Kyungsang Korean too.

31. There are no p-irregular stems in North Kyungsang Korean. In other words, there is observed no alternation between [p] and [w] in this dialect.

32. Actually, the stem-final [s] is pronounced as [t] due to neutralization. This stem does not have s-final variant. The labelling "s-irregular" is based on the Korean orthography, which used to be regarded to represent underlying phonemes. Here, I assume however that s-irregular stems have /s/ underlying, in order to distinguish them from t-irregular stems.

33. The stem-final [s] changes to [t] before a consonant due to neutralization.

34. This stem is irregular in North Kyungsang Korean too.
35. There are counter examples to the present analysis. Consider the stem koôp-tá ‘to be pretty’. The long vowel in this stem does not shorten before a vowel: e.g. koôw-aN-ta ‘was pretty’, koôw-Eni ‘because it is pretty’. The analysis proposed here would predict that the final consonant does not bear a mora. However, note that this stem is a p-irregular stem: the final [p] alternates with [w]. The stem uût-ta ‘to smile’ is also a counter-example. Since the long vowel in this stem shortens before a vowel, the present analysis assigns a mora to the final [s]. However, this [s], unlike other mora-bearing consonants, does not alternate with zero in any dialect of Korean.

36. Since the nucleus is the tone bearing unit in Kim’s analysis, a long vowel has only one tone bearing unit.
CHAPTER V
TONE IN DERIVATIONAL MORPHOLOGY

The aim of this chapter is to investigate tone as it relates to derivational morphology. It will be shown that the analysis proposed so far can provide an enlightening explanation for these tonal facts.

Among derivational affixes we will consider passive and causative suffixes, and various other verbal suffixes. The causative and passive suffixes are the most productive derivational suffixes. Other derivational affixes are so unproductive that their examples are limited in number.

5.1 Causative and Passive Suffixes

The causative suffix attaches to a verb stem X and derives another verb stem meaning ‘make someone or something X’. For example, the causative suffix -i attaches to the verb stem mEk- ‘to eat’ and derives the causative verb stem mEk-i- ‘to make eat’.

The passive suffix attaches to a verb stem X and derives a verb stem meaning ‘be X-ed’. So, for example, the passive suffix -hi attaches to the verb stem mEk- ‘to eat’ and derives the passive verb stem mEk-hii- ‘to be eaten’. In (5.1) are listed various forms of the causative suffix.
(5.1) Causative Suffixes

<table>
<thead>
<tr>
<th>Suffix</th>
<th>Example</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. -i</td>
<td>mÉk-i-ta</td>
<td>‘to make eat’</td>
</tr>
<tr>
<td></td>
<td>pút-i-ta</td>
<td>‘to attach’</td>
</tr>
<tr>
<td></td>
<td>c’ol-i-ta</td>
<td>‘to make boil dry’</td>
</tr>
<tr>
<td></td>
<td>cul-i-ta</td>
<td>‘to make decreased’</td>
</tr>
<tr>
<td>b. -ii</td>
<td>po-þi-ta</td>
<td>‘to make see’</td>
</tr>
<tr>
<td>c. -ki</td>
<td>án-ki-ta</td>
<td>‘to make hold in arms’</td>
</tr>
<tr>
<td></td>
<td>or an-ki-ta</td>
<td>‘to make (hair) washed’</td>
</tr>
<tr>
<td></td>
<td>ká-ki-ta</td>
<td>‘to make starve’</td>
</tr>
<tr>
<td></td>
<td>or kam-ki-ta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>kulm-ki-ta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or külm-ki-ta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or nám-ki-ta</td>
<td>‘to make remain’</td>
</tr>
<tr>
<td>d. -hi</td>
<td>ýp-hi-ta</td>
<td>‘to make dressed’</td>
</tr>
<tr>
<td></td>
<td>or ýp-hú-ta</td>
<td>‘to make solid’</td>
</tr>
<tr>
<td></td>
<td>süt-hi-ta</td>
<td>‘to make get cold’</td>
</tr>
<tr>
<td></td>
<td>Ép-hi-ta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or Ep-hú-ta</td>
<td>‘to make carry (a baby) on the back’</td>
</tr>
<tr>
<td>e. -li</td>
<td>tól-li-t a</td>
<td>‘to make turn’</td>
</tr>
<tr>
<td></td>
<td>hÉl-li-ta</td>
<td>‘to make flow’</td>
</tr>
<tr>
<td></td>
<td>al-li-ta</td>
<td>‘to make know’</td>
</tr>
<tr>
<td></td>
<td>or al-li-ta</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or p’al-li-ta</td>
<td>‘to make breast-feed’</td>
</tr>
<tr>
<td></td>
<td>or pul-li-ta</td>
<td>‘to make swell’</td>
</tr>
<tr>
<td>f. -u</td>
<td>phí-u-ta</td>
<td>‘to make bloom’</td>
</tr>
<tr>
<td></td>
<td>pi-u-ta</td>
<td>‘to make empty’</td>
</tr>
<tr>
<td></td>
<td>k’é-u-ta</td>
<td>‘to make wake’</td>
</tr>
<tr>
<td>g. -huu</td>
<td>mac-húu-ta</td>
<td>‘to make low’</td>
</tr>
<tr>
<td></td>
<td>nÉc-húu-ta</td>
<td>‘to make be late’</td>
</tr>
<tr>
<td></td>
<td>mac-húu-ta</td>
<td>‘to hit (the mark)’</td>
</tr>
<tr>
<td>h. -kuu</td>
<td>sos-kúu-ta</td>
<td>‘to make soar’</td>
</tr>
<tr>
<td></td>
<td>tal-kúu-ta</td>
<td>‘to make hot’</td>
</tr>
<tr>
<td></td>
<td>tot-kúu-ta</td>
<td>‘to make higher’</td>
</tr>
<tr>
<td></td>
<td>il-kúu-ta</td>
<td>‘to make rise’</td>
</tr>
</tbody>
</table>

As can be seen, causative suffixes such as -ki, -hi, -li freely alternate with one with a long vowel in some verbs (e.g. púl-li-ta ‘make swell’, pul-li-ta). In contrast, there is no vowel length variation in the Cuu- suffixes such as -kuu, and -huu.
In (5.2) are listed passive suffixes.

(5.2) Passive Suffixes

a. -ii
   po-ni-ta ‘to be seen’
   sah-ni-ta ‘to be piled up’
   chi-ni-ta ‘to be hit’
   col-ni-ta ‘to be boiled dry’

b. -kii
   t’El-kii-ta ‘to be plucked’
   c’ic-kii-ta ‘to be torn apart’
   kam-kii-ta ‘to be closed (eyes)’

c. -hii
   Ep-hii-ta ‘to be carried on the back’
   cap-hii-ta ‘to be caught’
   tar-hii-ta ‘to be closed’

d. -lii
   tEl-lii-ta ‘to be heard’
   pul-lii-ta ‘to be swollen’
   phal-lii-ta ‘to be sold’

Passive suffixes all are long-voweled: there are no short-voweled passive suffixes. This is in contrast to causative suffixes, some of which have a long vowel and others of which have a short vowel.

We will not concern ourselves with the problem of the distribution of various forms of the causative suffix and the passive suffix. For a discussion of this, see Y.S. Kim (1984).

The tone of causative and passive verb forms exhibits a regularity, namely that there is a H on the penultimate mora of the derived stems. So, in forms with a long-voweled suffix (e.g. t’El-lii-ta ‘to be shaky’, nEc-huu-ta ‘to let something be late’) a H appears on the first mora of the suffix; if a suffix is short-voweled, a H appears on the final mora of the base stem. The penultimate H would be a natural consequence in the analysis proposed so far, of the assumption that both base stems and these suffixes are underlyingly toneless. Under this assumption, HI (3.10) would insert a H in the derived stems. The inserted H then would associate, by FL (3.12),
with the final mora of the derived stem, which is phonetically the penultimate mora
due to the extratonality of the phonetically final mora (SET (3.15)). To illustrate, the
derivations of mÉk-i-ta ‘to let something eat’ and nac-húu-ta ‘to let something low’
are given in (5.3).

\[
\begin{array}{lll}
(5.3) & \text{mEk-} & \text{nac-} & \text{UF} \\
     & \text{mEk-i} & \text{nac-huu} & \text{derivation} \\
     & \text{mEk-i} & \text{nac-huu} & \text{HI (3.10)} \\
     & \text{H} & \text{H} & \\
     & \text{mEk-(i)} & \text{nac-hu(u)} & \text{SET} \\
     & \text{H} & \text{H} & \\
     & \text{mEk-(i)} & \text{nac-hu(u)} & \text{FL} \\
     & \text{H} & \text{H} & \\
     & \text{Inflectional Morphology Level} & \\
     & \text{mEk-(i)-ta} & \text{nac-hu(u)-ta} & \text{suffixation} \\
     & \text{H} & \text{H} & \\
     & \text{mEk-i-ta} & \text{nac-huu-ta} & \text{Peripherality Condition} \\
     & \text{H} & \text{H} & \\
\end{array}
\]

Unfortunately, not all base stems of causative forms and passive forms are toneless.
Take, for example, the causative form phi-u-ta ‘to make bloom’ and the passive form
chi-iti-ta ‘to be hit’. The base stems of these forms, namely phi- ‘to bloom’ and chi-
‘to hit’, have a floating H underlyingly: they exhibit the tone pattern of Invariant
Tone Class II verb stems (e.g. chi-kÈla ‘hit!’, chi-kê-ta ‘will hit’). With an underlying
floating H of a base stem, the penultimate H could not be derived directly, as
illustrated in (5.4).

\[
(5.4) \begin{array}{ll}
\text{chi-} & \text{UF} \\
\text{H} & \\
\end{array}
\]
The floating H would associate with the initial mora by the AC (3.45). The linked H would spread to the following mora to the right by Spreading, deriving the incorrect form *chl-ti-ta.

There are two different ways to solve this problem: one is to assume that the AC (3.45) does not apply at the derivation stratum. Then, Spreading cannot spread the H. As a result, the floating H of the stem would associate, by FL, with the right-most available mora, which is phonetically the penultimate mora due to the extratonality of the phonetically final mora (SET (3.15)).

The other is to assume a rule which deletes the underlying tone of base stems in forms containing a derivational affix. The deletion of the underlying tone of base stems would leave no tone in the domain. So, HI (3.10) would insert a H, which associates with the right-most available mora, which is phonetically the penultimate due to the extratonality of the phonetically final mora by SET (3.15).

As far as passive forms and causative forms are concerned, one solution works as well as the other. However, there is one derived form which refutes the first approach, namely the approach restricting the AC. The form is ciŭke ‘eraser’. This word is derived by attaching the suffix -ke ‘deverbal suffix’ to the verb stem ci-u-ta.
'to erase'. (The discussion of the suffix -ke appears in the next section.) The verb stem ciu-ta 'to erase' has a prelinked H on the first mora, since a H invariably appears on the first mora: e.g. ciu-ta 'to erase', ciu-ko 'erase and', ciu-ket-ta 'will erase', ciw-Ela 'erase!'. The suffix -ke 'deverbal' is toneless as are other suffixes. Note that in the derived form ciükke 'eraser', a H appears on the second mora, not on the first mora. The rule restriction approach cannot account for the tone of this derived form: preventing the AC (3.45) from applying to this form does not derive the surface form, since the AC (3.45) has nothing to do with prelinked H. The deletion approach, on the other hand, can explain the tone of this form in a straightforward way. The H of base stems would be deleted, leaving no H in the domain. The inserted H associates, by FL, with the right-most available mora, which is the phonetically penultimate mora due to SET (3.15). Accordingly, I adopt the deletion approach. The following H-deletion rule hence is proposed.

(5.5) Derivational H-deletion (domain: derivation stratum)

\[
H \xrightarrow{\text{ Derivational H-deletion }} \emptyset
\]

The form chi-li-ta 'to be hit' is derived as in (7.6).

(5.6)  

\begin{align*}
\text{ chi-} & \quad \text{UF} \\
\text{ H} & \\
\text{ chi-ii-} & \quad \text{derivation} \\
\text{ H} & \\
\text{ chi-ii} & \quad \text{Derivational H-deletion} \\
\text{ H} & \\
\text{ chi-ii(i)} & \quad \text{SET (3.15)} \\
\text{ H} &
\end{align*}
There is still a problem which remains to be solved regarding causative and passive forms. Consider the following causative and passive forms. These forms have something in common, that is, their base stems underlyingly are all long-voweled and the long vowel is shortened in the causative and passive forms.

(5.7) a. c’ol-i-ta ‘to make boil dry’
     (c’ool- ‘to boil dry’ + -i ‘causative’)

b. c’ol-ii-ta ‘to be boiled dry’
     (c’ool- ‘to boil dry’ + -ii ‘passive’)

c. cul-i-ta ‘to make small’
     (cuul- ‘to become small’ + -i ‘causative’)

d. kulm-ki-ta or kulm-kii-ta ‘to make starve’
     (kuulm- ‘to starve’ + -ki(i) ‘causative’)

e. nam-ki-ta or nam-kii-ta ‘to make remain’
     (naam- ‘to remain’ + ki(i) ‘causative’)

f. töl-li-ta ‘to make turn’
     (tool- ‘to turn’ + -li ‘causative’)

g. ál-li-ta or al-li-ta ‘to make know’
     (aal- ‘to know’ + -li(i) ‘causative’)

h. pûl-li-ta ‘make swell’  
   (puul- ‘to swell’ + -li ‘causative’)

i. tal-kûu-ta ‘make hot’  
   (taal- ‘to be hot’ + -kuu ‘causative’)

j. il-kûu-ta ‘make rise’  
   (iil- ‘to rise’ + -kuu ‘causative’)

The long vowel of base stems is shortened when followed by a causative suffix or a passive suffix, regardless of whether the suffix is vowel-initial (e.g.-i) or consonant-initial (e.g.-li(i), -ki(i), -kuu). We know that the same is not true in inflectional morphology. In inflectional morphology, stem-final long vowels are shortened only when the stem is followed by a vowel-initial suffix. So, for example, the stem naam- ‘to remain’ is not shortened in naâm-kêt-ta ‘will remain’ but is shortened in nâm-Et-ta ‘remained’, where -ket ‘future tense’ and -Et ‘past tense’ are inflectional suffixes. (For more, see Chapter 4.8). Therefore, Shortening (4.70), which shortens a stem-final long vowel when the stem is immediately followed by a vowel, cannot account for the shortening in causative and passive forms.

There might be various ways to account for the shortening in causative and passive forms. One might try to propose that causative and passive suffixes are all vowel-initial underlyingly. The initial consonant is later inserted in some phonetic environment. Then, the shortening in base stems would be a result of the application of Shortening (4.70) provided that this rule applies before the initial consonant is inserted. This approach, however, is not tenable because the initial consonant is not predictable on the basis of the phonetic environment; the initial consonant must be part of underlying representation of these suffixes.
Rather, I propose that the shortening in causative forms is the result of the application of a rule which shortens stem-final long vowels if stems are followed by causative suffixes and passive suffixes.

(5.8) Causative Vowel Shortening

\[
\begin{array}{c}
\text{M} \ M \ \text{M} + \text{causative suffix} \\
\text{passive suffix}
\end{array}
\]

It remains to be seen whether this rule applies in derivational morphology in general. Until we have supporting evidence for it, we will simply assume that this rule applies only before causative suffixes and passive suffixes.

To illustrate, the derivation of the form *tal-kùu-ta* 'to make hot' is given in (5.9).

(5.9) taal- \quad UF

taal-kuu- \quad derivation

tal-kuu- \quad Derivational Shortening (5.7)
tal-kuu- \quad HI (3.10)
tal-ku(u)- \quad SET (3.15)
tal-ku(u)- \quad FL (3.12)

Inflectional Morphology Level

tal-ku(u)-ta \quad suffixation
Before wrapping up the discussion, I will show that the tone of the variant forms of the causative is a natural corollary of the proposed analysis. Some causative forms have variants, one with a short-voweled suffix, the other with a long-voweled suffix (e.g. \textit{nām-ki-ta} 'to make remain' alternating with \textit{na-n-kī-ia}). In the form with a short-voweled causative suffix, a H appears on the stem mora; in the form with a long-voweled causative suffix, a H appears on the first mora of the suffix. That is, in both forms a H appears on the penultimate mora of the derived stems, which is exactly what is predicted by the proposed analysis. In (5.10a) is given the derivation of a variant with a short vowel; in (5.10b) is given the derivation of a variant with a long vowel.

\[
\begin{array}{lll}
\text{(5.10) a.naam-} & \text{b.naam-} & \text{UF} \\
\text{naam-ki} & \text{naam-kii} & \text{suffixation} \\
\text{nam-ki} & \text{nam-kii} & \text{Derivation Shortening} \\
\text{nam-ki} & \text{nam-kii} & \text{HI} \\
\text{H} & \text{H} & \\
\text{nam-(ki)} & \text{nam-kii(i)} & \text{SET} \\
\text{H} & \text{H} & \\
\text{nam-(ki)} & \text{nam-kii(i)} & \text{AC} \\
\text{H} & \text{H} & \\
\text{Inflectional Morphology Level} & \text{nam-(ki)-ta} & \text{nam-kii(i)-ta} \\
\text{suffixation} & \text{H} & \text{H} \\
\end{array}
\]
5.2 Deverbal Suffixes and Penultimate H

There are various suffixes which attach to verb stems to derive non-verb output. Among them are -ke, -Em, and -i. We first consider the noun-forming suffix -ke. The suffix -ke attaches to verb stem X and derives a noun meaning ‘a thing which does X’. This derivation is not productive, so the examples with this suffix are limited.

(5.11) Deverbal Suffix -ke

\[
\begin{align*}
t\text{Éph-ke} & & \text{‘cover’} & (t\text{Éph-ta ‘to cover’ + -ke}) \\
m\text{ák-e} & & \text{‘stopper’} & (m\text{ák-ta ‘to stop’ + -ke}) \\
n\text{ál-ké} & & \text{‘wing’} & (n\text{ál-ta ‘to fly’ + -ke}) \\
c\text{í-ke} & & \text{‘carrier’} & (c\text{í-ta ‘to carry’ + -ke}) \\
c\text{íp-ke} & & \text{‘tongs’} & (c\text{íp-ta ‘to pick’ + -ke}) \\
c\text{íu-ke} & & \text{‘eraser’} & (c\text{íu-ta ‘to erase’ + -ke})
\end{align*}
\]

A H regularly appears on the penultimate mora of the derived forms with one exception, nál-ké ‘wing’. The analysis proposed above for causative and passive forms can explain the penultimate H in these derived forms in a straightforward way. Since the stems are underlyingly toneless, as is the suffix, HI inserts a H, which associates with the right-most available mora. Since the phonetically right-most mora is made extratonal due to SET (3.15), this H associates with the phonetically penultimate mora, as illustrated in the derivation of cí-ke ‘carrier’. 
The base stem -ci ‘to carry on the back’ is underlying toneless. (It is a Variant Tone Class verb stem). So, Derivational H-deletion would apply vacuously.

As noted above, the tone of nāl- ké ‘wing’ cannot be derived by the proposed analysis. I would treat this form as an exception and propose that tone of this form is lexically assigned.

Secondly, we discuss the noun-forming suffix -Em. The suffix -Em attaches to a verb stem to derive a noun. This suffix is not productive, so the examples with this suffix are few.

(5.13) Deverbal Suffix -Em

<table>
<thead>
<tr>
<th>Stem</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>kÉl-Em</td>
<td>‘walking’ (kEIl- ‘to walk’ + -Em)</td>
</tr>
<tr>
<td>úl-Em</td>
<td>‘crying’ (uul- ‘to cry’ + -Em)</td>
</tr>
<tr>
<td>Él-Em</td>
<td>‘ice’ (EEl- ‘to freeze’ + -Em)</td>
</tr>
<tr>
<td>nol-Ém</td>
<td>‘gamble’ (noól-tá ‘to play’ + -Em)</td>
</tr>
<tr>
<td>mül-Em</td>
<td>‘question’ (muul- ‘to question’ + -Em)</td>
</tr>
<tr>
<td>ús-Em</td>
<td>‘laugh’ (uus- ‘to laugh’ + -Em)</td>
</tr>
</tbody>
</table>

A H appears on the penultimate mora with one exception, nol- Ém ‘gamble’. Note also that the base stems are all underlyingly long-voweled, but are shortened in derived
forms. The penultimate H of these forms and the shortening of long vowels can be straightforwardly explained by the analysis proposed above. First, shortening is the result of the application of Shortening (4.70), which shortens a stem-final long vowel when the stem is followed by a vowel, since the base stems in these examples are followed by a vowel-initial suffix -Em. As for the penultimate H, since the suffix -Em is toneless and the base verb stem has no tone (either underlyingly or due to Derivational H-Deletion), HI would insert a H. By FL, this H would associate with the final mora, which is phonetically the penultimate due to the extratonicity of the phonetically final mora. To illustrate, the derivation of úl-Em ‘crying’ is given in (5.14).

(5.14) uul-UF
    uul-Em suffixation
    ul-Em Shortening (4.70)
    ul-Em HI
    H
    ul-(Em) SET (3.15)
    H
    ul-(Em) FL
    l H
    úl-Em

After Shortening (4.70) has applied, there is no longer a long vowel at the left edge of the form, which explains why Long Vowel H-Insertion cannot apply here. Instead, HI applies.
The tone of the form nol-Ém 'gambles', however, cannot be derived by the present analysis. What makes this form distinct from other derived forms in (5.11), besides tone, is that the semantic connection between the derived form and the base verb stem is more remote in this form: there might even be some people who make no synchronic connection between this form and the verb stem nool- ‘to play’. Even though semantic shift is one of the characteristics of derivational morphology, I propose not to set up any synchronic connection between nol-Ém 'gambles' and the verb stem nool- ‘to play’. Tone in this form can be treated simply as lexically assigned.

Finally, the adverb-forming suffix -i is discussed. The suffix -i attaches to a verb stem and derives an adverb.

(5.15) Deverbal Suffix -i

<table>
<thead>
<tr>
<th>Base Stem</th>
<th>Derived Form</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>p’álí</td>
<td>p’álE- -i</td>
<td>‘quickly’</td>
</tr>
<tr>
<td>kilí</td>
<td>kilE- -i</td>
<td>‘for a long time’</td>
</tr>
<tr>
<td>tálí</td>
<td>talE- -i</td>
<td>‘differently’</td>
</tr>
<tr>
<td>kúci</td>
<td>kut- -i</td>
<td>‘stubbornly’</td>
</tr>
<tr>
<td>káchí</td>
<td>kathi- -i</td>
<td>‘together’</td>
</tr>
<tr>
<td>mflí</td>
<td>miil- -i</td>
<td>‘in advance’</td>
</tr>
<tr>
<td>nÉlli</td>
<td>nEll- -i</td>
<td>‘widely’</td>
</tr>
<tr>
<td>(or nÉlli)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kipí</td>
<td>kipE- -i</td>
<td>‘deeply’</td>
</tr>
<tr>
<td>mÉlli</td>
<td>mEllE- -i</td>
<td>‘far away’</td>
</tr>
<tr>
<td>nóphi</td>
<td>nophE- -i</td>
<td>‘high (adverb)’</td>
</tr>
</tbody>
</table>

The adverb-forming suffix has variants: -i and -li. -li seems to occur when the base stem ends in [l] (e.g. tálí ‘differently’, mÉlli ‘far away’, nÉlli ‘widely’); kil-i ‘for a long time’ is an exception.

We first turn to the shortening of base stems. Note that a long vowel in base stems is shortened when the stem is followed by a vowel. So, in kilí ‘for a long
time', where the base stem *kiil* ‘to be long’ is followed by a vowel-initial suffix -i, the stem long vowel is shortened. In contrast, the long vowel of the base stem is not shortened in the form *mêÉll* ‘far away (adverb)’, since the stem is followed by a consonant-initial suffix -li. This is exactly what is predicted by Shortening (4.70), which shortens a stem-final long vowel when the stem is immediately followed by a vowel.

We next turn to tone in the examples in (5.13). With one exception (that is *kâcli* ‘together’), a H regularly appears on the penultimate mora, if there is no long vowel at the left edge of a form. If there is a long vowel at the left edge, the second and the third mora are high-toned (e.g. *mêÉll* ‘widely’). The tones of both cases can be explained by the analysis proposed so far. First, the tone of forms with a long vowel at the left edge is a result of the application of LVH (3.97), which inserts a H in a form with a long vowel at the left edge (see Chapter 3.4). The inserted H would associate, by the AC (3.45) with the left most available mora. Spreading (3.46) would spread the linked H to the next mora to the right. To illustrate, the derivation of *mêÉll* ‘widely’ is given in (5.16).

(5.16)  mêÉll-  
mêÉll-li suffixation 
mêÉll-li LVH (3.97) 
H (mê)Éll-li LET 
H (mê)Éll-li AC 
I
The penultimate H, on the other hand, is explained by the interaction of DHI and FL. Since derived forms are underlyingly toneless (due to the fact that suffixes are underlyingly toneless and the tone of base stems, if there is one, is deleted by Derivational H-Deletion (5.5)) and there is no long vowel at the left edge of a form (after Shortening (4.70) has applied), a H is inserted by HI. This inserted H would associate, by FL, with the final mora, which is phonetically the penultimate, since the phonetically final mora is rendered extratoneal by SET (3.15). Below in (5.17) is given the derivation of kiil ‘for a long time’.

(5.17)  

| (5.17)  |  
| kiil-  |  
| kiil-i | suffixation  
| kil-i | Shortening (4.70)  
| kil-i | HI  
| kil-(i) | SET  
| H |  
| kil-(i) | FL  
| H |  
| kil-i |  

How about the tone of the form kâchî ‘together’? This word has two high-toned moras, not one high-toned mora as is expected of short-voweled forms. What distinguishes this form from other derived forms in (5.14) besides tone is that the
base stem of this form has a floating H underlyingly (e.g. káth-iá ‘to be same’) while the base stems of other forms are inherently toneless. If the underlying floating H is retained, then the tone of the form káchi ‘together’ is a natural result of this underlying tone, since a floating H ends up associating with the first two moras by Initial Tone Association and Spreading. However, as we know, the underlying tone of base stems in derivational morphology is deleted by Derivation H-deletion (5.5), so this cannot be the case.

As a way to solve the problem, we can either restrict Derivational H-deletion to certain derivational suffixes such as causative, passive suffixes and the noun-forming suffix -ke. In the adverb forming suffix -i and -li the rule does not apply. An alternative would to treat káchi ‘together’ as an exception to this rule. It remains to be seen which one is a better solution.
Notes

1. Stems in these examples are in their underlying forms, rather than surface forms for the sake of discussion. On the surface, obstruents in the syllable coda are neutralized and merge with [t].

2. In the standard dialect, where there is no vowel length distinction, passive suffixes have exactly the same forms as causative suffixes.

3. In the Standard dialect, where vowel length is not distinctive, causative suffixes and passive suffixes are identical in many cases.

4. The cases where causative suffixes and passive suffixes attach to polysyllabic verb stems are rare: tEÉlÉp-hi-ta ‘to make dirty’ is the only such example. This, I think, is simply a result of the fact that there are few polysyllabic verb roots.

5. Resyllabification (4.11) does not apply in this case even though there arises two "strictly" adjacent moras, since the second mora is part of a long vowel. Resyllabification applies, I assume, when neither of two adjacent moras is a member of a long vowel.

6. In Hausa, some tonal phenomenon can be accounted for by deleting the tone of stems in inflected forms. According to Odden (in a personal communication), tone of stems is deleted in Nama reduplication and compounding.

7. This form underwent glide formation.

8. Only stem-final long vowel seems to be shortened. So, the long vowel of the base stem tEElÉp- ‘to be dirty’ is not shortened when followed by the causative suffix -hi: tEÉlÉp-hi-ta ‘to make dirty’. tEElÉp-hi-ta ‘to make dirty’ is, as far as I know, the only example where the base stem is polysyllabic.

9. Passive forms, on the other hand, do not have variants.

10. This suffix has to be distinguished from the formally indentical but functionally different suffix -Em ‘nominal suffix’. The nominal suffix attaches to a verb stem X and derive a word meaning ‘the state or action of X’ e.g. mÉk-Em ‘the state of eating’, múl-Em ‘the action of questioning’. These derived forms are different from the derived nouns listed in (5.12) in that the former cannot function like ordinary nouns: they cannot be a subject, an object and so on; they are more like verbs in the sense that they have a subject or an object: e.g. pap-El mEk-Em ‘eating a meal’ where pap-El is in the accusative case serving as an object of mEk-Em. In contrast, the nouns listed in (5.12) function exactly like ordinary nouns: they can be a subject and an object. So, for example, in the following sentence úl-Em-El thEt’ÉlyEtta ‘burst in tears’, úl-Em ‘cry’, which has an accusative marker -El, serves as an object of the verb thEt’ÉlyEtta ‘burst (past)’.
11. The base stem-final [t] and [th] becomes [c] and [ch] respectively before the suffix -i due to palatalization.
The purpose of this chapter is to examine tone of compounds. Compounding is a process which involves two free morphemes or words, and whose output is a lexical item.

In the first section, I will briefly discuss the Bindung-s phenomenon, which is a phonological (segmental) phenomenon which occurs only in compounds. In the second section, tone of compounds will be discussed.

6.1 Bindung-s

There are several phenomena which occur between two elements of compounds. The consonant of the second element is tensified even when it is preceded by a sonorant. (There is a general tensification process by which a consonant is tensified when preceded by an obstruent (/mEk-ta/ 'eat' becomes mEk-t'a; /cap-kol/ 'catch and' becomes cap-k'o.) When the first element is vowel-final, [n] is inserted between the two elements if the second element begins with [n]; [t] is inserted if the second member is vowel-initial.

(6.1)  a. anp'ang 'living room' (an ‘inside (noun) + pang ‘room’)
    b. alenni 'lower teeth' (ale ‘below (noun)’ + ni ‘tooth’)
Traditionally (Huh 1968, K.M. Lee 1978), these seemingly different phenomena were accounted for by epenthetic s between the two elements of compounds. The inserted [n] is the result of the inserted s assimilating to the following nasal, the inserted [t] is the result of neutralization of s, the tensification of the following consonant is conditioned by the presence of s. This is why these phenomena are named Bindung-s.

There are, however, some types of compounds which are not subject to the Bindung-s rule. Co-compounds are one of them. Co-compounds are the compounds where the two morphemes involved have the structure head + head, as in the English compound deaf-mute and are thus conjoined, in contrast to sub-compounds, where the two morphemes involved have the head + modifier relation, as in the English compound blackbird. In (6.2) are listed examples of co-compounds. Note that the initial consonant of the second element is not tensified.

(6.2) [[pom][kaEl]] ‘spring and fall’ (pom ‘spring’ + kaEl ‘fall’)
    [[non][path]] ‘fields (in general)’ (non ‘a rice field’ + path ‘field’)

There is another group of compounds which do not undergo the Bindung-s rule. These compounds have as the left-hand element either a lexical adjective morpheme or an adnominal-inflected word (Sohn 1987). An adnominal-inflected word is a verb stem with an adnominal suffix such as -nEn, -En and -El. In (6.3) are given compounds whose left-hand member is a lexical adjective; in (6.4) are given compounds whose left-hand member is an adnominal-inflected word. Note that in both types of compounds, the Bindung-s phenomenon does not occur: the
initial consonant of the right-hand member is not tensified.

(6.3) \([\text{paan}][\text{tal}]\) ‘half moon’ (paan ‘half (adj.)’ + tal ‘moon’)

\([\text{han}][\text{pam}]\) ‘deep night’ (han ‘big’ (adj.) + pam ‘night’)

(6.4) \([\text{tan}][\text{pi}]\) ‘long-awaited rain’ ([[tal], En] ‘sweet’ [pi] ‘rain’)

\([\text{sikEn}][\text{pap}]\) ‘meal left over’ ([[sik], En] ‘got cold’ [pap] ‘meal’)

Whenever relevant, the Binding-s phenomenon will be referred to in the following discussions.

6.2 Tone of Compounds

Compounds consist of noun plus noun, adjective plus noun, or verb stem plus verb stem. Noun-noun compounds are the most common compounds; there are a few adjective-noun compounds; verb stem-verb stem compounds are rare. I will concern myself with adjective-noun compounds and noun-noun compounds. Adjective-noun compounds are examined first. The comparison of these compounds with adjective-noun phrases reveals that tone of compounds is distinct from tone of phrases.

6.2.1 Adjective-Noun Compounds

In English, certain sequences of adjective and noun can be distinguished for being compound or a phrase according to the stress pattern. If the stress occurs exclusively on the left-hand member, it is a compound; if the primary stress occurs on the right-hand member, it is a phrase. So, for example, the compound bláckbird
is stressed on the left-hand member, whereas the phrase *a black bird* is primarily stressed on *bird*.

In North Kyungsang Korean, there is a parallel correlation between compounds and phrase-level sequences, signalled by tone. In compounds, any underlying tone of the left-hand member is deleted and the tone of the right-hand member survives as the tone of the whole compound. In phrases, on the other hand, the tone of the left-hand member survives and the tone of the right-hand member is deleted. Consider the following examples. The first example in each set is a phrase and the second one is a compound.

(6.4)⁵ (a)  
khEn ápÉci 'big (physically) father' ⁶
khEn apÉci 'older brother of father'

/khÉn 'big' apÉci 'father'/

caâkÉn apÉci 'small (physically) father'

caâkÉn apÉci 'younger brother of father'

/caâkÉn 'small' apÉci 'father'/

caâkÉn atEl 'small (physically) son'

caâkÉn átEl 'son but the oldest'

/caâkÉn 'small' átEl 'son'/
(b) khÉn páng ‘big room’
khÉn páng ‘living room’
/khÉn ‘big’ páng ‘room’/ H
caákÉn pang ‘small room’
cakÉn páng ‘subsidiary room’
/caákÉn ‘small’ páng ‘room’/ H
caákÉn cip ‘small house’
cakÉn cip ‘uncle (younger brother of father)’s house’
/caákÉn ‘small’ cip ‘house’/ H

(c) sǐkÉn pap ‘meal which has got cold’
sǐkÉn pap ‘meal left over’
/sǐkÉn ‘get cold’ páp ‘meal’/ H

(d) pǐpim pap ‘mixed rice’
pǐpim p’ap ‘a Korean dish’
/pǐpim ‘mixed’ p’ap ‘rice’/ H

(Actually, words with a long initial vowel do not have a floating H underlyingly. Recall that a H is inserted in such forms by LVH. In the data here and following, however, for the sake of convenience, stems with a initial long vowel are assigned a floating H underlyingly. This does not affect the discussion in any significant way.)
We note that the meaning of the phrases in (6.4) is generally predictable from the individual word's meaning and their construction (hence the semantic interpretation is compositional), whereas the meaning of the compounds is not predictable.

As noted above, the tonal difference between compounds and phrases is that in phrases the underlying tone of the left-hand member survives and tone of the right-hand member is deleted, whereas in compounds the tone of the right-hand member survives and the tone of the left-hand member is deleted. This can be explained by the following rules.

(6.5) Compound Rule 1

In a compound X + Y, the tone of X is deleted.

(6.6) Phrase H-Deletion

In a phrase X # Y, the tone of Y is deleted.

First, consider the examples in (6.4a). These examples involve a word with a floating H followed by a word with a prelinked H. In phrases, the first two moras are high-toned on the surface (e.g. khEn âpEci 'big father'), whereas in compounds a H appears on the mora in the right-hand member which has a prelinked H (e.g. khEn apÉci 'father's old brother'). Phrase H-deletion (6.6) correctly predicts the tone of these phrases. The tone of the right-hand member deletes by Phrase H-deletion (6.6). Then, the floating H of the left-hand member associates with the initial mora by the AC (3.45). This linked H spreads to the following mora to the right by Spreading (3.46), deriving the phrase tone correctly.

(6.7) khEn apEci

\[ \begin{array}{c}
\text{UF} \\
\text{H} & \text{H}
\end{array} \]
In compounds, on the other hand, the floating H of the left-hand member deletes by Compound Rule 1. The prelinked H of the right-hand member thus surfaces.

(6.8) khEn apEci  
H

khEn apÉci

Let us move to the examples in (6.4b). These examples involve a word with a floating H as the right-hand member, and a word with no inherent tone as the left-hand member. The first two moras are high-toned in phrases (e.g. khÉn páng ‘big room’), whereas in compounds a H appears on the right-hand member (e.g. khÉn páng ‘living room’). These tone patterns can also be explained in a straightforward way by the analysis proposed so far. In phrases, the floating H of the left-hand member would survive, and associates with the first two moras by the AC (3.45) and Spreading (3.46).

(6.9) khEn pang  
H

NA

Phrase H-deletion (6.6)
In compounds, on the other hand, the floating H of the left-hand member would be deleted, leaving no tone in the domain. HI applies and inserts a H to this toneless domain. This inserted H is not subject to the AC and Spreading, since, as we discussed earlier, HI applies after these two rules have applied. The inserted H, rather, will end up associating with the final mora by FL.

(6.10) khEn pang
     H
khEn pang
     C
khEn pang
     F

Now, the examples in (6.4c) will be considered. These examples involve a word with a prelinked H as the left-hand member, and a word with a floating H as the right-hand member. On the surface, a H appears on the mora of the left-hand member which has a prelinked H in phrases (e.g. sikEn pap 'meal which has got cold', whereas in compounds the final mora of the left-hand member is high-toned (e.g. sikÉn pap 'meal left over'). The tone of phrases can directly be derived by
Phrase H-deletion (6.6), which deletes the tone of the right-hand member. The derivation of the phrase *sǐkÈn pap 'meal which got cold' is given in (6.11).

(6.11) sikÈn pap

\[ \text{sikÈn pap} \quad \text{Phrase H-deletion (6.6)} \]

\[ \text{sikÈn pap} \]

The tone of compounds, however, cannot be derived by the analysis proposed so far. Compound Rule 1 would delete the H of the left-hand member. The floating H of the right-hand member would survive and end up associating with the first two moras by the Association Conventions and Spreading, deriving incorrect forms.

(6.12) sikÈn pap

\[ \text{sikÈn pap} \quad \text{Compound Rule 1} \]

\[ \text{sikÈn pap} \]

\[ \text{sikÈn pap} \quad \text{AC (3.45)} \]

\[ \text{sikÈn pap} \]

\[ \text{sikÈn pap} \quad \text{Spreading (3.46)} \]

\[ \text{sikÈn pap} \]

\[ \text{*sìkÈn pap} \]

The incorrect form *sìkÈn pap, instead of the correct form sikÈn pap 'meal left over', is derived. In order to derive the correct form, we require a rule which docks a floating H to the final mora of the preceding morpheme in compounds.
(6.13) Compound Rule 2

In a compound X + Y, dock a floating H to the final mora of X.

\[
\begin{array}{c}
\text{M} \\
\text{H}
\end{array}
\]

Provided that Compound Rule 2 applies after Compound Rule 1, Compound Rule 2 correctly docks the floating H of the right-hand member to the final mora of the left-hand member, as illustrated in the derivation of \textit{sikÉn pap} 'meal left over'.

(6.14) \textit{sikEn pap}\

\[
\begin{array}{c}
\text{UF} \\
\text{H} \\
\text{H}
\end{array}
\]

There is one more fact which needs to be explained in the examples in (6.4). Consider the compounds \textit{cakEn pâng} 'subsidiary room' and \textit{cakEn åîEl} 'son who is not the eldest'. The left-hand member \textit{cakEn} 'small' has a short vowel on the surface. Note however that it is long-voweled underlyingly, i.e. \textit{caakEn}. The surface shortening of this vowel is a result of the application of Level-toned Vowel Shortening (3.87), which shortens a level-toned long vowel. (Recall that there are no level-toned long vowels in this language.) The initial long vowel of \textit{caakEn} 'small' would be low level-toned after compound rules and other relevant rules have applied.
The initial long vowel is low level-toned after Default L-insertion has applied, so LTS (3.85) applies.

LTS (3.85) could in fact be regarded as a phonetic implementation rule since it applies quite late in the derivation, after Default L-insertion. There are no rules which are required to follow this rule.

6.2.2 Noun-Noun Compounds

Now, we turn to compounds which consist of two nouns. A sequence of noun plus noun cannot be regarded as a phrase, so a comparison between phrases and compounds cannot be made as was possible in the case of adjective plus noun.

Consider the following noun-noun compounds in (6.16). The tone of these examples is explainable by the compounds rules proposed above. First, consider the compounds in (6.16). Underlyingly, these compounds have a word with a prelinked H as the right-hand member. The left-hand member has either a H, prelinked or floating, or no H. On the surface, a H appears on the mora of the right-hand
member which has a prelinked H.

(6.16) (a) miyEk c'úiki 'stem of seaweed'
/miýEk 'seaweed' + cúiki 'stem'/
\ H \ H
kimchi k'úkmul 'juice of kimchi'
/kímchi 'Korean pickle' + kúkmul 'juice'/
\ H \ H

(b) pap k'ÉlEt 'rice bowl'
/páp 'rice' + kÉlEs 'bowl/
\ H \ H
son p'átak 'the palm of the hand'
/són 'hand' + pátak 'bottom'/
\ H \ H

(c) mok t'Élmi 'nape of the neck'
/mók 'neck' + tÉlmi 'nape'/
\ H \ H

mEnci thÉli 'duster'
/mEnci 'dust' + thÉli 'shaker'/
\ H \ H

The surface tone of these examples is a natural result of the application of Compound Rule 1, which deletes the underlying tone of the left-hand member of a compound, the tone of the right-hand member survives as the tone of compound.

The compounds in (6.17) have a word with a floating H as the right-hand member. The left-hand member has either a H, prelinked or floating, or no H
underlyingly. On the surface, a H appears on the final mora of the left-hand member in all these examples.

\[(6.17)\] (a) culÉm sal 'wrinkles in the face' \(^{12}\)  
\[\text{/culÉm 'wrinkle'+ sal 'flesh'/} \]
\[\text{H} \]

(b) páp thoN 'rice barrel'
\[\text{/páp 'rice' + thoN 'barrel'/} \]
\[\text{H} \quad \text{H} \]

k'úl t'anci 'honey jar'
\[\text{/k'úl 'honey' + tanci 'jar'/} \]
\[\text{H} \quad \text{H} \]

tampé t'e 'pipe for cigar'
\[\text{/taampe 'cigar' + te 'stick'/} \]
\[\text{H} \quad \text{H} \]

(c) kuk mul 'liquid part of a dish'
\[\text{/kuk 'soup' + mul 'water'/} \]
\[\text{H} \]

chEntùng oli 'a kind of duck'\(^{13}\)
\[\text{/chEntung 'thunder'+ooli 'duck'/} \]
\[\text{H} \]

sán p'ul 'mountain fire'
\[\text{/san 'mountain' + pul 'fire'/} \]
\[\text{H} \]

kochu cang 'red pepper paste'\(^{14}\)
\[\text{/kochu 'red pepper' + caang 'sauce'/} \]
\[\text{H} \]

The surface tone of these examples can be explained by Compound Rule 1 and Compound Rule 2. The left hand tone deletes by Compound Rule 1. The tone of the right-hand, which is a floating H, survives, and associates with the final mora of the left-hand member by Compound Rule 2, as illustrated in the derivation of culÉm sal 'wrinkles'.
Let us turn to compounds whose right-hand member is underlyingly toneless.

(6.19) (a) more sacáng ‘sandy beach’
/more 'sand' + sacang 'sandy beach'/
| | H

titil p'anga ‘treadmill’
/titil 'treading' + panga 'mill'/
| | H

(b) chek k'apáng ‘school bag’
/chek ‘book’ + kabang ‘bag’/
| | H

kama s6t ‘big pot’
/kaama ‘furnace’ + sot ‘pot’/
| | H

son mdk ‘wrist’
/son ‘hand’ + mok ‘neck’/
| | H

pal mdk ‘ankle’
/pal ‘foot’ + mok ‘neck’/
| | H

mil k’alú ‘wheat flour’
/mil ‘wheat’ + kalu ‘flour’/
(c) sul c’ip ‘bar’
/sul ‘alcohol + cip ‘house’/

kochu k’alú ‘red pepper power’
/kochu ‘red pepper’ + kalu ‘powder’/

The examples in (6.19) have inherently toneless right-hand member. The left-hand member has either a H, prelinked or floating, or no underlying H. On the surface, a H appears on the final mora of the right-hand member.

The surface tone of these examples is also correctly predicted by Compound Rule 1. Compound Rule 1 would delete the tone of the left-hand member, leaving no tone in the domain. HI (3.10) would insert a H in the toneless domain. This inserted H would associate with the final mora by FL, as illustrated in the derivation of more sacâng ‘sand beach’.

\[
\begin{array}{c}
(6.20) \text{more sacang} \\
\quad \text{UF} \\
\quad \text{H} \\
\end{array}
\]

\[
\begin{array}{c}
\text{more sacang} \\
\quad \text{Compound Rule 1} \\
\quad \text{H} \\
\end{array}
\]

\[
\begin{array}{c}
\text{more sacang} \\
\quad \text{HI (3.10)} \\
\quad \text{H} \\
\end{array}
\]

\[
\begin{array}{c}
\text{more sacang} \\
\quad \text{FL} \\
\quad \text{H} \\
\end{array}
\]

more sacâng

The H inserted by HI does not associate with the final mora of the left-hand member by Compound Rule 2, since HI applies after Compound Rule 2.15

Now, let us turn to the shortening in the examples above. The examples which contain a long vowel underlyingly are repeated in (6.21).
(6.21) (a) tampē t’e ‘pipe for cigar’
/taampe ‘cigar’ + te ‘pipe’/
H     H

(b) chEntūng oli ‘a kind of duck’
/chEntung ‘thunder’ + ooli ‘duck’/
H

(c) kochū cang ‘red pepper paste’
/kochu ‘red pepper’ + caang ‘sauce’/
H

(d) kama sót ‘big pot’
/kama ‘furnace’ + sot ‘pot’/
H

Note that underlying long vowels are shortened on the surface in these examples.
The shortening in these examples can also straightforwardly be explained by LTS (3.87). That is, the long vowels in these examples are low level-toned after Default L-insertion has applied, as illustrated in kochū cang ‘red pepper paste’.

(6.22) kochu caang
    H
NA         Compound Rule 1

kochu caang
    H

kochu caang
    H

Default L-insertion
L  H  LL

Level-toned long vowels are subject to LTS (3.85), which shortens level-toned long vowels.

(6.23) kochu caang
    L  H  LL

output of Default L-insertion
L  H  LL

kochu cang
L  H  L

LTS (3.85)
As a final point, note that the Bindung-s phenomenon occurs in most examples given so far.¹⁶ \textit{kochú cang} ‘red pepper paste’ is the only example where the Bindung-s phenomenon does not occur. The failure of the Bindung-s phenomenon could be taken as an indication that this example is a co-compound. Or this example might just be an exception to the Bindung-s phenomenon.

6.3 Lexical Compounds vs. "Syntactic" Compounds

There are, however, noun-noun compounds which exhibit both the compound tone pattern and the phrase tone pattern without entailing a remarkable meaning difference.

(6.24) a. puché(t) chum ~ púche(t) chum ‘fan dance’
\[ /\text{puche} \text{‘fan’ chum ‘dance’}/ \]
\[ | \quad H \]
\[ H \]

| patát k’a ~ pátat k’a ‘sea shore’
\[ /\text{pata} \text{‘sea’ kaa ‘bounds’}/ \]
\[ | \quad H \quad H \]

b. siné(t) k’a ~ síné(t) k’a ‘brook side’
\[ /\text{siine} \text{‘brook’ kaa ‘side’}/ \]
\[ H \quad H \]

| chésó(t) k’ake ~ cheésó(t) k’ake ‘vegetable store’
\[ /\text{cheeso} \text{‘vegetable’ kaake ‘store’}/ \]
\[ H \quad H \]

| tampé(t) k’ake ~ taâmpé(t) k’ake ‘cigarette store’
\[ /\text{taampe} \text{‘cigarette’ kaake ‘store’}/ \]
\[ H \quad H \]
The compounds in (6.24) exhibit two tone patterns, namely the compound tone pattern and the phrasal tone pattern. In the first variant, the tone of the right-hand member survives and the tone of the left-hand member is deleted (Compound Rule 1 (6.5)). In the second variant, the tone of the left-hand element survives and the tone of the right-hand deletes (Phrase H-deletion (6.6)). Note, however, that the difference in tone pattern does not result in a difference in meaning as was in the case of adjective plus noun (see Chapter 6.2).

The Binding's phenomenon also occurs in both variants: the initial consonant of the right-hand member is tensified in both variants, and/or a consonant, which is $L$, is inserted between two members, suggesting that they are both in fact compounds, despite the tonal difference.

There are, however, a group of noun-noun compounds which always exhibit the phrasal tone pattern.

(6.25)  

a. caăng t'ök 'sauce jar'  
(caăng 'sauce' + t'ök 'jar')  
H  
mül c'ip 'blister'  
(mül 'water' + c'ip 'house')  
H  

b. kÉřím chek 'picture book'  
(kÉřím 'picture' + chék 'book')  
H H  
kÉřím yÉpsÉ 'postcard'  
(kÉřím 'picture' + yÉpsÉ 'postcard')  
H H
coóm yák ‘mothballs’
(coóm ‘moth’+ yák ‘medicine’)
H H

ifyáiki chek ‘story book’
(iiýáki ‘story’+ chék ‘book’)
H H

c. khón nóre ‘humming song’
(khó ‘nose’+ nóre ‘song)
H |
H
múl k’óki ‘fish’
(múl ‘water’ + kóki ‘meat’)
H |
H

d. cóngi pe ‘paper boat’
(cóngi ‘paper’+ pé ‘boat’)
| H
H

siléki thoN ‘waste basket’
(siléki ‘waste’+ thóng ‘basket’/
| H
H

k’óli komtang ‘a Korean dish’
(k’óli ‘tail’+ koómtång ‘a Korean dish’)
| H
H

e. teéchú namu ‘prune tree’
(teéchú ‘prune’+ namú ‘tree’)
H

All the examples in (6.25) exhibit the phrasal tone pattern and only that pattern: the
tone of the right-hand member is deleted and the tone of the left-hand member
survives. Why do these examples exhibit the phrasal tone pattern?

The Binding-s phenomenon might provide a clue to resolve this problem.
The Binding-s phenomenon is not exhibited in all the examples above: some do
(e.g. khôn nôre 'humming song', mûl c'lp 'blister') but others do not (e.g. cóngi pe 'paper boat', seíchû namu 'prune tree'). Those which do not exhibit the Bindung-s phenomenon are not co-compounds, nor do they have a lexical adjective or an adnominal-inflected word as the left-hand member. Therefore, we must find some other explanation for why these examples do not undergo the Bindung-s process. One possibility is to treat them as exceptions to the Bindung-s phenomenon. An alternative is to treat them as different kind of compounds, namely "syntactic" compounds, in contrast to lexical compounds which are formed in the lexicon. Lexical compounds would undergo lexical rules such as the Binding-s rule. "Syntactic" compounds, in contrast, are not subject to lexical rules, since they are formed outside the lexicon, namely postlexically. Hence, "syntactic" compounds are not expected to be subject to the Bindung-s processes and compound tone rules, which are lexical rules.

This does not solve all the problems: there are some compounds which exhibit the Bindung-s phenomenon but have the phrase tone pattern (e.g. khôn nôre 'humming song'). One possible explanation would be that these compounds were originally formed at the postlexical level, but through time they moved to the lexicon (in other words, were lexicalized). However, they do not seem to be lexicalized completely, since they still retain their "syntactic" (or phrase) tone pattern, while undergoing the Bindung-s process.

Evidence for the claim that compounds are first formed at the postlexical level (or syntactic level) but later move to the lexicon comes from the following observation. That is, any sequence of two nouns is potentially a possible compound
as far as semantics allows it. So, for example, \textit{strEm} 'wrestling' and \textit{kuûkyûng} 'watching' could combine together to form a compound \textit{strEm kukyung} 'wrestling game watching'; and \textit{hánEl} 'sky' and \textit{kuûkyûng} 'watching' could be put together to form a compound \textit{hánEl kokyung} 'sky watching'. Most of these noun-noun compounds exhibit the phrase tone pattern. So, the compound \textit{strEm kokyung} 'wrestling game watching' and the potential compound \textit{hánEl kokyung} 'sky watching' exhibit the phrase tone pattern: tone of the left-hand member survives. Furthermore, note that they do not exhibit the Bindung-s phenomenon. These two properties of these compounds can be naturally explained if they are assumed to be formed at the syntactic level (or the postlexical level).

The assumption that compounds are first formed at the syntactic level, then later move to the lexicon seems to provide an explanation to the long-standing problem concerning the order between inflection and derivation on the one hand and compounding on the other in Lexical Phonology.

One of the base assumptions of Lexical Phonology is that levels of the lexicon are linearly ordered. One consequence of this assumption is that the output of a later level cannot feed the input to an earlier level. This assumption, however, has been called into question since several counterexamples have been found. Interestingly, most counterexamples invariably involve compounding processes. So, for example, compounds in Korean are ordered before inflection and derivation for morphological and phonological reasons (Ahn 1985) However, it turns out that derivation and inflection can feed the input to compounding (Sohn 1987). Another counterexample is the Malayalam co-compounding and sub-compounding interaction
detailed in Mohanan (1982).17

If compounds are first formed postlexically but through time move to the lexicon, then it is not difficult to see how inflection and/or derivation, for example, can feed and be fed at the same time by the compounding process. That is, compounding can be fed by derivation and/or inflection since compounding occurs at the postlexical level, and derivation and inflection occur in the lexicon. Compounds, on the other hand, can feed derivation and/or inflection since they occur in the lexicon after they have moved to the lexicon.
Notes

1. These examples are from Sohn (1987).

2. Neutralization in Korean is a process by which [p, p', ph] are neutralized into [p], [t, t', th, s, c, c', ch] are neutralized into [t], [k, k', kh] are neutralized into [k] in the syllable coda position. It has been observed that neutralization applies to the morpheme-final consonant of the lefthand element of compound even when the following morpheme is vowel-initial. For details, see Sohn (1987).

3. A different analysis of these phenomena of compounds has been proposed by Sohn (1987).

4. The definitions of the two kinds of compounds are from Mohannan (1986).

5. Given three tonal classes, there could be nine possible combinations of adjective-noun compounds. I could not find all of them. The examples given here are all I could find.

6. A spreading rule is involved here. For a detailed discussion of the spreading rule, see Chapter 7.

7. The form sikEn is derived from the verb stem sik- ‘to get cold’ (Tone Class III) and the adnominal suffix (or relativiser) -En. The tone of sikEn ‘got cold’ is derived by H-insertion (3.10) and FL (3.11).

8. The initial consonant of the lefthand member is tensified, which means that the right-hand member is not a lexical adjective or adnominal-inflected word, but a noun. Recall that the Binding-s rule does not apply to the compounds whose lefthand member is a lexical adjective. The analysis where the compound pipimp'ap ‘a Korean dish’ is made up of pipin ‘mixed’ and pap ‘rice’ and the surface form pipim is a result of nasal assimilation in place of articulation cannot predict the tensification, since the lefthand member pipin ‘mixed’ is an adnominal-inflected word. An alternative, which correctly predicts the tensification in this compound, is to analyse pipimp‘ap as consisting of the noun pipim ‘mixing’ and the noun pap ‘rice’. Then, the tensification in this compound is naturally explained: that is, this compound is a noun-noun compound and the tensification is the result of the application of the Binding-s rule. For the sake of discussion, I assume the phrase pipin pap and the compound pipim p'ap have the same underlying representation /pipin pap/. This does not affect our discussion significantly because pipin ‘mixed’ and pipim ‘mixing’ have the same tonal representation.

9. This rule of phrase tone is tentative. It will be modified later in Chapter 7, where tone at the sentence level is discussed.
The tensification of the initial consonant of the right-hand member could be either attributed to the Binding-s rule phenomenon or to the general tensification process by which an obstruent is tensified if preceded by another obstruent (e.g. *ipc'ang 'situation' from the Sino-Korean morpheme *lπl/ and the Sino-Korean morpheme /cang/). It is not possible to test which process is involved in this case, the Binding-s process or the general tensification phenomenon. Such an indeterminacy arises in every case where the left-hand member ends in an obstruent and the right-hand member starts with an obstruent.

Aspirated sounds cannot be tensified.

In standard Korean, the initial consonant of the right-hand member is tensified, culÉm s'al. The Kyungsang dialects, on the other hand, do not have tensified s in their sound inventory.

The s inserted by the Binding-s rule (or the Denominal Adjective Morpheme by Sohn (1987)) is not realized on the surface when the left-hand member ends in a consonant and the right-hand member is vowel-initial. For a detailed discussion, see Sohn (1987).

The Binding-s rule does not seem to apply in this case. If it did, we would expect the initial consonant of the right-hand member to be tensified, namely *kochúc'ang. The failure of the application of the Binding-s rule seems to suggest that this compound is a co-compound. Recall that the Binding-s rule does not apply to co-compounds. However, as far as meaning is concerned, this compound is more like a sub-compound rather than a co-compounds: the left-hand member and the right-hand member are in a modifier-head relationship. Which criteria, semantic or phonological, takes a priority in determining between co-compounds and subcompounds remains to be seen.

In fact, the H on the final mora of the right-hand member in these examples comes from the application of HI at the postlexical level. The reason is as follows. These compounds, like Variant Tone Class nouns, exhibit the tonal alternation when followed by suffixes.

- more+sacáng-i 'beach (nom.)'
- more+sacáng-esE 'in a beach'
- more+sacang-cócha 'even a beach'
- more+sacang-chÉlEm 'like a beach'

Recall that the H in uninflected forms of Variant Tone Class (e.g. *parám 'wind') is assigned by HI at the postlexical level. See Chapter 3.1.1.4. Along the same line, the H on the final mora of compounds also is assigned by HI at the postlexical level. The following question would be raised: how can we prevent HI from applying to these compounds? The Elsewhere Condition cannot prevent it from applying to these forms, since they are actually derived forms. One way to solve this problem is to
assume that HI does not apply at the compound stratum. In other words, the level where compounds are derived is not the domain of HI.

16. As pointed out in note 9, the tensification of the initial consonant of the right-hand member could be due to the general tensification rule. Here, I tentatively assume that it is due to the Bindung-s process.

17. As a way to solve such an ordering paradox, we would invoke the device of the loop, which recycles the output of n+1 level to n stratum. (Halle & Mohanan 1984).
CHAPTER VII
TONE AT THE PHRASAL LEVEL

In this chapter, tone beyond the word level will be discussed. Since the main purpose of this dissertation is to investigate the tone at the lexical level, I will not delve into details when discussing the tone at the phrasal level.

In the first section, the tone of noun phrases will be considered. The tone of verb phrases is discussed in section 2. Section 3 is concerned with the tone of sentences. Finally, the prepausal falling tone is discussed in section 4.

7.1 Noun Phrases

We consider the tone of noun phrases which consist of a modifier and a noun. Consider the following noun phrases. We see that the tone of the noun deletes and the tone of the modifier survives.

(7.1) a.musÉp-En atEl
(musÉp-En 'scary', átEl 'son')

musÉp-En atEl-i
(musÉp-En 'scary', átEl-i 'son (nom.)')

musÉp-En atEl-man
(musÉp-En 'scary', átEl-man 'only a son')

musÉp-En atEl-cocha
(musÉp-En 'scary', átEl-cocha 'even a son')

musÉp-un atEl-mengkuro
(musÉp-En 'scary', átEl-mengkuro 'like a son')
b. musÉp-En kÉrim ‘scary picture’  
(musÉp-En ‘scary’, kÉrim ‘picture’)

musÉp-En kÉrim-i ‘scary picture (nom.)’  
(musÉp-En ‘scary’, kÉrim-i ‘picture (nom.)’)

musÉp-En kÉrim-man ‘only a scary picture’  
(musÉp-En ‘scary’, kÉrim-man ‘only a picture’)

musÉp-En kÉrim-cocha ‘even a scary picture’  
(musÉp-En ‘scary’, kÉrim-cocha ‘even a picture’)

musÉp-En kÉrim-mengkuro ‘like a scary picture’  
(musÉp-En ‘scary’, kÉrim-mengkuro ‘like a picture’)

c. musÉp-En kore ‘scary whale’  
(musÉp-En ‘scary’, kore ‘whale’)

musÉp-En kore-ka ‘scary whale (nom.)’  
(musÉp-En ‘scary’, kore-ka ‘whale (nom.)’)

musÉp-En kore-man ‘only a scary whale’  
(musÉp-En ‘scary’, kore-man ‘only a whale’)

musÉp-En kore-cocha ‘like a scary whale’  
(musÉp-En ‘scary’ kore-cocha ‘even a whale’)

musÉp-En kore-mengkuro ‘like a scary whale’  
(musÉp-En ‘scary’, kore-mengkuro ‘like a whale’)

The forms in parentheses represent the tonal representations of the words when they come out of the lexical level. The examples (7.1a) have an Invariant Tone Class I noun (inflected and uninflected). In (7.1b), the noun is Invariant Tone Class (inflected and uninflected). The noun in the examples (7.1c) is of the Variant Tone Class. Recall that uninflected Variant Tone Class nouns come out of the lexicon without H tone, thus kore. (The surface tone of kore ‘whale’ is the result of the postlexical application of H-insertion (3.10), which inserts a H in a toneless phonological phrase.)
The modifier *mūsēp-En* 'scary' is derived from the verb stem *mūsēp-ta* 'be scary' (which is Variant Tone Class: *mūsēp-kēt-ta* 'will be scary', *mūsēp-kēt-kūna* 'ah, (it) will be scary!', *mūsēp-Eni* 'because it is scary', *mūsēp-Esi-kēt-ta* 'will be scary (hono.)'), by attaching the adnominal suffix (in other words, the relative suffix) *-En*.

In all these examples, the tone of the noun deletes, and the tone of the modifier survives. I propose this is the result of the application of the following phrasal rule, which deletes a H if it is preceded by another H.

(7.2) **H-deletion (domain: phonological phrase)**

\[
H \rightarrow \emptyset / H ______
\]

In the above examples, the tone of the verb is preceded by the tone of the modifiers, hence is deleted by H-deletion.

There are some phrases, however, whose tone is not correctly predicted by H-deletion (7.2). These phrases have a modifier which has a H on the final mora.

(7.3)a. p'algán mīyEk 'red seaweed'

(p'algán 'red', mīyEk 'seaweed')

p'algán mīyEk-i 'red seaweed (nom.)'

(p'algán 'red', mīyEk-i 'seaweed')

p'algán mīyEk-man 'only red seaweed'

(p'algán 'red', mīyEk-man 'seaweed')

p'algán mīyEk-cocha 'even red seaweed'

(p'algán 'red', mīyEk-cocha 'seaweed')

p'algán mīyEk-mengkuro 'like red seaweed'

(p'algán 'red', mīyEk-mengkuro 'seaweed')

b. p'algán kērīm 'red picture'

(p'algán 'red', kērī 'picture')
The modifier *p'algân* ‘red’ is derived from the verb stem *p'algâh-ta* ‘to be red’ (Variant Tone Class: *p'algâ-ni* ‘because it is red’, *p'algah-kêt-ta* ‘will be red’, *p'algah-ket-kuna* ‘will be red!’) by attaching the adnominal (in other words, the relative suffix) *-En*. In the examples in (7.3), we see that the tones of both the modifier and the noun survive. Furthermore, all the free moras following the first high-toned mora up to the next high-toned mora get a H. Thus, for example, the noun *kore-mengkúro* ‘whale (nom.)’ becomes *kôré-méngkûro* when preceded by *p'algân* ‘red’. The same tone pattern is observed with trisyllabic modifiers and monosyllabic modifiers which have a H on the final mora as shown in (7.4) and (7.5), respectively.

(7.4)a. coyonghâ-n átEl
   (coyonghá-n ‘quiet’, átEl ‘son’)

   coyonghá-n átEl-i
   (coyonghá-n ‘quiet’, átEl-i ‘son’)

   coyonghá-n átEl-man
   (coyonghá-n ‘quiet’, átEl-man ‘only a son’)
coyonghâ-n átEl-cocha
(coyonghâ-n ‘quiet’, átEl-cocha ‘even a son’)
‘even a quiet son’

coyonghâ-n átEl-mengkuro
(coyonghâ-n ‘quiet’, átEl-mengkuro ‘like a son’)
‘like a quiet son’

b. coyonghâ-n hákséng
(coyonghâ-n ‘quiet’, hákséng ‘student’)
‘quiet student’

coyonghâ-n hákséng-i
(coyonghâ-n ‘quiet’, hákséng-i ‘student (nom.)’)
‘a quiet student (nom.)’

coyonghâ-n hákséng-man
(coyonghâ-n ‘quiet’, hákséng-man ‘only a student’)
‘only a quiet student’

coyonghâ-n hákséng-cocha
(coyonghâ-n ‘quiet’, hákséng-cocha ‘even a student’)
‘even a quiet student’

coyonghâ-n hákséng-mengkuro
(coyonghâ-n ‘quiet’, hákséng-mengkuro ‘like a student’)
‘like a quiet student’

c. coyonghâ-n kóré
(coyonghâ-n ‘quiet’, kóré ‘whale’)
‘a quiet whale’

coyonghâ-n kóré-ka
(coyonghâ-n ‘quiet’, kóré-ka ‘only a whale’)
‘a quiet whale (nom.)’

coyonghâ-n kóré-man
(coyonghâ-n ‘quiet’, kóré-man ‘only a whale’)
‘only a quiet whale’

coyonghâ-n kóré-cócha
(coyonghâ-n ‘quiet’, kóré-cócha ‘even a whale’)
‘even a quiet whale’

coyonghâ-n kóré-méngkuro
‘like a quiet whale’

(7.5) a. hín miyEk
(hín ‘white’, miyEk ‘seaweed’)
‘white seaweed’

hín miyEk-i
(hín ‘white’, miyEk-i ‘seaweed (nom.)’)
‘white seaweed (nom.)’

hín miyEk-man
(hín ‘white’, miyEk-man ‘only seaweed’)
‘only white seaweed’

hín miyEk-cocha
(hín ‘white’, miyEk-cocha ‘even seaweed’)
‘even white seaweed’
hûn miyEk-mengkuro ‘like white seaweed’
(hûn ‘new’, miyEk-mengkuro ‘like seaweed’)

b. hûn kûrÉm ‘white cloud’
(hûn ‘white’, kûrÉm ‘cloud’)

hûn kûrÉm-i ‘white cloud’
(hûn ‘white’, kûrÉm-i ‘cloud’)

hûn kûrÉm-man ‘only a white cloud’
(hûn ‘white’, kûrÉm-man ‘only cloud’)

hûn kûrÉm-cocha ‘even a white cloud’
(hûn ‘white’, kûrÉm-cocha ‘even cloud’)

hûn kûrÉm-mengkuro ‘like a white cloud’
(hûn ‘white’, kûrÉm-mengkuro ‘like cloud’)

c. hûn kórÉ ‘a white whale’
(hûn ‘white’, kórÉ ‘whale’)

hûn kórÉ-ka ‘white whale (nom.)’
(hûn ‘white’, kórÉ-ka ‘whale (nom.)’)

hûn kórÉ-man ‘only a white whale’
(hûn ‘white’, kórÉ-man ‘like a whale’)

hûn kórÉ-cócha ‘even a white whale’
(hûn ‘white’, kórÉ-cócha ‘like a whale’)

hûn kórÉ-méngkuro ‘like a white whale’
(hûn ‘white’, kórÉ-méngkuro ‘like’)

In all these examples, the tones of the modifiers and the nouns do not delete. Instead, a spreading rule operates here, so all the free moras between the first high-toned mora and the next high-toned mora get a H. If there is only one high-toned mora in the phrase, all the free moras following the high-toned mora get a H (e.g. sé kórÉ ‘a new whale’ from sé and kórÉ, coyonghá-n kórÉ ‘a quiet whale’ from coyonghá-n and kórÉ ‘whale’. Recall that the uninflected variant tone class noun stem kórÉ comes out of the lexical level without a tone.)
A rule which is responsible for spreading of the final H of a modifier could be formulated like the following:

\[(7.6) \quad M \uparrow M_0 \]
\[\quad \quad \quad H\]

This rule intends to state that a H on the final mora of the preceding word spreads to the maximal string of free moras to the right until it encounters another high-toned mora: H cannot spread beyond it due to the ban on the crossing association lines. Note that this rule contains the problematic zero subscript. Without the zero subscript, this rule would spread the H only to the following mora to the right (not to the maximal string of free moras) due to the word boundary in the structural description of the rule.

\[(7.7) \quad M \uparrow M \]
\[\quad \quad \quad H\]

If we eliminate the word boundary, this rule would spread a H to the maximal string of free moras to the right, since this rule is supposed to apply iteratively.

\[(7.8) \text{Phrasal Spreading} \quad M \uparrow M \]
\[\quad \quad \quad H\]

This rule, however, cannot be correct since it would incorrectly spread any H in the phrase rightward. So, for example, the H’s of \textit{musÉun átÉl} ‘scary son’ would spread rightward by this rule, deriving an incorrect form \textit{*musÉun átÉl}.

There is a way to get out of this dilemma, and that is to assume that the Strict Cycle Condition also holds at the postlexical level. This is not the first such claim: there has been claims that the postlexical level also exhibits cyclicity, on the
contrary to the earlier claims of lexical phonology (Odden, 1988).

If this is the case, we can simply formulate the spreading rule as one in (7.8). Since this rule is subject to the Strict Cycle Condition, it will apply only to derived environments. The H on the final mora of a modifier will spread to the following mora without violating the Strict Cycle Condition, since the mora to which a H spreads is contained in a separate word (in other words, spreading occurs across the word boundary.) The subsequent spreading of H to the following moras would not violate the Strict Cycle Condition, since the H which spreads is a derived one. For example, in p'algân ‘red’ plus kore-côcha ‘even a whale’, the H on the final mora of p'algân spreads to the following without violating the Strict Cycle Condition. The result is p'algân kôre-côcha. Then, the H on kôre will spread to the following mora by reappliation of Spreading (7.8), which is not against the Strict Cycle Condition, since the H is a derived one. We now get p'algân kôré côcha. The H in côcha cannot spread since it is not the derived one: it is inherited from the lexical level. This derivation is illustrated in (7.9).

(7.9) pʼalgan kore-cocha 

\[ \begin{array}{c}
\text{p'algan kore-cocha} \\
\text{Phrasal Spreading} \\
\text{Phrasal Spreading (7.8)}
\end{array} \]
Note that H spreads even to the high-toned mora of the noun. Otherwise, H-deletion would delete the H of the noun, deriving an incorrect form *p'algán kóré-cocha, instead of the correct p'algán kóré-cócha.

(7.10) p'algan kore-cocha

\[ \begin{array}{ccc}
\text{p'algan} & \text{kore-cocha} & \text{H-deletion (7.2)} \\
\text{H} & & \\
\end{array} \]

Spreading (7.8) cannot spread the non-final H of a modifier since it violates the Strict Cycle Condition. This is why spreading does not occur in musÉun kore-cocha 'even a scary whale'.

The only remaining problem is to prove that the postlexical level of North Kyungsang Korean is cyclic, or to find some independent explanation for the derived environment restriction.

Now, let us consider the cases where a rising toned noun is preceded by a modifier which has a H on the final mora. The final H of the modifier would spread rightward as expected by Spreading (7.8).

(7.11) p'algán sárám 'red people'

(p'algán 'red', saáram 'people')
p’algán támpé ‘red cigarette’

(p’algán ‘red’, taampé ‘cigarette’)

If we compare the forms in parentheses with the phrasal forms, we notice another change besides the spreading of the final H: the initial long vowels of the nouns are shortened in the phrases. This is exactly what is predicted by the analysis proposed so far. Recall that level-toned long vowels are not allowed, so are shortened by Level-toned Vowel Shortening (3.85). This explains shortening of noun initial long vowels in the above examples. The initial long vowels of the nouns become level high-toned after Spreading (7.8) has applied. These level-toned long vowels are shortened by LTS (3.85). The derivation of p’algán sârâm ‘red people’ is given in (7.12).

(7.12) p’algan saaram

\[\begin{array}{c}
1 & V \\
H & H \\
p’algan & saaram & \text{Spreading (7.8)} \\
\hline
\end{array}\]

Note that the initial long vowel of the noun saaram ‘people’ becomes high level-toned as the result of Spreading (7.8). This level-toned long vowel is shortened by Level-toned Vowel Shortening (3.85).

A careful reader might have noticed that H-deletion has not applied in the above derivation. The application of this rule would derive an incorrect form *p’algán săram, as shown in (7.13).

(7.13) p’algan saaram

\[\begin{array}{c}
1 & V \\
H & H \\
\end{array}\]
It seems that H-deletion does not apply to forms which underwent Spreading (7.8). In other words, H-deletion and Spreading seems to be in the disjunctive relationship. I do not see any explanation for this. For the present purpose, I assume that H-deletion does not apply to the forms where Spreading applied.

The falling-toned long vowels of nouns, however, are not shortened in the same environment.

(7.14) p’algân údóong ‘red noodle’
(p’algân ‘red’, údóong ‘noodle’)

p’algân áa ‘red kid’
(p’algân ‘red’, áa ‘kid’)

The final H of the modifier spreads rightward. Note that the long vowels in these examples are not shortened. The reason why they do not shorten is obvious. The long vowels in these examples do not become level-toned even after Spreading (7.8) has applied, since the H cannot spread to the second mora of the long vowels due to the ban on the crossing association lines, as illustrated in (7.15).

(7.15) p’algân udoong

\ /  
H  H

p’algân udoong  Spreading (7.8)
\ /  
H  H
The long vowels in these examples are not level-toned, so they do not shorten.

Since Level-toned Vowel Shortening (3.85) shortens both high level-toned long vowels and low level-toned long vowels, we would expect that long vowels which become low level-toned as the result of H-deletion (7.2) and Default L-insertion would shorten. This prediction is correct.

(7.16) musÉpEn saram ‘scary people’
(musÉpEn ‘scary’, saárám ‘people’)

musÉpEn a ‘scary kid’
(musÉpEn ‘scary’, áa ‘kid’)

musÉpEn makne ‘scary youngest’
(musÉpEn ‘scary’, maknée ‘youngest’)

The H of the modifier does not spread since it is not the final H. H-deletion applies, deleting the H of the noun. After the application of Default L-insertion, which inserts a L for each free mora, the long vowels in the nouns become low level-toned, as illustrated in (7.17).

(7.17) musEpEn saaram
\[ \begin{array}{c|c} 
| & \checkmark \\
H & H \\
\end{array} \]

musEpEn saaram H-deletion (7.2)
\[ \begin{array}{c|c} 
| & \\
H & \\
\end{array} \]

musEpEn saaram Default L-insertion
\[ \begin{array}{c|c|c|c|c|c} 
| & | & | & | & | \\
L & H & L & LL & L \\
\end{array} \]

The low level-toned long vowels shorten by LTS (3.85).
7.2 Verb Phrases

In this section, I will consider verb phrases. Verb phrases exhibit the same tonal phenomena as noun phrases.

First, consider the following phrases which consist of an object noun and a verb. We see that the H of the verbs delete and the H of the object nouns survive.

(7.18) a. kimchi mEk-nEn-ta ‘eat pickled cabbages’
    (kimchi ‘pickled cabbage’, mEk-nEn-ta ‘eat’)
    kimchi-man mEk-nEn-ta ‘eat only pickled cabbages’
    (kimchi-man ‘only pickled cabbage’, mEk-nEn-ta ‘eat’)
    kimchi-k’aci mEk-nEn-ta ‘eat even pickled cabbages’
    (kimchi-k’aci ‘even pickled cabbage’, mEk-nEn-ta ‘eat’)

b. nàlké mEk-nEn-ta ‘eat a wing’
    (nàlké ‘wing’, mEk-nEn-ta ‘eat’)
    nàlké-man mEk-nEn-ta ‘eat only wings’
    (nàlké-man ‘only wings’, mEk-nEn-ta ‘eat’)
    nàlké-k’aci mEk-nEn-ta ‘eat even wings’
    (nàlké-k’aci ‘even wings’, mEk-nEn-ta ‘eat’)

c. poli-man mEk-nEn-ta ‘eat only barley’
    (poli-man ‘only barley’, mEk-nEn-ta ‘eat’)
    poli-k’áci mEk-nEn-ta ‘eat even barley’
    (poli-k’áci ‘even barley’, mEk-nEn-ta ‘eat’)

The forms in parentheses represent the tonal representations of the words when they come out of the lexical level. The examples (7.18a) have an Invariant Tone Class I noun (inflected and uninflected) as the object. In (7.18b), the object noun is Invariant Tone Class II (inflected and uninflected). The object noun in the examples (7.18c) is Variant Tone Class (inflected). In all these examples, Phrasal Spreading cannot apply, since it would violate the Strict Cycle Condition. Instead, H-deletion
(7.2) applies, deleting the H of the verbs.

One of the predictions this rule makes is that the high tone of verbs will not be deleted if the preceding object nouns do not have a high tone. This prediction turns out to be true. Consider the following example, where the object noun does not have a H. We see that the H of the verbs does not delete.

(7.19)a. poli mEk-nÉn-ta ‘eat barley’
(poli ‘barley’, mEk-nÉn-ta ‘eat’)
cintalle mEk-nÉn-ta ‘eat azalea’
(poli ‘azalea’, mEk-nÉn-ta ‘eat’)
sul mEk-nÉn-ta ‘drink alcohol’
(sul ‘alcohol’, mek-nÉn-ta ‘eat’)

The nouns poli ‘barley’, cintalle ‘azalea’ and sul ‘alcohol’ are Variant Tone Class nouns (e.g. poli-ka ‘barley (nom.)’, poli-chÉlEm ‘like barley’; cintalle-ka ‘azalea (nom.)’, cintalle-chÉlEm ‘like azalea’; sul-i ‘alcohol (nom.)’, sul-chÉlEm ‘like alcohol’). Recall that uninflected Variant Tone Class nouns bear no tone when they come out of the lexicon. Their surface tone is the result of the postlexical application of the H-insertion rule which would insert a H in a toneless phonological phrase. In the above example, poli ‘barley’, cintalle ‘azalea’ and sul ‘alcohol’ do not have a H since they form a phonological phrase with the following high-toned verbs. Since the preceding object nouns do not have a H, H-deletion does not delete the H of the verbs in the examples in (7.19).

Now, consider the following examples where the object noun have a H on the final mora. We see that the tone of verbs, as well as the tone of object nouns, survives. Furthermore, the maximal string of free moras after the the first high-toned mora get a H. Thus, for example, the verb mEk-ket-sEmni-ta ‘will eat
(formal)’ becomes mÉk-kÉt-sÉmní-ta when preceded by the object noun pâp ‘meal’.

(7.20) pâp mÉk-nÉn-ta
       (pâp ‘meal’ mEk-nÉn-ta ‘eat’)

       pâp mÉk-kÉt-sÉmm'-ta
       (pâp ‘meal’ mEk-ket-sEmm-ta ‘will eat (formal)’)

In the examples (7.20), we see that the tone of both the object noun and the verb survive. Furthermore, the moras between the high-toned moras of the object noun and the tone of the verb become high-toned. This is exactly what is predicted by Phrasal Spreading (7.8). The noun pâp ‘meal’, which is Invariant Tone Class II (e.g. pâp-i ‘meal (nom.)’, pâp-mân ‘only meal’, pâp-côcha ‘even a meal’), has a H when it comes out of the lexical level. The spreading of this H to the following mora to the right would not violate the Strict Cycle Condition, since it applies across the word boundary. The subsequent spreading of H would not also violate the Strict Cycle Condition, since the H which is spread is a derived one. To illustrate, the derivation of pâp mÉk-kÉt-sÉmní-ta ‘(I) will eat the meal’ is given in (7.21).

(7.21) pap mEk-ket-sEmni-ta
       ||       ||
       H       H

       pap mEk-ket-sEmni-ta
       ||       ||
       H       H

       pap mEk-ket-sEmni-ta
       \  ||       ||
       /  H       H

       pap mEk-ket-sEmni-ta
       \  ||       ||
       /  H       H

       pap mEk-ket-sEmni-ta
       \  ||       ||
       /  H       H
The phrases where the object noun has a long vowel will be considered. As shown in the following examples in (7.22), the final H of the object nouns spreads if the noun is monosyllabic. If the noun is polysyllabic, the H of the object noun does not spread.

(7.22) a. paám mÉk-sÉmni-ta ‘(I) eat a chestnut (formal)’
(paám ‘chestnut’, mÉk-sÉmni-ta ‘eat (formal)’)

b. suüpák mEk-sEmni-ta ‘(I) eat a watermelon (formal)’
(suüpák ‘watermelon’, mEk-sEmni-ta ‘eat (formal)’)

In both examples above, the object noun has a H on the final mora. Spreading (7.8) would predict the H to spread in both cases. However, spreading does not occur in (7.22). Hence, we need to modify the spreading rule (7.8), so that spreading does not occur in (7.22a).

The difference between the final H of the object noun in (7.22a) and that in (7.22b) is that in the former the H of the modifier is multiply associated, whereas in the latter the H of the modifier is associated to a single mora. However, it is not true that only H which associates with a single mora spreads. We have seen that the H which multiply associates with moras spread. So, for example, to derive hin kôré-chÉlEm ‘like a white whale’ from hin and kôré-chÉlEm, Spreading (7.8), at its first application, spreads the H of the modifier to the following mora to the right, deriving hin kôré-chÉlEm. At the reapplication of Spreading, the H, which now multiply associates with two moras, spreads to the following mora to the right, deriving hin kôré-chÉlEm. Hence, we cannot restrict spreading to the H which associates with a single mora. For the resent, I have no solution for this problem. I
will leave this to future study.

Now, let us consider the verb phrases where the object noun is preceded by a modifier. In such phrase, if the modifier has a non-final H, the H’s of the following nouns and the verbs are deleted by H-deletion. If the modifier has a final H, then it spreads rightward as predicted by Spreading (7.8).

(7.23) a. musÉun kore cap-at-ta ‘caught a scary whale’
   (musÉun ‘scary’, kore ‘whale’, cáp-at-ta ‘caught’)

   b. p’algan pólí mÉk-nÉn-ta ‘eat red barley’
   (p’algan ‘red’, poli ‘barley’, mÉk-nÉn-ta ‘eat’)

We turn to the verb phrases which have two NP’s. In such phrases, the H of the first NP survives and the tones of the second NP and the verb delete.

(7.24) a. apÉci-chElEm kimchi mÉk-nÉn-ta ‘eat kimchi like father’
   (apÉci-chElEm ‘like father’, kimchi, mÉk-nÉn-ta ‘eat’)

   apÉci-hanthe kimchi phal-at-ta ‘sold kimchi to father’
   (apÉci-hanthe ‘to father’, kimchi, phal-át-ta ‘sold’)

   siúcáng-esE kimchi phal-at-ta ‘sold barley at a market’
   (siúcáng-esE ‘at the market’, kimchi, phal-át-ta ‘sold’)

   b. apÉci-chElEm pap mÉk-nÉn-ta ‘eat meal like father’
   (apÉci-chElEm ‘like father’, pap ‘meal’, mÉk-nÉn-ta ‘eat’)

   apÉci-hanthe pap phal-at-ta ‘sold meal to father’
   (apÉci-hanthe ‘to father’, pap ‘meal’, phal-át-ta ‘sold’)

   siúcáng-esE pap phal-al-ta ‘sold meal at the market’
   (siúcáng-esE ‘at the market’, pap ‘meal’, phal-át-ta ‘sold’)

In the examples above, the H of the first NP (or, more precisely, prepositional phrase) survives, and the H’s of the second and the verb delete. This is exactly what H-deletion predicts.
Finally, I will consider the cases where a verb is preceded by a negative adverb. There are two negative adverbs *an* and *moot*. The adverb *an* does not have a H on the surface and does not affect the tone of the following verbs. In that respect, this adverb acts like a toneless word.

\[(7.25)\]  
\[an\] mEk-nÉn-ta ‘(I) do not eat’ \[ (mEk-nÉn-ta ‘eat’)\]  
\[an\] sûm-nÉn-ta ‘(I) do not hide’ \[ (sûm-nÉn-ta ‘hide’)\]  
The adverb *moot*, on the other hand, is rising-toned on the surface and seems to affect the tone of the following verbs.

\[(7.26)\]  
\[moot\] mÉk-nEn-ta ‘(I) cannot eat’ \[ (mEk-nEn-ta ‘eat’)\]  
\[moot\] mÉk-sÉmni-ta ‘(I) cannot eat (formal)’ \[ (mEk-sÉmni-ta ‘eat (formal)’)\]  
\[moot\] sûm-nEn-ta ‘(I) cannot eat’ \[ (sûm-nÉn-ta ‘eat’)\]  

Note that the final H of the adverb does not spread, in contrary to the prediction of Spreading (7.8). Furthermore, the H of the verbs appears to shift to the initial mora. How could we account for this phenomena? Why does the adverb *moot* not behave like other modifiers?

Note the similarity between the tone pattern of the phrases in (7.24) and that of nouns with a initial long vowel (e.g. *paám-cócha* ‘like a chestnut’, *paám-méngkuro* ‘like a chestnut’): in both cases the second and the third mora are high-toned. That is, the phrases in (7.26) act like the words with an initial long vowel. In this regard, the adverb *moot* seems to behave as if it is part of the verbs. In other words, it behaves more like an affix than a word. Under the assumption that the adverb *moot* is as an affix, the tone pattern of the examples in (7.26) can be
explained in a straightforward manner. The forms which result from prefixing *moot* would satisfy the structural description of Long Vowel H-insertion (3.98), which inserts a H in a form with a long vowel at the left edge. The inserted H associates by the Association Conventions (3.45) with the initial mora, which is phonetically the second mora due to the extratonality of the phonetically left-most mora by Long Vowel Extratonality (3.90). This linked H would spread rightward by Spreading (3.46).

(7.27) moot mEk-

\[
\begin{array}{c}
\text{moot mEk-} \\
\text{H} \\
(mo)ot mEk- \\
| \\
H \\
(mo)ot mEk- \\
\text{Spreading (3.46)} \\
\text{LET (3.90)} \\
\text{LVH (3.98)} \\
\text{AC (3.45)}
\end{array}
\]

In the derivation above, I assume *moot* prefixes before other suffixes attach.

The assumption that *moot* is an affix needs to be tested further, morphologically and/or phonologically.
7.3 Tone of Sentences

When a noun phrase and a verb phrase put together in a sentence, the tones of the noun phrase and the verb phrase survive. Consider the following sentences.

(7.28) a. [átEl-i]\(\text{np}\) [páp mÉk-nÉn-ta]\(\text{vp}\) ‘a son is eating a meal’
(átEl-i ‘son (nom.)’, páp mÉk-nÉn-ta ‘eat a meal’)

b. [átEl-i]\(\text{np}\) [kóki mEk-nEn-ta] \(\text{vp}\) ‘a son is eating meat’
(átEl-i ‘son (nom.), kóki mEk-nEn-ta ‘eat meat’)

Note that the H of the verb phrase is retained as well as the noun phrase. That is, the H of the subject does not trigger deletion of the following H’s in the verb phrases. This shows that H-deletion (7.2) has a syntactic condition: it applies within phrases, but not across the phrases.

7.4 Prepausal Falling Tone

As briefly pointed out in the discussion of contour tones in Chapter 3.4, every high-toned mora becomes falling-toned prepausally. So, for example, the nouns parám ‘wind’, táncl ‘jar’, satall ‘ladder’ when used in isolation have a falling tone on the final mora: parám, táncl, satall. To my observation, the final vowel does not become long even when it becomes falling-toned. So, I propose the following rule, which inserts a L to the final high-toned mora of an intonation group.

(7.29) Prepausal L-insertion
Since the intonation group is demarcated by a pause, this rule will correctly inserts a L to a high-toned mora prepausally.
Notes

1. When we put a focus on the modifier, a H appears only on the final mora of the modifier: \textit{p'algaln kuReM}. The forms I give here are neutral forms: no words are particularly focused in these forms. The tone at the phrasal level becomes complicated because of the focus, which plays an important role in determining the position of H.

2. This rule is unusual in that the zero subscript appears in the focus, rather than in the environment. In autosegmental phonology, the zero subscript has no place.
CHAPTER VIII

CONCLUDING REMARKS

In this dissertation, I have proposed an analysis of the tone system of North Kyungsang Korean within a unified theoretical framework which draws together several recent developments in the theory of phonology: autosegmental phonology, Lexical Phonology, underspecification, and extraprosodicity.

Both noun stems and verb stems classify into invariant tone classes and a variant tone class. Invariant tone class stems do not exhibit tonal alternations. Variant tone class stems exhibit tonal alternations when followed by suffixes. The present work departs from all previous analyses of North Kyungsang Korean tone in its accounting of the tonal alternation of variant tone class stems. In previous analyses, the tone of variant tone class stems was accounted for in terms of the interaction between the tone of stems and the tone of suffixes (i.e. tonal sandhi rules). Such analyses, among other things, fail to capture the generalizations regarding the tone of variant tone class stems, namely that a H appears on the stem-final mora if the stem is immediately followed by vowel-initial suffixes; otherwise, a H appears on the penultimate mora of the entire form. That is, the position of H is totally predictable in variant tone class stems based on the syllabicity of the suffix-initial segment which immediately follows the stem: the
tone of stems and suffixes do not play any role in predicting the position of H.

In the present analysis, variant tone class stems are assumed to be inherently toneless, as are suffixes. The surface tone is the result of the application of a rule which inserts a H in a toneless domain. The inserted H associates by rules with the stem-final mora when the stem is immediately followed by a vowel. Otherwise, the H associates with the final mora, which is phonetically the penultimate due to the extratonality of the final mora of the suffix.

Extratonality plays a crucial role in accounting for various tonal phenomena in this language. The asymmetrical distribution of tone patterns in trisyllabic and quadrisyllabic nouns is related to the asymmetrical distribution of segments in these nouns. Extraprosodicity is invoked to explain these asymmetries. Extratonality has also been shown to allow an enlightening analysis of tonal phenomena concerning contour tones. It is also shown that vowels must shorten if they are phonetically level-toned.

Although we require a few additional tonal rules, the tone in derivational morphology and compounds fits with the analysis proposed for nouns and verbs.

The tone at the phrasal level has been briefly examined. Since the data I have covered there is limited in scope, the analysis I propose might not be tenable when a wider range of data are taken into consideration. I will leave this to future study.
Bibliography


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