#### Ecology of PF: A Study of Korean Phonology and Morphology in a Derivational Approach

Inkie Chung, Ph.D.

University of Connecticut, 2007

This dissertation studies the component of PF, i.e., morphology, phonology and phonetics, in Korean in a consistently derivational approach. Using phonological arguments and an acoustic phonetic study, chapter 2 identifies the surface syllable structure. It also recognizes the two syllable structure constraints: the complex onset constraint and the branching nucleus constraint. Using this syllable structure and these constraints, chapter 3 provides a comprehensive analysis of hiatus in verbal morphology and related issues within Calabrese's (1995, 2002a) Dynamic Phonology framework. A limited number of actual outcomes for similar hiatus configurations show that the constraint-induced repairs are not finite but limited, and subject to the general principle of economy. It is shown that economy chooses shorter derivations over longer ones, when more than one derivation is possible and yield the same final outcome. It also shows that the hiatus constraint is a non-surface, cyclic constraint, operating once per morphophonological cycle. Furthermore, it argues that certain phonological operations must be described with the traditional rule-like formalism. It is also pointed out that the syllable structure constraints identified in chapter 2 are surface constraints. Chapters 4 and 5 provide a morphological study in Distributed Morphology (Bobaljik 2000, Halle and Marantz 1993, Marantz 2006). With verbal and adjectival roots exhibiting negative and honorific suppletion, these chapters identify the morphological structure of the inflected predicates (and hence phrase structure to a certain extent) in Korean. It identifies the paradoxical situation arising from the interaction of negative suppletion and honorific suppletion: the structurally outer honorific morphology blocks the inner negative suppletion. Root allomorphy of honorific suppletion is analyzed as vocabulary insertion, and the portmanteau negative suppletion is characterized as fusion interleaved with vocabulary insertion. The notion of phases (Chomsky 2000, et seq.) explains the unavailability of honorific suppletion with causatives. The dissertation resolves the issue of opacity, the major problem of a representational and parallelist theory The derivational approach allows a coherent and more adequate grammatical analysis of Korean morphophonology. It highlights the ecological nature of language, in that language is a living, dynamic and organic body, and more than simply a static or representational object.

# Keywords:

generative grammar, phonology, morphology, morphophonology, morphosyntax, PF, Dynamic Phonology, Distributed Morphology, acoustics, syllable, derivation, rule, constraint, repair, hiatus, suppletion, allomorphy, contextual allomorphy, vocabulary insertion, fusion, Korean

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# APPROVAL PAGE

Doctor of Philosophy Dissertation

Ecology of PF: A Study of Korean Phonology and Morphology in a Derivational Approach

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2007

TO MY FAMILY

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Everybody has a long story about their life, and I am no exception. For the last several years in the middle of my life at UConn and in Storrs, my second hometown, I have experienced so many things, both good and bad, and learned many lessons of scholarship and life. No one can achieve certain landmarks alone in life, and a doctoral dissertation is one such thing. I have to proclaim very loudly that I have been helped by innumerable people and organizations. I got help from them not just for my studies and dissertation, but also for diverse aspects of life and living, and I will repay this help to people and the world in similar and different ways. Perhaps, this is why I came to hold great interest in the humanities and life sciences, especially ecology and evolutionary biology, as this dissertation claims that it deals with the ecological nature of language.

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# Chapter 1

#### Introit

#### 1. Purpose, Scope and Outline

The purpose of this dissertation is to study Korean morphology and phonology in a uniformly derivational approach of generative grammar. One fundamental thesis in grammar is that the grammatical model needs to be coherent and cannot be hybrid in that a derivational approach and a purely constraint-based, non-stratal approach such as (classical) Optimality Theory cannot be combined in single grammatical architecture. In generative grammar, the notion of derivation is central and indispensable especially for the transformational aspects in syntax, morphology and phonology. Since the distinction between the two classical notions, i.e., generation and transformation, has been blurred since the advent of minimalism in the realm of syntax (Chomsky 1993), the derivational nature of generation is highlighted with the unified merge. When phonology is integrated with syntax in the entire grammar, the two components must employ a coherent approach. If syntax is derivational as is assumed in the majority of generative grammar frameworks, morphology and phonology are expected to be derivational.

The appeal to a derivational syntactic model is not a persuasive argument for employing a derivational phonological framework. Thoroughly constraint-based, non-derivational grammar architecture is also possible, and unification of non-derivational syntax and phonology has been advanced, notably in recent advances in Lexical Functional Grammar adopting Optimality Theory (e.g., Kuhn 2003). Optimality Theory has commanded a majority in the area of phonology since

early 1990's (Kager 1999, McCarthy 2001, 2002, McCarthy and Prince 1993, 1994, Prince and Smolensky 1993/2004, among others). This parallel, constraint-based theory hoped that single generation-evaluation machinery could yield the surface forms. No processes or intermediate levels would be assumed between underlying forms and surface forms. In this sense, it is representational, rather than generative (not to mention non-derivational). Attempts have been made to apply this non-derivational approach to other areas of linguistics (e.g., Archangeli and Langendoen 1997, Barbosa, Fox, Hagstrom, McGinnis and Pesetsky 1998, Dekkers, van der Leeuw, and van de Weijer 2000, Legendre, Grimshaw and Vikner 2001, Sells 2001b, Song, Chung and Kim 1994, Tesar and Smolensky 1998, among others).

While there are successful aspects in Optimality Theory, it also raises questions and problems (See Calabrese 2002a, 2005, Chomsky 1995, Clements 2000, Fikkert 2000, van der Hulst 2000b, Idsardi 2000, 2006, Mohanan 2000, Newmeyer 2002, Steriade 2001, among others). Some of the problems include the Fallacy of Perfection, the ad hoc and language-specific aspect of many constraints, the rule-like nature of many constraints, the non-restrictedness of constraint rankings, and the problem of computational infinity. However, the most serious and long-standing problem of Optimality Theory is derivational opacity. Various attempts have been made to unravel this problem (Bermúdez-Otero 1999, Hale, Kissock and Reiss 1998, Hermans and van Oostendorp 1999, Itô and Mester 2003, Kenstowicz 1995, Kiparsky 2000, McCarthy 1999, Roca 1997, Rubach 2000, among others). Most recently, McCarthy (2006) incorporates derivationalism straightforwardly in phonology (and hence in grammatical theory in general), and reintroduces serialism and intermediate levels. Serial derivations are necessary and indispensable even in a purely constraint-based model. In this dissertation, I show that derivational models provide better analyses of PF phenomena in Korean verbal morphology.

First, chapter 2 identifies the surface syllable structure in Korean. It provides several

phonological arguments and an acoustic phonetic study. The phonetic evidence helps to show the relationship between underlying phonological forms and surface forms. The surface syllable structure identified here is utilized, along with constraints yielding these surface syllable and segmental forms, for the adequate treatment of hiatus resolution and related phenomena in chapter 3.

The morphophonological study in chapter 3 adopts the Dynamic Phonology framework by Calabrese (1995, 1998, 2002a). Dynamic Phonology is a derivational constraint-and-rule model of phonology. One crucial tenet of Dynamic Phonology is that both deterministic univocal rules and negative constraints (evoking multiple repair operations) must be employed in phonological analysis. Another characteristic is that serial derivations are essential for an adequate phonological analysis: rules and constraint-evoked repairs must be extrinsically ordered. It will be shown that the way Dynamic Phonology works can deal with hiatus-related phenomena and other constraint-induced phenomena in Korean verbal morphology adequately.

For the morphophonological study in chapters 4 and 5, the Distributed Morphology framework is adopted. Distributed Morphology (Halle and Marantz 1993, 1994, Harley and Noyer 1999, Marantz 1997a,b, 2006 among others) maintains the derivational view in concert with the minimalist syntactic theory. In Distributed Morphology, morphology is subsequent to, and dependent on, syntax in the entire grammar architecture. Therefore, morphological structure is predictable from syntactic structure, by and large. Any mismatch between syntax and surface morphology is to be dealt with in the mediating morphological component. Hence, identification of the proper syntactic information is crucial to morphological analyses. These morphosyntax chapters investigate some aspects of Korean conjugations. The primary data is suppletive verbal and adjectival root forms in negation and subject honorification. The first objective is to identify the morphosyntactic structure of the inflected predicates in Korean. It explains the paradoxical structural relationship between the inner negation suppletion and the outer honorific suppletion, where the latter blocks the former. With doing so, the nature and mechanism of honorific root allomorphy (in terms of vocabulary insertion) and portmanteau negative suppletion (in terms of fusion) are formulated explicitly.

The term "ecology" in the title of the dissertation is to highlight the aspect of language as a living, dynamic and organic body, not simply as a static or representational object. This dissertation, equipped with two derivational frameworks, Dynamic Phonology and Distributed Morphology, successfully describes and explains this ecological nature of PF in Korean verbal morphology. The combination of these two models provides a coherent and consistent view on language. The problem of opacity does not arise. Furthermore, these derivational approaches provide empirically more adequate analyses of Korean morphophonology, as is presented throughout the dissertation.

#### 2. Theoretical Frameworks

This section presents a brief outline of Calabrese's (2002a) Dynamic Phonology framework on which the phonological analysis in chapter 3 is couched, and general characteristics of Distributed Morphology adopted for the morphosyntactic study in chapters 4 and 5.

#### 2.1. Dynamic Phonology

Dynamic Phonology is a derivational constraint-and-repair model that has been developed in Calabrese (1988, 1995, 1998, 2002a) (cf. Calabrese 2005, LaCharité and Paradis 1993, Paradis 1988). The general architecture is presented in (1). (1) Dynamic Phonology (Calabrese 2002a)



The markedness module contains (i) universal constraints, and (ii) repairs that adjust ill-formed configurations caused by violations of these universal constraints. Markedness effects found across languages are due to the operations of this module. In addition to this module, there is a rule component which contains a more traditional system of rules which can be ordered among each other and also with respect to the repairs of the markedness module. At every stage of the phonological derivation, the phonological string is checked for well-formedness by the relevant constraints. Violations of these constraints are fixed by repair procedures. Languages differ from each other in that a marking statement (i.e., constraint) is active (or activated) in one language causing an appropriate repair, but is deactivated in another language tolerating the configuration in question.

Only the ill-formed configuration needs to be affected by repair operations. This property follows from a general principle of economy, which requires that modifications of the phonological string should be last resort operations:

(2) Last resort

Phonological manipulations must be minimal, and can occur only if they are necessary.

The principle in (2) governs the free manipulations implemented by repair operations and

characterizes them as last resort operations applying only to ill-formed configurations.

A set of repair operations regarding fixing an ill-formed structure involves several parallel derivations. The outputs and the derivations are then evaluated by the Economy criterion, according to which the most economical output and derivation are chosen. The principle of derivational economy is: given two derivations leading to the same outcome, the longer derivation of the two must be excluded. In particular, this condition eliminates roundabout derivations, where no effect of repair applications is obtained.

Calabrese argues that not all phonological processes are due to constraint-induced repairs. Some processes are implemented by rules, i.e., unitary and deterministic instructions to perform a given structural change on a given structure. Rules are needed to capture, in the most economical way, not only processes characterized by idiosyncratic changes due to the history of a language, but also changes involving sequential restrictions on the phonological string. Once economy are taken into consideration, the duplicate problem due to overlap in effects of constraints and rules can be resolved. The rules of the phonological component, however, are not affected by (2) in so far they involve deterministic, univocal instructions to modify a given string.

One fundamental characteristic is that this model is derivational: surface phonetic representations are obtained from underlying representations by step-by-step applications of rules and repairs that are serially ordered in a phonological derivation. The basic assumption is that by postulating phonological derivations, more efficient and simpler analyses can be achieved.

#### 2.2. Distributed Morphology

Distributed Morphology (Bobaljik 2000, 2006b, Embick and Noyer 2001, Halle and Marantz 1993, 1994, Harley and Noyer 1999, 2000, Marantz 1997a,b, 2006, among others) assumes that syntax lacks phonological contents, and syntactic operations manipulate syntacticosemantic features only (*separation*). Hence, phonological features are inserted after syntax (*late insertion*). The vocabulary insertion (providing phonological features) depends on the syntacticosemantic features of a given terminal node in a morphosyntactic representation and a vocabulary item that has a specification of both phonological features and syntactico-semantic features. When the specification of syntactico-semantic features in a given terminal node matches the specification of the syntactico-semantic features of a vocabulary item, then the terminal node is provided with the corresponding phonological features of that vocabulary item. However, the match can be nonexhaustive, that is, vocabulary insertion takes place even when the set of syntactico-semantic features of a vocabulary item is properly included in the set of such features of the terminal node in question (*underspecification*). Therefore, it is possible that there is more than one vocabulary item whose phonological features can be inserted in a given terminal node (*competition*). In this case, the vocabulary item that is specified with the most syntactico-semantic features is chosen: The most highly specified item compatible with a given terminal node wins the competition.

Distributed Morphology also assumes that morphological operations are done after overt syntax, i.e., in PF, and that such postsyntactic morphological operations are done on the phrase structure resulting from the syntactic component. Halle and Marantz (1993, 1994) discuss those morphological operations including (morphological) merger (Baker 1988, Bobaljik 1994, Marantz 1984, 1988), impoverishment (Bonet 1995, Halle 1997, Noyer 1997), fission (Halle 1997, Noyer 1997), fusion and morpheme insertion. Relevant to the present discussion is fusion. A fusion operation takes two sister nodes having syntactico-semantic features only, and turns them into a single terminal node with all the relevant syntactico-semantic features that the two original nodes had. Fusion processes precede vocabulary insertion, since at the point of fusion, terminal nodes are free of phonological content. After fusion, vocabulary insertion takes place

matching syntactico-semantic features of the fused node and of vocabulary items. However, Korean facts show that fusion needs to be interleaved with vocabulary insertion. Vocabulary insertion can interact with morphosyntactic information in an outer cycle for contextual allomorphy (Bobaljik 2000, Halle and Marantz 1993).

#### 3. Preliminary Data

The section presents a description of basic linguistic phenomena in Korean. Section 3.1 provides aspects Korean segmental phonology. Section 3.2 describes the linear ordering of verbal morphology and proposes the clausal structure in Korean. More detailed discussions are found in appropriate parts throughout the dissertation.

#### 3.1. Segmental Phonology in Korean

Let us first look at the relevant phonological aspects of Korean. Consonant and vowel phonemes and their relevant allophonic variations are presented. The following table illustrates the consonant phonemes.

mann	er place	labial	dental	palatal	velar	laryngeal
	plain/lax	р	t	č	k	
stop	aspirated	p <sup>h</sup>	t <sup>h</sup>	č <sup>h</sup>	k <sup>h</sup>	
	glottalized/tense	p'	t'	č'	k'	
fric- ative	aspirated		S			h
	glottalized/tense		s'			
	nasal	m	n		ŋ	
	approximant	w	1	у	(w)	

(3) Consonant phonemes in Korean

Palatals are phonetically affricates. I simply attribute the difference in manner of articulation for palatal obstruents to a surface-level rule of phonetic implementation and will not discuss this issue here.

Note that there is no voicing contrast for obstruents: plain stops are realized as voiced allophones intervocalically or between sonorant segments. Fricatives do not have voiced variants at all. Glottalized and aspirated stops and fricatives are constant in onset positions. However they are neutralized along with plain obstruents to the corresponding unreleased (plain) voiceless stops in coda positions. In a coda position, palatal stops and dental fricatives are also realized as the unreleased dental (plain) voiceless stop,  $[t^3]$ . Also, the laryngeal fricative /h/ is subject to neutralization in the coda position, and becomes  $[t^3]$ .

Another rule sensitive to syllabic positions is delateralization (or rhoticization) of /l/ in the onset position. The lateral [l] and the rhotic [r] are in complementary distribution and are allophones of the underlying /l/. Hence [l] appears in the coda position while the onset position has the [r] variant. From the articulatory point-of-view, the rhotic variant is an alveolar tap. When two instances of /l/ are put together, one in the coda position and the other in the onset position of the following syllable (whether this sequence is underlying or derived), they are realized as a single [l]. This degemination leads to minimal pairs at the phonetic level such as [p'ali] 'quickly' (< /p'al-li/ 'fast-adverb forming') vs. [p'ari] 'Paris'. However, they are /p'alli/ and /p'ali/ phonologically, and the contrast is not segment-internal properties, but the number of skeletal positions.

There is another allophonic variation, which has no exception. Dental consonants become palatalized before /i, y, ü/ resulting the surface  $[t^y, t^{hy}, t^{,y}]$ . In the case of fricatives and sonorants, /s, s', n, l, r/, the place of articulation becomes (alveo-)palatal: [š, š', n,  $\lambda$ ,  $r^y$ ]. The derived flap is lamino-palatal.

Vowel phonemes in Korean

(4)

The laryngeal /h/ has three allophonic variants depending on the following vowel: [ç] before /i/,  $[h^w \sim \phi]$  before a round vowel, and [h] before other vowels. At surface, this placeless consonant occurs only in an onset position, but not in a coda position. As mentioned earlier, /h/ in a coda position is realized as the unreleased dental stop [t<sup>7</sup>].

In the vowel inventory in (4), we find a perfect symmetry.

front back unround round unround round high i ü ш u mid ö e ٨ 0 low æ а

However, this symmetry disappears at the phonetic level. Specifically, except for very limited number of dialects and registers, the low front vowel raises to [e], and we have an absolute neutralization of /e/ and /æ/ into [e].

There is good evidence for the abstract vowel /a/ and the process of raising. One argument comes from the stylistic (or dialectal) umlaut rule: fronting of a back vowel before /i, y/ of the following syllable. When the target vowel is /a/, however, what we get is [e] as the following examples illustrate (ignoring other processes).

	Underlying	Surface	
a.	čukita	čükita	'kill'
	t <sup>h</sup> uŋkita	t <sup>h</sup> üŋkita	'thrum'
	čonil	čöŋil	ʻall day'
	koki	köki	'meat'
	t'utkita	t'itkita	'be plucked'
	s'ullita	s'illita	'be swept (with)'
	лті	emi	'mother (humble)'
	s'^khita	s'ekhita	'make rot'
b.	api	epi	'father'
	hakkyo	hekkyo	'school'
	a. b.	Underlying a. čukita t <sup>h</sup> uŋkita čoŋil koki t'utkita s'ullita ∧mi s'∧khita b. api hakkyo	UnderlyingSurfacea.čukitačükita $t^h$ uŋkitathuŋkitačoŋilčöŋilkokikökit'utkitat'itkitas'ullitas'illitaAmiemis'Akhitas'ekhitab.apiepihakkyohekkyohekkyo

In (5)a, a low front vowel [æ] is expected as a result of fronting of /a/. The surface vowel [e] can be accounted for only if the process of neutralizing /æ/ to [e] is assumed.

Another argument for the underlying /æ/ comes from the two classes of vowels with respect to vowel harmony: yang or light vowels (a, o, æ, ö) and yin or dark vowels (A, u, e, ü, and sometimes u, i). These two classes of vowels have different affective connotations: the dark vowels can be described as augmentative, and the light vowels as diminutive (S.-N. Lee 1978); or the dark vowels as 'ample' (good) or 'bulky, clumsy' (bad), and the light vowels as 'petite' (good) or 'dinky' (bad) (Martin 1962: 183-184). This meaning contrast is used morphologically for the affective modification of words. In the "dark" register all vowels of a word must be "dark," in the "light" one they must be "light." Thus we have the following examples:

(6)		Dark	Light	
	a.	tлtлk	tatak	'in clusters'
		sukun	sokon	'in whispers'
		k <sup>h</sup> ük <sup>h</sup> ü	k <sup>h</sup> ök <sup>h</sup> ö	'foul-smelling'
		p <sup>h</sup> uŋtʌŋ	p <sup>h</sup> oŋtaŋ	'splash'
		uŋʌl	oŋal	'mumblingly'
	b.	k'ič∧k	k'æčak	'scribbling'
		teŋkʌŋ	tæŋkaŋ	'at one stroke'

What should be noticed are the light vowels of the examples in (6)b. The vowel /æ/ in /k'æčak/and /tæŋkaŋ/ is realized as [e] at surface, which has the same phonetic value of the mid front phoneme /e/: hence [k'ejak'] and [teŋgaŋ]. The crucial point is that /e/ should not cooccur with /a/ since /e/ and /a/ belong to different classes. Thus, we must then suppose that the vowel is underlyingly /æ/, thus satisfying the morphological requirement mentioned above, and changes later to [e] by neutralization.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup>Recognizing that the harmonic feature in Altaic is  $[\pm ATR]$ , Andrea Calabrese (p.c.), and Harry van der Hulst (p.c.) raise the possibility that the low vowels can be viewed as [-low] (Low and non-high round vowels are [-ATR].). This, in turn, leads to another possibility of treating the dark vowels as mid vowels.

In terms of Dynamic Phonology, the change of [æ] to [e] is understood as the result of the following negative constraint (Calabrese 1995, 2002a, 2005).

# (7) Constraint against low front vowels \*[-back, +low]: A low front vowel is not allowed.

Being active, the above constraint does not allow [æ]. The responsible repair operation is to switch the feature value of [low] to minus, resulting in the corresponding mid vowel.<sup>2</sup>

The two front round vowels /ü, ö/ are realized as [wi, we], respectively. The above patterns regarding vowel harmony in (6)a and umlaut in (5)b support the reality of the abstract underlying vowel phonemes, which are later split into two segments. The split process is one of a few repair operations due to the following constraint.

# (8) Constraint against front round vowels

\*[-back, +round] / [\_\_\_\_, -cons]: A front round vowel is not allowed.

As extensively discussed in Calabrese (1998, 1995, 2002a), there is more than one repair operation for such marked segments as /ü, ö/. In Korean, the responsible repair operation is fission of the two incompatible features [-back] and [+round] (to preserve both) and sequencing them in the order of [+round] and then [-back]. Other languages have different repair strategies including fission of the two features and sequencing them in the opposite order to obtain /yu/, or deleting one feature, either [+round] to obtain [u] or [-back] to obtain [i]. (See Calabrese 1995,

Then, the distinction between the two vowel classes would be simply  $[\pm low]$  phonologically, with neutral vowels [i, ui]. See the brief discussion in section 2 of chapter 3 for the behavior of the neutral vowel [ui] in conjugations.

<sup>&</sup>lt;sup>2</sup>See Calabrese (1995, 2002a, 2005) for the essentially same analysis of raising of low vowels in umlaut situations in German, such as *Rad* [a:] 'wheel.SG' ~ *Räder* [ $\epsilon$ :] 'wheel.PL' and *Mann* [a] 'man.SG' ~ *Männer* [ $\epsilon$ ] 'man.PL' (in contrast to the transparent fronting cases such as *Buch* [u:] 'book.SG' ~ Bücher [ü:] 'book.PL' and *Wort* [ $\mathfrak{I}$ ] 'word.SG' ~ *Wörter* [ $\mathfrak{E}$ ] 'word.PL').

2002a, 2005 for extensive discussions.) The surface phonetic form of the marked vowels, with two separate segments, can be verified with spectrograms (See section 6 of chapter 2 for a spectrogram of the vowel /ü/ realized as [wi].) If there is an onset consonant in a syllable with one of the two vowels /ü, ö/, further changes follow. These aspects are discussed in sections 3.1 and 3.2.2 of chapter 3.

#### 3.2. Conjugation: Morphosyntax

Korean is an agglutinative language, where predicates are composed of a root and separately identifiable affixes (mostly suffixes). This is illustrated in the following diagram and example, which show the linear ordering of the verbal root and the maximally possible occurrence of verbal affixes.

- (9) Fully inflected predicate in Korean
   Negation-Root-Voice-Honorification-Tense-Aspect-Mood1-Humble-Mood2-Comp
- (10) an(i) nal li si ess ess kess sup ni ta
   NEG fly CAUS HON PAST PERF ASSUMPTIVE HUMBLE INDIC DECL
   'may not have made fly', 'probably did not deign to fly (something) at an earlier time, sir'

The affixes are optional except for the tense suffix and the so-called "closing" (i.e., final) suffix indicating the sentence type among declarative, interrogative, exclamatory, imperative and so on. The hierarchical structure regarding where the negation element is located relative to the root and the suffix is identified in chapters 4 and 5.

Distributed Morphology assumes that morphology follows syntax. Hence, morphological structure reflects syntactic phrase structure and operations done in syntax. This study assumes the following structure as the basic phrase structure in Korean. Overt movements are assumed as indicated with solid lines (see section 2.3 of chapter 4 for covert movements as well).



The functional categories shown in the above structure are only part of the maximally occurring heads and projections. For example, such heads related to aspect and mood as shown in (9) and (10) are not indicated in the above structure but can be easily located. However, the precise location of honorification is not clear as to where it is located in the structure relative to Neg. This is one topic of chapter 5.

Not all the functional categories are present in all instances of clause structure. For example, Neg is present only in a syntactically negated clause. Another optional functional category is the "little" v and its projections. I assume that they are present only with certain types of predicates including causative and agentive verbs. I also assume overt movement of the subject DP and the object DP and overt (syntactic or morphological) V<sup>0</sup> movement via intervening functional heads. See chapter 3 for some arguments for these assumptions.

# 4. Notations and Abbreviations

This section provides the Yale Romanization system of the Korean alphabet and the list of abbreviations used in this dissertation.

#### 4.1. Yale Romanization System

The following table shows the Yale Romanization system of *Hangul* or *Hangeul* (pronounced as [han.gul], the Korean alphabet) by Martin, Lee and Chang (1967). The Korean characters are provided with their phonetic values and sometimes underlying phonological forms.

(12)	Yale Rom	anization	System	(Martin,	Lee and	Chang	1967)
------	----------	-----------	--------	----------	---------	-------	-------

Hangul	phonetic value	Yale	Hangul	phonetic value	Yale
Н	$\mathbf{p} \sim \mathbf{b}$	р	]	i	i
Σ	$\mathbf{p}^{\mathbf{h}}$	ph	-1)	e	ey
нн	p'	pp	키	ye	yey
Г	$t \sim b$	t	Н	e < /æ/	ay
E	t <sup>h</sup>	th	þ	ye < /yæ/	yay
τĽ	t'	tt		wi < /ü/	wi
ス	č~j	c	케	we	wey
え	č <sup>h</sup>	ch	니	we < /ö/	oy
ᄍ	č'	сс	놰	we < /wa /	way
-1	$\mathbf{k} \sim \mathbf{g}$	k		ш	u
ㅋ	$\mathbf{k}^{h}$	kh	-]	٨	e
רר	k'	kk	킈	ул	ye
ス	S	S	거	WΛ	we
从	s'	SS	$\mathbf{F}$	a	а
ঠ	h	h	F	уа	ya
П	m	m	나	wa	wa
L	n	n	Т	u	wu
Ó	$\emptyset \sim \mathfrak{g}$	none or ng	TT	yu	yu
己	$l \sim r$	1	<u></u>	0	0
			<u>1</u> L	уо	yo
				щi	uy

Basically, each individual Korean character is transliterated as the comparable Roman character. Certain single characters are transliterated as a sequence of two Roman characters. The vowel [u] is one such case, which is transliterated as wu, while the transliteration u is used for the unround counterpart [uı]. The velar nasal appears only syllable-finally phononogically, but not in a syllable onset position. But the same character is used as a placeholder in the empty onset position of vowel-initial syllable when written in Korean. Throughout the dissertation, Roman transliterations and IPA symbols (with some variations) are used interchangeably. However, the Yale Romanization system is used mostly in chapters 4 and 5 following the usual practice in (morpho)syntax, while the phonetic symbols are used mostly in chapters 2 and 3.

#### 4.2. Abbreviations

The following list shows the abbreviations used in this dissertation.

## (13) Abbreviations

A	adjective	INF	infinitive
ACC	accusative	INTER	interrogative
AGENT	agent(ive)	LOC	locative
ALLA	allative	NEG/neg	negative, negation, negator
CAUS/caus	causative	NMLZ	nominalizer
CAUL	causal	NOM	nominative
COMP	complementizer	NPI	negative polarity item/marker
COND	conditional	PASS	passive
DECL	declarative	PAST	past (tense)
EG	epenthetic glide	PERF	perfect
ELA	elative	PL	plural
EV	epenthetic vowel	PNM	prenominal modifier/relativizer
FOC	focus marker	PRES	present (tense)
FUT	future (tense)	RPRT	reportive
GER	gerund	SG	singular
HON.NOM	honorific nominative case marker	SEQ	sequential
HON/hon	honorific suffix (conjugational)	Т	tense
HORT	hortative	TEMP	temporal
HUM	humble	TOP	topic marker
INDIC	indicative	V	verb, V
IMP	imperative	v	little/small/shell v

## Chapter 2

#### Surface Syllable Structure in Korean

#### 1. Introduction

This chapter deals with the surface syllable structure in Korean. The basic surface syllable structure in Korean is (C)V(C), and a consonant cannot appear in a syllabic peak position. In some instances, a glide such as [y] and [w] (or rather their core properties [+high, -back] and [+round], respectively) is present somewhere in the syllable in addition to an obstruent or sonorant onset consonant. Some of the glides stem from a phonological operation in a previous stage such as glide formation or from a loanword, but monomorphemic native words also have an underlying glide. Many authors hypothesize that there is an independent position for a separate glide segment and that the maximal syllable structure contains the CGV segment sequence. Regarding where the glide is located in the hierarchical syllable structure, some contend that a consonant and a glide form a complex onset as in (1)a (K.-O. Kim and Shibatani 1976, B.-G. Lee 1982, among others), while others argue that the glide constitutes a complex nucleus along with the following peak vowel as in (1)b (C.-K. Gim 1987, cf. Y.-S. Kim 1984; 9ff).

However, this chapter argues that, at least on the surface, there can be only one consonant segment position in an onset, i.e., no complex onset, and that there are no diphthongs, i.e., no complex nuclei. That is, the maximum surface syllable structure is simply CVC as in (1)c. A similar view is presented in S.-C. Ahn (1985: 48).





The claim for the structure (1)c is that at the surface phonetic level there is no glide as an independent segment between the onset consonant and the nucleus vowel. The alleged glide, which has once existed at a deeper phonological level, is incorporated into the preceding onset consonant as a property of secondary articulation, schematically represented as  $C^{y}$  and  $C^{w}$ .

This chapter provides arguments for the structure (1)c and against (1)a,b. First, some phonological aspects are discussed, including loanword adaptations of consonant-glide and consonant-liquid clusters, the distribution of the third glide [u<sub>1</sub>], the nonvocalic counterpart to the high back unround [u<sub>1</sub>], palatal variants of non-plosives before a vowel other than [i], hiatus-related simplifications of derived CG sequences in conjugations, and hiatus tolerance. An acoustic study follows to show that there is no separate glide in a C\_V environment (and the associated properties of such a glide realized on the consonant). Finally, a few factors are considered for (wrongly) identifying a glide in such syllables with a non-vocalic onset consonant. The phonological reality of the glide at issue is considered as well. While doing so, two constraints for the surface structure are recognized: the Complex Onset Constraint allowing only one onset consonant and the Branching Nucleus Constraint requiring that the nucleus be non-branching.

## 2. Consonant Cluster Adaptations in Loanwords

Korean loanword phonology strongly supports the view on the syllable structure (1)c. This

section considers loanword adaptations<sup>1</sup> focusing on two types of consonant clusters: consonantglide and consonant-liquid. There are two distinct cluster adaptations but the results of them share a common property: the lack of a glide as an independent segment between a non-vocalic onset consonant and a peak vowel in a single syllable. The lack of consonant-liquid sequences is employed to argue that Korean does not have consonant-glide sequences.

# 2.1. No CG Sequences in Loanwords

Consider the following loanwords, where the first consonant of a complex onset sequence is a stop and the second segment is a glide in the original loanword forms in the "lending" languages. Proper names are provided in some instances.

(2)	Loanwords with a complex onset of a consonant-plus-glide sequence					
	original form	borrowed form	borrowed form			
	[tyuwnə]	[t <sup>hy</sup> una]	'tuna'			
	[dyuws]	[t <sup>y</sup> usɯ]	'deuce' (in sports)			
	[twist]	[t <sup>h</sup> uwisut <sup>h</sup> u]	'twist' (dance)			
	[dwayt]	[tuwait <sup>h</sup> u]	'Dwight'			
	[swɛtər]	[suwet <sub>A</sub> ]	'sweat shirt'			
	[kyuwt]	[k <sup>hy</sup> ut <sup>h</sup> u]	'cute'			
	[kwiyn]	[k <sup>hwy</sup> in]	'queen'			
	[gwarneri]	[k <sup>w</sup> arumeri]	'Guarneri'			
	[pyuwmə]	[p <sup>hy</sup> uma]	'puma'			
	[byuwtı šap]	[p <sup>y</sup> ut <sup>h</sup> išap <sup>¬</sup> ]	'beauty shop'			
	[pwazɔ̃] Fr. poison	[p'uwajoŋ]	brand name			
	[fyuwz]	[p <sup>hy</sup> uj̃u] ~ [çuj̃u]	'fuse'			
	[rīvyuw]	[rib <sup>y</sup> u]	'review'			

The input consonant-plus-glide (CG) sequences in loanwords are transformed in two different

<sup>&</sup>lt;sup>1</sup>I adopt the view of loanword phonology that suggests loanword adaptations take place during perception (Kang 2003, Kenstowicz 2001, Peperkamp and Dupoux 2003, Silverman 1992, Yip 1993), not in production (as advanced in Jacobs and Gussenhoven 2000, and LaCharité and Paradis 2005). At the same time, however, I also adopt the view proposed by Calabrese (2006) that speech perception is based on speech production and hence that the "grammar of perception" mimics the phonological derivations presented in chapters 2 and 3.

ways. One way of adaptation is *u*-epenthesis, which separates the disallowed sequence into two syllables (resulting in CuGV). This insertion operation is observed in examples such as  $[t^{h}uwisut^{h}u]$ ,  $[tuwait^{h}u]$ ,  $[suwet_{A}]$  and  $[p'uwajo_{J}]$  from the French form  $[pwaz_{J}]$ .<sup>2</sup> The other adaptation process is a contraction or merger of the non-glide consonant and the following glide, resulting in C<sup>y</sup>/C<sup>w</sup>. Section 6 provides relevant spectrograms showing this aspect of a non-glide consonant segment with a secondary articulation effect but without the corresponding glide segment. This contraction process may be further analyzed as a series of separate phonological processes, i.e., glide deletion preceded by labialization or palatalization of the preceding consonant.<sup>3</sup>

Even though it is interesting to note that there are two different ways to fix a disallowed CG sequence in loanword adaptation, I will not discuss here what plays the role of choosing the appropriate operation between the two adaptations. What should be highlighted for the present purpose is that there is a conspiracy effect in the two distinct adaptation repairs of consonant clusters disallowed in Korean. The configuration that the two strategies target to change is syllable-initial CG sequences in the original lent words, and the resulting forms lack such configurations. The conspiracy effect is due to the following constraint:

<sup>&</sup>lt;sup>2</sup>An alternative form [p'uwajoŋ] is possible for this French word. The epenthetic vowel can be the round [u] instead of [u1]. The environment for the round vowel is not the following glide, because the round vowel is possible even when there is no glide [w] following it. This [ur~u] variation is found in loanwords with the initial consonant clusters whose first consonant is labial: [puraja] ~ [puraja] 'brassiere', [pulaindul] ~ [pulaindul] 'blind, shade', [p<sup>h</sup>uroguræm] ~ [p<sup>h</sup>uroguræm] 'program'. Hence, the vowel [u1] is to be inserted first in these cases of consonant clusters. Then, if the first consonant is labial, there is a process of rounding the inserted vowel to [u] (optionally).

<sup>&</sup>lt;sup>3</sup>The choice between a one-step contraction and a series of two independent processes for the Cy/Cw  $\rightarrow$  C<sup>y</sup>/C<sup>w</sup> change does not make any difference here. The latter, more analytic view on the consonant's acquisition of a glide's core property ([+round] or [+high, -back]) is adopted in the analysis of CG sequence simplification related to hiatus resolution in chapter 3. One reason is that labialization and palatalization take place also before the high front vowel and the round vowels, respectively. Crucially, the vowels do not delete. The absence of the responsible glides in surface forms is due to the constraints proposed in this chapter (the Complex Onset Constraint and the Branching Nucleus Constraint) and hence considered independent of labialization/palatalization of the preceding onset consonant.

(3) Complex Onset Constraint: Complex onsets are not allowed.



The constraint (3) bans syllables that have more than one onset segment. It also bans more marked structures with three or more onset consonants. It is plausible to assume that a more marked configuration in a scale is automatically banned if a less marked configuration is excluded in the same scale. Being a surface constraint in Korean, the constraint (3) marks the initial consonant sequence of the original loanwords in (2) with an asterisk. One of the two repair strategies (*u*-epenthesis; labialization/palatalization of the consonant (followed by glide deletion)) enters to fix the marked configuration. The result is the absence of the disallowed CG clusters, the structure found in (3). Lacking such onset consonant clusters, the surface syllable structure conforms to (1)c.

The two adaptation strategies of the original CG clusters show that there is no room for a glide when there is a non-vocalic onset consonant in the syllable onset. Neither of the two structures, (1)a and (1)b, with an independent glide segment is the correct syllable structure regardless of where the glide is linked. If the input glide could be syllabified into either the syllable node (as an onset as in (1)a) or the nucleus node (as part of complex nucleus as in (1)b), the epenthetic vowel would not be inserted or the input glide should remain as such. Rather, the structure (1)c without a glide is the correct syllable structure reflecting the loanword adaptations.

#### 2.2. Lack of Consonant-Liquid Clusters

Another piece of supporting evidence for the  $C^{(y/w)}VC$  syllable structure comes from the fact that a syllable onset does not allow an obstruent-liquid sequence (CL) in Korean. In fact, Korean does not allow any consonant clusters within a syllable. If the alleged CG case were acknowledged, this would be the only consonant sequence in Korean. It is thus strongly suggested that Korean does not have CG onsets.

Neither native Korean nor Sino-Korean words exhibit a syllable-initial sequence with an obstruent (or any other consonant) followed by either of [r, 1]. When Korean borrows words with such a consonant sequence in an onset, the constraint (3) actively draws the repair operation to fix the illicit structure. This point is illustrated in the following loanwords and their adaptation:

(4)	Loanwords with	n a complex onset of	f a consonant-plus-liquid sequence
	original form	borrowed form	
	[printər]	[p <sup>h</sup> urint <sup>h</sup> A]	'printer'
	[plækard]	[p <sup>h</sup> ulæk <sup>h</sup> adul]	'placard'
	[brəziər]	[puraja]	'brassiere'
	[blaynd]	[pulaindu]	'blind, shade'
	[kriym]	[k <sup>h</sup> urim]	'cream'
	[klinik]	[k <sup>h</sup> ɯlinik]	'clinic'
	[griys]	[kurisu]	'Greece'
	[glayd]	[kɯlaidɯ]	'glide'
	[trʌk]	[t <sup>h</sup> urʌk`]	'truck'
	[dr1]]	[turil]	'drill'
	[slipər]	[sulip <sup>h</sup> A]	'slipper'
	[friy lænsər]	[p <sup>h</sup> uriræns^]	'free-lancer'
	[ <del>0</del> r1]	[suril]	'thrill'

In the cases of the CL clusters, there is only one repair operation, w-insertion, unlike in the CG cluster cases.<sup>4</sup>

The absence of CL clusters is a problem if the CG onset sequence as in (1)a is the possible

<sup>&</sup>lt;sup>4</sup>The reason for the absence of the other repair process comparable to  $Cy/w \rightarrow C^{y/w}$  is most plausibly that a CL sequence cannot be contracted to a rhoticized or lateralized consonant segment (at least in Korean).
syllable structure. There is an implicational relationship between the CL cluster and the CG cluster in the syllable onset position. A language with a CG onset also has a CL onset; but not vice versa. This property has been observed by Calabrese (2002), Clements (1990) and van der Hulst (2005), among others. In Korean, there are no syllable-initial CL consonant clusters, as loanwords with such a sequence are subject to vowel epenthesis separating the sequence into two syllables. This suggests that Korean lacks syllable-initial CG clusters, as well. The structure (1)a, with a bisegmental onset whose second consonant segment can only be a glide but not a liquid, is the reverse to the implicational relationship, and hence is not to be the correct maximal syllable structure in Korean.

It might be argued that the implication between the CG and CL clusters does not exclude the structure (1)b, where the alleged glide constitutes a part of a branching nucleus as an on-glide. However, the loanword adaptations for CG sequences in section 2.1 show that the GV complex nucleus is not possible in Korean, either. Otherwise, the epenthetic vowel between the consonant and the glide would remain unexplained.

# 3. The High Back Unround Glide [44]

There is a totally unrelated piece of evidence against (1)b with a glide segment in the nucleus in Korean. In addition to [y] and [w], Korean has a third glide, which is often ignored in the literature. This third glide is [u], corresponding to the high back unround vowel [uı]. Its distribution provides a strong argument for the structure (1)c.

Peculiarly, this glide appears only before the vowel [i], and not with any other vowels within a syllable. Hence, we find words with the sequence of the glide  $[u_i]$  and the subsequent vowel [i] as in (5).

(5) Distribution of the glide [u]
[ui] 'justice'
[uimu] 'duty'
[uisa] 'physician'
[uija] 'chair'
[uigušim] 'doubt'

Relevant to the present discussion is the fact that a syllable containing the sequence [u<sub>i</sub>] cannot have a consonant preceding this sequence within the given syllable. Conversely, if a syllable contains a non-vocalic onset consonant and the vowel [i], the glide does not appear between the two segments. In fact, Korean systematically lacks syllables with an initial consonant followed by this peculiar glide and then the vowel [i].

This restriction on the Cuji sequence in a syllable is well-demonstrated in Sino-Korean words, whose non-initial part has the syllable /uji/ and the immediately preceding part ends in a consonant. The majority of the Sino-Korean words are compound words that have more than one word (or morpheme), where each word has one syllable. Those individual monosyllabic words have their own independent meaning and can be combined to form compound words. The restriction on Cuji is observed in a series of homophonous words with the syllable /uji/, when it appears as the second (or the following) part of a compound. When /uji/ appears in the first syllable of a compound word, the full form is realized at surface as in (5). However, if it is put in a syllable other than the first syllable and if the preceding syllable has a coda consonant, the glide is not pronounced as in (6).

(6) Deletion of  $[\mathbf{u}]$  in the resyllabilited C\_*i* environment

+	/uqi/ 'intention'	[ag <sup>y</sup> i] 'malicious intention'
+	/uqi/ 'intention'	[hab <sup>y</sup> i] 'mutual agreement'
+	/ųi/ 'justice'	[šim <sup>y</sup> i] 'deliberation'
+	/ųi/ 'justice'	[noni] 'conference'
+	/ųi/ 'doubt'	[čir <sup>y</sup> i] 'interrogation'
	+ + + +	<ul> <li>+ /ui/ 'intention'</li> <li>+ /ui/ 'intention'</li> <li>+ /ui/ 'justice'</li> <li>+ /ui/ 'justice'</li> <li>+ /ui/ 'doubt'</li> </ul>

The final consonant of the first syllable is resyllabilited as the onset of the following syllable [ui]. The resulting structure  $C_{\mu i}$  is reduced to  $C_i$  as shown above. The last form [ $\check{c}ir^{y}i$ ] clearly shows that the original coda consonant has been resyllabilited into the following syllable, as the liquid consonant is realized as rhotic. The rhotic allophone of the single liquid phoneme is found only in the onset position in Korean, while the lateral variant is found in the coda position. Further, the resyllabified consonants are palatalized as [nopi] illustrates clearly. The coronal nasal's place of articulation is distinguishably palatal at surface, and other resyllabified consonants are palatalized as well. Palatalization of these consonants is due to the following vowel [i], and shows that the consonant and the vowel are adjacent to each other in the same syllable at the point of application of this palatalization process.

The lack of the C*\mui* sequence is a crucial piece of evidence for the syllable structure (1)c.<sup>5</sup> The other structures (1)a and (1)b have room for the glide between the initial consonant and the peak vowel [i] regardless of the internal hierarchical relationship of the glide segment with respect to the nucleus, rhyme or syllable nodes. If either of (1)a or (1)b is correct, the glide should be able to appear in surface forms.

As pointed out earlier, the glide [u] occurs only with the vowel [i], as far as there is no other initial consonant in the syllable. This fact leads to the co-occurrence restriction between [u] and [i]. This co-occurrence restriction may well be represented structurally by forming a constituent within a syllable, so that the restriction is to be captured directly in the structure. In

- (i) *i*-initial words without [u]
  - [i] 'tooth', 'louse', 'this'
  - [imu] 'administrative duty'
  - 'moving', 'trustee' [isa]
  - [ija] 'interest 'earwax'
  - [igu]

<sup>&</sup>lt;sup>5</sup>The following words with the vowel [i] as the only segment in the first syllable are provided to show that the glide [u] is not inserted word-initially in surface forms.

other words, the on-glide [u] and the peak vowel [i] may form a complex nucleus constituent as in (7), which is part of the structure (1)b.

(7) Conceivable structure for the [uji] sequence reflecting the co-occurrence restriction



This structural treatment seems to be the most efficient and intuitive way to capture the cooccurrence restriction on the sequence [uqi].

However, this does not necessarily mean that this structure should be preserved in the surface representation. If the above structure, and hence (1)b, is a legitimate surface structure, it is not clear why the skeletal position is not available for [u] between the onset consonant and the peak vowel. The onset position is separate from and independent of the nucleus, complex or simplex, and hence should not interfere with a complex nucleus containing a glide. On the other hand, the structure (1)c has no such problem, because it does not have a position for the alleged glide occupying an independent skeletal position. Bisegmental complex onsets are disallowed by the Complex Onset Constraint (3).

To ensure that surface syllables lack a branching nucleus, the following constraint needs to be recognized in Korean.

(8) Branching Nucleus Constraint: Branching nuclei are not allowed.



Due to this constraint, the glide [u] cannot be housed under the nucleus node, even when there is

no preceding consonant in the syllable. Rather, it fills the onset position, which would normally be occupied by a single consonant.

When a Cui sequence arises due to morphological concatenations, the glide [u] is deleted as seen in (6). The glide [u], like the other two glides [y] and [w], competes with non-vocalic consonants for the single onset position. When there is a non-vocalic consonant in addition to one of these glides in a single syllable, the consonant takes precedence over the glide when syllabified as the onset of the syllable. The structure (1)c is the appropriate syllable structure reflecting these aspects.

#### 4. Palatal Allophones: Coronal Non-Stops and Laryngeal

A few other arguments in favor of the CVC syllable structure come from the distribution of palatal variants of certain non-plosives. This section observes the distribution of those palatal variants of coronal consonants other than oral stops, i.e., /s, n, l, r/, and of the laryngeal /h/. It argues that the nucleus vowels following those variants are not complex, i.e., not branching, and that there is no complex onset.

In considering this matter, one needs to look into morphologically complex or derived words (such as conjugated predicate forms of bound stems) and loanwords, because monomorphemic native words do not contain such relevant sequences as  $[š_A, š_a, š_0, š_u, ...]$ . Note that the palatal variant [š] of /s/ is also found before the high front [i] and that  $[š_i]$  can appear in morpheme-internally as in  $[š_ig_0]$  (< /si-ko/ 'be sour-and') and  $[t_as_i]$  (< /t\_asi/ 'again') and across morpheme boundaries as in  $[os_i]$  (< /os-i/ 'clothing-NOM.') and  $[mas_is'A]$  'be delicious-and' (< /mas-is'-A/ 'taste-exist-INF.'). The palatalization of /s/ is obligatory before the vowel [i] and the sequence  $[s_i]$  is not a licit surface form. Consider the following loanwords and loanword adaptations focusing on the coronal consonant and the glide [y] in the original form.

(9)	Palatal variants c	of coronal non-stop	consonants in loanwords
	original from	borrowed form	
	[syuwpər]	[šup <sup>h</sup> A]	'supermarket'
	[mɛnyuw]	[menu]	'menu'
	[vɔlyuwm]	[poʎum]	'volume, loudness'
	[ryuwmətızm]	[r <sup>y</sup> umat <sup>h</sup> ijɯm]	'rheumatism'

The relevant syllables in the original forms of the lent language contain a sequence of one of [s, n, l, r] plus the glide [y] followed by a vowel. The resulting forms in Korean show the palatal variants of these consonants, i.e., [š, n,  $\Lambda$ , r<sup>y</sup>] conforming to the general palatalization process.

The crucial point is that the resulting forms with the palatal variant of /s, n, l, r/ do not contain the original glide segment [y]. The glide [y] does not constitute an independent segment as part of a branching nucleus as represented in (1)b. The sequence of a palatal variant and the glide [y] followed by a vowel would perfectly fit in the syllable template (1)b, and the absence of this glide is unexpected. Another syllable template (1)a is confronted with the same problem of glide deletion, because this template also has room for the glide as an independent segment. However, the structure (1)c reflects the fact that there is no glide [y] in resulting borrowed forms, where the relevant property is realized as part of the preceding coronal consonant.

Consider the following conjugations, which exhibit exactly the same points as the cases of loanwords with a coronal consonant plus [y] regarding their segmental phonological aspects.

'	1 414141		onar non stop consonante	a non stop consonants in conjugations			
	stem		gerund /-ko/ 'and'	infinitive /-ʌ/			
	/tasi-/	'smack'	[tašigo]	[tašʌ]			
	/tani-/	'travel'	[tanigo]	[tan∧]			
	/talli-/	'run'	[takigo]	[taʎʌ]			
	/tali-/	'iron'	[tar <sup>y</sup> igo]	[tar <sup>y</sup> ^]			

(10) Palatal variants of coronal non-stop consonants in conjugations

In the gerund forms, various coronal onset consonants of the second syllable, /s, n, l, r/, become palatal before the stem-final vowel [i]. The infinitive forms also have palatal variants of the coronal consonants, but the stem vowel [i] found in the gerund forms is no longer present. This high front vowel causing palatalization first becomes the corresponding glide [y] in the environment of the suffixal vowel / $\Lambda$ / due to hiatus. If (1)b were the correct maximal syllable structure in Korean, the resulting glide would form a complex nucleus along with the following vowel, making an on-glide of the complex nucleus. Likewise, if (1)a were the correct structure, the glide would remain as an independent segment forming a complex onset.

However, this is not what happens in the actual outcome. Instead, we obtain forms with a single (palatal) consonant segment and a single nucleus vowel segment as the infinitive forms shown in (10). The preceding coronal consonant acquires the [+high, -round] property of the glide, which is not present as an independent segment in the actual surface forms. These forms show that the maximal syllable structure is CVC in Korean, which can have up to one onset segment and up to one coda segment along with a simple nucleus segment.

A very similar situation also supports the inadequacy of the syllable structures (1)a and (1)b for Korean. The relevant examples are shown below, where the consonant before the vowel /i/ is a palatal affricate underlyingly.

	 >	D 1 . 1			•			1. 1	<b>۳</b> ٦	•	•	
	 ۱.	Valatal	conconante	not	000000000000	<b>3371</b> th 1	tho o	rlida.	1 3 7 1	111	0001110	otione
4		гананат	CONSONAINS	ноя	UUUUUUUU	while i	IIC Y	inuc.	1 V I		COTINE	anons
			••••••••••	****							•••••	

stem		gerund /-ko/	infinitive /-//
/či-/	'lose'	[čigo]	[čʌ]
/č <sup>h</sup> i-/	'hit'	[č <sup>h</sup> igo]	[č <sup>h</sup> ∧]
/č'i-/	'steam'	[č'igo]	[č'ʌ]

The glide [y] resulting from the stem-final /i/ is expected in the infinitive forms as an independent segment. The relevant glide formation is due to hiatus resolution in verbal morphology (see chapter 3 for the comprehensive discussions). However, this glide lacks in infinitive forms, i.e.,

before the suffix vowel (cf. gerund forms with a consonant-initial suffix). Again, the absence of the expected glide segment shows that the maximal syllable structure in Korean is neither (1)a nor (1)b, and that a glide cannot constitute a branching nucleus together with a peak vowel.

The palatal variant, [ç], of the laryngeal /h/ shows the same point. This laryngeal fricative is placeless underlyingly and its place of articulation is determined by the following vowel. The palatal allophone is found before the high front vowel [i] as in [çim] < /him/ 'power'. The palatalization of it is phonetically grounded and the high front vowel is responsible for the palatalization process. Unexpectedly, however, the allophone is also found before some other vowels such as [ $\Lambda$ , a, u, o], which are not associated with the features responsible for the palatalization process.

(12) The palatal allophone [ç] of /h/ before vowels other than [i]
[çA] 'tongue'
[çaŋgi] 'scent'
[ç<sup>w</sup>ušik'] 'rest'
[ç<sup>w</sup>omo] 'yeast'

The same reasoning for the palatal variants of /s, n, l, r/ applies for the laryngeal fricative's palatal variant before a vowel other than [i]. That is, the segment sequence in the lexical representation would be CGV (in this case /hy/ plus one of / $\Lambda$ , a, u, o/<sup>6</sup>). The glide turns the laryngeal into palatal and is subsequently deleted. The following schematic derivation shows this point.

<sup>&</sup>lt;sup>6</sup>Because of a restriction on sequencing phonemes in the lexical representation, other vowels (i.e., /i, e, æ, ü, ö/) cannot co-occur with the preceding glide [y] if there is an additional, non-vocalic consonant before the glide within the same syllable. This can be understood as an OCP effect on the co-occurrence of a glide and a vowel (in the presence of a preceding consonant), because all of these vowels are front. The vowel /ui/ cannot be preceded by any glide at all (in Standard Korean) when it occupies a nucleus position. This co-occurrence pattern explains why the palatal variant [ç] does not appear before vowels other than [ $\Lambda$ , a, u, o] and [i], the last of which by itself causes palatalization of /h/.

(13) Derivation of  $/hy_{\Lambda}/$  to  $[c_{\Lambda}]$  'tongue'

/hyʌ/	UR
[çyʌ]	Palatalization
[ÇA]	Glide deletion

Again, the result is the absence of the glide in the context of  $C_V$  in a syllable.<sup>7</sup>

The alleged glide [y] does not occur between a palatal or palatalized consonant ([ $\S$ ,  $\mathfrak{p}$ ,  $\mathcal{K}$ ,  $\mathfrak{r}^{\mathsf{y}}$ ,  $\check{\mathsf{c}}, \check{\mathsf{c}}^{\mathsf{h}}, \check{\mathsf{c}}', \varsigma$ ]) and a vowel in phonetic representations of the above-mentioned forms. From a phonetic point of view, having the glide [y] after these palatalized consonants is much more natural and transparent. The reason why the glide is not present in the phonetic representation despite the opaque environment for the palatalized consonants is the simple syllable structure (1)c which lacks a position for a glide. The core property of the vocoid, i.e., [+high, -back], survives in the glideless syllable, not in an independent glide segment but as part of the palatalized consonant which linearly precedes the glide at some point of phonological derivation. The consonant is palatalized by virtue of this high front vocoid, before the vocoid deletes due to the restrictions on the syllable structure.

All the data discussed in this section provide arguments against any view on the maximal syllable structure in Korean, including (1)a,b, which recognizes the position for a glide as an independent segment in addition to the proper onset consonant and the peak vowel. Instead, the simple CVC structure (1)c is consistent with the data in this section.

<sup>&</sup>lt;sup>7</sup>The change from /hy/ to  $[\varsigma]$  could be viewed as a single process of contraction of the two underlying segments to a single segment without the extra step of glide deletion (similar to the Cy/Cw  $\rightarrow$ C<sup>y</sup>/C<sup>w</sup> cases discussed in section 2). Again, the choice does not affect the argument advanced here. The important points are that i) the surface  $[\varsigma]$  is derived from /hy/ and ii) this is due to the relevant constraints: the Complex Onset Constraint and the Branching Nucleus Constraint. Either the palatal fricative or the non-palatal counterpart can appear before a (back) vowel, but only  $[\varsigma]$  is found before [i]. The distribution of  $[\varsigma]$  shows that this single segment before a vowel other than [i] results from /hy/ whether this change is to be analyzed as a one-step contraction of [h] and [y] or as palatalization of [h] followed by glide deletion. The difference becomes meaningful when hiatus resolution comes into the picture. See section 3.2.2 of chapter 3.

## 5. Optionality of Hiatus Resolution to Avoid the CGV Sequence

There is an interesting variation in conjugated forms which supports the syllable structure (1)c. The variation is found in stems that end in one of [i, u, o] and have an onset consonant before this vowel. These stems are contrasted to stems that end in the same vowel but do not have an onset consonant.

Let us first consider stems ending in [i, u, o] without a preceding onset consonant. In the following set of verbal forms, the stem-final vowel becomes the corresponding glide (/i/  $\rightarrow$  [y]; /u,o/  $\rightarrow$  [w]) before a suffix-initial vowel (/ $\Lambda$ /).

(14) Stems exhibiting obligatory glide formation before the suffix vowel  $/\Lambda/$ 

stem		infinitive /-۸/	imperative /-Ala/	causal /-ʌsʌ
/i-/	'thatch'	[yʌ]	[yʌra]	[yasa]
/moi-/	'gather'	[moyʌ]	[moy∧ra]	[тоулѕл]
/u-/	'float' (arch.)	[WA]	[wʌra]	[WASA]
/meu-/	ʻfill up'	[mew <sub>A</sub> ]	[mew∧ra]	[mewʌsʌ]
/t'æu-/	'patch'	[t'æw∧]	[t'æw∧ra]	[t'æwʌsʌ]
/s'au-/	'fight'	[s'awʌ]	[s'awʌra]	[s'awʌsʌ]
/o-/	'come'	[wa]	[wara]	[wasʌ]
/t'ao-/	'quote'	[t'awa]	[t'awara]	[t'awasʌ]

No matter how this phenomenon of glide formation is expressed formally, it is important to recognize that this operation is obligatory. This obligatoriness is due to the hiatus constraint, which disfavors two consecutive nucleus positions. Without a non-nucleus segment between the two nuclei, the hiatus configuration is subject to some repair operation. In these cases, the preceding vowels become the corresponding glide, and this glide formation process is obligatory with the resulting glide resyllabified into the onset of the syllable where the infinitive suffix vowel [ $\Lambda$ ] becomes the nucleus of the syllable.

Contrary to the glide formation of [i, u, o], the stem vowel  $/\ddot{u}/$  does not show any hiatusdriven glide formation before the suffix vowel /n/ at all. Consider the following stems and conjugations containing the vowel /ü/. The underlying vowel /ü/ or the derived vowel [i] does not become a glide:

(15)	Stems with no glide formation before the suffix vowel $/\Lambda/$							
	stem		infinitive /-ʌ/	imperative /-ʌla/	causal /-ʌsʌ/			
	/улü-/	'get lean'	[улwіл]	[улwiлra]	[yawiasa]			
	/saü-/	'burn up'	[sawiʌ]	[sawiʌra]	[sawinsn]			

The sequence [wi] derived from /ü/ by splitting this marked vowel<sup>8</sup> into the two segments already constitutes a desirable CV sequence. (See section 3.2 of chapter 3 for more details of why the hiatus-driven glide formation of the final [i] of [wi] resulting from /ü/ is blocked before the suffix vowel / $\Lambda$ /.)

The common property in (14) with /i, u, o/ and in (15) with / $\ddot{u}$ / is that the relevant syllable does not contain a non-vocalic onset consonant underlyingly and that the surface syllable invariably contains a glide onset. The stem vowels in (14) do not have a consonant, and the vowels devocalize to the corresponding glides due to the hiatus constraint to form a stable CV syllable along with the suffix vowel. In (15), the stem vowel / $\ddot{u}$ / yields the [wi] syllable by itself due to the split operation. The vowel [i] of the resulting [wi. $\Lambda$ ] does not undergo the hiatus-driven glide formation. Consequently, [wi. $\Lambda$ ] unambiguously surfaces as such in the phonetic representation. The surface forms are constant in both cases, (14) and (15), and they are in contrast with the stems that have an onset consonant in the relevant syllable underlyingly.

As shown in the conjugated forms below, there is a certain amount of variation if the stem's (final) syllable has a non-vocalic onset consonant.

<sup>&</sup>lt;sup>8</sup>See section 3.1 of chapter 1, section 3.1 of chapter 3, and Calabrese (1995, 2002, 2005) for the fission repair operations due to the constraint \*[-back, +round].

	$\phi$ 1	Ų		
stem		infinitive /-ʌ/	imperative /-Ala/	causal /-ʌsʌ/
/ki-/	'crawl'	$[ki\Lambda] \sim [k^y\Lambda]$	[kiʌra] ~ [k <sup>y</sup> ʌra]	[kiʌsʌ] ~ [k <sup>y</sup> ʌsʌ]
/titi-/	'step on'	$[tidi\Lambda] \sim [tid^{y}\Lambda]$	[tidiʌra] ~ [tid <sup>y</sup> ʌra]	[tidiʌsʌ] ~ [tid <sup>y</sup> ʌsʌ]
/yʌmi-/	'adjust'	$[y \wedge mi \wedge ] \sim [y \wedge m^y \wedge ]$	$[y \wedge m \wedge ra] \sim [y \wedge m^{y} \wedge ra]$	$[y \wedge m \wedge s \wedge s \wedge ] \sim [y \wedge m^y \wedge s \wedge $
/si-/	'sour'	[šiʌ] ~ [šʌ]	[šiʌra] ~ [šʌra]	$[\check{s}i\Lambda s\Lambda] \sim [\check{s}\Lambda s\Lambda]$
/tu-/	'put'	$[tu\Lambda] \sim [t^w\Lambda]$	[tu∧ra] ~ [t <sup>w</sup> ∧ra]	$[tu \land s \land] \sim [t^w \land s \land]$
/k'u-/	'lend'	$[k'u\Lambda] \sim [k'^w\Lambda]$	[k'uʌra] ~ [k'ʷʌra]	$[k'u\Lambda s\Lambda] \sim [k'^w\Lambda s\Lambda]$
/s'u-/	'boil (gruel)'	$[s'u\Lambda] \sim [s'^w\Lambda]$	[s'uʌra] ~ [s'ʷʌra]	$[s'unsn] \sim [s'^wnsn]$
/po-/	'see'	$[poa] \sim [p^wa]$	[poara] ~ [p <sup>w</sup> ara]	$[poas \Lambda] \sim [p^w as \Lambda]$
/ko-/	'boil down'	$[koa] \sim [k^wa]$	[koara] ~ [k <sup>w</sup> ara]	[koasʌ] ~ [kʷasʌ]
/s'o-/	'shoot'	$[s'oa] \sim [s'^wa]$	[s'oara] ~ [s' <sup>w</sup> ara]	$[s'oas\Lambda] \sim [s'^was\Lambda]$

(16)	Stems showing	"optional"	glide formation:	Variations	with an	onset consonant
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The alternating forms in (16) have sometimes been said to be in free variation in the literature (Y.-S. Kim 1984, Y.-S. Lee 1996, among others). This is not correct. The variation depends on register or style of speech (Y.-S. Kim 2000). The forms with the stem vowel retained are the preferred and desired forms in formal and careful style, while the "contracted" forms with fewer syllables are used in colloquial and fast style. The formal style retains the stem vowel in the surface forms not exhibiting the glide formation operation observed in (14), while the colloquial forms do not have the stem vowel or the corresponding glide. Instead, the corresponding secondary articulation properties are realized on the preceding onset consonant.

The environment for the variation is the underlying non-vocalic onset consonant. In the cases where there is no such consonant, i.e., as in (14) and (15), the glide (derived from either /i, u, o/ or the [w] part of /ü/ in the stem) occupies the onset position. In this case, the syllabification of the glide into the onset position is stable and there is no variation in glide formation regardless of registers. On the contrary, an additional consonant prevents the glide at issue from occupying the onset as in (16). Due to the hiatus constraint, the stem vowel is first devocalized just like predicates in (14). However, the resulting glide cannot be housed in an appropriate skeletal position in a syllable, neither as a part of a complex onset nor as a part of a branching nucleus. Consequently, the casual style deletes the unsyllabified glide resulting from devocalization of the

stem vowel, while the formal style invalidates the glide formation operation motivated by hiatus.<sup>9</sup>

The formal style supports the CVC syllable structure. If the CGV is the correct maximal segment sequence in a syllable (either (1)a or (1)b), it is not clear why the input CV+V does not become CGV. As examples in (16) show, the otherwise expected glide formation of the stem-final vowel /i, u, o/ due to hiatus (as found in (14)) does not operate in the formal register when there is an additional consonant. The blocking of glide formation with an additional onset consonant is not explained with the segment sequence CGV within a single syllable.

The stem vowels /i, u, o/ do not surface as an independent segment (as a peak vowel or a glide) in the casual forms in (16), either. These vowels are rather realized as the corresponding secondary articulation properties on the preceding consonants. Chapter 3 analyzes the entire phenomena as a series of phonological operations: glide formation due to hiatus; secondary articulation process (palatalization/labialization); glide deletion. The glide deletion process is due to the Complex Onset Constraint (3) and the Branching Nucleus Constraint (8), and would not be driven if a glide position were available as in (1)a or (1)b.

More interestingly, both styles share the property of not having a complex onset or a branching nucleus in surface forms. That is, syllables do not have a glide with an additional onset consonant. In both registers, the Complex Onset Constraint and the Branching Nucleus Constraint are always satisfied in Korean. This common property of not having a glide in a syllable with an additional, non-vocalic onset consonant is compatible only with the structure (1)c. The "optional" operation of hiatus resolution (glide formation) shows that the correct maximal syllable structure in Korean is (1)c. There can be only one consonant position per onset and per coda in a syllable

<sup>&</sup>lt;sup>9</sup>This invalidation of glide formation in the formal style suggests that hiatus constraint be a nonsurface constraint in a derivational phonological model (see chapter 3), or be ranked lower than a faithfulness constraint in optimality theory.

and there is no complex nucleus.

# 6. An Acoustic Study of the Alleged CGV Sequences

This section examines spectrograms of syllables in Korean with a palatalized or labialized (and in some cases, palatalized and then labialized, or labialized and then palatalized) onset consonant, that is, syllables which are often claimed to contain a CGV sequence. Such syllables in Korean are compared with syllables with a genuine CGV sequence in English and with other types of syllables in Korean. Through the study of spectrograms across languages and within the language, the view of the syllable structure will be shown clearly that surface syllables in Korean do not contain a glide along with a non-vocalic onset consonant.

All of the speech samples are uttered by a seven-year-old female (125 cm or 4 feet and 1-1/2 inches).<sup>10</sup> She is a native speaker of both (Northeastern) American English and (Standard) Korean. A single bilingual speaker of both languages has been chosen in order to ensure that the differences regarding the glide (or its property) at issue in the two languages are indeed due to language differences rather than speaker differences.

First, the two monosyllabic Korean words *khwin*  $[k^{hw}in]$  and *khywu*  $[k^{hy}u]$  are compared with the two comparable English words *queen*  $[k^{h}wiyn]$  and *cue*  $[k^{h}yuw]$ , respectively, from which the corresponding Korean words are derived through loanword adaptation. The first two spectrograms are the pair of the English word *queen* and its adapted form *khwin*  $[k^{hw}in]$  'queen (playing cards)' in Korean.

<sup>&</sup>lt;sup>10</sup>All the speech samples have been recorded digitally to .wav files (monaural, 22050 Hz sampling frequency, 16 bits per sample) on a PC with a Microsoft Windows operating system, and converted to spectrograms using *Praat* version 4.4.05 (by Paul Boersma and David Weenink; available on the World Wide Web at http://www.praat.org).



(17) Spectrogram of the English word queen [k<sup>h</sup>wiyn]

(18) Spectrogram of the Korean word *khwin* [k<sup>hw</sup>in]



The presence of F1 far below the 1000 Hz range indicates sonorant segments including the prenuclear glide, the vowel parts and the postnuclear nasal. In both *queen* in English and *khwin* in Korean, the consonant part shows a very short falling transition after the burst. The falling transition is a general characteristic that the location of a velar stop's burst is always higher than the following vocoid, in this case [w] whose F2 is quite low. Afterwards, the rising transition targets the high F2 (over 3000 Hz), which is the property of the high front vocoid, the vowel [i] or the glide [y].

The following two spectrograms are from the English word *cue* and the corresponding loanword *khywu* [k<sup>hy</sup>u] 'billiard cue' in Korean.

(19) Spectrogram of the English word *cue* [k<sup>h</sup>yuw]



(20) Spectrogram of the Korean word *khywu* [k<sup>hy</sup>u]



In these cases, the F1 of the vocoid parts are low as these vocoids are high vowels and glides. The F2 transitions in the range between 1000 Hz and 4000 Hz show the same falling pattern in both the English and the Korean cases: falling from somewhere between 3000 Hz and 4000 Hz to somewhere between 1000 Hz and 1500 Hz.

The first difference to notice between English and Korean in each pair is that the rising ([w] to [i]) and the falling ([y] to [u]) transitions are quite longer in English than in Korean. This difference of transition times indirectly supports the absence of the claimed glides in Korean.

More importantly, however, the (a)synchronism of the F1 initiations and the F2 transitions reveals that Korean does not have a glide in the C\_V context in a syllable. In *queen* and *cue*, the F2 transition starts only after the F1 initiates, i.e., after the (sonorant) vocoid part starts to be pronounced. Hence, the glide starts at the starting point of the F1 along with the subsequent

vowel. In the case of *queen*, the rising transition to [iy] starts right after the beginning of the vowel and continues for a little longer than 100 ms. The glide in *cue* has much longer time duration with additional stable F2 for a little less than 100 ms before the falling transition.

The following spectrograms of the English words quarter and quest show the same point.

(21) Spectrogram of the English word *quarter* [k<sup>h</sup>woə'tə<sup>-</sup>]



(22) Spectrogram of the English word *quest* [k<sup>h</sup>wɛst]



Even though the two words are uttered in quite different rates, the F2 transition in both cases starts only after the beginning of the entire vocoid part, i.e., after the consonant part. Hence, it is clearly shown that the above English syllables have an isolable glide as an independent segment between an onset consonant and a nucleus vowel. When the secondary articulation effect on the consonant due to the glide is taken into consideration, narrower phonetic transcriptions for *queen* and *cue* would be  $[k^{hw}wiyn]$  and  $[k^{hy}yuw]$ .

However, this is not what is observed in Korean. In both  $[k^{hw}in]$  and  $[k^{hy}u]$ , the F2 transition already starts before the following vowel's F1 appears. The transition starts from around 2000 Hz immediately after the consonant burst in  $[k^{hw}in]$ , and reaches higher than 3000 Hz when the following vowel's F1 starts. The transition is almost completed, when the vowel [i] starts along with its F1. In  $[k^{hy}u]$ , the transition begins approximately 50 ms. after the stop burst and reaches the 2000 Hz range when the vowel's F1 starts. This demonstrates that the F2 transition is within the consonant segment, rather than following the consonant. In other words, the F2 transitions are totally different from those in English. In English, the F2 transition occurs in the vocoid part from [y] to [u] in *cue* or from [w] to [i] in *queen*, i.e., after the consonant. The consonant does not have any transition other than the short initial burst transition, and the consonant's formant is constant after the initial burst.

At the end of the stop  $[k^h]$  in  $[k^{hy}u]$  in Korean, the consonant is already labialized when the consonant is still in its release phase. The labialization would be unexplained if the glide [y] as an independent segment intervened between the consonant and the round vowel [u]. If [y] were present between  $[k^h]$  and [u], it would separate the segments linearly, and the separated round vowel should not be able to influence the consonant in terms of labializing it. Rather, the labialization effect at the end of the (already palatalized) consonant shows that there is no independent glide segment [y] after the consonant and that the consonant is immediately followed by the round vowel. Likewise, the consonant in  $[k^{hw}in]$  (labialized at the beginning) is palatalized at the end of it, when the articulation of the stop has not been completed. The (second) formant of the consonant  $[k^{hw}]$  reaches almost the 3000 Hz range at the end effectively making the already labialized consonant palatalized just before the vowel starts. The following vowel is [i] with the F2 ranging between 3000 Hz and 3500 Hz. Again, the additional palatalization, i.e., the rising transition of the formant within the consonant, shows that there is no glide [w] that would

intervene between the consonant and the vowel.

The labialized consonant further becomes palatalized toward the end in  $[k^{hw}in]$  due to the following front high vowel [i], and likewise the palatalized consonant becomes labialized in  $[k^{hy}u]$  due to the following round vowel [u]. Thus, more detailed phonetic transcriptions for  $[k^{hw}in]$  and  $[k^{hy}u]$  would be  $[k^{hwy}in]$  and  $[k^{hyw}u]$ , respectively. Such radical F2 transitions within the consonant are observed in other syllables that contain a nucleus vowel other than [u] or [i], as shown below. Observe the following spectrograms focusing on the initial consonant with a formant transition within it before the vowel's F1.





(24) Spectrogram of the Korean word *pyekey*  $[p^y \Lambda ge]$  'wall-LOC' (< /py \Lambda k + e/)



(25) Spectrogram of the Korean word kwaja [k<sup>w</sup>aja] 'cookie'



(26) Spectrogram of the Korean word *thwikim* [t<sup>hwy</sup>igim] 'fried food' (</t<sup>h</sup>ükim/)



The falling or rising formant transitions in the above syllables cover relatively smaller vertical spans than the cases of  $[k^{hyw}u]$  and  $[k^{hwy}in]$ . However, the initial consonant has the transition before the nucleus vowel starts in all cases and the transition is almost completed when the vowel starts. Hence, the difference of transition locations relative to the beginning point of the vocoid in the two languages reveals the status of the glide in Korean.

In addition to the cross-linguistic differences of the formant transition locations relative to the beginning of the following vocoid, a comparison between syllables containing a consonant with a relevant secondary articulation property and syllables containing a genuine glide but not such a consonant in Korean also shows that there is no surface glide in the C\_V context. Compare the initial consonants in (23)-(26) to the initial glide segments [y] or [w] without a consonant in the following spectrograms.



(27) Spectrogram of the Korean word yosay [yose] 'currently'

(28) Spectrogram of the Korean word yeki [yAgi] 'here'



(29) Spectrogram of the Korean word wase [wasA] 'come-CAUSAL' ( $< /0 + \Lambda SA/$ )



(30) Spectrogram of the Korean word wiey [wie] 'top-LOC' ( $\langle /\ddot{u} + e \rangle$ )



In each of the above cases (27)-(30), the glide part's F1 and F2 are distinct from those of the following peak vowel. Both formants show a visible transition to the following vowel after the onset of the glide in each case. However, no such (vertically) separable glide segments observed in spectrograms in (27)-(30) are found in the spectrograms in (23)-(26). As discussed above, the only properties related to the glides, i.e., palatality, labiality or both, are superimposed on the consonant as part of it.

There is one point that should be mentioned. Chapter 1 argued on the basis of vowel harmony and optional vowel fronting that Korean has front round vowels /ü, ö/ underlyingly or derived in phonological derivations. It was also argued that these vowels are fissioned to [wi, we], respectively, due to the constraint \*[-back, +round]. The spectrogram (30) for *wiey* shows this point: the F2 of the first syllable in this spectrogram is not steady, but rises from a little over the 1000 Hz level to over the 3000 Hz level while maintaining the steady F1 at the range of 300 Hz (similar to the F2 of the initial labialized and palatalized dental stop of *thwikim* in (26)). This F2 transition shows that the syllable does not contain a monophthong [ü] at surface. This syllable is either a diphthong or a sequence of two vocoid segments.

To conclude this section, I reiterate that there is no glide in the C\_V context at the level of phonetic representation. The glide which once existed at a deeper phonological level survives as a secondary articulation effect superimposed on the consonant. After labializing or palatalizing the

preceding consonant, the abstract glide deletes due to the Complex Onset Constraint (3) and the Branching Nucleus Constraint (8). Formant transitions within the consonant segments show the consonant's acquisition of such a secondary articulation property. Spectrograms show that there is no identifiable glide segment in the C\_V context. If, in this resulting syllable (after glide deletion), the subsequent peak vowel carries the other secondary articulation, i.e., if the resulting sequence is one of C<sup>w</sup>i, C<sup>y</sup>u, and C<sup>y</sup>o, then the consonant further acquires this other secondary articulation effects rejects a similar CVC syllable structure with the glide property incorporated into the nucleus vowel (e.g., Y.-S. Kim 1984) (See section 3.2.2 of chapter 3 for more discussions regarding the derivational phonological analysis of a consonant's acquiring two secondary articulation properties.). The additional secondary articulation of the consonant is reflected in the formant transitions within the consonant as illustrated in the spectrograms in (18), (20) and (23)-(26). The study with spectrograms in this section provides evidence that Korean has no glide in a C\_V environment.

# 7. The Phonological Reality of the Glide and its Vestige in Phonetic Forms

As argued repeatedly, my claim is that in Korean there is no glide as an independent segment in a surface syllable that has an additional onset consonant. Instead, the relevant properties of such alleged glides are incorporated into the preceding non-vocalic onset consonant as the secondary articulation features. This section briefly considers possible factors that confuse language users and linguists regarding the status of the alleged glide. It also considers the phonological reality of such glides and the phonetic correlates.

One major reason for (wrongly) identifying a glide in the C\_V context in Korean may be orthography. First of all, non-vocalic onset consonants are written consistently regardless of

whether they are palatalized or labialized by the following vocoid or not. For example, the palatalized allophone [ $\check{s}$ ] before the vowel [i] and the non-palatalized [s] before other vowels are written with the same letter. Likewise, a single identical consonant letter used for the labialized [ $k^{hw}$ ] before [u] or [o] and the non-labialized [ $k^{h}$ ] before other vowels. The main reason for the use of the same symbol is that the allophonic differences on the consonant part are not distinctive but predictable. The following vowel is responsible for palatalization and labialization of the consonant.

For the alleged CGV sequences, an additional symbol is used on the vowel part. In the cases of the "CyV" sequences, the glide part is represented as an additional stroke (or line) on the vowel symbol (Compare the vowel letters  $\perp$  [o] and  $\perp$  [yo], for example.). The additional stroke is used also for the genuine glide in a syllable without a non-vocalic consonant. For the "CwV" cases, an additional vowel character is added between the non-vocalic consonant and the peak vowel as in  $\uparrow$  [a] and  $\perp$  [wa]. The glide characters used for the alleged CwV sequences are the same as the characters for the vowels [u, o] which are used as sole vocalic segments in CVC syllables and as the characters for the corresponding glide [w] in a syllable without a non-vocalic consonant. The additional stroke (for palatality or [y]) and the vowel/glide symbol (for labiality or [w]) are for palatalization and labialization, respectively, of the preceding consonant. Crucially, those glide symbols are not realized as a real glide in the phonetic forms. They are better understood as diacritics for the preceding onset consonant as far as surface forms are concerned.

The identical symbols for the glide properties of the onset consonants are used in the cases without a non-vocalic onset consonant. When there is no additional consonant, those symbols represent genuine glides. The confusion seems to arise here. Because the symbols for the genuine glides are used for the secondary articulation properties of the additional, non-vocalic onset consonant, this double use seems to induce the confusion and to get the secondary articulation "diacritics" treated as independent segments in the C\_V contexts. As advanced in previous sections, however, the conceived glides denote secondary articulation properties in surface phonetic representations and do not have a status of an independent segment.

Treating the glide symbols as independent segments is not totally superfluous. In fact, this treatment and the orthography reflect native speakers' intuition on the phonetic palatality and labiality properties of the onset consonants. They are actual glides at a deeper level of phonological representation. For example, the loanwords in (2) contain a glide in the input forms, which are repaired to conform to the surface constraints and requirements. This glide incurs palatalization or labialization of the preceding consonant. If there is no glide, the preceding consonant is not palatalized before a vowel other than [i] or labialized before an unround vowel. As shown below, the initial stops in the borrowed forms are not palatalized when there is no [y] in the original forms of the lending language.

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	<b>ר</b>	1 1 1 1 1	natatatizati			н плиет плат		
- t	~ 1	1 1 1 0	Duruunzun					
- 1		, -					_	

original form	borrowed form		
[pɛst]	[p <sup>h</sup> esut <sup>h</sup> u]	*[p <sup>hy</sup> esut <sup>h</sup> u]	'pest'
[tɛst]	[t <sup>h</sup> esut <sup>h</sup> u]	*[t <sup>hy</sup> esuut <sup>h</sup> u]	'test'
[seksi]	[s'ek'š'i]	*[s <sup>'y</sup> ek'š'i], *[š'ek'š'i]	'sexy'
[kæstıŋ]	[k <sup>h</sup> æsɯt <sup>h</sup> iŋ]	*[k <sup>hy</sup> æsɯt <sup>h</sup> iŋ]	'casting (of characters)'
[hæpnɪŋ]	[hæpuniŋ]	*[h <sup>y</sup> æpuniŋ], *[çæpuniŋ]	'happening'

The surface secondary articulation properties are a reflection of the reality of glides at a deeper level.

Likewise, the infinitive forms of those predicates in (10), (11) and (16) have a stem-final vowel, i.e., one of /i, u, o/ before the suffix vowel / $\Lambda$ /. Even though the stem vowel is not retained in the casual style, it survives in the formal style. In addition, the same vowel always surfaces in other forms with a consonant-initial suffix such as the gerund forms in (10) and (11). In the casual forms of infinitives, the vowel is represented with a glide symbol. This suggests that the stem-

final vowel is actually considered as a derived glide resulting from the hiatus configuration. The devocalized vowel in the casual infinitive forms is phonologically real at a deeper level of representation.

The writing system reflects the glidehood (and devocalization) of the underlying stem vowels in the (casual) infinitive forms in (10), (11) and (16). The Korean writing system is basically alphabetic, but consonant and vowel symbols are combined to form syllable blocks. Each syllable block has an onset consonant symbol, a vowel symbol and an optional coda consonant symbol. As discussed earlier, when a syllable has a glide, a line on the vowel symbol (for palatality) or a vowel symbol (for labiality) is added. The casual infinitives form of /ki-ʌ/, for example, is written in a single syllable with the additional line for the glide part on the vowel symbol. The use of the "glide symbol" and the single syllable block (with two underlying vowels) indicate that the stem vowel is not a nucleus vowel any more in the casual infinitive form, but a devocalized glide. In other words, the double use of the glide symbol in orthography mentioned earlier in this section reflects native speakers' knowledge on the phonological reality of the glide.

Spectrograms, too, support the presence of an abstract glide. As illustrated in the previous section regarding the spectrograms, the initial stops in *khwin* [ $k^{hwy}$ in] (18) and *khywu* [ $k^{hyw}$ u] (20) contain two secondary articulation properties: the stop in [ $k^{hwy}$ in] contains labiality and then palatality, and the stop in [ $k^{hyw}$ u] contains palatality and then labiality. In each case, the second of the two secondary articulation effects is due to the peak vowel that immediately follows the consonant in the phonetic forms. The first secondary articulation effect reflects the reality of the corresponding glide (i.e., [w] for the labiality and [y] for the palatality) at a deeper level, even though the responsible glide is not present in the phonetic forms as an independent segment.

What is argued here is that the glide at issue is present between an initial consonant and a vowel at an earlier stage of derivation, and that it later deletes due to constraints such as the

Complex Onset Constraint (3) and the Branching Nucleus Constraint (8). The surface forms have a vestige of the glide, i.e., a secondary articulation property on the preceding consonant. This phonetic cue reflects the psychological and phonological status of the glides and may lead native speakers to the recognition of independent segments for the glides at the surface.

There are many cases where a core property of a phonologically separate segment is realized as a part of another segment instead of an independent segment. Native speakers would still recognize the property of the segment added to the other segment as the original segment at issue. The nasality of vowels is one such case in English. Nasal vowels in English are predictable: the nasality of a vowel depends on that of the following consonant. If there is a nasal consonant following a vowel, the vowel becomes nasal phonetically, and if not the vowel remains oral. Some dialects of English drop the nasal consonant before a voiceless consonant. The nasal drops after vowel nasalization. Consequently, the phonetic difference between words such as *set* and *sent* is the nasal consonant as in [set] and [sēt], while the phonological contrast is absence vs. presence of the nasal consonant as in /set/ and /sent/. The nasality of the vowel is not contrastive or distinctive phonologically, and the phonetic difference between the oral and nasal vowels is not recognized as such, but as absence or presence of the responsible nasal consonant. That is, native speakers regard the nasal property of the vowel in [sēt] as a phonologically independent segment /n/, not as a property discerning the nasal and oral vowels.

The abstract glides and the palatal and labial properties of the consonants in Korean have the same status. The glide segments at a deeper level are materialized as corresponding secondary articulations on the preceding consonant. The acoustic phonetic properties on the consonant (for palatality and labiality) as shown in the spectrograms (18), (20) and (23)-(26) are reconstructed as the respective phonological segments. This property, represented in orthography, reflects native speakers' phonological knowledge. This knowledge and orthography, however, do not show that surface forms necessarily have a glide as an independent segment. The surface phonetic forms do not contain individual glides in the C\_V context, but the non-vocalic onset consonant carries the relevant core properties of these glides. When a CGV string arises either from loanwords or from morphological concatenations, the glide palatalizes or labializes the preceding consonant. Subsequently, the glide deletes due to the Complex Onset Constraint and the Branching Nucleus Constraint.

# 8. Conclusion

This chapter has examined syllable structure in Korean. A wide range of phenomena indicates that a surface syllable contains a maximum of the CVC sequence as in (1)c. It has three syllabic components: optional onset, obligatory nucleus and optional coda. Each of these components can have only one segment. There is no complex onset, and no branching nucleus. The glides, whose presence is supported underlyingly by certain conjugated forms of predicates, loanwords and a co-occurrence restriction, do not appear in the phonetic representations when there is an onset consonant in the syllable. This non-occurrence of the intervening glide is due to the two constraints: the Complex Onset Constraint (3) and the Branching Nucleus Constraint (8).

The study of spectrograms for such syllables which are often claimed to have a CGV sequence shows that these syllables do not contain a glide as a separate segment, but that the relevant property of the glide is incorporated into the consonant. Orthography, which could be an obstacle to identifying the accurate phonetic forms, reflects native speakers' knowledge of the glides at a deeper phonological level. The conclusion drawn from this study for Korean conforms to the relationship between CL and CG sequences: a language with CG onsets allows CL onsets.

# Chapter 3

### Hiatus Resolution, Constraints, Rules and Derivations

# 1. Introduction

Hiatus, i.e., a configuration in which two vowels appear consecutively, can be considered a marked configuration across languages. This marked structure needs to be repaired. Interestingly, languages deal with this marked configuration not in a single way, nor in a large amount of diverse ways, but in a limited number of distinct ways. The observed repairs are deletion of one of the two vowels, devocalization of one vowel, and insertion of a glide or a consonant between them. In this chapter, I will deal with the process of hiatus resolution in Korean verbal morphology. Typically hiatus configurations in Korean verbal inflections arise when a vowelinitial suffix is attached to a vowel-final stem, although some stems ending in a consonant also exhibit hiatus situations. There are several interesting phenomena related to hiatus and hiatus resolution in Korean. First of all, three different strategies are observed to repair this structure: vowel elision, glide formation and glide insertion. Secondly, the operation of hiatus resolution itself is sometimes apparently optional. A third notable thing, which makes the problem more complicated, is that sometimes two consecutive vowels have to surface in phonetic representations. The last situation arises especially when a certain stem-final consonant is deleted between the stem vowel and the suffix vowel. I will investigate the issues in hiatus and hiatus resolution in Korean verbal morphology in the framework of Dynamic Phonology (Calabrese 1995, 1998, 2002a).

The chapter is organized as follows. Sections 2 through 5 discuss how the hiatus configurations are resolved and why some instances of them are tolerated. Section 2 deals with the vowel elision cases, and section 3 discusses a variety of glide formation cases where one of the two hiatus vowels is devocalized. It is argued in section 4 that the hiatus constraint is a non-surface cyclic constraint. It is also contended that cyclic information – both morphosyntactic and phonological – is critical to properly dealing with hiatus resolution. Further arguments for these claims are provided in section 5. Section 6 concludes the chapter.

## 2. Hiatus in Korean: A First Sketch

According to the syllable structure in Korean proposed in chapter 2, the maximum number of consonants between two vowels is two in surface forms. However, since the number of stemfinal consonants can vary from zero to two depending on the stem's lexical representation, clusters of three consecutive consonants<sup>1</sup> and hiatus situations are encountered. To resolve the marked structure of hiatus, a few different phonological operations are utilized. This section deals with conjugations where one vowel deletes.

First, consider the following conjugations of consonant-final stems.

(i) underlying surface gloss anč-ko ank'o 'sit-GER' Aps-ko Ap'k'o 'not.exist-GER' 52

<sup>&</sup>lt;sup>1</sup>In this case, one of the three consonants is deleted, usually the unsyllabified, middle one (cf. Y.-S. Kim 1984: 18ff).

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'exist'

it'k'o

is'-

(1)	Regular conjugations (consonant-final stems)							
	stem	gloss	gerund 'and'	interrogative	infinitive	causal	sequential 'as'	
			-ko	-ni	-Λ	-ΛSΛ	-umi	
	ip-	'put on'	ip`k'o	imni	іbл	ibasa	ibuni	
	n^m-	'go over'	n∧mk'o	nлmni	плтл	namasa	nʌmɯni	
	muk'-	'bind'	muk <sup>°</sup> k'o	muŋni	muk'n	muk'ʌsʌ	muk'umi	
	mak-	'block'	mak <sup>°</sup> k'o	maŋni	maga	magas∧	maguni	
	k'oč-	'inset'	k'ot`k'o	k'onni	k'oja	k'ojasn	k'ojumi	

inni

These stems have one final consonant and show regular patterns in the sense that there is no segment deletion or addition (other than general phonetic rules such as intervocalic voicing of a plain stop and nasalization of an obstruent before a nasal) when the stem is put together with the following suffix (beginning with a consonant or a vowel).<sup>2</sup>

it⁻ĭa

is'asn

is'uni

The first case of vowel deletion is seen in predicates whose stem-final segment is the high back unround vowel, /ui/. Thus, when a stem such as /s'ui/ 'to write' or /k<sup>h</sup>ui/ 'to grow' gets a vowel-initial suffix such as infinitive / $\Lambda$ /, the result is [s' $\Lambda$ ] and [k<sup>h</sup> $\Lambda$ ] as in (2).<sup>3</sup>

<sup>&</sup>lt;sup>3</sup>Vowel harmony is responsible for the two different suffix vowels at surface in the infinitive and causal forms: [muk' $\Lambda$ ] vs. [maga], and [muk' $\Lambda$ s $\Lambda$ ] vs. [magas $\Lambda$ ]. Descriptively, the suffix-initial / $\Lambda$ / harmonizes with the vowels /0, a/ in the stem's last syllable, and is converted to [a]. The suffix vowel is realized as [ $\Lambda$ ] after all other stem vowels /i, e, æ, ü, ö, uu,  $\Lambda$ , u/. Other suffix-initial vowels and non-suffix-initial vowels remain as such. The following *SPE* formalism illustrates this process.

(i)	+back -high -low rnd	→ [+low] /	$\begin{bmatrix} +back \\ -high \\ \alpha low \\ -\alpha rnd \end{bmatrix}$	C <sub>0</sub> +
	L —rna _		L – arna J	

If the mid round vowels, /o,  $\ddot{o}$ , are considered [+low] phonologically, the "- $\alpha$ rnd" specification can be dispensed with in the environment, and the rule is more naturally formulated.

<sup>&</sup>lt;sup>2</sup>When a coda obstruent is followed by a nasal consonant in the next syllable, this obstruent becomes nasal, retaining its place of articulation. This has been understood recently as a result of the syllable contact law, which requires the sonority of the preceding coda consonant to be higher than or equal to that of the following onset consonant. (cf. Clements 1997, Calabrese 2002a §5.6)

(2)

*w*-irregular conjugations

stem	gloss	gerund 'and'	interrogative	infinitive	causal	sequential 'as'
		-ko	-ni	-Λ	-ΛSΛ	-umi
s'ш-	'write'	s'ugo	s'umi	s'A	s'asa	s'uni
t <sup>h</sup> u-	'sprout'	t <sup>h</sup> ugo	t <sup>h</sup> uuni	t <sup>h</sup> л	t <sup>h</sup> лsл	t <sup>h</sup> uuni
t'uı-	'float'	t'uigo	t'uni	t'A	t'лsл	t'umi
k <sup>h</sup> u-	'grow'	k <sup>h</sup> ugo	k <sup>h</sup> uuni	k <sup>h</sup> л	k <sup>h</sup> лsл	k <sup>h</sup> umi
k'uı-	'turn off'	k'ugo	k'umi	k'∧	k'nsn	k'umi
sɯlpʰɯ-	'sorrow'	sulp <sup>h</sup> ugo	sulp <sup>h</sup> uni	sɯlp <sup>h</sup> ʌ	sɯlpʰʌsʌ	sulp <sup>h</sup> uni

It should be pointed out that when the stem-final vowel is /u/ this option of hiatus resolution, i.e., deletion of this stem-final vowel, operates without further condition. As will be shown later in this section, if neither of the two vowels is [u], deletion of a vowel needs further requirements.

The vowel [u] is deleted in the mirror image situations as well. When a suffix whose initial segment is [u] is attached to a vowel-final stem, this suffix-initial vowel deletes. This point is illustrated in the following examples, where the stem-final segment is a vowel. To make this point clear, the stems are chosen whose final vowel is not [u].

(3)	Suffix-initial [u] deletes after a stem-final vowel						
	stem	gloss	inter-	dubitative	sequential	adversative	intentional
			rogative	interrog.	'as'	'but'	'so that'
			-ni	-na	-uni	-uina	-wlʌ
	sa-	'buy'	sani	sana	sani	sana	sarA
	sΛ-	'stand'	sлni	sлna	sлni	sлna	SATA
	si-	'sour'	šini	šina	šini	šina	šira
	s'0-	'shoot'	s'oni	s'ona	s'oni	s'ona	s'ora
	s'u-	'cook (gruel)'	s'uni	s'una	s'uni	s'una	s'urʌ
cf.	sam-	'make'	sama	samna	samuni	samuna	samurn
	sak-	'decay'	saga	saŋna	saguuni	saguna	saguur∧

In the sequential, adversative and intentional forms, the suffix-initial vowel [ui] is deleted in the environment of the preceding stem-final vowel. Hence there is no distinction between interrogative and sequential forms for those stems whose final segment is a vowel. The distinct forms between interrogative and sequential forms can be observed for the consonant-final stems in (1).

A vowel is also deleted when it is adjacent to another vowel of the same quality. Such cases are already presented in (2) for the sequential forms, where the suffix-initial vowel is [u], which is identical to the stem-final vowel. Hence, the difference between the interrogative forms and the sequential forms is lost for the *u*-final verb stems by deleting one *u* in /s'uı-uni/ > [s'uni], /t<sup>h</sup>uıuni/ > [t<sup>h</sup>uni], /t'aluı-uni/ > [t'aruni]. More illustrative examples are those that contain a vowel other than /uı/, like / $\Lambda$ / or /a/ as stem-final and suffix-initial vowels, as in (4).

(4)	Vowel deletion under identity							
	stem	gloss	gerund 'and'	interrogative	infinitive	causal	imperative	
			-ko	-ni	-Λ	-ΛSΛ	-Ala	
	SΛ-	'stand'	sлgo	sлni	SΛ	SASA	sлra	
	k <sup>h</sup> yл-	'turn on'	k <sup>hy</sup> лgo	k <sup>hy</sup> лпі	k <sup>hy</sup> л	k <sup>hy</sup> лsл	k <sup>hy</sup> ∧ra	
	kлnnл-	'cross'	клпплдо	kлnnлni	kлпл	kлпплял	kлnnлra	
	sa-	'buy'	sago	sani	sa	sasn	sara	
	ka-	'go'	kago	kani	ka	kasn	kara	
	p <sup>h</sup> a-	'dig'	p <sup>h</sup> ago	p <sup>h</sup> ani	p <sup>h</sup> a	p <sup>h</sup> as∧	p <sup>h</sup> ara	

In the case of the infinitive [ka] (and the causal [kas $\Lambda$ ]), vowel harmony first converts the suffix vowel to [a], which is then identical to the stem vowel. Consequently, [kaa] is reduced to [ka]. After vowel harmony applies, the suffix vowel [ $\Lambda$ ] or [a] deletes after the identical stem-final vowel. The derivation is illustrated in (5).

(5)		SΛ-ΛSΛ	ka-nsn
	Vowel harmony	_	kaasn
	Vowel deletion	SASA	kasn

This deletion operation follows vowel harmony in the serial phonological derivation, as illustrated in (5). If these two operations were ordered reversely, i.e., first vowel deletion and then vowel harmony, then vowel deletion would not apply because the suffixal vowel and the stem vowel are not the same, but vowel harmony would still apply to yield \*[kaas $\Lambda$ ] or \*[ka:s $\Lambda$ ].

The absence of a hiatus configuration in (2), (3) and (4) is accounted for by assuming the

### constraint (6).

\*

(6) Hiatus constraint: Two adjacent nuclei are not allowed.

This negative constraint states that the above-mentioned configuration is avoided. Therefore, a subsequent operation is incurred to repair this marked configuration. The response to the hiatus constraint in the cases of (2), (3) and (4) is deletion of the relevant segment involved in the marked configuration. If necessary, further repair(s) will enter to fix the resulting structure.

Consider the cases where the deleted vowel is [u]. The first case involves the sequences whose second vowel is [u], which is the (initial) vowel of the suffix (as it is for the sequential, adversative and intentional forms found in (3)). The following operation shows the repair of the hiatus structure by deleting the vowel [u].





The repair of the hiatus configuration in (7)a is deletion of the skeletal position of the vowel [u].

Then, the nucleus loses the syllabic head segment. Consequently, this nucleus node and the remaining projections in this syllable are deleted. Hence, the form in (7)c, [sAni], is obtained as the correct surface form. This is a simple case of deletion to repair the hiatus structure.

Consider the mirror-image case, where [u] is the first vowel of such a hiatus. This is found in the infinitive, causal and sequential forms in (2). Again, the same vowel deletes regardless of where it appears:  $/s'ui - \Lambda s \Lambda / > [s' \Lambda s \Lambda]$  'write-CAUS'.

(8) The stem-final [u] deletes as a repair of the hiatus configuration /s'ui- $\Lambda$ s $\Lambda$ /



This case with the stem-final [uu] has one more step in the derivation (8)d: onset incorporation. The initial consonant in the stem /s'uu/ loses its nucleus vowel as a consequence of segment deletion, as the step from (8)b to (8)c illustrates. At this point, in (8)c, this consonant is not syllabified and the representation is ill-formed. This situation does not arise in the previous case where the vowel [uu] is the suffix vowel, and the stem syllable retains its structure after [uu] deletion. Hence, in order to rescue the orphaned consonant, the following syllable projected from the suffix vowel incorporates this consonant via onset incorporation. The process of onset incorporation, i.e., addition of the onset association line between the unsyllabified consonant and the onset-less syllable node is the most economical way of repairing the structure (8)c. The condition of deletion should be clearly specified that either of the two vowels is [uu].

Deletion under identity

(9)

Let us now turn to the cases of deletion under identity, in (4). They include conjugations such as /sʌ-ʌsʌ/ 'stand-CAUS' and /ka-ʌla/ 'go-IMP'. In the latter case, the suffix-initial vowel has changed to [a] due to vowel harmony, first yielding [ka-ala]. Hence, the discussion of the deletion repair under identity is restricted to stages after vowel harmony, starting with the form [ka-ala].

#### a. $\sigma \sigma \sigma$ b. $\sigma \sigma \sigma$ c. $\sigma$ R R R R R N N N N X X X X X X $S \Lambda \Lambda S \Lambda$ deletion of the skeleton of the second twin A RR R

The step from (9)a to (9)b is a hiatus resolution operation, and it deletes one of the consecutive nuclear skeletal positions, both of which have the same vocalic feature content.

This operation of deletion is essentially the same as the deletion of the skeletal position of [uu] in (7). The difference is that in the case of identity deletion, the deleted skeletal position of the suffix vowel contains a vowel of the same segmental quality as the preceding stem-final vowel. However, the deleted skeletal position in (7) contains the vowel [uu], which is not necessarily the same vowel as the stem-final vowel. Afterwards, the headless nucleus node and the rest of the syllabic nodes are deleted, and the result is (9)c, which is the correct surface representation.

In the derivation (9), the second of the two identical vowels is deleted. However, one could think of deleting of the first vowel, instead of the second vowel, as the deletion repair. This option is illustrated in (10), which is parallel to the derivation (8) for /s'u-AsA/ > [s'AsA], again except

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for the segmental content of the deleted vowel.



#### (10) Deletion under identity: Deletion of the first vowel

The result is the correct surface form. After all, the same surface form [sASA] is obtained from the input /sA-ASA/ by deleting either of the two [A]'s (either the stem-final [A] or the suffix-initial [A]) adjacent to each other.

The case of identity deletion is where the two different derivations resulting in the same correct outputs can be compared. Disallowed by an active negative constraint, a marked configuration is freely repaired. Hence, both (9)b and (10)b are possible repairs to resolve the hiatus structure. The subsequent derivations are both legitimate and yield the allowed and correct surface form. However, according to the economy of derivation criterion, the shorter derivation is chosen, in this case (9). The derivation (10) has one more step of onset incorporation. This is the consequence of deleting the first vowel involved in the hiatus structure. The onset consonant is unsyllabified after the nucleus vowel of the stem is deleted. Onset incorporation is introduced to syllabify this consonant. This step of onset incorporation is unnecessary when the second vowel is deleted as in (9), because the consonant in question remains syllabified as the onset of the first vowel. Therefore, the derivation (9) is chosen over (10), because (9) has a shorter derivation, i.e.,

fewer steps in the derivation, and hence is more economical.<sup>4</sup>

There is a complication regarding the ordering of vowel harmony and vowel deletion. It is evident from the predicates in (4) and the ordering of the two operations in (5) that vowel deletion follows vowel harmony in the serial derivation. However, consider the following polysyllabic predicates with the final vowel [ui].

(11)	Polysyllabic predicate stems ending in [ui]						
		stem	gloss	interrogative	sequential 'as'	infinitive	causal
	a.	sulp <sup>h</sup> u- yep'u- kip'u- Asalp <sup>h</sup> u-	'sad' 'pretty' 'happy' 'coarse'	-ni sulp <sup>h</sup> uni yep'uni kip'uni Asaln <sup>h</sup> umi	-uni sulp <sup>h</sup> uni yep'uni kip'uni AsAln <sup>h</sup> umi	-A swlp <sup>h</sup> A yep'A kip'A Asalp <sup>h</sup> A	-ASA swlp <sup>h</sup> ASA yep'ASA kip'ASA ASAlp <sup>h</sup> ASA
	b.	nap'u- kop <sup>h</sup> u- t'alu- tamku- mou-	'bad' 'hungry' 'follow' 'soak' 'collect'	nap'uni kop <sup>h</sup> uni t'aruni tamguni mouni	nap'uni kop <sup>h</sup> uni t'arumi tamguni mouni	nap'a kop <sup>h</sup> a t'ara tamga moa	nap'asn kop <sup>h</sup> asn t'arasn tamgasn moasn

The infinitive and causal forms of these predicates show that the stem-final vowel is deleted because the final vowel is [u] and the suffix begins with a vowel. However, the forms in (11)a and (11)b show a consistent difference between the two groups. The (initial) vowel of the infinitive and causal suffixes is  $[\Lambda]$  in (11)a while the (initial) vowel of the same suffixes is [a] in (11)b. This is an effect of vowel harmony, but the suffix vowel harmonizes with the second last vowel of a stem, not with the last vowel.

This fact suggests that the deletion of the stem-final [ui] vowel precedes the vowel harmony operation in the phonological derivation as the following illustrates.

<sup>&</sup>lt;sup>4</sup>Another case of vowel deletion under hiatus supports the deletion of the suffix vowel:  $/pe-\Lambda s \Lambda / > [pes\Lambda]$  'cut-CAUS',  $/k\ddot{o}-\Lambda s \Lambda / > [k^wes\Lambda]$  'stagnate-CAUS'. This deletion operates only in casual style. The deletion process in these particular cases is discussed in sections 3.2.2 and 3.3.

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(12) yep'u-Λ tamku-Λ
 Vowel deletion yep'Λ tamkΛ
 Vowel harmony - tamka

Hence, there arises an ordering paradox regarding the application of vowel harmony and vowel deletion. If the stem ends in [u], deletion precedes harmony as in (12); if the stem ends in a vowel other than [u], harmony precedes deletion as in (5).

The solution comes from the nature of the neutral vowels to vowel harmony in Korean. As mentioned in section 3.2 of chapter 1, vowels are divided into two groups: bright /a, o, æ, ö/ and dark / $\Lambda$ , u, e, ü, i, u/. Certain classes of words such as predicates and sound symbolisms have a morphophological requirement of vowel harmony that these words should have vowels of the same class. The vowels /i, u/, which act as dark vowels in many situations, form a third group, i.e., neutral vowels, in certain positions. The vowel /u/ is transparently neutral in vowel harmony, as the following shows.

(13)	No	n-initial vowel	l [ɯ] transparent	to vowel harmony in sound symbolisms
		Dark	Light	
	a.	лкшčлк	akuıčak	'crunchy'
		tuŋkɯrʌŋ	toŋkuraŋ	'in a circle'
		pukuıl	pokul	'hubble-bubble'
		putuul	potul	'soft, tender'
		hututuik	hotutuuk	'popping, crackling'
	b.	hunuuč∧k	hanuıčak	'fluttery'
		ututuk	atuutuuk	'crunchy'
		kutuik	katuuk	'full'
		hunul	hanul	'in an airy manner'

Sound symbolisms in (13)a contain the vowel [u1] in the second syllable (and sometimes in the third syllable, as well). This vowel remains the same in both dark and light forms of harmony pairs. For example, in the pair  $\alpha kuuč\alpha k$ -akuučak, the two vowels in the first and last syllables harmonize, but the middle vowel remains constant as [u1] in both cases. Hence this vowel is transparent to vowel harmony, and behaves as if it were not present in terms of vowel harmony.

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Examples in (13)b show the same point, even if these words require a further consideration regarding the same vowel. In the words with dark vowels in (13)b, the initial syllable contains the problematic vowel [u1] and it is coupled with the vowel [a] in the words with light vowels. This vowel behaves as a dark vowel and not as a transparent vowel in the initial syllable. The vowel [u1] still behaves as a transparent vowel in the non-initial syllables. The *hunučak–hanučak* pair shows this contrast between initial and non-initial [u1]'s, and the behavior of this vowel as a dark vowel in the first syllable *hunučak* where the third vowel is also dark. The light counterpart *hanučak* contains the same vowel in the second syllable exhibiting the non-initial [u1]'s are transparent. The pairs *hututuk–hotutuk* and *ututuk–atutuk* show that the contrast is initial vs. non-initial, as the third syllable, as well as the second syllable, contains [u1] in both dark and light forms.

This positional contrast, i.e., different behaviors of the same vowel [u] depending on the syllable in which they appear between an initial and a non-initial syllable, can explain the apparent reverse ordering of the two operations, vowel harmony and vowel deletion, for cases in (11). The two operations apply uniformly in the ordering of vowel harmony and then vowel deletion, as in (5). When vowel harmony applies to such stems as in (11), the non-initial [u] does not count for vowel harmony. This point is illustrated in the following derivation:

(14)		уер'ш-л	tamkui-л	ka-л
	Vowel harmony	-	tamkuta	kaa
	Vowel deletion	yep'∧	tamka	ka

In the step of vowel harmony for the *u*-final stems in (14), this non-initial vowel [u] does not initiate vowel harmony and is transparent to the process. Hence, the initial stem vowel turns the suffix vowel (which follows the non-initial [u]) to the appropriate harmonizing vowel. Afterwards, vowel deletion applies and this vowel [u] deletes before the suffix vowel. Treating a

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non-initial [u1] as transparent to vowel harmony solves the problem of rule ordering.

In this section, it has been observed that the disallowed hiatus configurations are repaired by deletion of a vowel segment. The condition is that either nucleus vowel is [uI] or that the two nuclei have identical vowels. In the former case, the nucleus position dominating vowel [uI] deletes regardless of whether this vowel belongs to the stem or the suffix. In the latter, either nucleus position could delete, where two options reach the same surface output. The economy principle enters to choose the shorter of the two convergent derivations (among others) resulting from these deletion options, and hence the option of suffix vowel deletion is taken.

#### 3. Glide Formation and its Optionality

Another way in which Korean resolves hiatus configurations in verbal morphology is glide formation. This section addresses cases where certain vowels become a glide to resolve the hiatus configuration. First, it examines the glide formation cases, and turns to the cases where the glide formation operation is blocked. These cases will provide a deeper understanding of glide formation in conjugations in conjunction with syllable structure constraints. It further argues that hiatus is not a surface constraint, and that a derivational approach of phonology explains the hiatus resolution and related phonological issues better than a purely constraint-based theory such as Optimality Theory.

#### 3.1. Obligatory Glide Formation and Tolerance of Hiatus

In the following set of verbal forms, a stem-final vowel, i.e., one of [i, u, o], becomes the corresponding glide before a vowel-initial suffix other than [u]. Remember that if the suffixal vowel is [u] – as in the sequential form – this vowel is elided.

,	stem		infinitive	imperative	causal	sequential
	:	'thatah'	-/1	-//1a	-//3/1	-uini
	1-	thatch	ул	улга	улбл	1111
	moi-	'gather'	тоул	тоулга	тоулял	moini
	čoi-	'tighten'	čоул	čоулга	соулял	čoini
	meu-	ʻfill up'	mewA	mew∧ra	тежлял	meuni
	teu-	'heat'	tewл	tew∧ra	tewnsn	teuni
	s'au-	'fight'	s'awA	s'awлra	s'awnsn	s'auni
	0-	'come'	wa	wara	wasn	oni

	/ * · · ·	<u> </u>	1 .	1 . 1	c
1	115	) Steme	chowing	alide	tormation
1	1.5	) Stems	SHOWING	giluo	TOTHIALION

This operation of glide formation is formally expressed as in the following way. The stem-final vowel loses its nucleus projection as well as the higher projections, i.e., rhyme and syllable nodes. At this point, the original stem vowel is unsyllabified. Subsequently, it is syllabified as the onset of the following suffix vowel via onset incorporation.

(16) Glide formation: Nucleus deletion followed by onset incorporation



The segment [i] in the resulting structure (16)c is interpreted as [y], because it appears in a nonnucleus position in a syllable. Then the resulting output is  $[y_{\Lambda}]$ , which is the correct phonetic form /i- $\Lambda$ / for the infinitive from of 'thatch'.

Deletion of one of the two nucleus nodes put together in a row is the most economical way to repair this marked hiatus structure. This repair requires the least amount of structural change. However, this simplest repair operation yields another illegitimate structure (16)b, where the segment [i] becomes unsyllabified. Since segments cannot be left unsyllabified, this segment is subject to resyllabification. Addition of an association line between this segment and the syllable node of the following vowel as in (16)c is one immediate option, and it is the most economical repair operation as syllabifying the floating segment.

In the previous section, the cases have been discussed where either nucleus vowel is deleted in hiatus configurations: u-deletion and identity deletion. If the same deletion operation is involved in the cases in (15), e.g., /i- $\Lambda$ /, the following results would be obtained.

(17) Results with segment deletion from  $/i-\Lambda/$ 



However, this deletion repair should not take place in these cases, i.e., both segments should be preserved in the output configurations. This job will be done by premium value on the skeletal positions of these segments in the glide formation cases.

Related to the derivation in (16), one needs to think of other competing derivations. Specifically, consider the situation where the nucleus node of the other vowel  $[\Lambda]$  deletes as the hiatus resolution. Then, the following derivation would be obtained.

(18) Nucleus deletion followed by rhyme incorporation



From the formal point of view, the second repair in the derivation (18), rhyme incorporation, is as simple and economical as onset incorporation in the derivation (16). However, the output of the derivation (18) is [iA], and it is not the correct surface form. This form can be excluded by establishing the following constraint.

(19) Non-high vocoid constraint: A non-high vocoid cannot appear in a non-nucleus position.

The constraint in (19) states that a non-high vocoid cannot appear under a syllable or a rhyme node, i.e., in a syllable margin. This constraint is active in Korean, and hence the form obtained by the derivation (18), [iA], is ruled out.

Another constraint that rules out the form [iA] is the following constraint that prevents a continuous segment from appearing in a coda position.

(20) Coda constraint: A continuous segment cannot appear in a coda position.



As mentioned in section 3.2 of chapter 1, an obstruent consonant in a coda position is realized as the corresponding unreleased stop. Sonorant consonants can occupy the coda position, because they are all non-continuant, i.e., either nasal or lateral.<sup>5</sup> This constraint bans a configuration like (18), where a vocoid appears in a coda position.

There is one more possible, minimal repair that should be considered for the intermediate structure (18)b, where the vocoid  $[\Lambda]$  is unsyllabified. Instead of incorporating this vocoid  $[\Lambda]$  as the coda of the nucleus [i], the other repair incorporates it as a part of the complex nucleus. This operation is depicted in the following diagram:

(21) Nucleus deletion followed by complex nucleus formation



However, this option of complex nucleus formation resulting in  $[i_{\Lambda}]$  is not available, as chapter 2

<sup>&</sup>lt;sup>5</sup>This constraint explains why the liquid phoneme surfaces as a lateral, a [-continuant] segment, in a coda position.

shows that branching nuclei are not possible in Korean. The relevant branching nucleus constraint, (22) as discussed in chapter 2, rules out the resulting structure in (21)c.

(22) Branching nucleus constraint



Then, the change of  $/i\Lambda/$  to  $[y\Lambda]$  is the consequence of choosing the most economical derivation, avoiding the general active constraints on the distribution of non-high vocoids.

The stems with the final /u/ have the completely parallel derivation to those with /i/. From the input /u- $\Lambda$ /, the following outputs are obtained from which the correct surface form is chosen. (Again, premium value on skeletal positions prevents segments from being deleted.)

(23) /u-л/



# (24) Candidates of $/u-\Lambda/$



All the candidates are involved in two steps of repair operations. In each case, the first repair is deletion of the nucleus node of either vowel. Subsequently, this vowel is incorporated as the onset in (24)a, as the coda in (24)b, and as the part of the complex nucleus in (24)c, all via simple addition of an association line. In terms of derivational economy, the three derivations are equally economical. The structure in (24)b contains the vocoid in a coda position, and violates the non-high vocoid constraint (19) and the coda constraint (20). The structure in (24)c contains a complex nucleus, violating the branching nucleus constraint (22). The structure (24)a for  $[w\Lambda]$  does not violate any constraint and is chosen as the surface form, which is the correct output of /u- $\Lambda$ /.

The case of the mid round vowel /o/ in the stem is a little more complicated. Think about the case of  $/o-\Lambda/$  'come-INF'. Vowel harmony first converts the suffix vowel to [a], since the stem vowel /o/ is a light (or yang) vowel. Then, the nucleus node of the stem vowel deletes as the repair due to the hiatus constraint. Subsequently, this orphaned [o] is incorporated as the onset of the following nucleus vowel, as the following derivation illustrates.

# (25) Glide formation: $/o-\Lambda/$



The resulting structure contains the non-high [o] in the non-nucleus position, which is a violation of the non-high vocoid constraint (19). Hence, a further repair operation enters to have the corresponding high vocoid u/w. The operation switches the value of the [high] feature: [-high] to [+high]. This operation of switching the feature value is the simplest repair for the ill-formed configuration (25)d, as it only affects the value of a single feature. The result looks like:

# (25) Surface form of $/o-\Lambda/$ after mid vocoid raising



This further repair implies that among the two constraints (non-high vocoid constraint and coda constraint) that exclude the repair (24)b, non-high vocoid constraint is not relevant to exclusion of (24)b. Both (24)b and (25)d would be ruled out by non-high vocoid constraint, but (25)d is further repaired while (24)b is simply discarded. Then, the relevant constraint ruling out

(24)b is coda constraint, (20).

There is an interesting case where glide formation is not operating while the stem ends in [i] (at least at surface) followed by the suffix vowel [ $\Lambda$ ]. Those stems end in / $\ddot{u}$ / underlyingly. Section 3.2 of chapter 1 discussed this abstract vowel (along with / $\ddot{o}$ /). However, it is realized as [wi]. This derived glide-vowel sequence surfaces as such when the vowel does not have an onset consonant. (Section 3.2.2 discusses the cases with an onset consonant in a syllable whose underlying nucleus vowel is / $\ddot{u}$ /, and section 3.3 discusses the cases for / $\ddot{o}$ /.) The derived final vowel [i] does not become a glide, as the following shows (cf. (15)):

(26)	Stem-final [i] not showing glide formation					
	stem		infinitive /-ʌ/	causal /-ʌsʌ/	sequential /-uni/	
	y∧ü-	'get thin'	улжіл	улшілѕл	улwini	
	saü- pačaü-	'burn up' 'act niggardly'	sawiл pačawiл	sawiлsл pačawiлsл	sawini pačawini	

All the relevant distinctive features of the original segment /ü/ being preserved in the resulting structure, this change is a fission process of the marked segment of /ü/ to [wi]. This fission operation is a repair responding to the following marking statement.

(27) Constraint against [ü, ö]\*[-back, +round] / [\_\_\_, -cons]

Both of the two conflicting features, [-back] and [+round], in the marking statement are assigned premium value, and the fission operation enters as the repair of the marked configuration to preserve both features. This discussion of fission is from Calabrese (1988, 1995, 2002a), and the entire operation from  $/\ddot{u}/$  to [wi] is shown in (28).

## (28) Fission of /ü/ to [wi]



The structure (28)b resulting from the fission repair is subject to a further repair due to the constraint on Branching Non-consonantal Roots, (29).

(29) Constraint on branching non-consonantal roots



Two root nodes in (28)c survive as they bear premium value and they both are realized as independent segments (with their respective skeletal position). The repair of (28)c is uniformly (28)d. It does not become, for example, [uy], because of coda constraint (20): A continuous segment cannot appear in a coda position.

The fission operation in (28) forms a block in the entire derivation as proposed in Calabrese (2002a). A given form or configuration is checked against a marking statement, i.e., constraint, and it is fixed by repair if it violates the marking statement. The result is then evaluated and checked against another marking statement. This checking-repair-evaluation is done until a correct and the most economical output is obtained in a given block. In this particular case, three marking statements are relevant and when each marking statement is checked, the most economical repair is done respecting premium value within the given block, where the marked form /ü/ is eventually converted to [wi].

Let us turn to the issue of hiatus of the derived stem vowel [i] and the suffix vowel  $[\Lambda]$ .

When the fission operation is completed resulting in [wi] from the underlying stem vowel /ü/, the intermediate representation looks like the following, where braces denote syllabic constituents with syllabified segments:

(30) Derivation of  $/y_{\Lambda}\ddot{u}_{-\Lambda}/$  to  $[y_{\Lambda}wi_{\Lambda}]$  (up to fission)



In the structure (30)b, the third syllable lacks an onset consonant, resulting in a hiatus configuration. Vowel deletion is not a possible hiatus-resolving repair, because each segment bears premium value. Instead, the first vowel of the hiatus configuration is expected to become a glide as in (15). Glide formation, which is a series of two separate processes, nucleus removal and onset incorporation, would result in the following structure, where segments not braced indicate that they are not syllabified:

(30) Derivation of /yʌü-ʌ/ to [yʌwiʌ] (up to glide formation, i.e., nucleus removal + onset incorporation)



The second syllable of the resulting structure (30)d contains two onset segments and they are both glides. The problem is the two glides are of the same sonority and this configuration is universally prohibited. Due to the universal prohibition (31), the inner onset segment, i.e.,  $\beta$  in (31), should be more sonorous than the outer onset segment,  $\alpha$ , within a single syllable (Clements 1990, Calabrese 2002a).

(31) Prohibition against onset clusters of identical sonority (Calabrese 2002a: 93)



Since the block of glide formation (nucleus removal plus onset incorporation) leads to the universally prohibited configuration, this option of hiatus resolution is not adopted. This means that the derivation in (30) ceases at (b), and does not proceed to (c) or (d). The hiatus configuration (30)b remains as such and this structure surfaces as the output, which is the correct surface representation of /yʌü-ʌ/ (See Calabrese 2002a, 2005 for further discussions of blocking).

One might think of a further repair to fix the prohibited structure  $[y_{\Lambda}.wy_{\Lambda}]$ , (30)d. That is, the second syllable, which has a complex onset anyway, is split into two separate syllables assigning a nucleus node, i.e., [+syllabic], to either of the two glides in the second syllable in (30)d. One result of this vocalization repair is  $[y_{\Lambda}.wi_{\Lambda}]$ , which is the same as the earlier form in the derivation (30)b. This is a case of a roundabout derivation with a convergent output. Economy principle rejects this long derivation, and chooses the derivation without glide formation and syllable split. Vocalization of the other glide in the second syllable of (30)d results in  $[y_{\Lambda}.u_{J},]$ , which violates coda constraint (20) that does not allow a continuous segment to appear in a coda position. Another form  $[y_{\Lambda}.u_{J}A]$  is also possible and legitimate, but the derivation for this form is longer than that of (30)b, in that this form is involved in more steps in the derivation. Also, this form is not any better than  $[y_{\Lambda}.wi_{A}]$  in that it still contains a hiatus configuration between the first and the second syllables. Again, economy of derivation chooses a shorter derivation, which yields the correct surface form.

Another potential way to fix the ill-formed structure  $[y_{\Lambda}.wy_{\Lambda}]$  (30)d would be deleting either glide of the problematic syllable:  $[y_{\Lambda}.w_{\Lambda}]$  or  $[y_{\Lambda}.y_{\Lambda}]$ , neither of which is the correct output. This means that each skeletal position bears premium value and deletion of any of these two glides in  $[y_{\Lambda}.wy_{\Lambda}]$  is not allowed.

Concluding this section, let us reiterate that it is important to recognize blocks of constraint-repair sets. Dynamic Phonology correctly explains why the forms like /yAü-A/ ends up with [yA.wi.A] tolerating hiatus. When a prohibited configuration would be produced as the result of hiatus resolution, this particular step of the derivation is blocked. However, what is prevented is not the entire derivation for /yAü-A/, but only the relevant part of the derivation, that is, the block of hiatus resolution. The block of fission applies to get a legitimate (intermediate) configuration, [yA.wi.A]. If a single repair does not produce a legitimate form, another repair

enters to play a role, and this constraint-checking-plus-repair-operation is done until a legitimate form is obtained. This is done in a single block. Once a legitimate form is obtained regarding the triggering constraint in the block, the derivation is valid and final until that time in the block. The form that can be a potential surface form proceeds to the subsequent phonological processes, that is, it either undergoes a rule or is checked against the constraint in the following constraint-repair block. If this following block cannot yield a legitimate output from the block's input or results in a universally prohibited configuration, then this block is skipped. It is the way Dynamic Phonology is organized regarding constraints and their repairs (See Calabrese 2002a, 2005 for the discussions of blocking).

### 3.2. Optional Glide Formation

Of particular interest is that, in all the cases in (15) with final /i, u, o/ and (26) with final /ü/, the stem syllable (or the last syllable of the stem) has no non-vocalic onset consonant. The vowels /i, u, o/ in an onsetless syllable become the corresponding glide as in (15), when followed by a suffix vowel / $\Lambda$ /. In the cases in (26), where the stem-final vowel is [wi] derived from /ü/ with no non-vocalic onset consonant, the derived fissioned syllable surfaces, along with the suffix vowel / $\Lambda$ /, invariably as [wi. $\Lambda$ ]. The common thing between the two cases is that each of them has only one invariant surface form. However, if the stem's (final) syllable has an onset consonant, there is a variation:<sup>6</sup>

<sup>&</sup>lt;sup>6</sup>There is only one (surface) exception to this pattern regarding the *u*-final stem verbs:  $p^{h}u$ - 'to dig'. The stem-final vowel, when present at surface, is [u], but it behaves exactly the same as the unround counterpart, *uu*, before a suffix vowel: this vowel deletes before a vowel-initial suffix. Meanwhile no other verb stems ending in [u], like /ču/ 'to give' and /tu/ 'to put', show this behavior: the final vowel *u* does not delete before a suffix vowel in these cases. Hence, it is the standard assumption that the verb stem  $p^{h}u$ - has the underlying *uu*, and that this becomes rounded after the labial consonant when it survives. (Y.-S. Kim 1984: 66ff).

(32)	variatio	ns with an ons	infinitivo / /	imporativa / 1a/	
	stem		IIIIIIIIVe / A/	Imperative / Ala/	Causal /ASA/
	ki-	'crawl'	kin~k'n	kiʌra~k <sup>y</sup> ʌra	kiasa~k <sup>y</sup> asa
	titi-	'step on'	tidi∧~tid <sup>y</sup> ∧	tidiʌra~tid <sup>y</sup> ʌra	tidiʌsʌ~tid <sup>y</sup> ʌsʌ
	улті-	'adjust'	ултіл~улт <sup>у</sup> л	ултілга~улт <sup>у</sup> лга	ултілѕл~улт <sup>у</sup> лѕл
	si-	'sour'	šia~ša	šiлra~šлra	šілsл~šлsл
	tu-	'put'	tu∧~t <sup>w</sup> ∧	tu∧ra~t <sup>w</sup> ∧ra	tuasa~t <sup>w</sup> asa
	k'u-	'lend'	k'un~k' <sup>w</sup> n	k'uлra~k' <sup>w</sup> лra	k'unsn~k' <sup>w</sup> nsn
	s'u-	'boil (gruel)'	s'u^~s' <sup>w</sup> ^	s'uʌra~s' <sup>w</sup> ʌra	s'uasa~s' <sup>w</sup> asa
	po-	'see'	poa~p <sup>w</sup> a	poara~p <sup>w</sup> ara	poasл~p <sup>w</sup> asл
	ko-	'boil down'	koa~k <sup>w</sup> a	koara~k <sup>w</sup> ara	koasn~k <sup>w</sup> asn
	s'0-	'shoot'	s'oa~s' <sup>w</sup> a	s'oara~s' <sup>w</sup> ara	s'oas^~s' <sup>w</sup> as^
	t'ü-	'run'	t' <sup>w</sup> i∧~t' <sup>wy</sup> ∧	t' <sup>w</sup> i∧ra~t' <sup>wy</sup> ∧ra	t' <sup>w</sup> iasa~t' <sup>wy</sup> asa
	halk <sup>h</sup> ü-	'scratch'	halk <sup>hw</sup> i∧~halk <sup>hwy</sup> ∧	halk <sup>hw</sup> iʌra~halk <sup>hwy</sup> ʌra	halk <sup>hw</sup> iʌsʌ~halk <sup>hwy</sup> ʌsʌ
	sü-	'rest'	š <sup>w</sup> iл~š <sup>w</sup> л	š <sup>w</sup> iлra~š <sup>w</sup> лra	š <sup>w</sup> iλsλ~š <sup>w</sup> λsλ

As discussed in chapter 2 regarding the surface syllable structure in Korean, the variation depends on speech style (Y.-S. Kim 2000). The first form retaining the stem vowel in each pair is the formal form, and the second form with fewer syllables is the colloquial form. The stem vowel in the colloquial forms is realized as the corresponding secondary articulation on the preceding onset consonant, not as an independent segment.

Chapter 2 proposes that the systematic absence of the CGV sequences is due to the following surface constraints:

(33) Complex onset constraint: Complex onsets are not allowed.







It will be shown in section 3.2.2 that the correct forms in the two styles in (32) are obtained by means of the repairs induced by constraints (33) and (22), along with relevant operations of glide formation and acquiring a secondary articulation effect.

In order to explain the variation in (32), one might say that hiatus constraint (6) is "deactivated" (i.e., inert or inoperative; see Calabrese 2002a) in formal speech but still active in colloquial speech. However, this is not correct because the forms in (15) do not show such a variation: If the (final) syllable of the stem does not have an onset consonant, glide formation is obligatory in both styles as in (15). The variation regarding the stem-final vowel occurs only if the stem syllable has an onset consonant as in (32). Hence, the deactivation of the constraint (33) in formal style is not a viable explanation.

## 3.2.1. An Optimality Theory Analysis of Obligatory and Optional Glide Formation

An Optimality-Theoretic analysis of this variation is found in Y.-S. Kim (2000), who correctly points out that the apparent free variation observed in (32) is not actually "free" but is due to different grammars in different styles: formal vs. casual, among others. Working within Optimality Theory, he posits two grammars with two different rankings of the two constraints: Ident-IO and \*VV, the latter of which is a near approximation of the hiatus constraint (6).

- (34) Ident-IO: Every segment in the input is preserved in the output.
- (35) \*VV: Adjacent vowels are prohibited.
- (36) Different rankings in two different styles
  - a. Formal: Ident-IO  $\gg$  \*VV
  - b. Casual:  $*VV \gg Ident-IO$

One thing that should be emphasized regarding the proper formulation of the hiatus constraint is that the constraint should refer to nuclei, as in (6), instead of "vowels". Calabrese (2002a) shows

this point discussing hiatus resolutions in French. He shows that two vowels within a single nucleus are not subject to hiatus resolution. In Korean, there is no single surface nucleus which has two vowels, given the CVC syllable structure advocated in chapter 2. So the two distinct formulations of the hiatus constraint, (6) and (35), do not make a practical difference in Korean. However, the nuclei still need to be referred to, since the difference between, for example, [u] and [w], has been considered as the different syllabic positions in which these segments appear. The two vocoids [u] and [w] (and likewise [i] and [y]; [ü] and [u]; etc.) share common distinctive features, and the syllabicity is determined by the position in which they appear in a syllable, under nucleus or non-nucleus positions, respectively (Chomsky and Halle 1968, McCarthy and Prince 1986).

With the ranking (36)a for formal speech, the hiatus configuration is forced to be preserved by the higher-ranked constraint, Ident-IO. On the other hand, the hiatus configuration is to be obliterated by \*VV, which outranks Ident-IO in casual speech. The picture would be completed if the following tableaux had been added to his explanation.

(37) Tableaux for  $/ko-\Lambda/$  in formal and casual styles according to Y.-S. Kim (2000)

a.	Formal

/ko-л/	Ident-IO	*VV
🗢 ko.a		*
kwa	*!	

b. Casual

/ko-л/	*VV	Ident-IO
ko.a	*!	
🖙 kwa		•

However, as will be shown immediately, this analysis is not tenable. One obvious problem is that the casual form of  $/ko-\Lambda/$  is not [kwa], but [k<sup>w</sup>a]. This is so because Korean simply does not have

complex onsets like [kw] due to the complex onset constraint.

Kim's analysis is quite rudimentary, as he himself concedes. Specifically, he states that "a full analysis of the Korean data may need other constraints including Onset and \*Complex" (Y.-S. Kim 2000: 325). However, the problem is not only that he does not provide an analysis of the above data (concerning both /o- $\Lambda$ / and /ko- $\Lambda$ /) using additional constraints, but also that these additional constraints cannot explain the data. There are several problems.

The first problem is that the two different rankings in (36) for different styles cannot explain why the infinitive form of 'come' /o- $\Lambda$ / always surfaces as [wa] in both formal and casual styles, while /ko- $\Lambda$ / is realized as [koa] in formal speech and as [k<sup>w</sup>a] in casual speech (showing the apparent free variation). Since Ident-IO is ranked higher than \*VV in formal style, we would expect [0.a] from /o- $\Lambda$ / in this style.

Surely, one can think of another constraint such as Onset, which requires an onset consonant in a syllable, as Kim mentions. This should be ranked higher than both Ident-IO and \*VV in both styles, so that the round vowel becomes a glide to be incorporated as the onset of the following vowel nucleus. The following tableaux illustrate this possible analysis.

(38) Tableaux for  $/0-\Lambda/$  in formal and casual styles based on Y.-S. Kim (2000)

/o-n/	Onset	Ident-IO	*VV
0.a	*!		*
🖙 wa			

b. Casual

/o-ʌ/	Onset	*VV	Ident-IO
0.a	*!	*	
🗢 wa			*

At the first glance, with the constraint Onset ranked higher than other two constraints, these

tableaux seem to show nicely why [wa] is obtained from /o- $\Lambda$ / in both styles while /ko- $\Lambda$ / has variations depending on speech style. The form /ko- $\Lambda$ / already contains an onset consonant, while /o- $\Lambda$ / does not. Hence, to satisfy the higher-ranked Onset constraint, requiring an onset consonant, /o/ in /o- $\Lambda$ / devocalizes in both grammars.

However, if the form /ko- $\Lambda$ / is considered more carefully, there is an evident problem. The second syllable of /ko- $\Lambda$ / does not have an onset, either. So the tableaux with the input /ko- $\Lambda$ / will look like the following and yield the wrong output of the formal form. (The reverse index sign,  $\sim$ , denotes the output wrongly chosen to be optimal in the given tableau.)

(39) Wrong tableaux for  $/ko-\Lambda/$  in formal and casual styles

a.

	/ko-ʌ/	Onset	Ident-IO	*VV
	ko.a	*!		*
Ŷ	kwa			

b. Casual

/ko-л/	Onset	*VV	Ident-IO
ko.a	*!	•	
🗢 kwa			*

To fix this problem, another constraint could be introduced that dominates Onset in formal style in order to nullify the critical violation of Onset for the output [ko.a] of the formal form of /ko- $\Lambda$ /. \*Complex (or its equivalent complex onset constraint (33)) can be placed higher than Onset for this style. The following tableau illustrates this adjustment:

rixec	i tableau it	$\frac{1}{1000}$ / $\frac{1}{1000}$	ial style	· ······		
/ko-ʌ/		*Complex	Onset	Ident-IO	*VV	
5	ko.a		*		*	
	kwa	*!		*		

(40) Fixed tableau for  $/ko-\Lambda/$  in formal style

Even if this can fix the problem, there is another problem. If \*Complex is placed higher than Onset also in casual style, the following tableau will be obtained:

/ko-n/ *Complex		Onset	*VV	Ident-IO	
÷	ko.a		inde condition of a State		
	kwa	*!			*

(41) Wrong tableau for  $/ko-\Lambda/$  in casual style

The tableau (41) wrongly chooses the candidate [ko.a] even in casual style. To prevent this situation, \*Complex should be ranked lower than Onset, for example, as in the following:

/ko-л/	Onset	*Complex	*VV	Ident-IO		
ko.a	*!		*			
🗢 kwa	-		arriente de la companya de la compa Companya de la companya de la company Companya de la companya de la company	n eden de la composition de la composit La composition de la c		

(42) Fixed tableau for  $/ko-\Lambda/$  in casual style (revision of (41))

Then, the relevant constraints should be ranked in the two different styles as follows:

- (43) Two different constraint rankings
  - a. Formal speech:  $*Complex \gg Onset \gg Ident-IO \gg *VV$
  - b. Casual speech: Onset  $\gg$  \*Complex  $\gg$  \*VV  $\gg$  Ident-IO

Since two different styles in Korean have two distinct grammars, having the two different rankings of the same constraints can be possible in principle when Y.-S. Kim's (2000) reranking approach is maintained. Optimality Theory assumes different rankings of the same universal constraints leading to different grammars of different languages, and this same premise can hold for dialects and styles as well as languages.

However, there are a few theoretical problems. The two different surface forms of the input  $/ko-\Lambda/$  in two different styles do not appear to stand quite apart from each other. The difference between the formal form and the casual form is very minimal in that the difference is whether the

stem vowel has changed to the corresponding glide (as in the casual form) or not (as in the formal form). The two rankings in (43) are quite dissimilar to each other. Because two output forms derived from the identical input are very similar, the rankings of these constraints, too, are expected to be very similar. Moreover, many more constraints will be necessary to complete the two grammars. Further, if there are some other variations between formal and casual styles, the rankings with these additional constraints will be drastically different and diverse.

Also, if we consider that the stylistic variation is not observed for the onsetless stems such as  $/i-\Lambda/$ ,  $/meu-\Lambda/$  and  $/o-\Lambda/$ , it might be necessary to rank constraints differently depending on not only the style but also whether or not the stem has an onset consonant in each style (or regardless of style). This will complicate the reranking approach tremendously.

As shown in chapter 2, the surface syllable structure in Korean does not contain a complex onset or branching nucleus. Hence, the surface casual form of /ko- $\Lambda$ /, for example, is not [kwa], but [k<sup>w</sup>a]. This correct form [k<sup>w</sup>a] should be placed into the tableaux. Furthermore, another candidate, [ka], needs to be considered, which results from deleting one of the two vowels (cf. /s'ui- $\Lambda$ / > [s' $\Lambda$ ], /ka- $\Lambda$ / > [ka]). However, what is obtained based on the two rankings of those constraints in (43) is the following tableaux which show no correct outputs.

/ko-л/	*Complex	Onset	Ident-IO	*VV
ka			*	
ko.a		*i		·····
kwa	*!		*	
k <sup>w</sup> a			*	

(44) Tableaux for /ko-Λ/ considering two more candidates, [ka] and [k<sup>w</sup>a]
a. Formal style (correct output [koa])

/ko-л/	Onset	*Complex	*VV	Ident-IO
ka				*
ko.a	*!		*	
kwa		*!		*
k <sup>w</sup> a				*

b. Casual style (correct output  $[k^wa]$ )

Both tableaux contain two survived candidates after passing through all the constraints in them. In casual style, [ka] survives along with the actual output  $[k^wa]$ . The tableau for formal style excludes the correct output [koa].

In order to choose the correct outputs for each speech style, further constraints need to be employed and ranked appropriately. A constraint (or two) that puts a violation mark for the forms [ka] and [k<sup>w</sup>a] should be ranked higher than Onset so that the added constraint(s) can exclude these two forms, causing [koa] to be chosen as the correct output for the formal form. In the case of casual style, the same (or different) constraints need to be placed somewhere in the ranking and this constraint should "kill" the candidate [ka], which otherwise would tie with the actual correct surface form [k<sup>w</sup>a] in the tableau in (44)b. When a form with an inserted segment between the two vowels (e.g., \*[kowa] or \*[ko?a]) is considered, another constraint should be employed, such as Prince and Smolensky's (1993) Dep-IO constraint, which bans a form with a segment absent in the underlying form. It is needless to say that all these additional constraints and their places in the two rankings increase the problems that have been discussed so far.

There is a more general, conceptual problem. As Steriade (2001) points out, Optimality Theory has a problem of gaps in factorial typology, which she calls the "too-many-solutions problem." While Optimality Theory successfully captures the phenomena of multiple solutions for a certain marked configuration, the theory allows too many solutions. Among all the logically possible rankings of given constraints, only a part of the rankings are actually attested across languages. In the current case of hiatus resolution in Korean, four constraints have been considered in each of the two tableaux for formal style (40) and for casual style (42) With four constraints, there are 4! (= 24) different rankings and hence 24 distinct grammars can be obtained. What is actually found in Korean is only two. Naturally, it could be argued that these two rankings in Korean happen to be the two grammars out of 24 possible scenarios. However, this is not so correct, because across languages the marked hiatus configurations are not resolved in, say, 24 different ways, but in quite a restricted number of ways, including vowel deletion, glide formation, glide insertion, insertion of a consonant, and a little more at best. If only a few of rankings are actually used by languages from logically possible rankings, there are always constraints that are ranked very high or low. This is one serious flaw of Optimality Theory, because Optimality Theory cannot explain why some constraints are always ranked higher or lower than some others throughout grammars.

This point becomes clearer when vowel deletion is considered in the hiatus situation in Korean, where one of the two vowels is [ttt] or two vowels are identical. These cases choose vowel deletion, while cases in (15) and (32) choose glide formation to resolve hiatus. In order to take the vowel deletion option into consideration, Optimality-Theoretic analyses should introduce further constraints that ensure the correct choice of the appropriate phonological operation to resolve the given hiatus configuration between vowel deletion and glide formation depending on the vowels that are put together to create hiatus configurations. This would make the number of possible rankings of all the relevant constraints increase tremendously. Again, compared to the number of possible rankings, there are very few actual phonological operations to repair the marked hiatus configurations. Given such conceptual and empirical difficulties, I will not pursue solutions in the Optimality Theory framework any further. Instead, I will present a Dynamic Phonology analysis of the optional glide formation in Korean in the following section.

#### 3.2.2. A Dynamic Phonology Analysis of Obligatory and Optional Glide Formation

Dynamic Phonology provides an elegant phonological derivation and yields the correct surface representations. The proposed analysis also explains neatly why the underlying vowel /o/ in /o- $\Lambda$ / and in /ko- $\Lambda$ / are realized differently, and why the two different phonetic forms ([koa] and [k<sup>w</sup>a]) are obtained from /ko- $\Lambda$ / in two different styles. In short, glide formation (a series of operations consisting of nucleus node deletion, onset incorporation and, in the case of /o/, raising of [-high] to [+high]) is done first, regardless of the presence or absence of an onset consonant. If there is no onset consonant, the resulting glide ends up with occupying the onset position, as shown in section 3.1 for the stems ending in /i, u, o/. (Braces indicate syllabic constituency, and the segments not braced are unsyllabified at the relevant point.)

(45)	Derivation	of $[i-\Lambda]$ ,	[meu- $\Lambda$ ]	and	[0 <b>-</b> Λ]	(in	both	styl	es)	
	_									

a.	Input		$\{i\}\{\Lambda\}$	${me} {u} {\Lambda}$	{o} {A}	
b.	Vowel harmony		_	_	$\{o\}\{a\}$	
c.	Glide formation	N-remov.	i{ <b>A</b> }	${me}u{\Lambda}$	o{a}	(due to hiatus)
		Onset inc.	{yʌ}	${me} {wA}$	{oa}	
		Raising	-	_	{wa}	

Skeletal positions bear premium value, which prevents deletion of either vowel, as a repair of the hiatus constraint. For those stems without a non-vocalic onset consonant, the resulting forms in (45) are not subject to further constraint checking and there are no further rules taking them as inputs. Hence, they surface as the correct phonetic forms.

If there is an onset consonant, further phonological processes will enter to obtain the secondary articulation for the onset consonant before hiatus constraint is checked. The repaired form resulting from hiatus is then followed by glide deletion which is induced by complex onset constraint (33), in the case of casual speech. The following show the derivations for  $[k^y \Lambda]$  from /ki- $\Lambda$ /,  $[k'^w \Lambda]$  from /k'u- $\Lambda$ / and  $[k^w a]$  from /ko- $\Lambda$ /.

5)	Derivation of $/k_1 - \Lambda/$ , $/k'_1 u - \Lambda/$ and $/k_0 - \Lambda/$ in the causal style								
	a.	Input	$\{ki\}\{\Lambda\}$	{k'u} {^}	{ko} {\}	cf. $\{i\}\{\Lambda\}$			
	b.	Vowel harmony	_	-	{ko} {a}	_			
	c.	Sec. articulation	$\{k^{y}i\}\{\Lambda\}$	$\{k'^{w}u\}\{\Lambda\}$	$\{k^{w}o\}\{a\}$	_			
	d.	Glide formation	{k <sup>y</sup> yл}	{k' <sup>w</sup> w <b>A</b> }	{k <sup>w</sup> wa}	{ya}	due to hiatus		
	e.	Glide deletion	$\{k^y \Lambda\}$	{ <b>k</b> <sup>•</sup> <sup>w</sup> Λ}	$\{k^{w}a\}$	—	due to complex onset		

 $n \circ f / k i_{\lambda} / / k' u_{\lambda} / \cdot$ nd /k . / • . . 41. (46)

The output forms,  $[k^{y}\Lambda]$  [k<sup>'w</sup> $\Lambda$ ] and  $[k^{w}a]$ , are convergent forms. Furthermore, there is no shorter derivation to reach these correct outputs. The difference between  $i_{-\Lambda}$  and  $k_{i-\Lambda}$ , for example, is that there are two further operations for  $/ki-\Lambda/$ : secondary articulation, and glide deletion (evoked by the hiatus constraint). The stem of  $/ki-\Lambda/has$  an onset consonant followed by a high front unround vowel, which causes palatalization of the preceding consonant. In the cases of  $/k'u-\Lambda/$ and  $ko-\Lambda$ , labialization is in effect for the onset consonant before a round vowel. After secondary articulation is obtained, glide formation is in order in the same scenario in which the stem-final vowels in  $i_{\Lambda/2}$  /meu- $\Lambda/2$  and  $i_{\Lambda/2}$  became their corresponding glide. The result is a complex onset, which contains the original, and now palatalized or labialized, onset consonant and the glide resulted from the stem-final vowel via glide formation. Glide deletion, one of the repair operations for the ill-formed complex onsets, deletes the glide to produce a simple onset. These two additional operations are due to the onset consonant in  $/ki-\Lambda/$ ,  $/k'u-\Lambda/$  and  $/ko-\Lambda/$ .

One might say that the operation of vowel deletion would be a simpler repair for hiatus. Thus instead of first converting the stem-final vowel to the corresponding glide (due to hiatus) and then deleting the resulting glide (due to complex onset constraint), vowel deletion would delete the stem-final vowel in the context of hiatus. This would yield a shorter derivation, since the two steps (glide formation plus glide deletion) would reduce to one (vowel deletion), skipping the step (46)d:  $\{k^{y_i}\}_{\Lambda} > \{k^{y_{\Lambda}}\}$ . Further, if one considers that the block of glide formation consists of several repair operations, i.e., nucleus node deletion, onset incorporation and, for the stem-final /o/, raising of [-high] to [+high], the vowel deletion option would "shorten" the entire derivation considerably.

However, [i] deletion in  $/ki-\Lambda/$  would not be directly related to its cause. The same vowel becomes a glide in  $i - \Lambda$ . The determining factor is of course the onset consonant of the stem vowel [i]. Then, it is not clear why the preceding onset consonant matters when the same hiatus configuration is to be resolved. It is much more natural to assume that the same repair operation for the same constraint violation and that then a subsequent phonological operation follows if the resulting form is ill-formed for some other reason. In i-A, the stem vowel is not deleted. This job is done by premium value assignment. Premium value ensures that the element is preserved under repairs, while repairs apply freely and minimally to fix the entire ill-formed configuration in a given repair block. This characteristic leads different languages with premium value on different elements to different repair operations and different resulting structures. In this case, premium value on the skeletal slot of [i] prevents this segment from deleting. Therefore, the stem vowel in  $[ki-\Lambda]$  is not to be deleted in response to the hiatus constraint, but becomes the glide [y] along with the stem vowel in [i- $\Lambda$ ]. Then, because the resulting structures in (46)d, {y $\Lambda$ } and {k<sup>y</sup>y}, are different in terms of onset structure, the complex onset becomes relevant only to  $\{k^yy_A\}$ . The complex onset constraint checks the onset structure, and the relevant structure  $\{k^yy_A\}$  is subject to a repair. In this case, the glide deletion operation is adopted, which means that the skeletal positions do not bear premium value as in hiatus-induced repairs.

Another possibility of deriving  $/k^{y} \Lambda / \text{ from } /ki \cdot \Lambda / \text{, } [k'^{w} \Lambda] \text{ from } /k'u \cdot \Lambda / \text{, and } [k^{w}a] \text{ from } /ko \cdot \Lambda / \text{ is a simple merger of the onset consonant and the stem vowel. In this view, the onset consonant and the following vowel's relevant features ([+high, -back] of [i], and [+round] of [u, o]) are coalesced into a single complex segment, i.e., a palatalized or labialized consonant. This analysis would collapse the three steps in (46)c-e to only one, significantly reducing the number of the derivation steps.$ 

This simple operation of merger, however, raises problems regarding its motivation. According to this view, the merger operation would apply to (46)b, which is essentially a hiatus configuration. If there is no vowel following the stem vowel, the onset consonant is simply palatalized or labialized, and the stem vowel is retained.

(47)	Final vowels retained intem /ki/, /k'u/ and /ko/ before a consonant-initial suffix								
	stem		infinitive interrogat		hortative	intentional 'so that			
			-ko	-ni	-ča	-ke			
	ki-	'crawl'	k <sup>y</sup> igo	k <sup>y</sup> ini	k <sup>y</sup> ija	k <sup>y</sup> ige			
	k'u-	'lend'	k' <sup>w</sup> ugo	k' <sup>w</sup> uni	k' <sup>w</sup> uja	k' <sup>w</sup> uge			
	ko-	'boil down'	k <sup>w</sup> ogo	k <sup>w</sup> oni	k <sup>w</sup> oja	k <sup>w</sup> oge			

The point is that the secondary articulation effect is observed regardless of whether the hiatus situation arises or not, and that the disappearance of the stem-final vowel, i.e., merger of the consonant and the vowel, is due to the presence of the following suffix vowel. Hence, the coalescence process is to be caused by the following suffix vowel. The problem with this view is that it is not clear why the deletion of the vowel accompanies the secondary articulation effect on the preceding consonant, if the reason of the deletion is hiatus. Vowel deletion without the secondary articulation effect would be much simpler for hiatus resolution. What is actually obtained is a palatalized or labialized consonant. The analysis of merger of the onset consonant and the stem vowel does not seem to be an adequate way to go.

Returning to the proposed derivation in (46), particularly the step (e) due to the complex onset constraint, one needs to ask why the deleted segment is the glide and not the consonant. The following illustrates the two possible deletion options to simplify the complex onset:

(48) Two possible deletion repair operations for the resulting complex onset



b. Repair 1: deletion of the glide





The option of deletion of the original onset consonant, i.e., the consonant with a secondary articulation effect, is as complex as deletion of the resulting glide, in that deletion of either consonant involves deletion of one skeletal slot. A further criterion, therefore, should be considered.

The solution can be found by comparing the content of the onset segment of the syllable structure in the resulting forms in (48)b,c. Specifically, the onset in (48)b contains a stop, while that in (48)c contains a glide. Obviously, syllables like (48)b are much more preferable over those like (48)c in terms of sonority dispersion principle by Clements 1990 (cf. Calabrese 2002a). This preferred syllable configuration is chosen when the two repaired structures (48)b,c are evaluated. Hence, repair operations remain to be free and evaluation component will choose the most economical and "optimal" result respecting economy. Casual forms in (32) are thus accounted for.

Let us now turn to formal forms which retain the stem vowel in the surface forms. First of all, let us examine the surface outputs of those formal forms:  $[k^{y_{i\Lambda}}]$ ,  $[k'^{w_{u\Lambda}}]$  and  $[k^{w_{oa}}]$ . Two

characteristics need to be pointed out. One is that those surface forms tolerate hiatus, and the other is that it seems that no phonological operations have happened but vowel harmony (for  $[k^woa]$ ) and secondary articulation effect, both of which are general predictable phenomena in Korean. Note, however, that these formal forms do not violate the complex onset constraint. All of these properties are related and Dynamic Phonology explains why hiatus is tolerated. Consider the derivation up to glide formation (as a hiatus resolution) in (46). The resulting forms contain a complex onset which is disallowed in Korean. A repair to fix this structure is to be evoked. In casual style, this structure is repaired by deletion of the glide. In formal style, however, the segment should be preserved, which means that the skeletal slots of the glide are assigned premium value. Then, the only way to avoid the complex onset configuration preserving skeletal positions is splitting the syllable while vocalizing the glide in the resulting configuration. The entire derivation for the formal forms of /ki- $\Lambda$ /, /k'u- $\Lambda$ / and /ko- $\Lambda$ / is illustrated in (49).

(49)	Derivation of $/ki - \Lambda /$ , $/k'u - \Lambda /$ and $/ko - \Lambda /$ in formal style						
	a.	Input	{ki} {A}	{k'u} {^}	{ko} { \ { \ A }		
	b.	Vowel harmony	_	_	{ko} {a}		
	c.	Sec. articulation	$\{k^{y}i\}\{\Lambda\}$	{k' <sup>w</sup> u} {^}	$\{k^{w}o\}\{a\}$		
	d.	Glide formation	$\{k^{y}y\Lambda\}$	{k <sup>'</sup> w <sub>M</sub> λ}	{k <sup>w</sup> wa}	due to hiatus	
	e.	Syllable split	$\{k^{y}i\}\{\Lambda\}$	$\{k'^{w}u\}\{\Lambda\}$	$\{k^{w}o\}\{a\}$	due to complex onset	

The resulting outputs are the correct surface forms for  $/ki-\Lambda/$ ,  $/k'u-\Lambda/$  and  $/ko-\Lambda/$ , and hence the derivations are convergent. (The form  $[k^woa]$  and its derivation are discussed shortly.)

However, there is another derivation that yields the same output in formal style:

(50)	Derivation of $/ki-\Lambda/$ , $/k'u-\Lambda/$ and $/ko-\Lambda/$ in formal style						
	a.	Input	{ki} {^}	$\{k'u\}\{\Lambda\}$	${\mathbf{ko}}{\mathbf{\Lambda}}$		
	b.	Vowel harmony	_	-	$\{ko\}\{a\}$		
	c.	Sec. articulation	$\{k^{y}i\}\left\{ \Lambda\right\}$	$\{k'^{w}u\}\{\Lambda\}$	$\{k^wo\}\{a\}$		

This derivation is shorter than (49) and is properly included in (49). Therefore, two legitimate

derivations are obtained which yield the identical convergent output. Then, the two derivations need to be compared. Economy principle dictates to choose the shorter derivation, (50).

Therefore, one grammatical difference between two styles is whether skeletal slots are assigned premium value (formal style as in (50)) or not (casual style as in (46)) regarding the application of repair operations fixing the complex onset structures. This difference leads to different repair processes for the same input in different styles. The difference is quite minimal, and clearly this analysis has advantage over an Optimality Theory explanation considered in section 3.2.1. In the proposed analysis, the difference is only a matter of having premium value for a segment or not with all the constraints and rules the same, while Optimality-Theoretic analyses would have quite distinct orderings of relevant constraints.

In effect, the hiatus configuration in (50) is tolerated, as the surface forms demonstrate. Because the repair of glide formation, a hiatus resolution, is not involved in (50), resulting forms like (49)d with a complex onset do not arise in formal style. Consequently, the complex onset constraint is vacuous in (50) with the formal forms, but because this shortest derivation is to be evaluated with other convergent derivations including (49), the complex onset constraint does play an active role of deriving the forms,  $[k^{y}i\Lambda]$ ,  $[k'^{w}u\Lambda]$  and  $[k^{w}oa]$ . This Dynamic Phonology analysis nicely explains the formal forms with an onset consonant tolerating hiatus, an apparent ill-formed configuration in Korean.

In addition to the theoretical consideration, i.e., economy principle, in favor of the shorter derivation in (50), there is an empirical piece of evidence for the idea that the shorter derivation is indeed correct. The form  $[k^w o.a]$  in (49)e is not the form we would get when syllable split would have applied to the output  $[k^w wa]$  of the previous step, (49)d, in the derivation. The input that is to be checked by the complex onset constraint,  $[k^w wa]$ , contains a glide [w]. This glide has been derived from the underlying /o/ of the stem /ko/, and converted to [w] because a mid vocoid

cannot be a glide in Korean. When the syllable  $[k^wwa]$  in (49)d splits as a repair of the complex onset constraint, the resulting form would be  $[k^wu.a]$ . There is no reason to further change the now derived vowel [u] to [o], since [u.a] is a permitted surface sequence in Korean. The following words show the [u.a] sequences do not have any requirement of changing to [o.a].<sup>7</sup>

(51)	Surface forms containing [u.a]					
	/uaha-ni/	'elegant-INTER'	[u.a.ha.ni]	*[o.a.ha.ni]	*[wa.ha.ni]	
	/muan/	'disgrace'	[m <sup>w</sup> u.an]	*[m <sup>w</sup> o.an]	*[m <sup>w</sup> an]	*[mwan]
	/kuali/	(place name)	[k <sup>w</sup> u.a.r <sup>y</sup> i]	*[k <sup>w</sup> o.a.r <sup>y</sup> i]	*[k <sup>w</sup> a.r <sup>y</sup> i]	*[kwar <sup>y</sup> i]

The lack of a necessary and motivated change of [u] to [o] in the derivation of  $[k^{w}o.a]$  in (49) indicates that the correct derivation from /ko- $\Lambda$ / is (50). The longer derivation is not only uneconomical, but also empirically wrong. Therefore, the shorter derivations (50) is chosen, where glide formation as a hiatus repair is prevented from applying. Economy principle chooses the proper derivation and yields the correct surface forms.

Unlike these stems with an onset consonant, the stems /i/, /meu/ and /o/ in (15), whose (final) syllable lacks an onset consonant do not show this blocking effect in formal style (as well as in casual style). The result of glide formation for these onsetless stems does not create a complex onset. All the relevant processes apply throughout the derivation as far as the structural description is met for negative constraints and univocal rules, and the resulting forms are distinct from the input. Hence, the economy of derivation plays a trivial role.

Till now, I have discussed the two distinct types of surface forms, depending on the style, of the stems with an onset followed by the suffix vowel / $\Lambda$ /. The (final) stem vowel is one of /i, u, o/. The last cases in (32) with the vowel / $\ddot{u}$ / are in order. Let us first consider the formal form: [t<sup>,wy</sup>i $\Lambda$ ]

<sup>&</sup>lt;sup>7</sup>Vowel harmony might be called for to change [u] to [o] in this situation. However, vowel harmony is initiated by a stem vowel and changes suffix vowels. The change of [u] to [o] is the opposite in terms of the initiating vowel and the directionality, and hence cannot be considered as vowel harmony.

< /t'ü- $\Lambda$ / 'run-INF'. As usual, the onset consonant becomes labialized and palatalized, as the secondary articulation effects, before the high front round vowel /ü/. This vowel is subsequently fissioned to [wi] as discussed in section 3.1. The resulting form, [t'<sup>wy</sup>wi. $\Lambda$ ], contains a hiatus configuration. The repair is glide formation of [i] (i.e., nucleus removal plus onset incorporation), because skeletal positions bear premium value at this point:

(52)	Part of derivation	of /t'ü-ʌ/	in formal	l style: 1	up to	hiatus	resolution
------	--------------------	------------	-----------	------------	-------	--------	------------

a.	Input	{t'ü} {Λ}	
b.	Sec. articulation	${t'^{wy}\ddot{u}}{\Lambda}$	
c.	Fission	${t'^{wy}wi}{\Lambda}$	due to *[-back, +round]
d.	Glide formation	{t' <sup>wy</sup> wy۸}	due to hiatus

However, the resulting structure is prohibited, because two segments ([w] and [y]) are of the same sonority within the syllable onset. The structure is a violation of prohibition against onset clusters of identical sonority (31) and is not to be yielded in a derivation. As discussed in section 3.1, this prohibited configuration cancels this step of derivation. That is, the block of hiatus resolution is skipped and the derivation proceeds to the next step, where the complex onset constraint is to be checked, as the following illustrates:

(53) Complet	e derivation	of /t'ü-ʌ/	in	formal	style
--------------	--------------	------------	----	--------	-------

	1		5
a.	Input	{t'ü} {A}	
b.	Sec. articulation	{t' <sup>wy</sup> ü} {Λ}	
c.	Fission	${t'^{wy}wi}{\Lambda}$	due to *[-back, +round]
d.	Glide formation	BLOCKED	due to hiatus: blocked by the prohibition (31)
e.	Glide deletion	${t'^{wy}i}{\Lambda}$	due to complex onset constraint

The identical sonority constraint (31) correctly prevents the step of glide formation and the correct surface form of  $[t'^{wy}i.\Lambda]$  is obtained as the formal form of  $/t'\ddot{u}-\Lambda/$ .

Again, the case of stems with an onset consonant plus [ $\ddot{u}$ ] followed by / $\Lambda$ / is a very illustrative case supporting the model of Dynamic Phonology. In Dynamic Phonology, each operation (a deterministic rule, a constraint-induced repair operation, or a block of repairs
initiated by a constraint) is an independent entity, and one operation (or one block of repairs) can be added, deleted and reordered. Also, it is possible that a particular operation or a block of repairs cannot yield a legitimate output resolving the constraint in question. In the case of  $[t^{,wy}i.\Lambda]$ from /t'ü- $\Lambda$ / in formal style, the block of glide formation (a series of operations as hiatus resolution) is skipped to avoid a universally prohibited constraint, (31).

Let us now turn to the casual form of /t' $\ddot{u}$ -A/: [t'<sup>wy</sup>A]. One possible derivation would be (54).

a.	Input	{t'ü} {^}	
b.	Sec. articulation	{t' <sup>wy</sup> ü} {Λ}	
c.	Fission	${t'^{wy}wi}{\Lambda}$	due to *[-back, +round]
d.	Glide formation	{t' <sup>wy</sup> wy^}	due to hiatus
e.	Glide deletion	$\{t'^{wy}\Lambda\}$	due to complex onset constraint

The problem with this conceivable derivation is obviously the step (d) of glide formation. Once this intermediate form  $[t^{,wy}wy_{\Lambda}]$  is brought out, then glide deletion (a repair induced by the complex onset constraint) could delete the two glides. However, as shown in the derivation of the formal form in (53), this intermediate form with two glides in a complex onset cluster is prohibited universally and not allowed to be obtained. Hence, (54) cannot be the correct derivation.

Meanwhile, the complex onset constraint does seem to play a role. Suppose that this constraint is checked before, as well as after, checking of the hiatus constraint, and that when the complex onset constraint is checked before hiatus constraint checking the skeletal position of the glide is not assigned premium value.

(55) Derivation of  $/t'\ddot{u}-\Lambda/$  in casual style (revised)

		<b>.</b> .	/
a.	Input	{t'ü} {^}	
b.	Sec. articulation	{t' <sup>wy</sup> ü} {Λ}	
c.	Fission	{t' <sup>wy</sup> wi} {A}	due to *[-back, +round]
d.	Glide deletion	$\{t^{,wy}i\}\{\Lambda\}$	due to complex onset constraint
e.	Glide formation	$\{t^{wy}y_{\Lambda}\}$	due to hiatus
f.	Glide deletion	$\{t^{wy}\Lambda\}$	due to complex onset constraint

If this analysis is correct, the crucial difference between formal and casual style is that the complex onset constraint is checked one more time in casual style than in formal style: before hiatus constraint checking. The aspect of premium value assignment in casual style is the same at the two times, i.e., not assigning premium value to the glide.

At this moment, let us compare the two formal forms,  $[k^{y_{i}}.\Lambda]$  from /ki- $\Lambda$ / in (49)/(50) and  $[t^{wy_{i}}.\Lambda]$  from /t'ü- $\Lambda$ / in (53), and their derivations. It is necessary to consider the longer derivation (49) for the result  $[k^{y_{i}}.\Lambda]$  in formal style because additional operations in the potential step (actually blocked in this particular case) could be actually employed in other cases as in casual style.

(49)/(50) Formal from $/ki-\Lambda / > [k^{y}i.\Lambda]$			(53) Fo	ormal form /t'	ü-л/ > [t' <sup>₩у</sup> i.л	]	
	a.	Input	{ki} {A}	a.	Input	{t'ü} {A}	
	b.	Sec. artic.	$\{k^{y}i\}\{\Lambda\}$	b.	Sec. artic.	{t' <sup>wy</sup> ü} {A}	
	c.	_	_	c.	Fission	${t'^{wy}wi}{\Lambda}$	due to *[-bk,+rnd]
	d.	Glide form.	{k <sup>y</sup> yʌ}	d.	Glide form.	BLOCKED	due to hiatus
	e.	Syl. split	$\{k^{y}i\}\{\Lambda\}$	e.	Glide del.	${t'^{wy}i}{\Lambda}$	due to COC

These steps in the two cases above are to be the same in other cases and the specific operations are expected to be the same if all other things are the same including syllable structure and premium value assignment. When the two derivation steps from  $\{k^{y}y_{\Lambda}\}$  to  $\{k^{y}i\}\{\Lambda\}$  in (49) and from  $\{t^{,wy}wi\}\{\Lambda\}$  to  $\{t^{,wy}i\}\{\Lambda\}$  in (53) are compared, one big difference is noted. The repair of the complex onset constraint in (49)/(50) preserves the glide (hence, the syllable split repair) while the same constraint deletes the glide in (53) resulting in the same syllable structure. This is the result of assigning premium value to the glide in  $[k^{y}y_{\Lambda}]$  but not to that in  $[t^{,wy}wi_{\Lambda}]$ , when the

complex onset constraint enters to check the configurations in order for appropriate repairs to do the job. If these repairs are evoked by the same constraint at the same point in a given derivation applying to the same structural description, premium value is expected to be assigned in the same manner in both cases.

Maintaining this thesis, consider a possibility that the relevant constraint is checked twice in the derivation also in formal style: before and after hiatus checking. Further, assume that the aspect of premium value assignment is different in the two instances of checking of the complex onset constraint. In casual style, the complex onset constraint is checked as in (55). Each time the glide does not bear premium value and glide deletion is chosen to fix the complex onset cluster. In formal style, too, the complex onset constraint is checked twice, but when it is checked the second time the glide does bear premium value while the first checking of the complex onset constraint is done without premium value on the glide. This lets the glide delete even in formal style when the complex onset constraint is checked before hiatus resolution. This is illustrated in the following derivations:

## (56) Derivation of /ki- $\Lambda$ / and /t'ü- $\Lambda$ / in the formal and casual styles (final)

		Formal		Casual		
a.	Input	${ki} {\Lambda}$	{t'ü} {^}	${ki} {\Lambda}$	{t'ü} {^}	
b.	Sec. artic.	$\{k^{y}i\}\{\Lambda\}$	${t'^{wy}\ddot{u}}{\Lambda}$	$\{k^{y}i\}\{\Lambda\}$	{t' <sup>wy</sup> ü} {Λ}	
c.	Fission	_	${t'^{wy}wi}{\Lambda}$	-	${t'^{wy}wi}{\Lambda}$	*[-bk, +rnd]
d.	Glide del.	_	${t'^{wy}i}{\Lambda}$	_	${t'^{wy}i}{\Lambda}$	COC
e.	Glide form.	{k <sup>y</sup> yл}	{t <sup>'wy</sup> ул}	{k <sup>y</sup> yл}	{t' <sup>wy</sup> yʌ}	hiatus
f.	Syl. split/G Del.	{k <sup>y</sup> i}{^}	{t <sup>"wy</sup> i}{Λ}	$\{\mathbf{k}^{y}\Lambda\}$	{t' <sup>wy</sup> ^}	COC

The derivations produce correct surface outputs for the two conjugations in each style. Again, in the formal forms, the full derivation of  $/ki-\Lambda/$  and  $/t'ü-\Lambda/$  yields the same output as the shorter derivation up to (56)d. Hence, the shorter derivation is chosen by the economy principle with the two steps (56)e,f, the italicized parts, cancelled.

Two grammars of formal and casual styles are minimally different in that the only

difference is premium value assignment in the second checking of the complex onset constraints. Canceling of the two steps (56)e,f in formal style is due to the independent economy principle. This characteristic is very important because the two styles show a very minimal output difference for the same input forms and are expected to have a minimal difference in grammar. As pointed out in the previous section, Optimality Theory should allow quite different rankings of the relevant constraints for these minimally different output forms. The present analysis neatly resolves this conceptual difficulty of exhibiting a minimal grammar difference in two styles and provides correct outputs.

This section has dealt with the variation of stems with an onset consonant with respect to glide formation (and further simplification of complex onsets) in two different styles. The different aspect of premium value assignment in different styles is the key to the different surface forms. It has also been shown that the economy principle is critical in choosing correct surface representations and shorter derivations (especially in formal forms). As pointed out in section 3.2.1, Optimality Theory has a problem of radically different rankings of relevant constraints in two styles for very minimal surface form differences. The present analysis successfully captures the minimal grammatical difference between two styles in Korean.

## 3.3. Non-high Front Stem Vowels

I now turn to the hiatus cases where a stem ends in a non-high front vowel followed by the suffix / $\Lambda$ /. Among the 6 non-high vowels (4 mid and 2 low), the back vowels / $\Lambda$ , o, a/ have already been discussed in previous sections, and the relevant stem vowels dealt with here are /e, æ, ö/. Stems with one of these vowels in a hiatus configuration surface as in (57). The imperative (with / $\Lambda$ la/) and casual forms (with / $\Lambda$ s $\Lambda$ /) show the same pattern as the infinitive forms (with / $\Lambda$ /) with respect to the behavior of the stem vowel and the suffix vowel.

stem	-	a.	Formal	b.	Casual
e-	'gouge'		ел		e
te-	'get burned'		ten		te
se-	'count'		sen		se
pe-	'cut'		рел		pe
me-	'carry'		meл		me
tæ-	'touch'		teл		te
sæ-	'leak'		seл		se
næ-	'hand in'		пел		ne
mæ-	'tie'		тел		me
kæ-	'fold'		keл		ke
Ö-	'memorize'		weл		we
tö-	'become'		t <sup>w</sup> eл		t <sup>w</sup> e
sö-	'celebrate'		s <sup>w</sup> eл		s <sup>w</sup> e
k'ö-	'coax'		k' <sup>w</sup> eл		k' <sup>w</sup> e

(57)	Non-high front sten	vowels in	two styles	followed	by the suffix	vowel /ʌ/

Underlyingly, there are three different stem vowels: /e, æ, ö/. Among them, two vowels /æ, ö/ are converted to yield the surface [e], resulting in a 3-to-1 neutralization. As mentioned in section 3.2 of chapter 1, the front low vowel /æ/ becomes mid in Korean. On the other hand, the front mid round vowel /ö/ undergoes fission resulting in [we], similar to the high counterpart /ü/ which is fissioned to [wi]. Then, a uniform situation, [e. $\Lambda$ ], is obtained in an intermediate step of the derivation of all three cases.<sup>8</sup> The result is that this uniform configuration surfaces as such in formal style, while the suffix is deleted in casual style.

Since both [e] and [ $\Lambda$ ] are preserved in formal style regardless of the presence or absence of the onset consonant, both segments bear premium value on their skeletal positions. Hence, there is no deletion in response to hiatus resolution. This situation [e. $\Lambda$ ] is the only case where the two non-identical vowels are of the same height. The cases that are discussed in section 2 are involved

<sup>&</sup>lt;sup>8</sup>Because the suffix vowel / $\Lambda$ / does not harmonize to [a] after the stem vowel [ö], a bright vowel, the fission to [we] occurs before vowel harmony. Likewise, the /æ/ to [e] raising also occurs prior to vowel harmony to prevent the underlying /æ/ from harmonizing the suffix vowel / $\Lambda$ /. Alternatively, vowel harmony is to be limited to back vowels in conjugations, so that the stem vowels /æ, ö/ do not affect the suffix vowel / $\Lambda$ /.

in two identical vowels  $[\Lambda\Lambda]$  and  $[aa] (</a-\Lambda/)$ . Hence, it is necessary that if the two vowels in a hiatus situation are of the same height and are not identical, both vowels will be assigned premium value.

In casual style, however, this is not the case. Just as in the cases of identical vowels, the suffix vowel deletes. Then, it can be said that premium value assignment looks only into the height features when considering the identity. In other words, the identity condition for premium value assignment in casual style only cares about the height values. So, if the two vowels are of the same height, then only the first vowel (the stem vowel) is assigned premium value at the point when the hiatus constraint is checked. Then, one difference between the formal and casual grammars is the way they assign premium value to the two vowels: to both of the two non-identical vowels of the same height and to the first of the two identical vowels in formal style, but only to the first of the two vowels of the same height in casual style. The casual forms with the deletion repair in (57) can be accounted for.

Then, the question is why no other hiatus resolution operation, such as glide formation, is at work in formal style, given that vowel deletion is not available because of premium value on both vowels. Comparing the cases of glide formation to the case of  $[e.\Lambda]$  reveals a difference: difference in height. In all cases of glide formation discussed in section 3.1 and 3.2, the preceding vowel is higher than the following:  $[i.\Lambda]$ ,  $[u.\Lambda]$  and [o.a]. In the case of  $[e.\Lambda]$ , the two vowels are of the same height. So it can be said that the resulting non-high vocoid cannot be raised to the corresponding high glide when the non-high vocoid is of the same height as the following vowel.

One possible way to prevent devocalizing [e] before  $[\Lambda]$  is the non-high vocoid constraint, (19). If [e] is devocalized, that is, if the nucleus node for this vowel is deleted and this vowel is incorporated into the syllable of the following nucleus vowel, then the result will be a syllable that has a non-high front vocoid [e] in the onset position. The constraint (19) could exclude this result. However, this does not seem to be an explanation, if the case of [0.a] is considered, where the mid vowel [0] eventually becomes [w]. If the same devocalization operates on  $[e.\Lambda]$  followed by mid vocoid raising in the onset position,  $[y\Lambda]$  would be obtained.



(58) Conceivable devocalization of [e] before  $[\Lambda]$  (formal style)

The result, (58)d, is not the correct output: glide formation should be blocked. This could be achieved by assigning premium value to the feature [-high] of the non-high vocoid in the environment of the following vowel of the same height. The feature [-high] would be enough because the non-high vocoid and the following vowel are mid and there are no cases with a low vowel.<sup>9</sup> Then a repair to convert [ $\underline{e}$ ] in the onset position to [y] is unavailable, because this change will destroy an element with premium value. At the same time, the configuration [ $\underline{e}A$ ], (58)c, obtained by nucleus removal and onset incorporation is not legitimate, either. In this situation, where a convergent output could be obtained after applying (a series of) repairs, the entire block of repairs is cancelled including the first two steps in (58), nucleus removal and onset incorporation. The derivation returns to the "problematic" input with the hiatus configuration:

<sup>&</sup>lt;sup>9</sup>Also, because of vowel harmony, a vowel sequence such as  $[0.\Lambda]$  does not have chance to be checked by the hiatus constraint.

 $[e.\Lambda]$ . Hence, the marked hiatus situation surfaces as such because there are no legitimate repairs that would fix this marked configuration without losing premium value (and hence the repairs are blocked).

The present section has exhaustively discussed the cases of glide formation and vowel deletion due to hiatus, and the cases where hiatus is tolerated. It considers all the relevant aspects affecting hiatus-related operations including the stem vowel quality, the presence or absence of the onset consonant in the stem syllable, and speech style. By properly assigning premium value to appropriate elements and by ordering processes in the derivation, along with the governing principle of economy, it can be explained when and how the relevant phonological operations are done to obtain correct surface forms, supporting the Dynamic Phonology framework.

## 4. Hiatus Constraint as a Non-surface Constraint

Based on the various aspects of hiatus resolution, I have maintained the claim that the hiatus constraint is not a surface constraint. There is another piece of evidence for this claim: surface occurrence of hiatus due to a subsequent process of intervocalic consonant deletion. All the environments of hiatus in the previous sections are the cases where the stem-final vowel and the suffix-initial vowel are put together. This section presents several different cases with a surface hiatus configuration and argues in favor of the derivational approach and hiatus as a non-surface constraint.

#### 4.1. Surface Hiatus Violation Due to Subsequent Consonant Deletion

The first case of surface hiatus violations is as follows.

(59) Stems losing the final fricative before a suffix vowel

	stem		gerund /ko/	infinitive /ʌ/	sequential /uni/
a.	s-irreg	gular stems			
	is-	'link'	it <sup>°</sup> k'o	іл	iumi
	čis-	'make'	čit <sup>°</sup> k'o	čia	čiumi
	kus-	'draw'	kuut <sup>°</sup> k'o	kшл	kuuuni
	čas-	'stir'	čʌt <sup>¬</sup> k'o	čлл	čлшпі
	nas-	'(get) better'	nat <sup>-</sup> k'o	naa	naumi
	pus-	'pour'	put <sup>°</sup> k'o	рил	puuni
b.	h-sten	ns			
	č'ih-	'ram'	č'ik <sup>h</sup> o	č'in	č'iuni
	ոռh-	'insert'	плк <sup>ь</sup> о	плл	ոռաոi
	t'ah-	'braid'	t'ak <sup>h</sup> o	t'aa	t'auni
	čoh-	'good'	čok <sup>h</sup> o	čoa	čoumi

The infinitive and sequential forms of both formal and casual forms show that the hiatus constraint is not a surface constraint. Rather, the hiatus resolution is a non-surface requirement in an intermediate step in the entire derivations. The peculiar aspect in the infinitive and sequential forms in (59) is the presence of a process of fricative deletion in an intervocalic context as the following derivations show.

(60)	Derivations of <i>s</i> -irregular stems and <i>h</i> -stems						
		is-a	is-uni	čoh-л	čoh-umi		
	Vowel harmony	-	_	čoha	_		
	Hiatus resolution	_	_	_	-		
	Fricative deletion	іл	iuni	čoa	čoumi		

Fricative deletion and its ordering with respect to hiatus resolution is interesting. In order to get the forms  $[i\Lambda]$ ,  $[pu\Lambda]$  and [čoa] (without glide formation, cf. sections 3.1 and 3.2) and the forms such as [iuni],  $[č\Lambda\Lambda]$ , [kuuuni] and [čouni] (without vowel deletion, cf. section 2), fricative deletion must follow hiatus resolution. If fricative deletion applied prior to hiatus resolution as in the following, the surface forms would be  $*[y\Lambda]$  and \*[č<sup>w</sup>a] (with the stem vowel devocalized), and \*[ini] and \*[čoni] (with the suffix-initial vowel [u] deleted), which are ungrammatical.

(61) Wrong derivations of *s*-irregular stems and *h*-stems

	is-a	is- <b>u</b> ni	čoh-л	čoh-uni
Vowel harmony	_	-	čoha	_
Fricative deletion	iл	iuni	čoa	čouni
Hiatus resolution	ул	ini	č <sup>w</sup> a	čoni

The correct ordering is critical in casual style. In formal style, the ordering of hiatus resolution and fricative deletion is trivial especially for [čia], [pua] and [čoa]. With the fricative deletion – hiatus resolution order, the correct forms are derived. Take the /čoh-a/ case with this ordering. When fricative deletion applies to create the hiatus configuration, this result is then subject to glide formation as the repair of the hiatus configuration, [čo.a]. The repair is glide formation, not vowel deletion, because of premium value on the skeletal position of [o] in formal style as discussed in section 3.2.2. Glide formation and the subsequent syllable split (due to the complex onset constraint) are cancelled by the economy principle because the resulting surface forms are identical to the forms in a previous step of the derivation (parallel to the discussion of (49)/(50)). The final forms are the same as the outputs of the application of fricative deletion. The two vowels [o] and [a], keeping their nucleushood, surface as such, adjacent to each other.

The problem of fricative deletion – hiatus resolution order arises in casual style. With this order, the stem vowel [o] with the stem-final fricative deleted would become a glide before the suffix vowel [a] due to hiatus, and then would delete due to the complex onset constraint. (Note that the skeletal slot of the glide does not bear premium value in this step in casual style.) These operations would not be blocked as in formal style because the results,  $[\check{c}^y\Lambda]$ ,  $[p^w\Lambda]$ ,  $[\check{c}^wa]$ , etc. are distinct from their input. With the results being the wrong surface forms of casual style, the ordering of fricative deletion and then hiatus resolution is wrong.

The glide deletion repair due to the complex onset constraint in casual style is not the only place where the fricative deletion – hiatus resolution order yields the wrong surface forms. Forms such as  $/is-\Lambda/$  would be realized as  $[y\Lambda]$  with this ordering regardless of style. The stem /is/ does

not have an onset consonant and, after the application of fricative deletion the stem vowel would become the glide [y] before the suffix vowel [ $\Lambda$ ], just like the predicate /i/ 'thatch' without a coda fricative in the underlying form (see section 2). Because these stems lack an onset consonant, the complex onset constraint would be irrelevant to the resulting \*[y $\Lambda$ ] (< [i $\Lambda$ ] < /is $\Lambda$ /), and the glide would surface as such. With the reverse hiatus resolution – fricative deletion order, /is- $\Lambda$ / surfaces as [i $\Lambda$ ] correctly.

Similarly, with the fricative deletion – hiatus resolution order, the inputs such as  $/\check{c}\Lambda s - \Lambda/$  and /kuus-uuni/ would surface as  $/\check{c}\Lambda/$  and /kuuni/, respectively, because the two identical vowels would be adjacent to each other after the application of fricative deletion. By the same token, forms such as [iumi], [ $\check{c}\Lambda$ uuni], [puuni], and [ $\check{c}$ ouuni] with the suffix vowel [ul] show that fricative deletion is ordered after hiatus resolution, whose repair operation is vowel deletion in this case. Otherwise, the vowel [ul] should not appear adjacent to another vowel in the surface forms in either speech style. The ordering of hiatus resolution – fricative deletion yields the correct forms as in (60). Hence, the extrinsic ordering plays an important role, exhibiting an opacity case.

I observe that fricative deletion is a rule, i.e., an operation which cannot be attributed to constraint satisfaction. The deletion of the stem final /s/ between vowels is not an ambiguous operation in Korean in that deletion of this segment yields unique results. This aspect of uniformity of fricative deletion supports the view advocated here. While a negative constraint leads to multiple results via different repair processes, a rule has only one univocal operation yielding a single output. While this deletion operation is a univocal and unambiguous rule, it does not apply uniformly to all the stems with the parallel phonological input structure. Korean has the following paradigm in contrast to (59).<sup>10</sup>

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<sup>&</sup>lt;sup>10</sup>Stems in (59) showing the intervocalic /s/-deletion have been called s-irregular predicates. One tricky thing is that these s-irregular predicates never show the surface [s] at least in Standard Korean,

(62) s-regular stems

stem		gerund /ko/	infinitive /ʌ/	sequential /uni/
pis-	'comb'	pit <sup>°</sup> k'o	pisʌ	pisuni
s'is-	'wash'	s'it'k'o	s'isa	s'isuni
pʌs-	'take off'	p∧t <sup>¬</sup> k'o	рлял	рлѕшпі
p'æas-	'snatch'	p'æat`k'o	p'æasa	p'æaswni
us-	'laugh'	ut <sup>°</sup> k'o	usa	usumi
sos-	'soar'	sot'k'o	sosa	sosumi

In these cases, the stem-final /s/ does not delete before a suffix vowel. One possible way to discriminate the two different /s/'s in (59) and in (62) is to assign a diacritic feature to the verb stems in (59) (cf. Y.-S. Kim 1984). Crucially, the most adequate way of using diacritic features is to associate them to the use of rules (Halle 1998). In the case of the stems in (59), the diacritic feature states that only those stems with this feature undergo the rule of fricative deletion, which deletes an intervocalic fricative. Constraints cannot be used in this way. Hence, I conclude that the intervocalic fricative deletion is a rule, i.e., a univocal and deterministic operation, applying only to a certain stems ending in a fricative such as those in (59), and not induced by a negative constraint.

Thus, the Korean facts show that hiatus resolution, induced by the hiatus constraint (6), is ordered before a rule such as fricative deletion in the course of the phonological derivation. The consequence is that the surface form contains the two vowels in a row, and neither of the vowels devocalizes or deletes. These forms show that hiatus constraint is not a surface constraint, but is operative only in some intermediate step(s) of derivations.

because this consonant deletes between vowels and becomes the corresponding unreleased stop  $[t^{2}]$  before a consonant (i.e., in a coda position, see section 3.2 of chapter 1). The abstract /s/ surfaces as [s] between vowels in archaic forms and in some dialects: [isA] 'link-INF', [isuni] 'link-SEQ', etc. The stem-final /h/ makes the following stop aspirated, becoming the part of the resulting aspirated stop. In archaic forms and other dialects, again, the [h] surfaces as in [čohasA] and [čohuni].

Unlike *s*-regular predicates, there is no corresponding *h*-regular predicates (as opposed to *h*-irregular predicates) whose /h/ is realized as such between vowels regardless of dialects: In a given dialect, regional or social, all the stems with the final /h/ are either *h*-regular or *h*-irregular.

#### 4.2. Surface Hiatus Violation Due to a Subsequent Consonant-Vowel Interaction

Another situation where surface violation of hiatus is observed is the so-called *p*-irregular verbs, where a further phonological operation of the stem-final segment (resulting from the final consonant) and the suffix vowel yields a vowel.

(63)	<i>p</i> -irregular stems							
	stem		gerund /ko/	infinitive $/\Lambda/$	sequential /uni/			
	kip-	'sew'	kip <sup>¬</sup> k'o	kiwn	kiuni			
	mip-	'hateful'	mip <sup>°</sup> k'o	miwʌ	miuni			
	mæp-	'spicy hot'	mæp <sup>°</sup> k'o	mæwλ	mæuni			
	süp-	'easy'	š <sup>w</sup> ip`k'o	š <sup>w</sup> iwΛ	š <sup>w</sup> iuni			
	usup-	'funny'	ustup`k'o	usuiwA	usuni			
	mukʌp-	'heavy'	mukʌp`k'o	тиклwл	mukʌuni			
	sanap-	'wild'	sanap <sup>¬</sup> k'o	sanawa	sanauni			
	kup-	'bake'	kup <sup>°</sup> k'o	kuwл	kuuni			
	nup-	'lie down'	nup <sup>°</sup> k'o	nuwΛ	nuuni			
	top-	'help'	top <sup>¬</sup> k'o	towa	touni			
	kop-	'pretty'	kop <sup>°</sup> k'o	kowa	kouni			

In the cases of infinitive and sequential forms of the irregular predicates, the stem-final /p/ becomes [w] by "extreme weakening of /p/" between two vowels (cf. Y.-S. Kim 1984). Further, the resulting [w] and the [u] of the sequential suffix contract into [u] as the following derivation illustrates.

(64) Derivation of [kuuni] from /kup-uni/ 'bake-SEQ' Underlying form kup-uni Hiatus resolution – p-weakening kuwuni w-u contraction kuuni

In the surface sequential forms, we have the two vowel nuclei in a row: there is no deletion or glide formation. The fact is that hiatus resolution applies before p-weakening and w-w contraction: another case of counterfeeding relationship among processes. It is another situation

where hiatus resolution, a repair triggered by a constraint, precedes a phonological process like *p*-weakening in a serially ordered derivation. If the hiatus constraint were a surface constraint, the sequential forms of the predicates in (63) should not exhibit a vowel sequence.

There is an interesting set of predicates, as in (65), whose stems end in /p/ but behave differently from those in (63).

(65)	<i>p</i> -regular stems								
	stem		gerund /ko/	infinitive /ʌ/	sequential /uni/				
	ip-	'put on'	ip`k'o	ibл	ibuni				
	s'ip-	'chew'	s'ip'k'o	s'ibʌ	s'ibumi				
	лр-	'carry on the back'	лр`k'о	лbл	∧buuni				
	čap-	'hold'	čap`k'o	čaba	čabumi				
	kup-	'crooked'	kup <sup>¬</sup> k'o	kubл	kubuuni				
	p'op-	'take out'	p'op k'o	p'oba	p'obuni				
	čop-	'narrow'	čop`k'o	čoba	čobuni				

Of interest are the distinct surface forms, i.e., [w] and [b] in infinitive forms, of apparently the same underlying segment /p/ in the two classes. Two stems with the underlying form /kup-/ (one, the *p*-irregular 'bake'; the other, the *p*-regular 'crooked') lose homophony in infinitive and sequential forms. These distinct phonetic forms can reveal the configurations of phonological operations.

One possible way to deal with the phonetic [w] vs. [b] is that they are derived from the same underlying /p/ and different rules are responsible for yielding [w] and [b] with the aid of the diacritic feature. Hence, p-irregular stems are assigned a rule feature such as [+extreme weakening] while p-regular stems are not. The consequence is that the final /p/ of the predicates with this rule feature undergoes p-weakening as in (64), while the stem-final /p/ of the predicates without this diacritic feature does not, but simply undergoes the very general rule of intervocalic voicing of plain stops. In this case, a rule needs to be recognized just as in the discussion of non-uniform stem-final fricative deletion, and this rule and other phonological operations are serially

ordered.

There is another way that can deal with the contrast between the irregular and the regular /p/'s. This option establishes distinct underlying segments for different surface segment forms. One immediate way is to posit /p/ as the underlying form of the surface [b] in (65), and /b/ as the underlying form of [w] in (63). This is a typical abstract analysis. In Korean, voiced obstruents are hardly considered as independent phonemes of their own. Surface voiced (plain) stops appear in very restricted positions, namely intervocalically, and they are in the complementary distribution to the corresponding voiceless plain stops. In any case, if this rule approach is correct, then two distinct phonological processes should be recognized: one converting /b/ to [w]; the other, /p/ to [b]. Crucially, however, these two rules must be ordered:  $/b/ \rightarrow$  [w], and then /p/  $\rightarrow$  [b]. Otherwise, two distinct underlying segments /b/ and /p/ would result in the identical surface segment [w].

It would be extremely difficult, if not impossible, to account for the [w] vs. [b] distinction from the (apparently) identical /p/ in Optimality Theory. Assume a constraint, for example, \*b, to avoid the surface [b] from the underlying /b/ and to open a possibility for [w]. This constraint should be ranked higher than a faithfulness constraint. However, this constraint should be suppressed to get the surface [b] from the underlying /p/ in the *p*-regular stems. Another constraint could be devised to outrank \*b. Nevertheless, this third constraint should be formulated in such a way that it allows [b] to be derived from the underlying /p/, but not from the underlying /b/. In other words, this constraint should be sensitive to the underlying forms, since it should work on the underlying /p/, but not on the underlying /b/. This kind of constraint is impossible to formulate without referring to intermediate levels since basically constraints in Optimality Theory are surface constraints.

Once a derivational approach is adopted, however, the Korean facts can be easily accounted

for: serially ordering the two different phonological rules,  $/b/ \rightarrow [w]$  and  $/p/ \rightarrow [b]$ , with this order.

(66) Derivations of [w] from /b/ and of [b] from /p/ kub- $\Lambda$  kup- $\Lambda$ /b/  $\rightarrow$  [w] kuw $\Lambda$  -/p/  $\rightarrow$  [b] - kub $\Lambda$ 

On the other hand, when the uniform, more "concrete" underlying form /p/ for the *p*-irregular and *p*-regular stems is posited, these stems undergo a further rule of  $[b] \rightarrow [w]$  (after the uniform application of /p/  $\rightarrow$  [b]), which the *p*-regular stems do not undergo. The following derivations illustrate this point.

(67) Derivations of [w] and [b] from /p/ kup- $\Lambda$  kup- $\Lambda$ /p/ $\rightarrow$  [b] kub $\Lambda$  kub $\Lambda$ [b]  $\rightarrow$  [w] kuw $\Lambda$  –

In this case, the *p*-irregular stems (or the segments in question) are to bear the diacritic rule feature (such as [+extreme weakening]), as mentioned earlier. In either case, a derivational approach can deal with the [b] and [w] distinction regarding conjugations straightforwardly.

## 4.3. Vowel Sequences, Multiple Hiatus Resolutions and Cycles

There is a unique stem /moui/, which exhibits another case of surface hiatus violation. It shows interesting aspects regarding the underlying morpheme shape and hiatus resolution with and without a following vowel-suffix. This stem has two vowels in a row, and its second vowel is /ui/ which potentially creates a hiatus situation by itself with the preceding vowel /o/. First consider the following forms:

 (68) Conjugation of /moui/ stem gerund /ko/ infinitive /λ/ sequential /uni/ moui- 'collect' mouigo moa mouini Both of the two stem vowels surface before a consonant-initial suffix while the latter vowel [ui] deletes before a vowel-initial suffix as in [moa] (</mout- $\Lambda$ /).

The derivations of the two forms [moa] and [mouni] with a vowel-initial suffix are shown below:

	a.	infinitive /ʌ/	b.	sequential /umi/	
UR		тош-л		moui-uini	
Vowel harmony		mouia		-	
Vowel deletion		moa		mouuni	due to hiatus
	UR Vowel harmony Vowel deletion	a. UR Vowel harmony Vowel deletion	a. infinitive /ʌ/ UR moui-ʌ Vowel harmony mouia Vowel deletion moa	a.infinitive /n/b.URmoui-nVowel harmonymouiaVowel deletionmoa	a. infinitive /ʌ/ b. sequential /umi/ UR moui-ʌ moui-umi Vowel harmony mouia – Vowel deletion moa mouini

As discussed in section 2, the vowel [ui] in the second syllable of the stem is transparent with respect to vowel harmony, and the preceding vowel [o] turns the suffix vowel  $[\Lambda]$  to [a]. The derived forms in the above derivations are the final forms. There are two notable things regarding the two output forms. First, the result of the hiatus-repair (i.e., vowel deletion) still contains a hiatus configuration in both cases. Hence, even though stem-final vowel [ui] has deleted, the preceding stem vowel and the suffix vowel are still adjacent to each other. The second noticeable point is that the surface forms with a hiatus configuration suggest that only one hiatus-induced repair be available per legitimate derivation. Once an appropriate repair applies legitimately, no further repairs operate because of the same constraint, even though the result of the initial repair would create another hiatus configuration.

If further hiatus repairs applied to the results in (69), then ungrammatical forms such \*[m<sup>w</sup>a] and \*[moni] would be reached. The following derivations show this point:

(70)		a.	infinitive			b.	sequential	
	UR		тош-л		UR		mo <b>u-u</b> ni	
	VH		mouta		VH		-	
	Sec. artic.		m <sup>w</sup> owa		Sec. artic.		m <sup>w</sup> outuni	
	V del.		m <sup>w</sup> oa	hiatus	V del.		m <sup>w</sup> ouni	hiatus
	G formation		m <sup>w</sup> wa	hiatus	V del.		m <sup>w</sup> oni	hiatus
	G del.		m <sup>w</sup> a	COC				

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Therefore, the hiatus-induced repairs should be restricted in such a way that the hiatus constraint is checked only once in an entire derivation.

However, preventing the hiatus constraint from applying more than once is not sufficient. Suppose that the hiatus constraint applies to the first two vowels in /mout- $\Lambda$ /. In this case, too, vowel deletion enters to delete the vowel [ui] following vowel harmony. The result will be [moa], which is the correct surface form. The problem arises in the cases with a consonant-initial suffix such as /mout-ko/, /mout-ča/ 'collect-HORT', /mout-myAn/ 'collect-COND', etc. If vowel deletion targeted the first two vowels, the results would be \*[mogo], \*[moja], \*[momYAn], etc., with the vowel [ui] deleted. Note that monomorphemic words and stems may contain a vowel sequence as in [katul] 'autumn', [č<sup>h</sup>Atum] 'beginning, origin', [notul] 'glow in the sky', [keurtugo] (< /keutluti-ko/) 'lazy-GER', and [kuttuk<sup>h</sup>ago] (< /kuttukha-ko/) 'mystic-GER', where the second vowel is [ui]. The morpheme-internal tolerance of hiatus is not limited to such cases where one vowel is [ui]. Other forms such as [au] 'younger sibling', [heAm] 'swimming', [iAn] 'straw thatch', [uAn] 'burdock', [meugo] (< /meu-ko/) 'fill up-GER', [čoarigo] (< /čoali-ko/) 'kowtow-GER', [AiAp'sA] (< /AiAp's-A/) 'absurd-INF', [AurAjA] (< /AulAji-A/) 'get put together-INF', etc. are possible.

Therefore, the vowel serving as the environment of the deletion of [u] in [moa] and [mouni] is not the preceding stem vowel, but the suffix vowel. Accordingly, the hiatus constraint should refer to the fact that it is only relevant across a morpheme boundary. The following formulation of the hiatus constraint, which is a revision of (6), shows this point.

(71) Hiatus constraint (revised): Two adjacent nuclei are not allowed across a morpheme boundary.

$$\begin{array}{cccc} \sigma & \sigma \\ | & | \\ R & R \\ | & | \\ N & N \\ | & | \\ X & + X \end{array}$$

\*

Then, the potential derivations in (70) with iterative checking of the hiatus constraint and consequent iterative application of repairs can be prevented by the above formalism of hiatus constraint along with the Bracket Erasure Convention (Kiparsky 1982a,b, Mohanan 1986).

To demonstrate the critical feature of morpheme boundaries (and accordingly cycles) in applying hiatus-induced repair operations, the following conjugations of the stem /moui/ are provided:

(72) Passive conjugations of /moui/: /moui-i + suffix/
a. /moui-i-Λ/ [moyΛ] 'collect-PASS-INF'
b. /moui-i-uni/ [moini] 'collect-PASS-SEQ'

At the first glance, it appears that hiatus-repairs apply iteratively. In [moyA], the stem-final [u] has deleted and the passive suffix has undergone glide formation before the suffix vowel [A]. Similarly, both instances of the vowel [ui] in /mour-i-uini/, one stem-final and the other suffixinitial surrounding the passive suffix vowel /i/, have deleted. In the latter case, the single passive suffix vowel might be seen to serve as the conditioning vowel causing deletion of the two [ui]'s adjacent to the /i/ vowel.

The difference between [moa] (< /moul- $\Lambda$ /) and [moy $\Lambda$ ] (< /moul- $i-\Lambda$ /) regarding their underlying forms is not only the number of vowels, but also the number of morphemes. When the second suffix / $\Lambda$ / in /moul- $i-\Lambda$ / and the additional cycle are considered, the issue of iterativeness of hiatus-repairs in [moy $\Lambda$ ] does not arise. The additional suffix vowel with an additional cycle brings in an additional checking of the hiatus constraint. The following derivations illustrate the cyclic application of hiatus-repairs.

(73)	a. mou-i-n		b	. mou-i-uni	
Cycle 1	mow]i		Cycle 1	mow]i	
V del.	moi	hiatus	V del.	moi	hiatus
Cycle 2	moi]∧		Cycle 2	moi]uni	
G form.	тоул	hiatus	V del.	moini	hiatus

This treatment shows correctly that glide formation of the passive suffix vowel /i/, realized as the corresponding glide in [moyA], is due to the addition of the vowel of the second suffix, and not due to the stem vowel. The hiatus constraint is not only non-iterative, but is checking cyclically. The hiatus configuration is checked across morpheme boundaries and once per cycle. If an additional cycle creates another hiatus configuration, the same constraint enters to repair the marked structure. Once an appropriate repair is done legitimately in a given cycle, the checking of the constraint is completed for that cycle. This property is a new, but natural addition to Dynamic Phonology.

All the discussions related to cases in (59), (63), (68) and (72) show that the application of the repair triggered by the hiatus constraint (71) must be ordered with respect to other processes. Crucially, rules like fricative deletion and *p*-weakening should be ordered after the hiatus repair. Morpheme-internal vowel sequences are not subject to hiatus. The consequence is that two vowels appear adjacent to each other in surface forms. Hence the hiatus constraint applies across a morpheme boundary to non-surface forms in the middle of an entire derivation. On the other hand, syllable structure constraints such as the complex onset constraint (33) and the branching nucleus constraint (22) are indeed surface constraints. There is no case where these constraints are violated.

As for repairs for the hiatus constraint, there are at least two different possibilities: (i) glide

deletion and (ii) vocalization of the glide resulting in two separate syllables. Premium value determines which operation is to be used as the repair. After the repair, if Syllable Split due to the glide vocalization yields the same form as a form in a previous step of the derivation in some cases of formal forms, the relevant steps are cancelled due to the economy principle.

## 5. Stem ha- /ha/ and Glide Insertion as Hiatus Repair

Until now, two repair operations have been considered for hiatus resolution in Korean: vowel deletion and glide formation. A third common option for hiatus resolution is insertion of a glide or a consonant (see Calabrese 2002a). This option has not been discussed so far, and surprisingly, it is quite limited in Korean. There is indeed a case employing glide insertion as hiatus resolution, which is for the stem ha-/ha/.

As a lexical verb, *ha*- means 'do, make' as (74) shows. It is also used as a light verb as in (75).

a.	eysute-ka	swukcey-lul	ha-n-ta.
	Esther-NON	A homework-A	CC do-PRES-DECL
	'Esther is c	loing her home	work.'
b.	eysute-ka	pap-ul	ha-n-ta.
	Esther-NON	A boiled.rice-Ad	CC do-PRES-DECL
	'Esther is a	cooking rice.'	
a.	eysute-ka	wuntong-ul	ha-n-ta.
	Esther-NON	A physical.exer	cise-ACC do-pres-decl
	'Esther is g	getting exercise	.'
b.	eysute-ka	kongpu-ul	ha-n-ta.
	Esther-NON	M studying-ACC	do-pres-decl
	a. b. a.	<ul> <li>a. eysute-ka Esther-NOM 'Esther is of</li> <li>b. eysute-ka Esther-NOM 'Esther is of</li> <li>a. eysute-ka Esther-NOM 'Esther is of</li> <li>b. eysute-ka Esther-NOM</li> </ul>	<ul> <li>a. eysute-ka swukcey-lul Esther-NOM homework-AG 'Esther is doing her home</li> <li>b. eysute-ka pap-ul Esther-NOM boiled.rice-AG 'Esther is cooking rice.'</li> <li>a. eysute-ka wuntong-ul Esther-NOM physical.exer 'Esther is getting exercise</li> <li>b. eysute-ka kongpu-ul Esther-NOM studying-ACC</li> </ul>

'Esther is studying.'

The same stem is used as a pro-predicate as well, both as a pro-verb 'do (so)' and as a proadjective 'be (so)'. In the case of the pro-verb, it typically takes an adverb, i.e., a content adverb (manner, time, place) or a pro-adverb *kurehkey* [kur $\Lambda$ k<sup>h</sup>e] 'so, in that way'. The pro-adjective is always used with the pro-adverb *kure* [kur $\Lambda$ ] 'so'. The two forms of the pro-adverb depend on the use and meaning of the pro-predicate *ha*- between pro-verb and pro-adjective. In all cases, *ha*- is used with a complement (either an argument or an adverbial-adjunct).<sup>11</sup>

The two predicate categories are conjugated in the same manner regardless of the category status, as far as the hiatus with the suffix vowel  $[\Lambda]$  is concerned. The following conjugations represent all the cases of hiatus with the stem /ha/:

(76)	Conjugations of /ha/ before a vowel-initial suffixes					
	a.	/ha-^/	[hayʌ]	formal		
			[hæ]	casual		
	b.	/ha-uni/	[hani]	formal/casual		

The first case with the suffix-initial vowel  $/\Lambda$ / represents the infinitive  $/\Lambda$ /, the imperative  $/\Lambda$ la/ and the causal  $/\Lambda$ s $\Lambda$ /, and the second case with the suffix vowel /ul/ represents the sequential /ull/, the adversative /ulla/, the conditional /ully $\Lambda$ /, and the purposive /ull $\Lambda$ /.

Based on the discussions so far, the following derivations are obtained.

(77)	Derivations of /ha-٨/									
	a.	Formal			b.	Casual				
		UR	ha-л			UR	ha-л			
		Glide insertion	ha.yʌ	hiatus		Glide insertion	ha.yʌ	hiatus		
						[ay] contraction	hæ.ʌ			
						Vowel deletion	hæ	hiatus		

<sup>&</sup>lt;sup>11</sup>Adjectives are conjugated by themselves, i.e., without a copula, in Korean, and the two conjugation patterns are almost the same. There are two places where different suffixes are used depending on the category status of the stem. One is the presence (for verb stems) or absence (for adjective stems) of the (overt) present tense suffix -*n*- before certain final suffixes including the declarative -*ta*: *ca*-*n*-*ta* 'go-PRES-DECL' vs.  $c^h a - \emptyset - ta$  'cold-PRES-DECL'. Another difference is the different forms of the prenominal modifier suffix (also known as the relativizer) between -*nun* [ntun] (for verbs) and -*n* [n] (for adjectives): *ca*-*nun aki* 'sleep-PNM (i.e., sleeping) baby' vs.  $c^h a - n$  mul 'cold-PNM (i.e., cold) water'. The same distinction is found in the verb *ha*- and the adjective *ha*-: *kurehkey ha*-*n*-*ta* 'is doing so' vs. *kure-ha*- $\emptyset$ -*ta* 'is so'; *kurehkey hanun noli* 'the game how one does it' vs. *kure-ha*-*n noli* 'such a game'.

(78) Derivation of /ha-umi/ UR ha-umi Vowel deletion ha.ni

The derivation of [hani] from /ha-uni/ is straightforward: the suffix-initial vowel [u] deletes being adjacent to the stem vowel [a].

There are a few questions related to the forms in (76)a and the derivations in (77). The first question is the lack of vowel harmony of the suffix vowel / $\Lambda$ / to [a] after a yang (or bright) stem vowel in /ha/. The failure of the application of vowel harmony is clearly shown in the formal form [hay $\Lambda$ ]. In all other cases with the stem vowel [a], the suffix vowel / $\Lambda$ / is turned to [a] regardless of absence or presence of the intervening consonants and the number of such consonants.

(79)	/ka-ʌ/	'go-INF'	[ka]
	/mak-л/	'block-INF'	[maga]
	/anč-ʌ/	'sit.down-INF'	[anj̃a]

In the case of /ka- $\Lambda$ /, the stem vowel first turns to [a] by vowel harmony and then subsequently deletes under identity due to hiatus (section 2). The stem /ha/ does not exhibit this vowel harmony.

It might be that the inserted glide [y] somehow blocks vowel harmony. However, this is not possible in the present analysis, because vowel harmony is ordered before glide insertion (given that glide insertion is due to hiatus). At the point of vowel harmony, there is no intervening glide [y] present between the stem vowel and the suffix vowel. Hence, the stem /ha/ should have a lexical stipulation that this stem is not subject to vowel harmony.

The second question involves the glide insertion operation as a way of hiatus resolution. The peculiar thing is that /ha/ is the only stem adopting this repair process for the same phonological configuration. In all other situations where the stem ends in [a] and the suffix starts with [ $\Lambda$ ], the suffix vowel first harmonizes to [a] and then eventually deletes under identity as shown in [ka] (< /ka- $\Lambda$ /) in (79) and in the discussions in section 2. Hence, this stem is to be stipulated in a way that the hiatus resolution for it is glide insertion. The stipulation should also include that this repair is limited to the suffix with the [ $\Lambda$ ] vowel, but not to suffixes with another vowel such as [ $\mathbf{u}$ ] as in [hani] (\*[hayuni]).

Another point related to the preceding question is the inserted glide [y]. The two vowels causing glide insertion are [a] and [ $\Lambda$ ]. There is no simple way to relate the inserted glide and either or both of the vowels in terms of the segmental quality. The inserted glide [y] is very much expected in a situation where one vowel is [i], as in [ia]  $\rightarrow$  [iya], for example. In such a case, a simple line insertion operates between the skeletal position of the vowel [i] and a syllable constituent node (i.e., one of syllable, rhyme and nucleus nodes), and the ambisyllabic element is subsequently realized as the independent glide segment [y] (Calabrese 2002a). However, there is no vowel [i] or a similar vowel in the present case of glide insertion in Korean. Hence, a line insertion is not an appropriate repair operation.

One possible answer comes from the status of the glide [y] as the less marked glide. With this view, glide insertion is to be treated as insertion of a skeletal position only with [-consonantal] specification, which is the least specified "glide". Subsequent processes would fill the underspecified skeleton with features of the default glide [y]. In this way the formal form [hayA] can be obtained.

The casual form undergoes further processes. The first operation, which can be considered as a real ad hoc process, is the [a+y] to [æ] contraction. The process itself is quite natural across languages, and similar contractions are found in other places in Korean phonology:

(80) Optional [a+i] to [æ] contraction in Korean
/a.i/ (> [æ]) 'kid'
/sa.i/ (> [sæ]) 'gap'

What is unusual in the case of [hayA] and [hæ] is that the contraction of the two segments is operating across a syllable boundary. The glide [y] is already the onset of the following syllable whose nucleus is [A]. Containing a sequence of two syllables [ha] and [yA] with the ideal CV structure as a result of glide insertion responding to the hiatus constraint, the two heterosyllabic segments, i.e., the vowel [a] and the glide [y], do not seem to have a good motivation for the contraction. Another question related to this matter is the result of the application of the contraction. It leads to another hiatus configuration: [hæ.A]. For these reasons, the [a+y] to [æ]contraction is to be stipulated as an *ad hoc* rule in casual style (not relevant in formal style). It is an example of a rule in the framework of Dynamic Phonology, which is not motivated by a (negative) constraint. Rules often contain unnatural aspects, and sometimes are "crazy" (Bach and Harms 1972; Anderson 1981). Dynamic Phonology embraces such unnatural and crazy rules as part of grammar to keep grammatical descriptions and explanations simple.

The last property regarding the casual form [hæ] is related to the unnatural characteristic of the preceding [a+y] to [æ] contraction. The result of this operation contains a hiatus situation. This resulting form undergoes a deletion operation of  $[æ.\Lambda]$  to [æ] as a hiatus repair, to get the correct surface form. The deletion of the vowel  $[\Lambda]$  after [æ] is already found in Korean verbal phonology. Section 3.3 discusses the cases of  $[\Lambda]$  deletion after a stem vowel [æ] (which is neutralized to /e/). This current case is different from the cases in section 3.3, in that the vowel [æ] for the present case is derived from contraction of an underlying stem vowel and the inserted glide, which are morphologically independent of each other. The cases found in section 3.3 are direct interactions between a stem vowel and a suffix vowel, without any other factors other than stem vowel neutralization.

However, what is common between the two types is that once  $[x.\Lambda]$  is obtained, the vowel  $[\Lambda]$  is deleted. This leads to the possibility that hiatus is checked and hence appropriate repairs

apply whenever the structural description is met. But it has already been pointed out in section 4 that this is not the case and that hiatus checking is done cyclically. The environment of providing cycles discussed in section 4.3 is morpheme concatenations. The present case of [a+y] to [æ] should create a cycle in order for the  $[\Lambda]$  deletion as a hiatus repair to operate, while an iterative application of hiatus-induced repairs should be prevented for the cases where a hiatus configuration is created. This is due to a later rule of medial segment deletion as in /is- $\Lambda$ / >  $[i\Lambda]$  > \*[y $\Lambda$ ] (section 4.1) or due to the initial application of a hiatus repair as in (/mour- $\Lambda$ / >) [moura] > [moa] > \*[m<sup>w</sup>a] (section 3.3). The phonologically derived form [hæ. $\Lambda$ ], which has already undergone a hiatus repair, is the only case that is subject to hiatus resolution without further morpheme concatenation. The [a+y] to [æ] contraction introduces a (phonological) cycle between the resulting [æ] and the suffix vowel [ $\Lambda$ ] due to the peculiar nature of the contraction rule (the classical derived environment effect by Kiparsky 1973b). This cycle lets the hiatus constraint "see" the sequence [æ. $\Lambda$ ], deleting [ $\Lambda$ ].<sup>12</sup>

To sum up this section, the stem /ha/ presents a unique and even peculiar case of hiatus resolution in Korean: glide insertion for the sequence of the stem vowel [a] and the suffix vowel [ $\Lambda$ ], and an additional hiatus resolution operation without a further suffix. Even though there are a few peculiarities, there are also some very natural and expected aspects of this stem. It is the only case where the stem–suffix hiatus is repaired by glide insertion, but glide insertion itself is a common repair operation in general to fix a hiatus configuration. Hiatus is shown to be a non-

<sup>&</sup>lt;sup>12</sup>An alternative way to introduce a cycle without an additional morpheme is that the inserted glide [y] is somehow considered as a morpheme and provides an additional cycle. But this glide is better regarded as a phonological entity rather than a morphological entity, even though there indeed exist morphemes without meaning (such as the *cran* morph in *cranberry*, the second *-o-* in *morphology*, arguably *-o-* in *Jack-o-lantern* or thematic vowels in Romance languages). In any case, a special stipulation is to be made for the resulting [æ.A] sequence for the purpose of the second hiatus resolution operation, and this issue is left for future research.

surface and non-iterative constraint, but it is cyclic (as shown in section 4.3). A further phonological rule (the peculiar contraction) in casual style seems to introduce an additional cycle without additional morpheme. This additional cycle lets the appropriate hiatus repair apply, leading to the correct surface casual form  $[\hbar æ]$  with the suffix vowel  $[\Lambda]$  deleted.

#### 6. Conclusion

This chapter has exhaustively investigated the cases of hiatus in verbal phonology, the hiatus resolution operations, related phonological constraints and repairs, and some idiosyncratic rules in Korean. Observations and analyses in this chapter well support the framework of Dynamic Phonology as advanced in Calabrese (2002a). Rules determine only one actual output, while negative constraints induce several different, but limited number of repair operations, among which the evaluation component chooses one economical output. It has been shown that phonological operations, including rules and repairs, apply in a stepwise ordered manner to yield surface phonetic representations. It is also shown, following Calabrese (1995, 1998, 2002a), that repair operations are very limited, unlike what has been proposed in Optimality Theory where phonological outputs are infinite.

The choice of a particular operation among a limited number of hiatus repairs depends on the segmental quality of the stem, suffix vowels and premium value assignment. In some cases, no repair is operating at all. If there are two different derivations available to yield the same legitimate outputs for a single hiatus configuration, the shorter derivation is chosen. The economy principle enters to exclude longer derivations. This is not only conceptually appropriate, but also empirically, as some outputs produced by longer derivations are incorrect.

As has been observed and discussed, hiatus is to be viewed as a non-surface constraint.

There are many cases that support this point. Sections 3 and 4 provided such cases exhibiting surface violation of the hiatus constraint, either due to failure of repair applications or because of subsequent phonological operations in a serial derivation yielding a hiatus configuration. This constraint is shown to be cyclic, referring to morphological information. Hence the hiatus constraint is checked only when there is a morpheme boundary, and whenever another morpheme is added providing a phonological cycle. A unique stem ha- was also discussed. Some idiosyncrasies related to this stem are to be discussed further in future research. It has also been pointed out that syllable structure constraints, such as the complex onset constraint and the branching nucleus constraints, are surface constraints.

### Chapter 4

# Suppletive Negation and the Morphological Structure of Short-Form Negation\*

## 1. Introduction

Among the two different clausal negation constructions in Korean, the so-called short-form negation construction places a negator an(i) 'not' or mos 'cannot' before a predicate. However, a few short-form negation cases are involved in suppletion, i.e., instead of the expected short-form negation with an(i)/mos before the relevant predicate, a single lexical item is used which is morphophonologically unrelated to the affirmative counterpart (molu- 'not.know' instead of \*an(i)/mos al- for the negation of al- 'know'; eps- 'not.exist' instead of \*an(i)/mos iss- for the negation of short-form negation. It is further argued that suppletive negation is better to be analyzed in a separation theory such as Distributed Morphology (i.e., post-syntactically) than in a pre-syntactic or lexicalist approach.

The morphological framework adopted is Distributed Morphology (Halle and Marantz 1993, 1994, Harley and Noyer 1999, Marantz 1997a, 2006 among others). Distributed Morphology assumes that syntax lacks phonological features and manipulates abstract (i.e., syntactic, semantic, and morphological) features only. This mechanism of separation allows

<sup>&</sup>lt;sup>\*</sup>This chapter is a revision of I. Chung (2007). Part of it was presented at the third Workshop on Theoretical East Asian Linguistics (TEAL-3) held on July 22-23, 2005, at Harvard University, in conjunction with the 2005 Linguistic Society of America Summer Institute.

syntax uniform across distinct non-long-form negation constructions, i.e., short-form negation and suppletive negation. Without phonological information, the syntactic and semantic uniformity regarding properties related to negation is maintained in the two negation constructions. The difference emerges in PF, that is, after (overt) syntax, where phonological information is provided through vocabulary insertion for the nodes of the morphosyntactic structure. Vocabulary insertion can be preceded by morphological operations. One of those morphological operations is morphological fusion which takes two separate nodes in a structure and turns them into a single node. This resulting node retains all the relevant features of the two original nodes, and is provided with the phonological contents of the corresponding vocabulary item. Morphological fusion and vocabulary insertion are done in the postsyntactic morphological component within PF, and do not affect the syntactic or semantic properties of the sentence. This aspect of morphology independent of syntax and semantics explains the identical syntactic and semantic behaviors of the usual short-form negation and the suppletive negation.

The chapter is organized as follows. Section 2 presents two negation constructions in Korean, each of which is available for the *an(i)* negation (general negation) and the *mos* negation ('ability' negation). It is shown that the short-form negation is indeed a syntactic negation, using the distribution of negators, negative polarity item licensing, and the scope interaction of the negation with respect to quantifiers. Then, a syntactic derivation is provided within which this chapter is couched. In section 3, the suppletive negation cases are presented and are identified with short-form negation from a syntactic and semantic point-of-view. Section 4 considers two possible ways to related suppletive negation and short-form negation, i.e., a lexicalist analysis and a postsyntactic analysis. It identifies some problems with a lexicalist approach and presents a syntactic analysis in the framework of Distributed Morphology. Section 5 considers some special properties of the predicates exhibiting suppletive negation (especially 'know'), and suggests that

the verb 'know' be associated with some functional feature. Section 6 concludes the chapter.

#### 2. Clausal Negation in Korean

This section discusses the general characteristics of syntactic negation in Korean. First, section 2.1 presents two constructions (short-form and long-form) for each of the two negation constructions: the general (or "naïve") negation with an(i) 'not' and the ability (or modal) negation with *mos* 'cannot'. In section 2.2, it is shown that the short-form negation is syntactic. Section 2.3 presents the phrase structure and a syntactic derivation regarding short-form negation.

# 2.1. Types and Constructions of Negation

Korean has two negators: an(i) and mos. Each of them has two different constructions, commonly called short-form negation and long-form negation in the literature.<sup>1</sup> In the an(i) negation, the negator  $an(i)^2$  is placed before or after the predicate depending on the negation constructions (short or long, respectively). It basically means 'not' as shown in (2) and (3). The short-form negation has the negator right before a predicate as in (2).

(1) a. eysute-ka ca-n-ta. Esther-NOM sleep-PRES-DECL 'Esther sleeps/is sleeping.'

<sup>&</sup>lt;sup>1</sup>Different authors have used different terms for short-form and long-form negation: short and long (I.-S. Yang 1972), type I and type II (C.-K. Oh 1971, D.-W. Yang 1976, H.-O. A. Kim 1977), type A and type B (H.-B. Lee 1970), preverbal and postverbal (S.-H. P. Kim 1967, J.-M. Yoon 1990) and simple and complex (S.-C. Song 1988), respectively, among others.

<sup>&</sup>lt;sup>2</sup>The general negator, represented as an(i), has two forms: *ani* and *an*. The former is formal (or rather archaic to some speakers), while the latter is used in colloquial speech. There is no meaning difference in terms of proposition, scope of the negation, focus, etc. The difference is a matter of formality and the choice depends on speech style.

- b. eysute-ka pap-ul mek-ess-ta. Esther-NOM rice-ACC eat-PAST-DECL 'Esther ate rice.'
- c. eysute-nun sengsilha-ta. Esther-TOP sincere-DECL 'Esther is sincere.'
- (2) a. eysute-ka **an(i)** ca-n-ta. Esther-NOM NEG sleep-PRES-DECL 'Esther doesn't sleep/isn't sleeping.'
  - b. eysute-ka pap-ul **an(i)** mek-ess-ta. Esther-NOM rice-ACC NEG eat-PAST-DECL 'Esther didn't eat rice.'
  - c. eysute-nun **an(i)** sengsilha-ta. Esther-TOP NEG sincere-DECL 'Esther is not sincere.'

The long-form negation places a negator after the predicate with the suffix -ci, followed by the light predicate *ha*-, resulting in the string *V*-*ci* an(*i*) *ha*-. This is illustrated in (3).<sup>3</sup>

(3)	a.	eysute-ka	ca-ci	an(i)	ha-n-ta.	
		Esther-NOM	sleep-CI	NEG	do-PRES	-DECL
		'Esther does	n't sleep/is	sn't sle	eping.'	
	b.	eysute-ka	pap-ul	mek-o	ci <b>an(i)</b>	ha-y-ess-ta.
		Esther-NOM	rice-ACC	eat-Cl	NEG	do-EG-PAST-DECL
		'Esther didn'	t eat rice.	,		
	c.	eysute-nun	sengsilha	-ci <b>an</b>	(i) ha-ta	1.
		Esther-TOP	sincere-C	I NE	G do-D	DECL
		'Esther is no	t sincere.'			

The other negator, *mos*, is involved in the same structural configurations as the an(i) negation constructions. It basically means 'cannot, may not' or 'not able/allowed to', and is involved in lack of ability, non-permission (disapproval) from other person(s), or an external force going beyond the subject's control such as weather condition. In other words, *mos*<sup>4</sup>

<sup>&</sup>lt;sup>3</sup>When the colloquial form is used in the long-form negation constructions, the light predicate ha-following the negator is also contracted to h- (which is further deleted before a vowel-initial suffix), resulting in *V*-ci anh- from *V*-ci ani ha-. This stylistic variation is not discussed here. The glide y is an epenthetic glide discussed in chapter 3 section 5 for hiatus resolution for the root ha-.

<sup>&</sup>lt;sup>4</sup>This second negator is transliterated as *mos*, reflecting orthography. However, its phonetic form is [mot<sup>3</sup>] with the final unreleased dental stop, which is realized as a (released) voiced counterpart in the onset

additionally has some kind of modality like ability, possibility, permission or volition.

- (4) a. eysute-ka **mos** ca-n-ta. Esther-NOM NEG sleep-PRES-DECL 'Esther cannot/is not allowed to sleep.'
  - b. eysute-ka pap-ul **mos** mek-ess-ta. Esther-NOM rice-ACC NEG eat-PAST-DECL 'Esther couldn't/was not allowed to eat rice.'
  - c. \*eysute-nun **mos** sengsilha-ta. Esther-TOP NEG sincere-DECL (\*'Esther is not sincere.')
- (5) a. eysute-ka ca-ci **mos** ha-n-ta. Esther-NOM sleep-CI NEG do-PRES-DECL 'Esther cannot/is not allowed to sleep.'
  - b. eysute-ka pap-ul mek-ci **mos** ha-y-ess-ta. Esther-NOM rice-ACC eat-CI NEG do-EG-PAST-DECL 'Esther couldn't/was not allowed to eat rice.'
  - c. eysute-nun sengsilha-ci **mos** ha-ta. Esther-TOP sincere-CI NEG do-DECL 'Esther is not sincere.'

As indicated in (4)c, the short-form negation with *mos* is not available for adjectives, and this is true for all adjectives in Korean. In the long-form *mos* negation constructions for adjectives as in (5)c, the negator does not exhibit any ability or permission property. This is probably because adjectives in Korean describe states and simple states cannot be involved in ability or permission. Consequently, the sentence (5)c does not mean something like 'Esther is not able/allowed to be sincere' but a simple negation of the corresponding affirmative sentence, i.e., the simple state complementary to the affirmative sentence.<sup>5</sup> Some speakers seem to feel that an(i) negation and

in the resyllabified syllable of a vowel-initial stem. That is, the final consonant of mos behaves as /t/ phonologically.

<sup>&</sup>lt;sup>5</sup>This does not explain lack of the short-form *mos* negation construction with an adjective. There is an interesting contrast between (4) and (5) regarding the impossibility of an adjective's taking the ability negator *mos* in a short-form negation construction. It is generally agreed that the inserted dummy *ha*- (the light predicate) in a long-form negation copies the categorial status of the lexical predicate. The distinction between the present tense suffix found in (1)a and (1)c, *-n* for verbs and Ø for adjectives, is transparently transmitted to the light predicate *ha*- of the corresponding long-form negation sentences in (3)a,c and (5)a,c, respectively. The category information does not play a role in allowing the ability negator *mos*, present in

mos negation have a subtle emphatic difference in the long-form constructions for adjective predicates. That is, while an(i) means mere negation, mos means something like 'not possibly, absolutely not'.<sup>6</sup>

# 2.2. Short-Form Negation as Syntactic Negation

There is a general consensus for the long-form negation that it is a syntactic construction. However, there are two different views on the short-form negation. One approach treats an(i) as a prefix of predicates (D.-I. Cho 1994, J.-B. Kim 1999, Y.-K. Kim-Renaud 1974, M.-K. Park 1994, J.-M. Yoon 1990). According to this view, this negative prefix is attached to the predicate in the lexicon prior to syntax. Meanwhile D.-H. An (2003), J. Y.-K. Baek (1998), Hagstrom (1995, 1996, 2000) and Y.-J. Jung (1991) argue that the short-form negation is also a syntactic negation construction. This section considers some arguments in favor of a syntactic view on short-form negation. Although short-form negation with *mos* is occasionally mentioned the discussion will focus on an(i), as *mos* is not possible in short-form negation with an adjective.

the long-form negation, as shown (5). However, it matters when the same ability negator *mos* appears in the short-form negation: (4)a vs. (4)c. The concern is that the contrast between (4)c and (5)c shows that what blocks the appearance of *mos* with an adjective is not the categorial status of the predicate in short-form negation.

It is an interesting issue, and explanations would have to be explored. For example, it may be possible to impose a certain restriction on stacking the [+neg] feature and the modality feature, along with an adjective in a certain structure (i.e., short-form negation). If it is a viable way, it means that short-form negation and long-form negation have distinct structures. Alternatively, the light predicate *ha*- (or its categorial status) can be treated as inert in taking the ability negator. That is, the defective nature of the light predicate allows the arguably marked negator *mos* to appear before the light adjective. In any case, however, the category information of the lexical predicate is still necessary because the impossibility of having *mos* in short-form negation is limited to adjectives.

<sup>&</sup>lt;sup>6</sup>This might be the reason Martin (1992: 315) calls *mos* a "strong" negative. Although *mos* can be acknowledged to have such an emphasis, it certainly has no necessary implication about inability, non-permission or uncontrollable external factors for adjectives in long-form negation.

#### 2.2.1. Distribution of the Negators

The first point distinguishing negative prefixes and syntactic negators is the distribution of the negator: allowing an(i) before a negative prefix but not before an(i). There are three negative prefixes that can be attached to certain predicates. They are *pul-* (and its variant *pu-* before a coronal stop or affricate), *pi-* and *mi-*.<sup>7</sup> Those prefixes and some of the resulting predicates are illustrated below.

(6)	Ne	Negative prefixes in Korean						
	a.	pul-A	b.	pi-A				
		pul-kanungha- 'impossible'		pi-kyoywukcek-i- 'uneducational'				
		pul-chincelha- 'unkind'		pi-kwahakcek-i- 'unscientific'				
		pul-myenghwakha 'indistinct'		pi-sinsacek-i- 'ungentlemanly'				
	a'.	<i>pu</i> -A (before a coronal stop/affricate)	c.	mi-A 'yet'				
		pu-cekhapha- 'incongruous'		mi-wanseng-i/toy- 'incomplete'				
		pu-totekha- 'immoral'		mi-kakong-i/toy- 'unprocessed'				
		pu-cayensurep- 'unnatural'		mi-kanhayng-i/toy- 'unpublished'				

The two prefixes pu(l)- and pi- are very similar to the prefixes un- and in- in English in their meanings. Basically, they mean the opposite state of the stem adjectives. The last prefix mi- has an additional meaning 'yet'. Prefixing mi- 'yet' to a predicate root wanseng 'complete' means 'incomplete (yet)', implying that it might be completed in the time to come.

There is a restriction on the occurrence of the negative prefixes before a predicate in that a predicate can have only one of these prefixes (or, a negative prefix cannot be attached before another negative prefix). Hence forms like \**pi-pul-*, \**pul-mi-*, \**mi-pi-* which have more than one

<sup>&</sup>lt;sup>7</sup>All of these negative prefixes, along with the predicates to which the prefixes can be attached, are Sino-Korean, i.e., of Chinese origin. They are similar to the prefixes *in*- and *dis*-, and their bases in English. These prefixes (unlike the productive *un*-) have a restriction on the base. They can be prefixed only to a Latin or Romance base, and the prefixes themselves are of Latinate/Romance origin (Marchand 1969: 158, 168). The negative prefixes in Korean are Sino-Korean and so are their bases. Historically, the forms that already had these prefixes were borrowed, but there are also many derived words by adding one of these prefixes afterwards. Still, the bases are all of Chinese origin.

negative prefix are ungrammatical.

However, the negator an(i) is not subject to this constraint. A predicate with a negative

prefix *pul*- (or *pi*- or *mi*-) can have the negator *an(i)* before it, as in (b) sentences of (7) to (9).

- (7) a. con-un *pul*-sengsilha-ta. John-TOP in-sincere-DECL 'John is insincere.'
  - b. con-un **an(i)** *pul*-sengsilha-ta. John-TOP NEG in-sincere-DECL 'John is not insincere.'
- (8) a. i an-un *pul*-kanungha-y-ess-ta. this plan-TOP im-possible-EG-PAST-DECL 'This plan was impossible.'
  - b. i an-un **an(i)** *pul*-kanungha-y-ess-ta. this plan-TOP NEG im-possible-EG-PAST-DECL 'This plan was not impossible.'
- (9) a. ku noli-nun *pul*-kencenha-ta. the/that game-TOP un-sound-DECL 'That game is unsound.'
  - b. ku noli-nun **an(i)** *pul*-kencenha-ta. the/that game-TOP NEG un-sound-DECL 'That game is not unsound.'

The possibility of placing an(i) before a predicate with a negative prefix is contrasted to the impossibility of stacking up of an(i):

(10)	a.	*con-un <b>an(i) an(i)</b> sengsilha-ta.	(cf. (7)b)
		John-TOP NEG NEG sincere-DECL	
	b.	*i an-un <b>an(i) an(i)</b> kanungha-y-ess-ta.	(cf. (8)b)
		this plan-TOP NEG NEG possible-EG-PAST-DECL	
	c.	*ku noli-nun <b>an(i) an(i)</b> kencenha-ta.	(cf. (9)b)
		the/that game-TOP NEG NEG sound-DECL	

The above fact shows that when selection is not at issue, stems bearing a negative prefix can be negated with an(i), but stems already negated with an(i) may not be so negated.

Note that the choice of a lexical prefix is dependent on the predicate stem. Replacing the prefix in each example of (6) results in ungrammatical forms:
(11)	pul-kanungha-	'impossible'	*pi-kanungha-	*mi-kanungha-
	pu-cayensurep-	'unnatural'	*pi-cayensurep-	*mi-cayensurep-
	pi-kyoywukcek-i-	'uneducational'	*pul-kyoywukcek-i-	*mi-kyoywukcek-i-
	mi-wanseng-i/toy-	'incomplete'	*pul-wanseng-i/toy-	*pi-wanseng-i/toy-

Hence, the impossibility of having more than one prefix in each stem may be explained by this selectional restriction. The incompatible prefix would rule out the resulting form regardless of the number of such negative prefixes. However, even if this selectional restriction independently explains the ungrammaticality of stacking two or more negative prefixes, an(i) is still different from those prefixes. This negator can occur before any predicate: It does not exhibit any selectional restriction like those prefixes and can be placed before a stem with a negative prefix.

Stacking the other negator mos is also ungrammatical (\*mos mos V), and so are the combinations of the two negators in a row before a predicate in a single clause: \*mos an(i) V and \*an(i) mos V. The last sequence (an(i) mos) is marginally allowed when the an(i) negator negates mos, not the predicate, and is typically used in the first clause of a sentence with two paired clauses, of which the second clause contains an(i) V (meaning "not cannot, but do not"). In this case of contrasting mos in the first clause with an(i) in the second clause, these two negators are exceptionally stressed, while neither of them is generally stressed in a sentence with only one negator.

If an(i) were a prefix like *pul*- (*pi*- and *mi*-), this would not be explained without a special stipulation on the negator an(i). On the other hand, if an(i) is not such a prefix, there will be no problem in having this negative element in addition to a negative prefix as in (7) to (9)b. This shows that an(i) is not a negative prefix.

# 2.2.2. Scope Interaction with Respect to a Quantifier

One characteristic of syntactic negation (as opposed to negative prefixes) is scope

interaction with respect to quantifiers. In the following examples, either the negator or the quantifier (a numeral quantifier as in (12) or a universal quantifier as in (13)) can take wide scope over the other.

an(i) sengsilha-ta. (12) a. sey haksayng-i three student-NOM NEG sincere-DECL 3 >Neg: 'There are three students such that they are not sincere.' Neg > 3: 'It is not the case that three students are sincere.' b. sev haksayng-i an(i) ka-ss-ta. three student-NOM NEG go-PAST-DECL 3 > Neg: 'There are three students such that they didn't go.' Neg > 3: 'It is not the case that three students went.' c. ce haksayng-i sev chinkwu-lul an(i) manna-ss-ta. that student-NOM three friend-ACC NEG meet-PAST-DECL 3 > Neg: 'There are three friends such that the student didn't meet them.' Neg > 3: 'It is not the case that the student met three friends.' (13) a. motun haksayng-i an(i) sengsilha-ta. all student-NOM NEG sincere-DECL  $\forall$  > Neg: 'No student is sincere.' Neg >  $\forall$ : 'It is not the case that all students are sincere.' b. motun haksayng-i an(i) ka-ss-ta. student-NOM NEG go-PAST-DECL all  $\forall >$ Neg: 'No student went.' Neg >  $\forall$ : 'It is not the case that all students went.' c. ce haksavng-i motun chinkwu-lul an(i) manna-ss-ta. that student-NOM all friend-ACC NEG meet-PAST-DECL  $\forall$  > Neg: 'That student met no friend.' Neg >  $\forall$ : 'It is not the case that that student met all friends.'

The same scope ambiguity is observed with the other negator mos. Because mos cannot be used

in short-form negation with an adjective, all of the examples contain a verb.

(14)	a.	sey	haksayng-i	mos	s ka-ss-ta.				
		three	student-NOM	1 NEG	go-PAST-DE	CL			
		3 > Neg: 'There are three students such that they couldn't go.'							
		Neg $> 3$ : 'It is not the case that three students could go.'							
	b.	ce	haksayng-i	sey	chinkwu-lul	mos	manna-ss-ta.		
		that	student-NOM	three	friend-ACC	NEG	meet-PAST-DECL		
		2			C 1. 1.4	1 1	. 1		

- 3 >Neg: 'There are three friends such that the student couldn't meet them.'
- Neg > 3: 'It is not the case that the student could meet three friends.'

(15) a. motun haksayng-i mos ka-ss-ta. all student-NOM NEG go-PAST-DECL ∀ > Neg: 'No student couldn't go.' Neg > ∀: 'It is not the case that all students could go.'
b. ce haksayng-i motun chinkwu-lul mos manna-ss-ta. that student-NOM all friend-ACC NEG meet-PAST-DECL ∀ > Neg: 'That student couldn't meet no friend.' Neg > ∀: 'It is not the case that that student could meet all friends.'

The second reading (Neg >  $\forall$ ) with a universal quantifier in (13) and (15) is a little marginal. When a marker -(n)un, often identified as the focus (or topic) marker, is attached to the quantified DP replacing a case marker, the relevant reading emerges more clearly. In this case, the first reading ( $\forall$  > Neg) is still available:

(16) a. motun haksayng-un **an(i)** sengsilha-ta. student-FOC NEG sincere-DECL all  $\forall > Neg:$  'No student is sincere.' Neg >  $\forall$ : 'Not all students are sincere.' b. motun haksayng-un an(i) ka-ss-ta. student-FOC NEG go-PAST-DECL all  $\forall > Neg:$  'No student went.' Neg >  $\forall$ : 'Not all students went.' motun chinkwu-nun an(i) manna-ss-ta. c. ce haksayng-i that student-NOM all friend-FOC NEG meet-PAST-DECL  $\forall$  > Neg: 'That student met no friend.' Neg >  $\forall$ : 'That student didn't meet all friends.'

Speakers who have not seen a wide-scope reading in (12) to (15) agree that this reading is available in the -(n)un focus-construction.

Some speakers note that the negation-wide reading (Neg >  $\forall$ ) is hard to get in sentences like (12) through (15). In fact, many authors claim that the scope reading in question is not available in short-form negation (Hagstrom 2000, H.-H. Park 1998, J.-H. Suh 1989, among others). On the other hand, there are also quite many authors contending that this reading is available, thus leading to ambiguity of such sentences with a quantifier and short-form negation (J. Y.-K. Baek 1998, J.-B. Kim 1999, S. C. Song 1982, among others). Noticing the judgmental disagreement, Han, Lidz and Musolino (In press) recognize two dialects regarding the availability of negation-wide scope reading and propose that the two dialects employ different grammatical mechanisms yielding the identical surface forms with a root plus affixes. Hence, for those speakers who do not have the negation-wide scope reading at all, the argument made in this section that short-form negation is syntactic based on the scope ambiguity may be irrelevant. (However, the parallelism between short-form negation and suppletive negation is still compatible with dialects with only one scope reading in the sentences above, as mentioned in footnote 16.)

However, if the reading at issue is just hard to get and not unavailable, it is still possible to utilize the relevant reading to maintain the argument. In dealing with issues of ambiguity, it is quite common that one of the two (or more) readings is much more salient in the majority of cases and the other reading is less accessible. However, it is also common that once an appropriate context is provided, it is not so difficult to obtain the relevant, "hard-to-get" reading if this reading is at all possible. For example, the -(n)un focus-construction above makes the Neg >  $\forall$  reading more accessible.

The following coordination construction  $[QP_1 \dots Neg V-ko, \dots QP_2-man V-\dots]$  with two different quantifiers clearly shows that the first clause has the Neg >  $\forall$  reading.

- (17) a. motun haksayng-i an(i) ka-ko, ilpu haksayng-man/-i ka-ss-ta.
  all student-NOM NEG go-and part student-only/-NOM go-PAST-DECL
  'Not all students went, but (only) some students went.'
  - b. *sey* haksayng-i **an(i)** ka-ko, *twu* haksayng-man/-i ka-ss-ta. three student-NOM NEG go-and two student-only/-NOM go-PAST-DECL 'Not three students went, but (only) two students went.'

In the first clause of each sentence above, the negation is to be forced to take wide scope over the negation. On the other hand, the other reading is not available in (17), because it is contradictory to the subsequent conjunct of the sentence coordinated by -ko 'and'.

Further, if another quantifier ta 'all, both' is used instead of (or in addition to) motun as

below, the relevant reading becomes more salient.

- (18) a. (*motun*) haksayng-i ta **an(i)** ka-ko, *ilpu* haksayng-man/-i ka-ss-ta. all student-NOM all NEG go-and part student-only/-NOM go-PAST-DECL 'Not all students went, but (only) some students went.'
  - b. sey haksayng-i ta an(i) ka-ko, twu haksayng-man/-i ka-ss-ta. three student-NOM all NEG go-and two student-only/-NOM go-PAST-DECL 'Not three students went, but (only) two students went.'

Unlike *motun* which modifies the DP before the quantified DP, the quantifier *ta* follows the quantified DP, and acts more like an adverb. In this case, the relevant reading emerges without any difficulty. Of course, this adverb quantifier *ta* interacts with negation in that it can take wide scope over negation in non-coordinated clauses as in (19).

(19)	a.	(motun) haksayng-i ta <b>an(i)</b> ka-ss-ta.
		all student-NOM all NEG go-PAST-DECL
		$\forall > Neg:$ 'No students went.'
		Neg > $\forall$ : 'It is not the case that all students went.'
	b.	sey haksayng-i <i>ta</i> <b>an(i)</b> ka-ss-ta.
		three student-NOM all NEG go-PAST-DECL
		$\forall$ > Neg: 'There are three students such that they didn't go.'
		Neg > $\forall$ : 'It is not the case that three students went.'

The quantifier-wide scope reading is more salient in (19) as in the sentences without ta.

Finally, the marker -(n)un added to the adverb quantifier ta as in (20) makes the marginal

negation-wide scope reading more accessible, as expected.

(20) a. (motun) haksayng-i ta-nun an(i) ka-ss-ta. all student-NOM all-FOC NEG go-PAST-DECL ∀ > Neg; Neg > ∀
b. sey haksayng-i ta-nun an(i) ka-ss-ta. three student-NOM all-FOC NEG go-PAST-DECL ∀ > Neg; Neg > ∀

In fact, the quantifier-wide scope ( $\forall > Neg$ ) reading is hard to get in (20) with both *ta* and *-(n)un*.

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There is a subtle difference to a certain degree between the pre-DP quantifier *motun* and the post-DP quantifier *ta* in allowing the potentially hard-to-get Neg  $> \forall$  reading. One might study the nature of *motun* and *ta* regarding what causes the subtle difference between them with respect to the quantifier-negation scope ambiguity.

The role and the function of the marker *-nun*, the quantifier *ta*, and the combination of them (i.e., *ta-nun*) are beyond the scope of this study. The important point is that the negators an(i) and *mos* do exhibit scope interaction with a quantifier and that it evidences the syntactic view on short-form negation. I will return to this issue of availability of two readings in section 3, where I discuss the same scope ambiguity with suppletive negation.

In (13), the  $\forall > \text{Neg}$  reading is a special case of the  $\text{Neg} > \forall$  reading. That is, the latter reading properly includes (or logically entails) the former reading. Hence, whenever the former reading is true, the latter is true too; but not vice versa. This fact might obscure the scope ambiguity in (13). However, the two readings are preserved under further negation. For example, the sentence in (21) is negation of the sentence (13)a.<sup>8</sup>

(21) motun haksayng-i an(i) sengsilha-n-kes-i an-i-ta. all student-NOM NEG sincere-PNM-COMP-NOM NEG-be-DECL
a. Neg > ∀ > Neg: 'It is not the case that no student is sincere.'
b. Neg > Neg > ∀: 'It is not the case that it is not the case that all students are sincere.'

Crucially, the reading (21)b, Neg > Neg >  $\forall$ , where two negators cancel each other, confirms that the Neg >  $\forall$  reading is available in (13).

(i.e., 'All students are sincere.')

This ambiguity resulting from the scope interactions with a negation and a quantifier does

<sup>&</sup>lt;sup>8</sup> The ending -n after the adjective *sengsilha*- 'sincere' is the prenominal modifier, as briefly mentioned in section 5.4, which is used before a noun that the adjective modifies. The modified noun in this case is *kes*, which means 'thing' or 'one' as in *this one*, and is also used as a nominalizing complementizer as used here.

not arise with a predicate with a negative prefix. Sentences in (22)a and (22)b are the same as (12)a and (13)a, except that the predicate with the negative prefix *pul*-replaces the sequence of the negator an(i) plus predicate *sengsilha*-.

- (22) a. sev haksayng-i pul-sengsilha-ta. three student-NOM in-sincere-DECL 3 > pul-: '(The) three students are insincere.' \*pul - > 3b. motun haksayng-i/-un pul-sengsilha-ta. student-NOM/FOC in-sincere-DECL all  $\forall > pul$ -: 'All students are insincere.' \* $pul - > \forall$ haksayng-i i pul-chansengha-y-ess-ta. (23) a. sey an-ul three student-NOM this plan-ACC dis-approve-EG-PAST-DECL 3 > pul-: '(The) three students disapproved this plan.' \**pul-*>3
  - b. *motun* haksayng-i i an-ul **pul**-chansengha-y-ess-ta. all student-NOM this plan-ACC dis-approve-EG-PAST-DECL  $\forall > pul$ -: 'All students disapproved this plan.' \*pul->  $\forall$
- (24) a. ku haksayng-i sey an-ul pul-chansengha-y-ess-ta. the/that student-NOM three plan-ACC dis-approve-EG-PAST-DECL 3 > pul-: 'That student disapproved three plans.' \*pul- > 3
  - b. ku haksayng-i *motun* an-ul **pul**-chansengha-y-ess-ta.
    the/that student-NOM all plan-ACC dis-approve-EG-PAST-DECL 3 > *pul*-: 'That student disapproved all plans.'
    \**pul*-> 3

The negative ingredient of the negative prefix pul- does not behave like a negative operator: it never takes wide scope over the quantifier. This is a clear indication that an(i) is not a negative prefix and is a syntactic negation.

# 2.2.3. Licensing of Negative Polarity Items

Another piece of evidence comes from the distribution (and licensing) of negative polarity items. One typical and representative environment licensing a negative polarity item is a negative clause, which contains a syntactic negation element. The responsible negation elements are those negators an(i) and mos in short-form negation (as well as in long-form negation) in Korean.

Consider the following pairs of sentences:

- (25) a. \*con-un *cenhye* sengsilha-ta. John-TOP at all (NPI) sincere-DECL (\*'John is sincere at all.')
  - b. con-un *cenhye* **an(i)** sengsilha-ta. John-TOP at all (NPI) NEG sincere-DECL 'John is not sincere at all.'
- (26) a. \**amu-to* sengsilha-ta. any-NPI sincere-DECL (\*'Anybody is sincere.')
  - b. *amu-to* **an(i)** sengsilha-ta. any-NPI NEG sincere-DECL 'Nobody is sincere.'
- (27) a. \*na-nun *amu-to* manna-ss-ta. I-TOP any-NPI meet-PAST-DECL (\*'I met anybody.')
  - b. na-nun *amu-to* **an(i)** manna-ss-ta. I-TOP any-NPI NEG meet-PAST-DECL 'I didn't meet anybody.'
  - c. na-nun *amu-to* **mos** manna-ss-ta. I-TOP any-NPI NEG meet-PAST-DECL 'I couldn't meet anybody.'
- (28) a. \**amu-to* na-lul manna-ss-ta. any-NPI I-ACC meet-PAST-DECL (\*'Anybody met me.')
  - b. *amu-to* na-lul **an(i)** manna-ss-ta. any-NPI I-ACC NEG meet-PAST-DECL 'Nobody met me.'
  - c. *amu-to* na-lul **mos** manna-ss-ta. any-NPI I-ACC NEG meet-PAST-DECL 'Nobody was able to meet me.'

In the (a) sentences above, the negative polarity items *cenhye* 'at all' and *amu-to* 'anybody' appear without the negator, which results in ungrammaticality. In the (b,c) sentences, these negative polarity items are licensed by the negator an(i) or mos.

As indicated by many authors (e.g., J. Choi 1998, D. Chung and C. Lee 1997, D. Chung and H.-K. Park 1997, C. Lee, D. Chung and S. Nam 2000, S. Nam 1997, 1998, K.-W. Sohn 1995, among others), there seem to be more environments licensing a negative polarity item in Korean. For example, predicates with a negative meaning like *silh(-e ha)-* 'dislike' are claimed to license a negative polarity item in the predicate's embedded clause. This is similar to how verbs like *doubt* and *deny* in English license a negative polarity item such as *any* in their embedded clause.

(29) a. (?)na-nun *amu-to* manna-ki *silh-ta*. I-TOP any-NPI meet-NMLZ dislike-DECL
'I dislike to meet anybody.'
b. ??eysute-nun *amu-to* manna-ki(-lul) *silh-e ha-n-ta*. Esther-TOP any-NPI meet-NMLZ-ACC dislike-INF do-PRES-DECL
'Esther dislikes to meet anybody.'

While some native speakers do not accept the sentence fully, it is not completely impossible for the sentences in (29) with the embedded clause of the predicate *silh(-e ha)-* to contain a negative polarity item *amu-to*. These speakers and I find that replacing *amu-to* with *nwukwu-to* 'somebody/who-even' makes the sentence perfectly natural and much more appropriate.

Also, like the conjunction *before* in English, the corresponding conjunction complex in Korean *-ki cen-ey* 'before' is claimed by some authors (J. Choi 1998, D. Chung and C. Lee 1997, C. Lee, D. Chung and S. Nam 2000, S. Nam 1997, 1998) to license a negative polarity item like *amu-to* as follows:

(30) a. (?)*amu-to* pap-ul mek-ki cen-ey any-NPI rice-ACC eat-NMLZ before-TEMP yenghi-ka puekh-ulo ka-ss-ta. Younghee-NOM kitchen-ILLA go-PAST-DECL 'Younghee went to the kitchen before anybody ate rice.' b. (?)chelswu-ka amu kes-to mek-ki cen-ey Chulsoo-NOM any thing-NPI eat-NMLZ before-TEMP yenghi-ka puekh-ulo ka-ss-ta. Younghee-NOM kitchen-ILLA go-PAST-DECL 'Younghee went to the kitchen before Chulsoo ate anything.'

Again, the negative polarity item *amu-to* is not perfectly acceptable in a *-ki cen-ey* clause, but replacing *amu-to* with *nwukwu-to* makes the sentence natural. The indefinite pronoun *nwukwu* is

not necessarily a negative polarity item. The particle -to in nwukwu-to is a degree marker meaning 'even' in a non-embedded affirmative sentence.

C. Lee, D. Chung and S. Nam (2000) present an exhaustive list of the environments for *amu-to*: the so-called inherently negative predicates such as *silh(-e ha)-* 'dislike', the clause of the complex conjunction *-ki cen-ey* 'before', negative clauses, and *molu-/eps-.* Their survey indicates that except for the suppletive negative predicates (*molu-* 'not.know' and *eps-* 'not.exist') which are discussed extensively in section 3, negation with an(i) (and *mos*) is the only context for *amu-to* (and *cenhye* 'at all') in a non-embedded environment (e.g., root clause). Therefore, even though negative polarity items could be licensed in other situations, syntactic negation (with an(i) or *mos*) is the only licensor in a non-embedded clause. Hence, the discussion regarding negative polarity items is restricted to non-embedded clauses and syntactic negation. The capacity of *molu-* and *eps-* to license negative polarity items is discussed in section 3, and these lexically (or rather suppletively) negated predicates are shown to exhibit identical properties syntactically and semantically.

Note that a negative polarity item can appear in the subject position as shown in (28)b,c, as well as in the object position (as in (27)b,c) and in the adjunct position (as in (25)b). Section 2.3 takes this fact into consideration and provides the clause structure and the derivation.

The crucial point is that predicates with negative prefixes cannot license a negative polarity item. Compare the following with sentences in (25) through (28).

- (31) a. \*con-un *cenhye* pi-sinsaceki-ta. John-TOP at all (NPI) un-gentlemanly-DECL (\*'John is ungentlemanly at all.')
  b. \**amu-to* pi-sinsaceki-ta.
  - any-NPI un-gentlemanly-DECL (\*'Anybody is ungentlemanly.')
- (32) a. \*con-un *cenhye* **pul**-sengsilha-ta. John-TOP at all (NPI) in-sincere-DECL (\*'John is insincere at all.')

- b. \**amu-to* **pul**-sengsilha-ta. any-NPI in-sincere-DECL (\*'Anybody is insincere.')
- (33) a. \**amu-to* i pep-ey **pul**-pokcongha-y-ess-ta. any-NPI this law-DAT dis-obey-EG-PAST-DECL (\*'Anybody disobeyed this law.')
  - b. \*con-un *amu* pep-(ey)-*to* **pul**-pokcongha-y-ess-ta. John-TOP any law-DAT-NPI dis-obey-EG-PAST-DECL (\*'John disobeyed any law.')

The negative prefix pi- is attached to the adjective *sinsaceki*- in (31), and *pul*- to the adjective *sengsilha*- in (32) to the verb *pokcongha*- in (33). But they do not license a negative polarity item as these sentences are ungrammatical. If an(i) were a prefix like *pul*- and *pi*-, it should not be able to license a negative polarity item. This contrast between an(i) and negative prefixes is another indication that an(i) is not a prefix and that it is a syntactic negator which licenses a negative polarity item.

There is another syntactic phenomenon with regard to the negative polarity items, supporting the syntactic status of the negator an(i). Linebarger (1987) notes that a negative polarity item needs a local licensor. Specifically, a (universal) quantifier cannot intervene between a negative polarity item and its licensor, the negation operator. First consider the following sentence, where negation operator takes wide scope over the universal quantifier *every*.

(34) John didn't give money to every charity.
 Neg > ∀: 'It wasn't every charity that John gave money to.'

Now consider the following sentence, which has a negative polarity item in the direct object:

- (35) John didn't give any money to every charity.
  - a. Neg >  $\exists$  >  $\forall$ : 'There is no money that John gave to every charity.'
  - b. \*Neg >  $\forall$  >  $\exists$ : 'It wasn't every charity that John gave any money to.'

This sentence with a negative polarity item has (35)a as its reading, but not (35)b. In (35)b, the negative polarity item is not in the immediate scope of the negation operator, with the universal

quantifier every intervening between them.

The same pattern is observed in Korean. The following sentences with and without a negative polarity item are comparable to (34) and (35), respectively.

(36) con-un motun tanchey-ey(-nun) kipukum-ul **an(i)** nay-ss-ta. John-TOP all organization-DAT(-TOP/FOC) donation-ACC NEG pay-PAST-DECL Neg  $> \forall$ : 'It wasn't all (charity) organizations that John gave donations to.'

(37) con-un motun tanchey-ey(-nun) amu kipukum-to an(i) nay-ss-ta.
John-TOP all organization-DAT(-TOP/FOC) any donation-NPI NEG pay-PAST-DECL
a. Neg > ∃ > ∀: 'There is no donation that John gave to all organizations.'
b. \*Neg > ∀ > ∃: 'It wasn't all organizations that John gave any donation to.'

Just like *any* in English, the negative polarity item *amu* ... to 'any ... NPI marker' needs a local licensor, without an intervening quantifier like *motun* 'all'. The local licensor is the negator an(i), which further supports its status as syntactic negation.

Unlike English, the universal quantifier can take wide scope over negation and the negative polarity item:  $\forall > \text{Neg}$  in (36) and  $\forall > \text{Neg} > \exists$  in (37). It is so because a universal quantifier interacts with negation in terms of their scope as discussed in section 2.2.2. However, this scope ambiguity between the universal quantifier and negation has nothing to do with the present discussion. In either of the two interpretations,  $\forall > \text{Neg} > \exists$  and  $\text{Neg} > \exists > \forall$ , the negative polarity item (i.e., the existential quantifier) is in the immediate scope of negation, which is further support for Linebarger's observation.

Beck and Kim's (1997) intervention effect between a negative polarity item (and hence negation) and a *wh*-phrase also supports the view that short-form negation is syntactic. Beck and Kim observe that a *wh*-phrase must not be c-commanded by a negative polarity item (and hence by negation, because a negative polarity item is in the c-command domain of negation) at S-structure. In other words, an intervening negative polarity item licensed by negation blocks LF *wh*-movement. Beck and Kim discuss *wh*-questions with negation in German and *wh*-questions

with the long-form negation cases in Korean, but the same effect holds for short-form negation.

Compare the following sentences:

- (38) a. *nwu*-ka *amu-to* **an(i)** manna-ss-ni? who-NOM any-NPI NEG meet-PAST-INTER 'Who met nobody?'
  - b. \**amu-to nwukwu*-lul **an(i)** manna-ss-ni? any-NPI who-ACC NEG meet-PAST-INTER (\*'Who didn't anybody meet?')
  - c. *nwukwu*-lul *amu-to* **an(i)** manna-ss-ni? who-ACC any-NPI NEG meet-PAST-INTER 'Who didn't anybody meet?'

It is crucial that the *wh*-phrase moves to the front (i.e., to a higher position than negative polarity item and negation) overtly as in (38)c. If the *wh*-phrase remained in-situ at S-structure, it should move to the Spec-CP position covertly. But this LF movement is blocked because of the intervening negative polarity item (and negation).<sup>9</sup>

If there is no negative polarity item, no obligatory overt wh-movement is required even

<sup>9</sup>It is often observed that (38)b is better than the following sentence where there is no negation at all.

(i) \*\**amu-to nwukwu*-lul manna-ss-ni? any-NPI who-ACC meet-PAST-INTER

The reason (i) sounds worse seems to be that there is a negative polarity item without a licensor like negation, in addition to the fact that the negative polarity item precedes (i.e., is structurally higher than) a wh-phrase.

The sentence (38)b is arguably marginally acceptable in a discourse such as the following.

(ii) A: \*?*amu-to nwukwu-*lul an(i) manna-ss-ni? (= (38)b)
B: *amu-to* caki citokyoswu-lul an(i) manna-ss-ta. any-NPI self advisor-ACC NEG meet-PAST-DECL 'Nobody met his/her advisor.'

In fact, the sentence (38)b = (iiA) sounds better when an answer like (iiB) is considered together. Particularly, if one goes back to (iiA) after having heard (iiB), the sentence becomes even better.

However, the sentence (38)b still sounds odd and is not completely acceptable. Further, it is still remarkably degraded compared to both (38)a and (38)c. Once the contrast between (38)a,c and (38)b is taken into consideration, the present argument does not encounter a problem.

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when a clause is involved in an(i) negation. Hence, the sentence (39)a corresponding to (38)b in terms of surface order is perfectly grammatical, where the object *wh*-phrase remains in-situ and is to move covertly.

- (39) a. *nwu*-ka con-ul **an(i)** manna-ss-ni? who-NOM John-ACC NEG meet-PAST-INTER 'Who didn't meet John?'
  - b. con-i *nwukwu*-lul **an(i)** manna-ss-ni? John-NOM who-ACC NEG meet-PAST-INTER 'Who didn't John meet?'
  - c. *nwukwu*-lul con-i **an(i)** manna-ss-ni? who-ACC John-NOM NEG meet-PAST-INTER 'Who didn't John meet?'

In (39)b, the object *wh*-phrase remains in-situ and is to move covertly crossing the subject, which is blocked by the negative polarity item subject in (38)b. Again, the presence of a negative polarity item is crucial, because a negative polarity item is licensed by syntactic negation.

The same LF movement is possible in the following sentences without negation but with a negative prefix attached to the predicate:

- (40) a. nwu-ka con-eykey pul-pokcongha-y-ess-ni?
   who-NOM John-DAT dis-obey-EG-PAST-INTER
   'Who disobeyed John?'
  - b. con-i *mues-ey* **pul**-chansengha-y-ess-ni? John-NOM what-DAT dis-approve-EG-PAST-INTER 'What did John disapprove?'
  - c. *mues*-ey con-i **pul**-chansengha-y-ess-ni? what-DAT John-NOM dis-approve-EG-PAST-INTER 'What did John disapprove?'

The contrast within (38) and between (38) and (40) regarding the possibility of LF wh-movement shows that an(i) is syntactic negation licensing a negative polarity item also in short-form

negation, unlike negative prefixes such as pul-, pi- and mi-.<sup>10</sup>

From the above discussions, I conclude that the short-form negation is a syntactic construction, rather than a prefix attachment. Next section presents the phrase structure and syntactic derivation of negative clauses.

### 2.3. Phrase Structure and Syntactic Derivation of Short-Form Negation

Based on the above discussions of the distribution of negators, licensing of negative polarity items and negation-quantifier scope interactions along with some other grammatical aspects, this section considers the structure of negative clauses and the syntactic derivation.

Following D.-H. An (2003), Hagstrom (1995, 1996, 2000) and Han, Lidz and Musolino (In press), I assume that argument DPs overtly move out of VP from their base-positions. These authors point out that the VP adverb, *cal* 'well, often', can appear only immediately before the verb intervening between the verb and its complement object DP.

(41) (\*cal) con-un (\*cal) sayngsenhoy-lul (cal) mek-ess-ta. John-TOP raw.fish-ACC well/often eat-PAST-DECL 'John ate raw fish well/often.'

Other adverbs showing the same distribution as *cal* are *tel* 'incompletely', *te* 'more, further', *ta* 'all, completely', and *com* 'a little'.

<sup>&</sup>lt;sup>10</sup>It might be argued that the sentences in (40) cannot be directly compared with those in (38) in terms of negative polarity items, because they do not (and cannot) contain a negative polarity item. It is exactly the point that the current discussion tries to bring up. Sentences in (40) do not contain a negative polarity item, and for this reason there is no intervention effect. The intervention effect of *wh*-phrases is relevant only to negative polarity items, which are licensed by syntactic negation, and not by a negative prefix. The presence in (38) vs. absence in (40) of a negative polarity item and the intervention effect shows that short-form negation is syntactic and different from negative prefixes.

(42) a. (\*tel) con-un (\*tel) sayngsenhoy-lul (tel) mek-ess-ta. John-TOP raw.fish-ACC incompletely eat-PAST-DECL
'John didn't finish the raw fish.' (lit. 'John ate raw fish incompletely.')
b. (\*te) con-un (\*te) swukcey-lul (te) ha-y-ess-ta. John-TOP assignment-ACC more do-EG-PAST-DECL
'John did his homework more.'

Since these adverbs are considered to be generated in the VP-adjoined position and they cannot appear before the argument DP(s) at PF, the subject and the object must move out of VP overtly.<sup>11</sup>

These adverbs stand in contrast to other adverbs like *cacwu* 'frequently', which can be placed in the starred positions in (41) and (42), as in the following:

(43) (cacwu) con-un (cacwu) sayngsenhoy-lul (cacwu) mek-nun-ta. John-TOP raw.fish-ACC frequently eat-PRES-DECL 'John eats raw fish frequently.'

The distribution of *cal* and similar adverbs suggests that the argument DPs move out of VP overtly to higher positions, including the subject DP.

There is one thing that should be appreciated. It has been established from the discussions in section 2.2 that short-form negation with an(i) is a syntactic negation construction and that an(i) is the morphophonological realization of the syntactic negation feature. Assuming this standpoint, an adverb *cal* cannot be adjoined to, for example, V. If it were, an ungrammatical

<sup>&</sup>lt;sup>11</sup>Observing that PPs as well as DPs precede *cal* (or other similar adverbs such as *tel* 'less' and *com* 'a litte' with the same distribution), a question can be raised regarding what forces the PP movement. If it is assumed that *cal* is VP-adjoined, and DPs and PPs are generated inside the VP projection, those PPs and DPs must move out of VP overtly so that both DPs and PPs precede *cal* at PF. The question is what the motivation of the PP movement while DPs move for a case requirement.

One way is to assume that the PPs are generated outside VP. These PPs are considered to lack not only case properties but also argumenthood. They do not have predicate-oriented argumenthood, and thus it is more reasonable to base-generate them outside the VP projection. Then, they are not involved in a movement issue with respect to an adverb like *cal*. Another possible, independent way is that *cal* is adjoined to the right-hand side of VP. Then, the correct relative order between DPs and PPs on the one hand and the adverb at issue on the other hand is obtained even without moving those DPs and PPs. If this is indeed the case, the verb should definitely move out of its base position overtly to linearly follow the adverb. These two treatments are compatible with each other.

sequence like \*an(i) cal mek- would be induced after the movement of the V node which includes the adjoined adverb cal. Therefore adjoining an adverb at issue to VP (or V' at the lowest) gains further support. Having the adverb adjoined to VP (or a higher V projection than V<sup>0</sup>) and moving the V to a higher head position in a short-form negation clause yield the correct cal an(i) mek- sequence. (I thank Jeong-shik Lee for pointing out this matter to me.)

This study assumes the following phrase structure for clauses in Korean.<sup>12</sup>



Not all the functional categories are present in all instances of clause structure. For example, Neg is present only in a syntactically negated clause.

<sup>&</sup>lt;sup>12</sup>There have been some proposals of relating short-form negation to long-form negation, by either deriving one from the other or deriving them from a common underlying structure. For example, D.-H. An (2003) assumes a single identical syntactic structure for the two constructions and locate the negator before or after  $V^0$  in PF depending on the presence or absence of the Neg head's phonological content. This study puts aside issues regarding the relationship between short-form and long-form negation, and assumes the structure (44) as the base structure for short-form negation clauses.

Another optional functional category is the "little" v and its projections. I assume that they are present only in certain types of clauses. For example, causatives are one such case. Chomsky (1995), Hale and Keyser (1993), and Harley and Noyer (2000) argue that this additional functional category is related to the causative structure and the agent theta role of the verb. Korean has a morphological causative structure. It is realized as one of the causative suffixes after a certain verb, and the resulting predicate obtains an agent argument. In the above syntactic representation, the causative suffix (or the relevant feature) is generated as the v head as a separate functional category in syntax, and its specifier is for the argument with the agent theta role. However, process and state verbs do not involve an agent role or the causative construction. Hence, I assume that the v head and its projection are present in syntax, only when the relevant feature proper for this functional category, e.g., causative, is selected or the agent theta role is involved (See also Bošković 1997 and Chomsky 1995).<sup>13</sup>

In the above structure, where the subject DP and the object DP move out from their basegenerated positions, Neg needs to c-command these arguments after they have landed in their derived positions. Hence, Neg<sup>0</sup> moves to a functional head higher than  $T^0$  (i.e., to  $C^0$ ) to ensure that the Neg element c-commands a negative polarity item in the derived argument position, especially, the moved subject DP in Spec-TP.

Related to the verb stem,  $V^0$ , and the movement of it to the relevant functional heads, I assume overt head movement of the  $V^0$  up to  $C^0$  via intervening functional heads including Neg<sup>0</sup> (See D.-H. An 2003, Beck and Kim 1997, D.-I. Cho 1994 and Y.-S. Choi 1999 for overt  $V^0$ 

<sup>&</sup>lt;sup>13</sup>Harley and Noyer (2000) assume that the little v is present in all clause structures, and that a functional feature like BE and BECOME, respectively associated with state and process verbs, is inserted for this functional node (as the feature CAUSE is inserted in the cases of action verbs). In their "prix fixe" framework, however, the correlation between the verb type and the agent argument would be a mere accident: only action verbs, with CAUSE, have an agent role argument in the Spec-vP, and non-action verbs (i.e., state and process verbs), without CAUSE, never have an agent argument.

raising in Korean.). The primary reason for overt movement is that all the functional head elements are affixes in Korean. At PF, verbal elements like causative, tense and C are all affixes that follow the verbal stem ( $V^0$ ). Negators, *an(i)* and *mos*, appear before the verb stem at PF, and have not been considered as prefixes traditionally. However, as J.-B. Kim (1999), K. Park (1992) and M.-K. Park (1994) point out, the negators behave like clitics in that in a negative sentence, nothing can intervene between the negator (*an(i)* or *mos*) and the verb stem. Given that all the functional heads related to  $V^0$  are affixed (or cliticized) to  $V^0$ , I assume that  $V^0$  has undergone overt head movement from  $V^0$  via intervening functional heads (*v*, Neg, T) to C<sup>0</sup>. This overt syntax is reflected at PF.

There is support for the head movement of  $V^0$  and  $Neg^0$  to  $C^0$  from the LF side. Laka (1990) and Progovac (1992) show that licensing of polarity items is related to  $C^0$ . While discussing the licensing of polarity items (negative or nonnegative), they show that the responsible licensing element or "negative operator" is involved in the complementizer. This relationship between the licenser of negative polarity items (in our case, Neg) and the  $C^0$  can be directly established by moving Neg to C. This movement can be overt or covert. But the PF side also has a motivation for the overt head movement in Korean. In this line, I assume that the Neg head moves overtly to C along with V.

To account for the subject-object asymmetry of negative polarity item licensing in English, some kind of parametrization has to be assumed regarding the relationship between C and Neg. In English, a matrix negative declarative sentence with *not* in its base-generated position does not license a subject negative polarity item. If Neg (or the responsible feature) moves covertly to C, it would license the subject negative polarity item at LF. Hence, Neg in English would not reach C after Spell-out (i.e., S-structure), while Neg, along with V, moves to C in Korean.

Another possible way to think about the cross-linguistic difference comes from the point

that an overtly moved Neg has a different licensing domain. Thus, even if a negative polarity item does not appear normally in the subject position in English, there are cases where a negative polarity item appears legitimately in the subject position. A subject negative polarity item is possible when it is c-commanded by Neg in a higher position. Laka (1990) provides such cases as the following:

- (45) a. Negative preposing (Klima 1964) Never will *anyone* work this hard again.
  - b. *No way* colloquial negation (Laka 1990: 38) **No way** *anybody* is gonna tell me what to do.
  - c. Modal fronting with n't in southern dialects of American English (Laka 1990: 48)
     Can't anybody do that. 'Nobody can do that.' (anybody = negative polarity item)
     cf. Can anybody do that. 'Anybody can do that.' (anybody = free choice)

In all of the examples above, the negation element appears before the subject (and hence higher than the subject in the structure) at Spell-out, i.e., Neg moves overtly to the position higher than the subject. Consequently, it c-commands the subject position and licenses the negative polarity item in this position. This shows that a negative polarity item can only be licensed by Neg which is higher, whether in the base position or in the derived position, in the structure at Spell-out in English.

If the clause structure (44) is correct indeed, the possibility of uniformly having a subject negative polarity item in Korean is considered due to overt movement of Neg to a position ccommanding the subject position. As argued in section 4.2, the Neg projection is to be closer to the V projection than the T projection is. Then, the Neg head should move at least to the next higher head position than T whose specifier has the subject DP. In the structure (44), the next higher head node is  $C^0$ . (I will put the cross-linguistic issue aside and proceed with the position that all instances of Neg move overtly to C in Korean.)

The cases where the quantifiers (and numerals) take wide scope over the negation as

discussed in section 2.2.3 are to be taken care of by covert QR. I assume that the raised quantifier is adjoined to CP, thus c-commanding the Neg which is now part of the complex C. Then, the following derived structure is reached at the end of overt syntax for a negative clause with a transitive action verb, also reflecting the covert QR from the subject DP. The linear order of the functional elements affixed to the V head in the complex C is determined in PF, not in syntax, but is indicated in this representation for the expository purpose.



The derived subject position is c-commanded by Neg in the C position, and hence a negative polarity item can be licensed in this derived subject position. I assume here that the adjoined V, v, Neg, and T form a complex C, and that the Neg within this complex C c-commands what the original C node c-commands. Thus, the complex C (and Neg) c-commands TP and everything dominated by TP, including the derived subject DP in the Spec-TP position. A quantifier in the

subject position is raised covertly, and then the raised quantifier takes the wide scope over negation.<sup>14</sup>

Then, the question arises regarding distinguishing the Neg ("prefixed" to V) from the lexical negative prefixes. Especially when a clause lacks the v projection, Neg-V and prefix-V would have the same structure in the complex C at Spell-Out, unless some other affix intervenes between Neg and V. Because the two identical structures are different in terms of licensing of negative polarity items and scope interaction with a quantifier, an(i) is to have a syntactico-semantic feature that negative prefixes lack. This feature is syntactic negation, which heads the NegP.

This last point is further support for the present view that short-form negation is indeed syntactic negation. Recognizing this point, the following section relates short-form negation to suppletive negation using the same syntactic and semantic properties in these two non-long-form negation constructions. These identical properties serve the basis for the analysis of suppletive negation presented in the following section.

<sup>&</sup>lt;sup>14</sup>The scope ambiguity between a quantifier and negation does not arise in all contexts. That is, there are contexts where only one scope reading is possible due to the unavailability of QR when there is a quantifier, a negative polarity item and negation. Specifically, K.-W. Sohn (1995) reports that a quantifier preceding a negative polarity item (at surface) has a wide scope over negation while a quantifier following a negative polarity item has narrow scope under negation.

Even though the above scope reading seems to be quite rigid, it does not invalidate the quantifiernegation scope interaction. It would be the case that the otherwise general scope ambiguity, formalized as optional covert QR, is not available in certain situations. For example, the quantifier-negation scope ambiguity is acknowledged without question in English, as in *Everybody is not here yet*. However, this scope ambiguity is not found when an existential quantifier replaces a universal quantifier, as in *Somebody is not here yet*. Korean seems to have a similar situation, if not identical.

### 3. Suppletive Negation in Korean

There are a few cases where the (short-form) negation is not formed by adding the negator an(i)/mos, but by replacing the original affirmative predicate with the negative counterpart. This section describes the suppletive negative forms of two predicates: al- 'know' and *iss*- 'exist'. It shows that these suppletive forms behave like other regular short-form syntactic negation, using negative polarity item licensing, scope ambiguity and the distribution of the negators.

## 3.1. Verb Al- 'know' and its Negative Counterpart Molu- 'not.know'

Consider the following sentences, where the verb *al*- 'know' is not negated in the usual manner, but by being substituted with the negation counterpart, *molu*- 'not.know', which is a single lexical item.

(47)	a.	na-nun eysute-lul al-n-ta.
		I-TOP Esther-ACC know-PRES-DECL
		'I know Esther.'
	b.	na-nun eysute-lul <b>molu</b> -n-ta.
		I-TOP Esther-ACC not.know-PRES-DECL
		'I don't know Esther.'
	c.	*na-nun eysute-lul <b>an(i)/mos</b> al-n-ta.
		I-TOP Esther-ACC NEG know-PRES-DECL
		(*'I don't know Esther.')
(48)	a.	na-nun ku wuhwa-lul al-ass-ta.
		I-TOP the/that fable-ACC know-PAST-DECL
		'I knew the fable.'
	b.	na-nun ku wuhwa-lul <b>moll</b> -ass-ta.
		I-TOP the/that fable-ACC not.know-PAST-DECL
		'I didn't know the fable.'
	c.	*na-nun ku wuhwa-lul <b>an(i)/mos</b> al-ass-ta.
		I-TOP the/that fable-ACC NEG know-PAST-DECL
		(*'I didn't know the fable.')

Having a negator, an(i) or mos, before the verb al- does not yield corresponding negative sentences, as the ungrammatical sentences show.

One might say that the negative verb *molu*- could be considered to be the antonym of *al*-, like *khu*- 'big' vs. *cak*- 'small', or *ka*- 'go' vs. *o*- 'come'. There are several reasons against this lexical antonymy view on the relationship between *al*- and *molu*-. In the cases of lexical antonymy, it is possible to syntactically negate both predicates of each antonym pair, as in *an(i) khu*- 'not big' vs. *an(i) cak*- 'not small', and *an(i) ka*- 'not go' vs. *an(i) o*- 'not come' (and *mos ka*-'cannot go' vs. *mos o*- 'cannot come' in the cases of ability negation). However, *al*- is not negated in this way. As shown in (47) and (48) already, the result of negating *al*- is *molu*-, not \**an(i) al*- or \**mos al*-. Further, if *molu*- were a separate (syntactically unrelated) lexical entry antonymous to *al*-, its negated form with *an(i)* (or *mos*) should be expected. However, \**an(i) molu*- and \**mos molu*- are not possible sequences. Hence, the lexical antonymy approach is not correct, and *molu*cannot be a lexical antonym of *al*-.

### 3.1.1. No Syntactic Negator before Molu-

The impossibility of the sequences \*an(i) molu- and \*mos molu- are related to the constraint on the occurrence of the negator. A negative sentence with the short-form negation construction can have only one instance of either an(i) or mos, disallowing sequences like \*an(i) an(i), \*an(i) mos, \*mos an(i), and \*mos mos before a predicate. The suppletive negative verb molu- patterns as if a syntactic negator were in the clause in that neither an(i) nor mos can be placed before this verb:

(49)	a.	*na-nun	eysute-lu	l an(i)/m	os molu-n	-ta.
		I-TOP	Esther-AC	CC NEG	not.kno	w-PRES-DECL
	b.	*na-nun	ku	wuhwa-lul	an(i)/mos	moll-ass-ta.
		I-TOP	the/that	fable-ACC	NEG	not.know-PRES-DECI

If *molu*- were a lexical antonym to *al*-, the pattern in (49) would not be explained without a special stipulation for *molu*-. This stipulation is quite ad hoc, because it would not apply to

predicates with some negative meaning or with a negative prefix. For example, predicates with a negative prefix do not show this restriction on having a syntactic negator, as shown in section 2.2.1. Rather, the restriction of not having a syntactic negator before *molu*- suggests that *molu*- is a result of syntactic negation.

#### 3.1.2. Negative Polarity Items Licensed by Molu-

Negative polarity items, too, support the syntactic negation analysis of *molu*-. Consider the sentences below. The only difference between the two sentences in each pair, one negative and the other affirmative, in (50) to (52) is the predicate, *molu*- versus *al*-.

(50)	a.	na-nun	tap-ul	cenhye	moll-ass-ta.			
		I-TOP	answer-ACC	at all (NPI)	not.know-PAST-DECL			
		'I didn't l	know the answ	ver at all.'				
	b.	*na-nun	tap-ul	cenhye	al-ass-ta.			
		I-TOP	answer-ACC	at all (NPI)	know-PAST-DECL			
(51)	a.	na-nun	amu tap-to	moll-	ass-ta.			
		I-TOP	any answer	-NPI not.kı	now-PAST-DECL			
		'I didn't know any answer.'						
	b.	*na-nun	amu tap-to	al-ass	-ta.			
		I-TOP	any answei	-NPI know	-PAST-DECL			
(52)	a.	amu-to	tap-ul	moll-ass-ta	l.			
		any-NPI	answer-ACC	not.know-P	AST-DECL			
		'Nobody	knew the answ	wer.'				
	b.	*amu-to	tap-ul	al-ass-ta.				
		any-NPI	answer-ACC	know-PAST	-DECL			

There is no negator an(i) or mos in (a) sentences above. However, just like the negator an(i)/mos, and unlike negative prefixes such as *pul*-, the negative predicate *molu*- licenses a negative polarity item, while its affirmative counterpart *al*- does not. The contrast between *molu*- and *al*-, together with an(i)/mos as discussed in section 2.2.3 regarding negative polarity item licensing, suggests that *molu*- is a case of syntactic negation.

## 3.1.3. Quantifier Ambiguity with Molu-

A quantifier in a sentence with the verb *molu*- supports this verb's status of syntactic negation. Even if the following sentences lack a usual negator, they show the scope ambiguity as if there were a syntactic negator.<sup>15</sup>

(53)	a.	<i>sey</i> haksayng-i ku wuhwa-lul <b>molu</b> -n-ta.
		three student-NOM the fable-ACC not.know-PRES-DECL
		3 > Neg: 'Three students don't know the fable.'
		Neg $> 3$ : 'It is not the case that three students know the fable.'
	b.	ku haksayng-i <i>sey</i> wuhwa-lul <b>molu</b> -n-ta.
		the student-NOM three fable-ACC not.know-PRES-DECL
		3 > Neg: 'As for the three fables, the student doesn't know them.'
		Neg $> 3$ : 'It is not the case that the student knows three fables.'
(54)	a.	<i>motun</i> haksayng-i ku wuhwa-lul <b>molu</b> -n-ta.
		all student-NOM the fable-ACC not.know-PRES-DECL
		$\forall > Neg:$ 'No student knows the fable.'
		Neg $> \forall$ : 'Not all students know the fable.'
	b.	ku haksayng-i <i>motun</i> wuhwa-lul <b>molu</b> -n-ta.
		the student-NOM all fable-ACC not.know-PRES-DECL
		$\forall > Neg$ : 'The student knows no fable.'

Neg  $> \forall$ : 'The student doesn't know all the fables.'

That is, the scope of the quantifier in the subject or object position can be wider or narrower than what is considered to be syntactic negation associated with *molu*-. This scope ambiguity is unique to syntactic negation and has nothing to do with negative prefixes like *pul*- and *pi*-, or semantically negative predicates.

As discussed in section 2.2.2 regarding short-form negation (e.g., (12) to (15)), the Neg  $> \forall$  reading might not be immediately accessible in (53) and (54) with *molu*- or *eps*-. This reading is made more salient by adding the adverbial quantifier *ta* after the relevant quantified DP, replacing

<sup>&</sup>lt;sup>15</sup>It would be worth pointing out the difference between *molu*- and "inherently negative" verbs in English (e.g., *forget*) and German (*vergessen* 'forget'). These latter verbs do not allow the Neg (*forget*) >  $\forall$  reading with their direct object (See related discussions in Bobaljik and Wurmbrand 2005.). It is argued in section 4.2 that the reason *molu*- allows the Neg >  $\forall$  reading is that this verb includes the syntactic negation feature which is normally realized in the independent negators, *an(i)* and *mos*.

the case marker of the QP with the focus marker -(n)un, and adding *ta-nun* (combining the two devices) as in short-form negation clauses. The role of the focus marker and the quantifier *ta* regarding the scope ambiguity is consistent across the normal short-form negation constructions and the *molu*- sentences. This consistency is further support for identifying the suppletive negative predicate with short-form negation.

The  $[QP_1 ... Neg V-ko, ... QP_2-man ... V-]$  construction also reveals the Neg > Q reading as in the following sentences. According to some speakers, these coordinated sentences are not considered (fully) acceptable:

- (55) a. *?motun* haksayng-i i sasil-ul **molu**-ko, *ilpu*-man al-n-ta. all student-NOM this fact-ACC not.know-and some-only know-PRES-DECL 'Not all students know this fact, but only some do.'
  - b. ?con-kwa meyli-ka i sasil-ul **molu**-ko, con-man al-n-ta. John-and Mary-NOM this fact-ACC not.know-and John-only know-PRES-DECL 'It is not the case that (both) John and Mary know this fact, but only John does.'
- (56) a. *?motun* haksayng-i ku pang-ey **eps**-ko, *ilpu*-man iss-ta. all student-NOM that room-LOC not.exist-and some-only exist-DECL 'Not all students are in the room, but only some are.'
  - b. ?con-kwa meyli-ka ku pang-ey **eps**-ko, con-man iss-ta. John-and Mary-NOM that room-LOC not.exist-and John-only exist-DECL 'It is not the case that (both) John and Mary are in the room, but only John is.'

It is true that the Q > Neg reading is much more salient, and the Neg > Q reading is a little hard to

get. However, when the first conjunct of each sentence above is combined with ta-nun, the

Neg > Q reading is detected without question.

a.	motun ha	aksayng-i	ta-nun	i	sasil-ul	molu-ko,	
	all st	udent-NOM	all-FOC	this	fact-ACC	not.know-and	
	<i>ilpu-</i> man	al <b>-</b> n-ta.					
	some-onl	y know-PRE	S-DECL				
	'Not all students know this fact, but only some do.'						
b.	con-kwa	meyli-ka	<i>ta</i> -nur	ı i	sasil-ul	molu-ko,	
	John-and	Mary-NOM	all-FO	C this	fact-AC	C not.know-and	
	con-man	al-n-ta.					
	John-only	y know-pres	S-DECL				
	'It is not	the case that	(both) J	ohn a	nd Mary	know this fact, but	only John does.'
	a. b.	<ul> <li>a. motun ha all st ilpu-man some-onl 'Not all s</li> <li>b. con-kwa John-and con-man John-only 'It is not '</li></ul>	<ul> <li>a. motun haksayng-i all student-NOM ilpu-man al-n-ta. some-only know-PRE 'Not all students know</li> <li>b. con-kwa meyli-ka John-and Mary-NOM con-man al-n-ta. John-only know-PRES 'It is not the case that</li> </ul>	<ul> <li>a. <i>motun</i> haksayng-i <i>ta</i>-nun all student-NOM all-FOC <i>ilpu</i>-man al-n-ta. some-only know-PRES-DECL 'Not all students know this faile.</li> <li>b. con-kwa meyli-ka <i>ta</i>-nur John-and Mary-NOM all-FO con-man al-n-ta. John-only know-PRES-DECL 'It is not the case that (both) J</li> </ul>	<ul> <li>a. <i>motun</i> haksayng-i <i>ta</i>-nun i all student-NOM all-FOC this <i>ilpu</i>-man al-n-ta. some-only know-PRES-DECL 'Not all students know this fact, but</li> <li>b. con-kwa meyli-ka <i>ta</i>-nun i John-and Mary-NOM all-FOC this con-man al-n-ta. John-only know-PRES-DECL 'It is not the case that (both) John a</li> </ul>	<ul> <li>a. <i>motun</i> haksayng-i <i>ta</i>-nun i sasil-ul all student-NOM all-FOC this fact-ACC <i>ilpu</i>-man al-n-ta. some-only know-PRES-DECL</li> <li>'Not all students know this fact, but only som</li> <li>b. con-kwa meyli-ka <i>ta</i>-nun i sasil-ul John-and Mary-NOM all-FOC this fact-ACC con-man al-n-ta. John-only know-PRES-DECL</li> <li>'It is not the case that (both) John and Mary I</li> </ul>	<ul> <li>a. motun haksayng-i ta-nun i sasil-ul molu-ko, all student-NOM all-FOC this fact-ACC not.know-and <i>ilpu</i>-man al-n-ta. some-only know-PRES-DECL 'Not all students know this fact, but only some do.'</li> <li>b. con-kwa meyli-ka ta-nun i sasil-ul molu-ko, John-and Mary-NOM all-FOC this fact-ACC not.know-and con-man al-n-ta. John-only know-PRES-DECL 'It is not the case that (both) John and Mary know this fact, but</li> </ul>

- (58) a. *motun* haksayng-i *ta*-nun ku pang-ey **eps**-ko, *ilpu*-man iss-ta. all student-NOM all-FOC that room-LOC not.exist-and some-only exist-DECL 'Not all students are in the room, but only some are.'
  - b. con-kwa meyli-ka *ta*-nun ku pang-ey **eps**-ko, con-man iss-ta. John-and Mary-NOM all-FOC that room-LOC not.exist-and John-only exist-DECL 'It is not the case that (both) John and Mary are in the room, but only John is.'

In fact, Neg > Q is the only available reading in the above sentences with *ta-nun*, because the other reading, Q > Neg, is logically contradictory to the second conjunct of the coordinated sentence. Whatever the role of *ta* and *-(n)un*, and the effect of combining these two devices would be, the Neg > Q reading is available and the scope ambiguity does exist in sentences with a quantifier and suppletive negation (on a par with short-form negation). The negation element interacting with a quantifier in terms of scope ambiguity is syntactic negation, and not something like negative meaning as instantiated in negative prefixes or such predicates carrying negative significance as *silh(-e ha)-* 'dislike'.

It is worthwhile to mention the consistency of the availability of the Neg > Q reading in the two types of negation across dialects. Those speakers who allow the relevant reading with short-form negation allow the same scope relationship with suppletive negation (*molu-* and *eps-*), and vice versa. On the other hand, speakers who do not see the scope ambiguity between a quantifier and short-form negation do not see the scope ambiguity between a quantifier and short-form negation do not see the scope ambiguity between a quantifier and suppletive negation, and vice versa. <sup>16</sup> Further, the emergence of the Neg > Q reading with various grammatical devices including *ta*, *-(n)un*, *ta-nun*, and the [QP<sub>1</sub> ... Neg V-*ko*, ... QP<sub>2</sub>-*man* ... V-] coordination construction supports the current proposal of identifying suppletive negation with

<sup>&</sup>lt;sup>16</sup>For the latter group of speakers, the current argument cannot be maintained conclusively in favor of the syntactic view of short-form negation and suppletive negation. However, the consistency within a given dialect regarding the availability of the Neg > Q reading across the two different types of non-long-form negation supports the view of suppletion negation as a variation of short-form negation. The unavailability of the Neg > Q reading with short-form negation and suppletive negation, if real in the relevant grammar, still supports the ultimate view advocated here, regardless of the status of short-form negation.

short-form negation. The salience of one scope reading over the other depending on the choice of grammatical device is also consistent with the two non-long-form negation constructions.

# 3.1.4. Suffixal Causative and Inadequacy of a Phonological Explanation

The long-form negation of *al*- would help us understand the form *molu*-. The long-form negation construction takes the modal negator *mos*, not the general negator *an(i)*: *al-ci mos ha*-(cf. \**al-ci an(i) ha*-). The expected short-form negation would be \**mos al*- (rather than \**an(i) al*-), which is phonologically related to the actual non-long-form negation, *molu*-, to a certain extent. Then, it might be said that *molu*- is a result of the application of some phonological rule to *mos al*-. For example, one could think of a "contraction" rule such as mos+al- /mot-al/  $\rightarrow$  *molu*- [morul], deleting the final [s] of the negator and the verb-initial [a] and adding the final vowel. But this can be easily disputed. No other verbs starting with the phonological string [al] show this change, when they are negated with *mos*:

(59)	mos + a	lv		
	stem	gloss	modal (mos) negati	on (past declarative)
	alki-	'swindle'	mos alki-ess-ta	*molukiessta
	alsul-	'spawn'	mos alsul-ess-ta	*molusulessta
	alkyet-	'cluck (for a rooster)'	mos alkyet-ess-ta	*molukyetessta
	aloy-	'tell (a superior)'	mos aloyessta	*mol(u)oyessta/*moluessta

In (59), the same phonological sequence mos+al does not change to mol(u), regardless of the segment following al in the verb stem. Since the change of mos+al to molu is restricted to the verb al- 'know' and does not happen to any other verbs starting with the same phonological string [al], this change can hardly be considered phonological.

Crucially, *al-li*- 'let know, inform', the derived causative form of *al*-, does not exhibit such a change. Hence, the derived causative form remains the same (*al-li*-), when it has the ability negator *mos* (or the negator an(i)) before it:

- (60) Causative of al- and short-form negation
  - a. al-liknow-CAUS-'let know, inform'
  - b. Short-form ability negation (with mos)
    con-i yenghi-eykey ku sasil-ul mos al-li-ess-ta (\*mol(u)liessta)
    John-NOM Younghee-DAT the fact-ACC NEG know-CAUS-PAST-DECL
    'John couldn't inform Younghee of the fact.'
  - c. Short-form general negation (with an(i))
    con-i yenghi-eykey ku sasil-ul an(i) al-li-ess-ta (\*mol(u)liessta)
    John-NOM Younghee-DAT the fact-ACC NEG know-CAUS-PAST-DECL
    'John didn't inform Younghee of the fact.'

If a phonological process from mos+al- to molu- were posited (even with a certain (morpho)phonological restriction so that it refers to the verb al- with the semantics of [KNOW] only), it would remain mysterious that the same morphophonological input sequence does not change to *molu*- in the case of the causative. This is especially so, because the additional causative suffix appears after the stem and hence would not interfere with the sequence mos+al-with a prefix.

Unless a special morphophonological process restricted only to *mos* plus the verb *al*-'know' (and not the derived suffixal causative *al-li*- or other verbs beginning with the phonological sequence *al*) is posited, *molu*- could not be derived from *mos al*- phonologically. Hence, *molu*- is better to be treated as a single vocabulary entry exhibiting the properties of syntactic negation along with the lexical meaning of *al*-, that is, the suppletive negative form of *al*- (for short-form negation). Then a possibility to phonologically "derive" *molu*- from *mos*+*al*would be to locate this process in the lexicon prior to syntax. I will turn to this matter in section 4.1, and point out problems related to this lexical view. Before moving on, another predicate pair is in order.

### 3.2. Iss- 'exist' vs. Eps- 'not.exist'

The second pair of predicates that behaves in the same fashion as the pair *al*- and *molu*- is *iss*- 'exist, be present' and *eps*- 'not exist, not be present'. As in the (c) sentences below, the result of negation of *iss*- is *eps*-, not \*an(i) *iss*- or \*mos *iss*-.

- (61) a. thuroi mokma-nun iss-ess-ta. Troy wooden.horse-TOP exist-PAST-DECL 'The Trojan Horse existed.' b. \*thuroi mokma-nun an(i)/mos iss-ess-ta. Troy wooden.horse-TOP NEG exist-PAST-DECL ('The Trojan Horse didn't exist.') c. thuroi mokma-nun eps-ess-ta. Troy wooden.horse-TOP not.exist-PAST-DECL 'The Trojan Horse didn't exist.' (62) a. cha-ka pakk-ey iss-ta. car-NOM outside-LOC exist-DECL 'The car is outside.' b. \*cha-ka pakk-ey an(i)/mos iss-ta. car-NOM outside-LOC NEG exist-DECL ('The car is not outside.')
  - c. cha-ka pakk-ey **eps-ta**. car-NOM outside-LOC not.exist-DECL 'The car is not outside.'

Again, this unexpected negation is observed in the short-form negation. The long-form negation shows the usual pattern:<sup>17</sup>

- (63) a. thuroi mokma-nun iss-ci an(i) ha-y-ess-ta.
   Troy wooden.horse-TOP exist-CI NEG do-EG-PAST-DECL
   'The Trojan Horse didn't exist.'
  - b. cha-ka pakk-ey iss-ci **an(i)** ha-ta. car-NOM outside-LOC exist-CI NEG do-PAST-DECL 'The car is not outside.'

The suppletive short-form negation, eps-, shows the same syntactic behaviors as the syntactic

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<sup>&</sup>lt;sup>17</sup>When the modal negator *mos* is used in the long-form negation construction with *iss*-, the subject should be animate or personified. See the discussion in section 3.2.4.

negators (an(i) and mos).

# 3.2.1. No Negator before Eps-

First, a syntactic negator cannot be placed before eps-. Hence, neither an(i) nor mos can appear before this suppletive negative eps-, as the following ungrammatical sentences show:

(64)	a.	*thuroi mokma-nun	an(i)/mos	s eps-ess-ta.
		Troy wooden.horse-TO	P NEG	not.exist-PAST-DECL
	b.	*cha-ka pakk-ey	an(i)/mos	eps-ta.
		car-NOM outside-LOC	NEG	not.exist-DECL

This constraint is the same as *molu*- as well as usual short-form negation with an(i) or *mos*, and this fact supports identifying *eps*- as (a variation of) short-form negation.<sup>18</sup>

# 3.2.2. Negative Polarity Items with Eps-

Second, negative polarity items are licensed by virtue of the verb *eps*-, which is a characteristic of syntactic negation.

- (65) a. mul-i *cenhye* eps-ta. water-NOM at all not.exist-DECL 'There is no water at all.'
  - b. \*mul-i *cenhye* iss-ta. water-NOM at all exist-DECL
- (66) a. *amu-to* **eps**-ta. any body-NPI not.exist-DECL 'There is nobody.'
  - b. \**amu-to* iss-ta. any body-NPI exist-DECL

<sup>&</sup>lt;sup>18</sup>The long-form negation of *iss*- is possible with either an(i) or mos. In the latter case, i.e., *iss-ci mos* ha-, the same characteristics of long-form negation for adjectives are found, as discussed in section 2.1. and footnote 6.

In (a) sentences above, a syntactic negator *an(i)* or *mos* is not present, but the negative polarity items, *cenhye* and *amu-to*, appear in a sentence containing the negative predicate *eps*-.

D. Chung and H.-K. Park (1997) discuss "negative polarity items outside of negation scope" such as *kyelkho* and *celtay(lo)* "definitely, absolutely". The distribution of these negative polarity items is that they need to appear in a negative clause (short-form or long-form). However, because they mean "absolutely not" with an(i) or mos, and not "not absolutely", they appear outside the negation scope. This kind of unexpected negative polarity items could be considered as taking negation (something like binding negation) rather than as licensed by negation.<sup>19</sup> Whatever the analysis might be, the suppletive negation satisfy the negation requirement of these negative polarity items, just like short-form negation and long-form negation do.

(67)	a.	*eysute-nun	celtay	kwukswu-lul	mek-n	un-ta.	
		Esther-TOP	absolutely	noodle-ACC	eat-PR	ES-DECI	
	b.	eysute-nun	celtay	kwukswu-lul	an(i)	mek-nu	n-ta.
		Esther-TOP	absolutely	noodle-ACC	NEG	eat-PRE	S-DECL
		'It is absolute that Esther doesn't eat noodles.'					
	c.	eysute-nun	celtay	kwukswu-lul	mek-c	i <b>an(i)</b>	ha-n-ta.
		Esther-TOP	absolutely	noodle-ACC	eat-CI	NEG	do-pres-decl
		'It is absolute	e that Esthe	r doesn't eat n	oodles.	,	
(68)	a.	*eysute-nun	celtay	ttwungttwung	gha-ta.		
		Esther-TOP	absolutely	fat-DECL			
	b.	eysute-nun	celtay	an(i) ttwung	ttwungl	ha-ta.	
		Esther-TOP	absolutely	NEG fat-DEC	CL		
		'It is absolute	e that Esthe	r is not fat.'			

<sup>&</sup>lt;sup>19</sup>The modal negator *mos* perfectly satisfies the requirement of negation by such exceptional negative polarity items.

<sup>(</sup>i) eysute-nun celtay kwukswu-lul a. mek-nun-ta. mos Esther-TOP absolutely noodle-ACC NEG eat-PRES-DECL 'It is absolute that Esther can't eat noodles.' b. eysute-nun celtay kwukswu-lul mek-ci mos ha-n-ta. Esther-TOP absolutely noodle-ACC eat-CI NEG do-PRES-DECL 'It is absolute that Esther can't eat noodles.'

	c.	eysute-nun	celtay	ttwungttwu	ungha-ci	an(i)	ha-ta.
		Esther-TOP	absolutely	fat-CI		NEG	do-DECL
		'It is absolute	e that Esther	r is not fat.'			
(69)	a.	*eysute-nun	celtay	keki-ey	iss-ess-t	a.	
		Esther-TOP	absolutely	there-LOC	exist-PA	ST-DEC	CL
	b.	eysute-nun	celtay	keki-ey	eps-ess-	ta.	
		Esther-TOP	absolutely	there-LOC	not.exis	t-PAST	-DECL
		'It is absolute	e that Esthe	r was not th	ere.'		
	c.	eysute-nun	celtay	keki-ey	iss-ci	an(i)	ha-y-ess-ta.
		Esther-TOP	absolutely	there-LOC	exist-CI	NEG	do-EG-PAST-DECL
		'It is absolute	e that Esthe	r was not th	ere.'		
(70)	a.	*eysute-nun	celtay	i sasil-	ul al-n	-ta.	
. ,		Esther-TOP	absolutely	this fact-A	ACC kno	w-PRE	S-DECL
	b.	eysute-nun	celtay	i sasil-	ul <b>mo</b> l	<b>u-</b> n-ta	
		Esther-TOP	absolutely	this fact-A	ACC not.	know-	PRES-DECL
		'It is absolute	e that Esthe	r doesn't kr	now this <b>1</b>	fact.'	
	c.	eysute-nun	celtay	i sasil-	ul al-c	i I	mos ha-n-ta.
		Esther-TOP	absolutely	this fact-A	ACC kno	w-CI	NEG do-PRES-DECL
		'It is absolute	e that Esthe	r doesn't kr	now this :	fact.'	

The parallelism between short-form negation and suppletive negation with respect to the exceptional negative polarity items taking negation provides another support in favor of the view that short-form negation and suppletive negation are of the same kind and they are syntactic negation.

Another noticeable point regarding the licensing environment of negative polarity items with respect to the suppletive negative predicates is that like short-form negation, *molu*- and *eps*- do not need or are not involved in clause embedding. As mentioned in section 2.2.3, the so-called inherently negative predicates like silh(-e ha)- and the -ki cen-ey 'before' clauses seem to license a negative polarity item. As also advanced in section 2.2.3, however, short-form negation is not involved in clause embedding, and neither is suppletive negation, which is a further support to identify suppletive negation with short-form negation syntactically and semantically.

### 3.2.3. Scope Interaction with a Quantifier and Eps-

The scope ambiguity, too, is observed between a quantifier and the negative predicate eps-.

In the following sentences, either the quantifier (the numeral or the universal quantifier) or the negative predicate *eps*- (or the negative part of it) is seen to take wide scope over the other. The same property discussed in sections 2.2.2 and 3.1.3 holds for *eps*- regarding the relatively less accessible Neg > Q reading.

(71) a. sey haksayng-i eps-ta. three student-NOM not.exist-DECL 3 > Neg: 'Three students are not present.' Neg > 3: 'It is not the case that three students are present.'
b. motun haksayng-i eps-ta. all student-NOM not.exist-DECL ∀ > Neg: 'There are no students.' Neg > ∀: 'Not all students are present.'

Therefore, it is safe to conclude that sentences in (61)c and (62)c with the negative predicate *eps*-have syntactic negation, and that the negative predicate *eps*-serves as the syntactic negator.

# 3.2.4. Homophony of Iss-

Negation of *iss*-, however, does not always result in *eps*-. Hence, in other cases, the usual

negation an(i) iss- is also found. Consider the following:

- (72) a. wenswungi-ka wuli-ey iss-ess-ta. monkey-NOM cage-LOC exist/stay-PAST-DECL 'A/The monkey was in the cage.' b. wenswungi-ka wuli-ey eps-ess-ta. monkey-NOM cage-LOC not.exist-PAST-DECL 'A/The monkey was not in the cage.' c. wenswungi-ka wuli-ey an(i) iss-ess-ta. monkey-NOM cage-LOC NEG be-PAST-DECL 'A/The monkey was not/did not stay in the cage.' (73) a. Eysute-ka yeki-ey iss-ess-ta. Esther-NOM here-LOC exist/stay-PAST-DECL 'Esther was here.' b. Eysute-ka yeki-ey eps-ess-ta. Esther-NOM here-LOC not.exist-PAST-DECL
  - 'Esther was not here.'

c. Eysute-ka yeki-ey **an(i)** iss-ess-ta. Esther-NOM here-LOC NEG be-PAST-DECL 'Esther was not/did not stay here.'

In addition to the suppletive negation with *eps*- as in (b) sentences, the usual short-form negation (an(i) plus the verb) is possible as in (c) sentences. However, there is a (lexical) semantic difference between two negated predicates. While *eps*- means nonexistence 'do not exist' or simple absence like 'be not (present), be absent, be lacking', an(i) iss- involves intention. That is, an(i) iss- means 'intentionally not stay'. Also, the cases where an(i) iss- used have an animate subject, which is an agent. In the cases (61) and (62), the subject is inanimate, hence not an agent (unless personified or used metaphorically), and the predicate *iss*- does not mean 'stay intentionally'. In (72) and (73), however, the *eps*- negation and the an(i) iss- negation are possible, because *iss*- is ambiguous between 'exist/be present' and 'stay intentionally' in these cases.

Hence, two separate lexical entries are to be recognized:  $iss_{-1}$  'exist, be present' and  $iss_{-2}$  'stay intentionally'. One fact supporting two separate lexical entries is that they show different conjugation patterns. A categorial distinction between verbs and adjectives has been acknowledged in Korean. Aside from the meaning aspect, <sup>20</sup> there is a formal distinction: adjectives do not take certain suffixes that verbs do. One such suffix is the (overt) present tense suffix, -(nu)n.<sup>21</sup> While verbs require this suffix after the stem (and before a final-suffix such as declarative, interrogative, etc.), adjectives cannot have it.

(74) Present tense form of adjectives: without present tense suffix -(nu)n
 a. wenswungi-ka eli-ta. (\*eli-n-ta)
 monkey-NOM young-DECL young-PRES-DECL
 'The monkey is young.'

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<sup>&</sup>lt;sup>20</sup>With the exception of a handful of state verbs including al-/molu- and mit- 'believe', adjectives refer to state and verbs refer to process or action.

<sup>&</sup>lt;sup>21</sup>The two alternating forms, -n and -nun, are due to a phonological factor: whether the stem ends in a vowel or in a consonant, respectively.
	b.	wenswungi-ka	cak-ta.	(*cak-nun-ta)
		monkey-NOM	small-DECL	small-PRES-DECL
		'The monkey is	small.'	
(75)	Pre	esent tense form o	of verbs: with pre-	esent tense suffix -(nu)n
	a.	wenswungi-ka	ca-n-ta.	(*ca-ta)
		monkey-NOM	sleep-PRES-DEG	CL sleep-DECL
		'The monkey is	sleeping.'	
	b.	wenswungi-ka	wus-nun-ta.	(*wus-ta)
		monkey-NOM	laugh-PRES-DE	CL laugh-DECL
		'The monkey is	laughing.'	

A single predicate belongs to either of the two categories (or classes) and shows the appropriate

present tense form. However, iss- can appear in both of the above contexts.

(76) Present tense form of *iss*- with an animate subject: with and without -(nu)n

a.	iss- without -nu	n	
	wenswungi-ka	yeki-ey	iss-ta.
	monkey-NOM	here-LOC	exist-DECL
	'A/The monkey	is here.'	
b.	iss-with -nun		
	wenswungi-ka	yeki-ey	iss-nun-ta.
	monkey-NOM	here-LOC	stay-PRES-DECL

'A/The monkey stays here.'

Hence, *iss*- in (76)a is the adjective meaning 'exist, be present', while the same stem form in (76)b is the verb meaning 'stay intentionally'. Here the subject is animate, which can appear with either of the two homophonous predicates in a given clause.<sup>22</sup>

The sentence pair in (76) is contrasted with the following pair, whose subject is inanimate

- (i) a. *khu* without -*nun* wenswungi-ka khu-ta. monkey-NOM tall-DECL 'A/The monkey is tall.'
  - b. *khu* with -*nun*wenswungi-ka (cal) khu-n-ta.
    monkey-NOM well grow-PRES-DECL
    'A/The monkey grows (well).'

<sup>&</sup>lt;sup>22</sup>There is another set of homophonous predicates showing the same behavior as *iss*-:  $khu_{-1}$  'big, tall' and  $khu_{-2}$  'grow (intransitive)'.

(i.e., car).

(77) Present tense form of *iss*- with an inanimate subject: only without -(nu)n

a.	iss-without -nun							
	cha-ka	yeki-ey	iss-ta.					
	car-NOM	here-LOC	exist-DECL					
	'A/The ca							

b. *iss*- with *-nun*: ungrammatical \*cha-ka yeki-ey iss-nun-ta. car-NOM here-LOC stay-PRES-DECL

Since *cha* 'car' is not animate and cannot have intention, *iss*- with this subject as in (77) can only mean 'exist, be present', and not 'stay intentionally'. If the (overt) present tense suffix, compatible only with verbs, is attached, the sentence (77)b is not acceptable unless the car is personified or used metaphorically.

One good example that shows an inanimate subject's personified or metaphoric use is the following. It could also potentially challenge the claim that an(i) iss- is only possible when intention is involved.

(78) posek-i hana-to cey cali-ey **an(i)** iss-ko ... gem-NOM one-NPI its place-LOC NEG exist/staty-and 'There is no single gem in its place and ...'

The above clause (of a bigger sentence containing it) sounds acceptable, but the subject is not animate in its literal sense and cannot be involved in intention.

Notice, however, that to complete the utterance the most natural expression that would follow (78) is (79).

(79) ... eti(-lo) ka-ss-ci? where(-ALLA) go-PAST-INTER 'where did they go?'

If an expression such as eti iss-ci? 'where are they?' with iss- follows (78), the entire sentence

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(80) sounds odd and unnatural, even though it is not completely impossible.<sup>23</sup>

(80) ??posek-i hana-to cey cali-ey an(i) iss-ko eti(-ey) iss-ci?
gem-NOM one-NPI its place-LOC NEG exist/staty-and where(-LOC) exist-INTER
'No one gem is in its place, and where are they?'

The occurrence of the action verb *ka*- 'go' with an inanimate subject noun *posek* 'gem' shows that this noun is personified and thus involved in intention metaphorically.

One prediction regarding the long-form negation with *mos* is that inanimate subjects (unless personified or used metaphorically) should not be involved in a modal meaning (i.e., 'cannot stay' or 'may not stay'), whereas animate subjects should. This is indeed the case. For example, the subject in (81), monkey, is animate, can have intention, and the sentence exhibits a modal meaning.

(81) wenswungi-ka wuli-ey iss-ci mos ha-y-ess-ta. monkey-NOM cage-LOC train.stay-CI NEG do-EG-PAST-DECL 'The monkey was not able/allowed to stay in the cage.'

Further, if an inanimate subject is personified or used metaphorically (in a cartoon, for example), the modal meaning is exhibited with the inanimate but personified subject in long-form negation of *iss*- with *mos* as in the following.

(82) thomasu kicha-ka yek-ey iss-ci **mos** ha-y-ess-ta. Thomas train-NOM station-LOC stay-CI NEG do-EG-PAST-DECL 'Thomas, the train, was not able/allowed to stay in the station.'

In sum, the two separate lexical entries iss-1 'exist, be present' and iss-2 'stay intentionally' are

 $<sup>^{23}</sup>$ The reason the sentence (79) is not completely impossible may be related to the fact that the predicate *iss*- in the second clause is also an agent verb (as in (72)c, (73)c, and (76)b) with the personified subject.

recognized at this point. Among the two, only the adjective  $iss_{-1}$  has the suppletive negative form  $eps_{-1}$ .

#### 3.3. Section Summary

The uniformities between the regular syntactic short-form negation construction and the suppletive negative predicates suggest that there be only one uniform negation construction in syntax (overt and covert) for the two types of negation and that the difference arise in PF (i.e., in the postsyntactic component). This means that *al*- and *iss*-1 (or rather *molu*- and *eps*-) show exactly the same configurations and properties in syntax and semantics except for the syntactic, semantic and morphological features of the root nodes,  $V^0$ . The problem is that the suppletive negative forms do not have a separate negator and that these negative predicates are not morphophonologically related to their affirmative root.<sup>24</sup>

## 4. Suppletive Negation in Distributed Morphology

Based on the identical syntactic and semantic behaviors between short-form negation and suppletive negation, this section raises problems with a lexicalist approach to the suppletive

<sup>&</sup>lt;sup>24</sup>Sells (2001) presents that Korean has three different kinds of clausal negation (in indicative or "non-jussive" (after M. D. Pak 2004; cf. Han and Lee In press and Sells 2004) clauses): long-form negation, short-form negation and suppletive negation ("lexically negative verbs" in his term). However, this descriptive classification misses the fact that the affirmative predicates of those suppletive negative predicates do not have the expected shot-form negation construction and that the long-form negation constructions do not have such suppletive cases. Similarly, D. Chung and H.-K. Park (1997) identify suppletive negation as a third type of negation arguing that short-form negation and suppletive negation show different syntactico-semantic behaviors. They argue that these two non-long-form negation constructions are different. However, some of their grammaticality judgments are questionable and their arguments based on these judgments are not conclusive.

negative predicates. Then, a postsyntactic fusion analysis is provided within the framework of Distributed Morphology.

## 4.1. Problems with Lexicalist Approaches

Two different ways can be considered to deal with the suppletive negation. One is a lexicalist approach where the formation of *molu*- and *eps*- is done in the lexicon prior to syntax. It would combine all the syntactic, semantic, morphological and phonological features of the syntactic negation and the verb (*al*- or *iss*-1). An alternative way is a post-syntactic combination. In a separation theory like Distributed Morphology, the relevant combination of the phonological features occurs after the syntactic component and then the phonological features. As discussed in section 4.2, this study endorses the postsyntactic morphological view. This section points out some problems with a lexicalist view.

The first problem is how the syntactic negation construction and its semantic effect are obtained for *molu*- and *eps*- without the syntactic negator an(i) or *mos*. The two predicates would have a different syntactic structure from other predicates, because there is no (overt) syntactic negator for those suppletive predicates. Technically, it is not impossible to establish a phonologically null negator for those suppletive predicates. But the null negator is not well-motivated, because it is restricted only to those predicates showing the behavior of syntactic negation without an(i)/mos.<sup>25</sup>

The second problem is the relationship between *molu*- and *eps*- (lexical entries) on one hand and \*an(i)/mos al- and \*an(i) iss- (syntactic constructions) on the other. The predicates

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<sup>&</sup>lt;sup>25</sup>This possibility of positing a null negator is discussed and rejected in chapter 5 after dealing with the interaction of negative suppletion and subject honorification suppletion.

*molu*- and *eps*- are single lexical entries, behaving as the affirmative predicates' syntactic negation constructions. They block the expected and otherwise regular syntactic constructions  $*an(i)/mos \ al$ - and  $*an(i) \ iss$ -. This problem has been known as blocking in the literature. The following examples show the basic notion of blocking.

(83)	Xous	+ity	Noun	(Aronoff 1976: 41)
	various	variety	-	
	curious	curiosity	_	
	glorious	*gloriosity	glory	
	furious	*furiosity	fury	

In (83), certain adjectives can have the noun-forming suffix *-ity* resulting in a derived noun, while certain others cannot. Aronoff (1976) proposes that the difference stems from the existence of a noun for the latter adjectives. The nouns *glory* and *fury* block the potentially derivable nouns *\*gloriosity* and *\*furiosity* from *glorious* and *furious*, respectively. Meanwhile, adjectives *various* and *curious* do not have comparable nouns and consequently it is possible to have the nouns *variety* and *curiosity* derived from the adjectives.<sup>26</sup>

Many discussions have focused on the blocking relationship between lexical entries, i.e.,

<sup>&</sup>lt;sup>26</sup>The existence of a somewhat archaic word *curio* poses a problem to Aronoff's explanation of blocking. Further, nouns like *pomp* and *monster* do have a derived noun, which should be expected not to exist according to Aronoff.

(i)	Xous	+ity	Noun
	curious	curiosity	curio
	pompous	pomposity	pomp
	monstrous	monstrosity	monster

Note, however, that the root nouns and the derived nouns with *-ity* have different meanings. This is true especially for *pomp* and *monster* cases. Then, Kiparsky's (1983) Avoid Synonymy Principle (cf. Aronoff and Anshen 1998) may enter to resolve the problem. The root noun and the corresponding derived noun have different meanings and therefore the former does not block the latter. The case of *curio* and *curiosity* would be handled by the same principle. One of the meanings of *curiosity* is the same as *curio*. According to the Avoid Synonymy Principle, one of the two nouns would become out of use. The reason *curio* has been becoming extinct would be that *curiosity* has other meanings that *curio* does not have.

words (cf. Aronoff 1976, Kiparsky 1982, 1983). However, the present case is not between lexical entries, but between a single lexical entry (molu- or eps-) and a complex morphosyntactic construction (\*an(i)/mos al- or \*an(i) iss-). This is a problem because if morphology is done prior to syntax as assumed in lexicalist frameworks (i.e., Andrews 1990, Bresnan 2000, Chomsky 1993, 1995, Kiparsky 1982, 1983, 2005, Lieber 1981, Pullum and Zwicky 1992, di Sciullo and Williams 1987, Selkirk 1982, Sells 1998), then it is not so clear why a lexical item blocks a syntactic construction. This is because the potential derivation of \*gloriosity is to be done within the lexicon, while the ungrammatical \*an(i)/mos al- construction is done in syntax. Glory can be said to block \*gloriosity because the relationship between them (and the derivation process of \*gloriosity) is inside the lexicon. The \*mos/an(i) al- construction would be done outside the lexicon, but it is blocked by a lexical entry which is made up in the lexicon, a separate grammatical component. If one accepts a lexicalist tenet that syntax has no access to the inside of words (Lapointe 1980, di Sciullo and Williams 1987, Selkirk 1982) and consequently no conflicting relationships are expected between a lexical entry and a syntactic construction, it would be difficult to explain why a syntactic construction cares about the existence of a certain

lexical entry.<sup>27</sup>

Suppose that the lexical entries *molu*- and *eps*- are formed in the lexicon from *mos* plus *al*and an(i) plus *iss*-, respectively, with syntactico-semantic and phonological features altogether.

 $<sup>^{27}</sup>$  This blocking relationship is similar to the regular English comparative (and superlative) constructions. As is well known, the comparative form of a given adjective *A* is either a single lexical item *A-er* (e.g., *bigger* and *smaller*) or a phrasal construction *more A* (e.g., *more intelligent* and *more appropriate*), and a single adjective cannot have both *A-er* and *more A* forms. Hence a blocking relationship holds between two potential comparative forms *A-er* and *more A*. The choice in this case depends on a certain phonological aspect of the adjective, namely, monosyllabicity (Aronoff 1976, Zwicky 1989) or single foot (McCarthy and Prince 1990). See Embick (2006) and Embick and Noyer (2001) for discussions of the two ways of the comparative and superlative constructions in English in the Distributed Morphology framework.

Since these predicates already contain the relevant syntactico-semantic features of syntactic negation, they do not need a regular negator in syntax. The relevant negation feature should be accessible to syntax to avoid ungrammatical syntactic constructions like \*an(i)/mos molu- and \*an(i)/mos eps-. Chomsky's (1993, 1995) checking theory, for example, can access morpho-syntactic features inside words to check them off against the relevant features in some other syntactic position in a certain structural configuration, i.e., specifier-head relationship. Hence, the negation feature, already present in the verb head, can be made reference to by syntactic operations. If the negation feature is to be checked off in some syntactic configuration, this configuration may well be the specifier and head of the Neg projection.

The problem is: if the Neg feature is already incorporated in the  $V^0$  head and hence an independent (or rather regular) Neg, i.e., the syntactico-semantic feature of negation, is unnecessary and impossible, why would the Neg head node and its projections be necessary? If the Neg<sup>0</sup> node and its projections are to be established in this suppletive case any way, the Neg<sup>0</sup> will have no syntactico-semantic feature, and no phonological features inside it, because this feature is incorporated in the V<sup>0</sup>. Then, it is not so clear why and how a zero-level category (Neg<sup>0</sup>) and its projections are posited without the feature (negation feature) that is to be comprised in that zero-level category. This kind of blocking of a phrase by a word has been recognized by lexicalists as well (Kiparsky 1982, 2005, Poser 1992), and solutions have been proposed in a variety of lexicalist frameworks. For example, the morphological blocking principle by Andrews (1990) (cf. Bresnan 2000, Giegerich 2001, Kiparsky 1982, 2005, Sells 1998) generalizes this scenario. Technically, this sort of solution is not impossible, but there still remains at least a conceptual problem as pointed above.

Another related but independent problem is the asymmetric status of syntactic negation. The cases of negation with the (overt) negator, an(i) or mos, are syntactic negation constructions. That is, there is a separate lexical entry for negation, and consequently there are a separate node of negation (i.e.,  $Neg^0$ ) and its projections in syntactic representations. This separate node is combined with other heads and phrases in syntax to build a negative clause. But in the cases of *molu*- and *eps*-, syntactic negation is done in the lexicon according to lexicalists' view. The responsible negation feature is already combined with features of those predicates like *al*- and *iss*- into single lexical items. This non-uniform combination of Neg (i.e., scattering syntactic negation in different components of grammar depending on predicates in a clause) is certainly undesirable. Further, there is no guarantee that the two negation features – the regular morphosyntactic and semantic negation feature in the short-form negation cases on one hand and some kind of lexical negative feature incorporated in these individual suppletive negative predicates on the other hand – are the identical formal entity playing the same grammatical role.

These problems arise when the lexicalist hypothesis is maintained and when those suppletive forms are made in the lexicon prior to syntax while short-form negation is formed in syntax. If, however, the formation of these suppletive negative forms is done after syntax, these problems will disappear. In this line, next section provides an analysis within the framework of Distributed Morphology, and shows that it can dispense with the problems mentioned in this section.

#### 4.2. A Postsyntactic Fusion Analysis of Suppletive Negation

The morphological process responsible for the present discussion is fusion as proposed in Distributed Morphology (Halle and Marantz 1993). A fusion operation takes two sister nodes having syntactico-semantic features only, and turns them into a single terminal node with all the relevant syntactico-semantic features that the two original nodes had. Fusion processes precede vocabulary insertion, because terminal nodes are free of phonological content at the point of fusion. After fusion, vocabulary insertion takes place matching syntactico-semantic features of the fused node and of vocabulary items.

## 4.2.1. [+neg] + [KNOW] → /molu/

Based on the clause structure (46) as discussed in section 2.3, the following structure is obtained for the verbal complex *molu-n-ta* 'do not know' (under the resulting  $C^0$  node) at Spell-Out as a result of overt V movement to C via intervening functional heads. Note that the v head (along with its projections) is not present because al- is a state verb and does not require an agent argument.

(84) Structure for molu-n-ta (not.know-PRES-DECL) at the end of overt syntax



Crucial to the discussion is that within the framework of Distributed Morphology, the above syntactic structure lacks phonological content and that the terminal nodes are composed of only syntactico-semantic features. Unlike syntactico-semantic features characterizing functional categories like Neg, T, and C, those features of lexical categories are not well established. Hence, the notation [KNOW] is used to represent the syntactico-semantic feature of the vocabulary item al-. /al/ is used to represent the phonological content of the vocabulary item.

The above structure enters PF, and now undergoes morphological fusion in the morphological component. This operation takes the two sister nodes, the V node containing

[KNOW] and the Neg node with the [+neg] feature, and turns them into a single terminal node. This resulting node contains all the original syntactico-semantic features, [+neg, KNOW]. This process is illustrated below, showing the relevant part only:

(85) Fusion of Neg and V with [KNOW] (in the postsyntactic morphological component)



The Neg node is fused with the V node only when its sister node is the verb [KNOW] (or [EXIST] as will be discussed shortly), and not any other verb. So all other verbs remain in their original node without being fused with Neg. Subsequently, vocabulary insertion takes place. Relevant are the following vocabulary items:

(86) a. [+neg, KNOW]  $\leftrightarrow$  /molu/ b. [KNOW]  $\leftrightarrow$  /al/ c. [+neg]  $\leftrightarrow$  /an(i)/

If all the syntactico-semantic features of a vocabulary item are present in a given terminal node, vocabulary insertion can take place (per underspecification), but not vice versa. Because of this aspect of underspecification, any of the vocabulary items in (86) could be inserted in the fused node in (85) (per competition). However, in such a situation, the vocabulary item that is most highly specified with the features that are present in the terminal node is chosen. Therefore, (86)a is chosen and the fused terminal node is provided with /molu/, resulting in:

(87) Vocabulary insertion of /molu/ into the fused node

Neg		Neg
	$\rightarrow$	
[+neg, KNOW]		/molu/

In a sentence with [KNOW] and without [+neg] (i.e., in an affirmative sentence), the vocabulary item (86)b is chosen as in the following. (The T node and other higher nodes, too, will be provided with the appropriate phonological content.)



In a negative clause with other verbs showing the regular negation, the fusion does not occur and the original V and Neg nodes proceed to vocabulary insertion independently. Hence the fusion process, as in (85), needs to refer to the syntactico-semantic features in the terminal node, so that this process is limited to the case of 'know'.

The structure (84) (and likewise (85)) is crucial for the fusion operation. Fusion is done with two sister nodes. Hence, it is predicted that if another element intervenes between Neg and V in the input structure (i.e., the output of overt syntax), this operation will not take place. Indeed, this is the case. Consider the derived causative of 'know' in the negative context. As discussed in section 2.3, the causative feature is the head of v(P) structurally intervening between V(P) and Neg(P). After head movement of  $V \rightarrow v \rightarrow Neg \rightarrow T \rightarrow C$ , the following structure is obtained as part of the C<sup>0</sup> complex of the causative clause. (89) Structure for *an(i) al-li*- at the end of overt syntax (from (46))



In the above structure, Neg and V are not sisters, and therefore fusion is inapplicable. Then, each terminal node in the above tree structure separately undergoes vocabulary insertion.

(90) Vocabulary items inserted for *an(i) al-li*- without fusion of [+neg] and [KNOW]



<sup>(91)</sup>  $[+caus] \leftrightarrow / li/$ 

The above result yields the correct phonological representation, an(i) al-li-. Note that the morphosyntactic structure (89) (and its "more phonological" structure (90)) reflects the correct meaning of the string an(i) al-li- regarding the scope relation of causative and negation, which is 'not cause somebody to know' or 'not inform'. Thus, the fusion operation needs to meet two requirements: the sisterhood of the two nodes to be fused, and the content of the terminal nodes.

## 4.2.2. [+neg] + [EXIST] → /eps/

The case of  $iss_1$  'exist, be present' and its negative counterpart *eps*- is treated similarly. The difference is the syntactico-semantic feature of the predicate node. The output of overt syntax,

(92)a, is turned to the fused structure (92)b in morphology, when the syntactico-semantic feature of the original V node is [EXIST] and this node is the sister node of Neg.

(92) Fusion of Neg and the V node of [EXIST], then vocabulary insertion



The structure (93) is for the affirmative clause without negation.

(93) Vocabulary insertion for [EXIST] without [+neg]



The following vocabulary items have been inserted to the terminal nodes at the last step in the each of (92) and (93).

(94) a. [+neg, EXIST] 
$$\leftrightarrow$$
 /eps/  
b. [EXIST]  $\leftrightarrow$  /iss/

Again, the most highly specified vocabulary item with the features compatible with those in the morphosyntactic representation is chosen for the terminal node in question, i.e., (94)a for the resulting node in (92)c. (The fusion rule will be modified in section 5.1.2 of chapter 5 after considering the interaction of negative suppletion and honorific suppletion.)

### 4.2.3. Morphosyntactic Analysis of Iss- Homophony

The case of the agentive, non-suppletive  $iss_{2}$  'stay intentionally' (whose negative form is an(i) iss-) behaves like other regular predicates. The following representation showing the relevant morphosyntactic structure and vocabulary insertion without fusion can be postulated, where the set of syntactico-semantic features of  $iss_{2}$  is represented as [STAY].

## (95) Vocabulary insertion without fusion (for *iss*-2)



(96) [STAY]  $\leftrightarrow$  /iss/

While this treatment with two homophonous vocabulary items  $iss_{-1}$  and  $iss_{-2}$  can show the correct results, an alternative view is possible.

The alternative view recognizes only one vocabulary item *iss*- 'exist', but this vocabulary item interacts with the v(P) projection according to agentivity/volitionality. In the case of *al*- vs. *al-li*-, only the latter contains v(P) in the structure with the *v* head realized as the causative suffix *-li*-, since the former is not involved in the agent theta role while the latter has an agent theta role (see section 2.3). This difference between [Neg Neg [v [V KNOW] +caus]] and [Neg Neg [v KNOW]], i.e., with or without v(P), conditions the fusion operation. Likewise, *iss*-1 'exist' refers to simple existence or presence, while *iss*-2 refers to staying intentionally and is involved in the agent theta role, which is granted by v(P). In other words, *iss*-2 has the additional v(P) projection between V(P) and Neg(P). Hence, *iss*-2 in a negative clause is involved in the following structure for the complex C<sup>0</sup> after overt head movement:

(97) The structure of the complex  $C^0$  after head movement of *iss*-2 in a negative clause (partial)



In this structure [+neg] and [EXIST] are not sister nodes and hence fusion of them is inapplicable. Given that the [+agent] feature has phonologically null contents (at least for the predicate *iss*-), vocabulary insertion converts (97) to (98):

(98) Vocabulary insertion to (97)



The treatment satisfactorily relates the *al*- vs. *al-li*- case to the *iss*-1 vs. *iss*-2 case in two respects regarding v(P): the agent theta role and the blocking of fusion. Then, there is no need to recognize two separate homophonous vocabulary items, *iss*-1 'exist' and *iss*-2 'stay'. The meaning difference between the two apparent vocabulary items stems from the different morphosyntactic structure.

The stem form *iss*- is retained in the so-called progressive construction and the auxiliary verb is not realized as *eps*- in the negative progressive construction.

(99) a. nol-ko issplay-and BE 'be playing'
b. \*nol-ko epsplay-and not.exist
c. \*?nol-ko an(i) issplay-and NEG exist

- d. **an(i)** nol-ko iss-NEG play-and BE 'be not playing'
- (100) a. kongpu ha-ko issstudying do-and BE 'be studying'
  - b. \*kongpu ha-ko **eps**studying do-and not.exist
  - c. \*?kongpu ha-ko **an(i)** issstudying do-and NEG exist
  - d. kongpu **an(i)** ha-ko issstudying NEG do-and BE 'be not studying'

The unacceptability of the forms with *eps*- in (99)b and (100)b is expected, and the so-called progressive construction, V-*ko iss*- 'be V-ing', supports the analysis proposed in this chapter. First of all, the predicate *iss*- involved in the progressive construction is hardly regarded to have the meaning 'exist/be present'. Further, the fact that short-form negation of the progressive construction is an(i) V-*ko iss*- suggests that the two predicates, V (e.g., *nol*- or *ha*- as in (99), (100)) and *iss*-, are involved in some sort of predicate serialization mediated by *-ko* 'and', and is not separable (for the purpose of negation). Native speakers hardly accept a \*V-*ko an(i) iss*-sequence even marginally. Such forms as (99)c and (100)c are considered as speech error or child speech at best, if they are ever uttered in real situations. The unacceptable sequence \*V-*ko an(i) iss*- explains the ungrammaticality of \*V-*ko eps*- automatically. Because the *an(i) iss*-sequence (more precisely, the corresponding morphosyntactic structure for it) never has a chance to be formed in the course of derivation of a negative progressive construction, the suppletive form *eps*- cannot be obtained in such a context. The progressive construction shows that the structural relationship between the negation and the verb [EXIST] is critical.

#### 4.2.4. Summary

This section has shown how the Distributed Morphology framework explains the suppletive

forms of 'know' and 'exist' in Korean. The morphological fusion operation is sensitive to the syntactico-semantic features of the terminal nodes to be fused (e.g., [KNOW] and [EXIST]) in the given morphosyntactic structure of the regular short-form negation construction resulting from overt syntax. The structure in which this operation is done is also critical: only sister nodes can be fused: A hierarchically intervening node blocks this operation.<sup>28</sup> Finally, this operation is done

(i) Neg Neg V | | [+neg] [KNOW]

Consequently /molu/ is inserted to the higher node depriving the daughter nodes of a chance of vocabulary insertion. But this treatment will cause a problem with the causative structure with v. For the causative of al- in the negation context (i.e., [Neg +neg [v [V KNOW] + caus]], yielding an(i) al-li-), the higher Neg node includes [+neg], [KNOW] and [+caus]. Because of underspecification (the subset principle), a vocabulary item with the set of features properly included in the set {[+neg], [KNOW], [+caus]} (e.g., [+neg, KNOW] \leftrightarrow /molu/) can be inserted. Likewise, non-suppletive verbs in general have the same problem. The higher Neg node in (i) with [DIE], for example, instead of [KNOW] could be provided with either /an(i)/ or /cwuk/. Abandoning the subset principle or modifying it appropriately would solve the problem, in favor of the top-down vocabulary insertion.

A third possibility would be to recognize presyntactic feature bundling in different ways for different

<sup>&</sup>lt;sup>28</sup>Restricting the fusion operation with [+neg] to the [KNOW] and [EXIST] features is crucial. Potentially, any non-agent verb and any adjective could otherwise be fused with Neg in the sisterhood configuration. For example, the process verb *cwuk*- 'die', not having the v(P) projection, could undergo fusion. Then the hypothetical fused node [+neg, DIE] can be provided with either of the two vocabulary items ([+neg]  $\leftrightarrow /an(i)/$  or [DIE]  $\leftrightarrow /cwuk/$ ).

Thus, fusion should be stipulated to care solely about features [KNOW] and [EXIST] in the context of negation. [EXIST], along with copulas, is considered special (behaving as an auxiliary verb) in many languages as well, and section 5 provides some special properties of [KNOW] in Korean and other languages suggesting its modal-like nature. However, the auxiliary-like properties and the fusion operation of them with [+neg] are not connected formally.

Fusion happens when there is an independent, (suppletive) negative vocabulary item. One way to push this idea further is that fusion is driven by vocabulary items. Under this idea, morphology would scan the structure and vocabulary items and does fusion when the potential fused node matches a vocabulary item (e.g., [+neg, KNOW]).

Another, totally different, way would be top-down vocabulary insertion (see, for example, Legate 1999) without fusion contra the majority of the current Distributed Morphology literature assuming that vocabulary insertion is done bottom-up, that is, from root outwards (Bobaljik 2000, Embick and Noyer 2001, Halle and Marantz 1993 among others). In the following morphosyntactic structure, the higher Neg node, comprising [+neg] and [KNOW], matches the vocabulary item [+neg, KNOW]  $\leftrightarrow$  /molu/.

after syntax: the syntactico-semantic properties and configurations are uniform in syntax for the two superficially different non-long-form negation constructions. The analysis of fusion of the negation node and the V root node in PF explains why the two non-long-form negation cases exhibit the same syntactic and semantic behaviors. It also explains why there is no independent negator in the two suppletive negation cases and why there is a single vocabulary item (the root incorporating syntactic negation) instead of the negation plus root sequence.

### 4.3. Accomplishments of the Proposed Distributed Morphology Analysis

This section briefly recapitulates how the proposed analysis and Distributed Morphology in general can cope with the problems addressed in a lexicalist approach (section 4.1). The first problem is blocking: It would be difficult to explain the blocking relationship between *molu*- and \*an(i)/mos al- and between *eps*- and \*an(i) *iss*-1 in a lexicalist approach. Because the lexical entries and the otherwise regular periphrastic constructions (blocked by those lexical entries) are formed in different components of grammar, it is not clear where and how the blocking relationship can be established. It is not in the lexicon, because periphrastic forms are simply not in the lexicon. It is not in syntax, because the syntactic negation construction is expected to be regular and uniform across predicates chosen in a clause.

This problem does not arise in the present analysis. The clausal structure with these suppletive negative predicates is the same in syntax as the structure with other, regular short-form negation predicates. Both structures have the Neg node and its projections as separate syntactic categories in the identical syntactic configuration. The difference is that the two nodes (Neg and

verbs with respect to Neg in a single language (cf. Bobaljik and Thráinsson 1998). Hence, the [+neg] feature is bundled with [KNOW] (and with [EXIST]) to act as a single independent morphosyntactic object, while no other verbal features including [DIE] are not bundled with [+neg]. The implication is that there is no postsyntactic fusion process and that syntax has only one node for [+neg] and [KNOW] (or [EXIST]) throughout the derivation unlike regular short-form negation.

its sister node V) undergo a fusion process in morphology, resulting in a single terminal node which can house only one vocabulary item. Then, the phonological features are provided. Therefore, they are not in a blocking relationship or in competition. It is a matter of whether or not a postsyntactic fusion operation takes place, and hence whether the relevant structure has one or two terminal nodes at the time of vocabulary insertion in PF. (See Embick 2006 and Embick and Marantz 2006 for the parallel argument.)

J.-B. Kim (1999) treats the short-form negation construction as lexical prefixation to a predicate, operating in the lexicon prior to syntax. By doing so, it is possible to avoid the problem of blocking between two constructions in different components of grammar. He contends: "[a]ny syntactic or semantic attempt would fail in predicting these lexical blocking cases because of the existence of idiosyncratic cases" (p. 15). His assumption is that such lexical idiosyncrasies, i.e., suppletive negative predicates, are integrated lexical entities whose phonological features are present in syntax inseparable from non-phonological (i.e., syntactic, semantic and morphological) features. For this reason, those suppletive negative predicates should be in their full shape with phonological and non-phonological features before entering syntax. Consequently, short-form negation cannot avoid being handled in the lexicon, so that the blocking relationship between the two types of negation can be established in the same component.

However, placing short-form negation in the lexicon is not the only way to replicate the blocking relationship between short-form negation and suppletive negation. The present analysis establishes the alleged blocking relationship in the same component of grammar, the postsyntactic morphological component. The real problem is: once short-form negation is acknowledged as a syntactic construction, the lexical treatment of an(i) short-form negation is unsustainable. In addition, if this blocking phenomenon is recognized between the two types of negation, lexicon cannot be the right place to establish this blocking relationship.

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In the present analysis, the fusion process responsible for the suppletion takes place in the postsyntactic morphological component within PF. This and other morphological operations do not affect syntax (overt or covert). Before the fusion operation applies, syntactic structure of the suppletive negation is the same as that of regular negation cases. The divergence between the two types of negation (suppletive and regular) arises after syntax. Therefore, the syntactic representations and operations are uniform regardless of a predicate chosen in a negative clause. The hierarchical structure of the categories relevant to negative clauses and the structure of the  $C^0$  complex resulting from the application of head movement are uniform in all cases of clause negation. Also, such properties and behaviors related to syntactic negation as the distribution of negators, negative polarity item licensing and scope ambiguity, as discussed in sections 2.2 and 3, are established in the same structural configuration in syntax for suppletive and non-suppletive predicates.

The syntactic and semantic properties shared by short-form negation and suppletive negation have led to the suspicion that the two types of negation are of the same kind. For example, J. Choi (1999: 51), citing H. P. Im (1987), alludes to the identity between the two types regarding licensing of negative polarity items, but explicitly refuses to identify suppletive negative predicates with syntactic (short-form) negation. The main reason is the morphological divergence, i.e., lack of the negator an(i) or mos in the suppletive cases. In a similar vein, Sells 2001a recognizes three types of syntactic negation in Korean: long-form negation, short-form negation and "lexically negated" predicates. The present analysis formalizes the intuition that suppletive negation is the same as short-form negation (syntactically and semantically). Further, it portrays the morphophonological difference between the two types of negation. Capturing the similarities and differences at the same time is achieved in the current study by virtue of the separation hypothesis assumed in Distributed Morphology.

#### 5. Special Properties of [KNOW]

Al- and  $iss_{-1}$  are the only predicates that show the suppletive form when negated syntactically in the short-form negation constructions. The previous section has provided a Distributed Morphology analysis of these suppletive forms in terms of postsyntactic fusion of the V/A root node of these predicates and the Neg node, followed by vocabulary insertion accordingly. Then, one question is why the fusion process involved in only these predicates, that is, why only those predicates, and not others, show the behavior of suppletive negation. In other words, what is special to this limited number of predicates? This section considers the status of such predicates exhibiting suppletive negation.

Related to this question, let us think about the status of suppletion in general. Marantz (1997b) proposes that true suppletion is restricted to functional categories. That is, truly suppletive alternants which are separate vocabulary items must be functional categories, and lexical categories are free of suppletion. In the present cases, *al*- and *molu*- (and likewise *iss*-1 and *eps*-) have been treated as separate vocabulary items. Apparently, *al*- 'know' and *molu*- 'not.know' are considered to be lexical categories (l-morphemes, in the Distributed Morphology terminology). If Marantz's hypothesis is correct, those apparent lexical category predicates are to be related to some universal syntactico-semantic feature(s). If these predicates show such exceptional properties deviant from regular behaviors of lexical (as opposed to, for example, auxiliary) verbs and these properties are related to auxiliary verbs (i.e., functional categories or f-morphemes), it can be said that the suppletion of these predicates is due to these properties. Hence, this section presents some cases showing such behaviors that genuine lexical verbs would not exhibit. However, it focuses on 'know' only, since 'be' (with the meaning 'be present') is

found to be an auxiliary and shows suppletion in many languages.<sup>29,30</sup> The relevant properties of 'know' are from several different unrelated languages and from Korean.

## 5.1. German Wissen 'know'

There are two verbs in German that can be translated into 'know': *wissen* and *kennen*. Among the two, the epistemic *wissen* is conjugated differently from other lexical verbs. The first point is that the stem vowel of the present indicative forms is different depending on number of the subject. Hence, the singular forms contain [ay] in all persons, while the plural forms contain [I] in all persons which is the same as the infinitive stem vowel:

#### (101) Present indicative forms of wissen 'know'

person	singular	plural
1st	weiß	wissen
2nd	weißt	wisst
3rd	weiß	wissen

Strong verbs also have different vowel quality for singular forms, but only for second and third person:

<sup>&</sup>lt;sup>29</sup>The suppletion with 'be' (or suppletion in general) is not limited to negation, but can be for other verbal functional categories like tense, aspect, mood, person, number and so on. A well-known case is the suppletive paradigm for English *be*.

<sup>&</sup>lt;sup>30</sup>Due to the fact that the auxiliary-like *iss*-1 'exist' undergoes fusion while the true auxiliary *iss*- does not (as in the progressive construction discussed in section 4.2.3), the claim that fusion is confined to functional categories might not sound so strong. While it would be necessary to investigate what counts as a true auxiliary and what counts as something merely "auxiliary-like", in this particular case, both instances of *iss*- have something non-lexical. In terms of the relationship between being auxiliary (i.e., of a functional category) and exhibiting suppletion, it should be noticed that the relation between being suppletive and being of a functional category, i.e., auxiliary(-like), is unidirectional. That is, Marantz's claim that true suppletion is restricted to functional categories means that if there is a phenomenon of suppletion, it is a functional category. It does not mean that functional categories necessarily show suppletion. Hence, even though it can be arguable that the *iss*- showing no suppletion is "more" auxiliary, and the suppletive *iss*-1 less auxiliary, this does not cause a problem for Marantz's claim.

/		0					
	a. <i>fahren</i>	'drive, ride'	b. <i>sehen</i> '	see'	c. <i>helfen</i> 'help'		
person	sg.	pl.	sg.	pl.	sg.	pl.	
1st	fahre	fahren	sehe	sehen	helfe	helfen	
2nd	fährst	fahrt	siehst	seht	hilfst	helft	
3rd	fährt	fahren	sieht	sehen	hilft	helfen	

(102) Present indicative forms of strong verbs

Unlike strong verbs, the first person singular form also has a vowel mutation in *wissen*. Weak verbs have no mutation at all regardless of person and number.

(103) Present	indicative fo	rms of wea	k verbs				
	a. <i>sagen</i> '	say'	b.	legen	ʻlie'	c. stellen	'stand'
person	sg.	pl.		sg.	pl.	sg.	pl.
1 st	sage	sagen		lege	legen	stelle	stellen
2nd	sagst	sagt		legst	legt	stellst	stellt
3rd	sagt	sagen		legt	legen	stellt	stellen

The second property that distinguishes *wissen* and other verbs (strong or weak) is that the third person singular form of the present indicative is the same as the first person form. In other lexical verbs (strong and weak) the suffix for the first person is *-e* while the third person has a distinct suffix *-t*. Hence, not only does *wissen* have the identical form for the first and the third persons, but the first and the third person singular forms lack those usual person suffixes.

In fact, these two properties are of modal verbs in German. Modal verbs like *können* 'can', *wollen* 'will' and *müssen* 'must' have a different vowel for the present indicative singular forms (for all three persons), a vowel distinct from that of the corresponding plural forms, and the first and the third persons of present indicative singular forms are identical lacking usual person agreement suffixes.

4) Present i	ndicative for	rms of moda	l verbs					
	a. <i>können</i>	'can'	b.	wollen	'will'	c.	müssen	'must'
person	sg.	pl.		sg.	pl.		sg.	pl.
l st	kann	können		will	wollen		muss	müssen
2nd	kannst	könnt		willst	wollt		musst	müsst
3rd	kann	können		will	wollen		muss	müssen

(104) Present indicative forms of modal verbs

Thus, the verb *wissen* 'know' shares with the modal verbs some special properties, which are not found in genuine lexical verbs.

Historically, *wissen* and the modal verbs are the so-called preterite-present verbs, which show the above conjugational pattern. The preterite forms of what had been originally strong verbs came to be used as the present tense verbs. The newly formed present tense forms are inflected, in part, like the preterite tense forms of other "normal" verbs. For the normal verbs, past tense forms for the first and third person singular are the same as in (105)a,b, while present forms are distinct as in (102) and (103). But, the first and the third person present tense forms of the preterite-present verbs are identical as in (105)c. The past tense forms of these preterite-present verbs are inflected partly like strong verbs in that the stem vowel of the past tense is often different from the present tense vowel and partly like weak verbs in that the past tense takes the dental past tense suffix typical to Germanic languages and the person suffix *-e* for the first and the third person singular forms.

(105) Past tense co	onjugation
---------------------	------------

	a.	weak		b.	strong		c.	preterite-	present		
		sagen			fahren			wissen		können	
person		sg.	pl.		sg.	pl.		sg.	pl.	sg.	pl.
1st		sagte	sagten		fuhr	fuhren		wusste	wussten	konnte	konnten
2nd		sagtest	sagtet		fuhrst	fuhrt		wusstest	wusstet	konntest	konntet
3rd		sagte	sagten		fuhr	fuhren		wusste	wussten	konnte	konnten

There were more preterite-present verbs in Old High German and Middle High German and many of them became leveled to weak conjugation or out of use. However, *wissen* is the only preterite-present verb aside from true modal verbs in Modern German (Priebsch and Collinson 1934 and Schmidt *et al.* 1970). Presumably, the special feature of *wissen* has resisted paradigm leveling.

## 5.2. Itelmen xaq- 'know'

Itelmen, formerly known as Kamchadal, is a Paleo-Asisatic language spoken in the southern area of Kamchatka. The data and the grammatical aspect presented in this section are from Volodin (1976) and Volodin and Khaloimova (1989), and are provided by Jonathan Bobaljik (personal communication). In this language, the verb  $\chi aq$ - 'know' shows a peculiar behavior when negated. First, the regular affirmative and the corresponding negative constructions of a verb are as follows:

(106) Affirmative and Negative in Itelmen

a. Affirmative: V-Inflection
b. Negative: qa?m V-aq il-Inflection
not V-NEG be

(107) kəmma qa?m əŋqa ləmm-aq t-l-kičen

I not what/something kill-NEG 1.SG-be-3.SG.OBJ
'I didn't kill anything.'

In the negative construction, (i)<sup>*i*</sup>- is a transitive auxiliary verb that can be glossed as 'be'.

Turning to the verb  $\chi aq$ - 'know', this verb is expressed in a light verb construction with the same auxiliary verb (i)t- 'be' as in (108).

(108) χaq ił-es know be-Inf.
(109) χaq t-i-s-čen know 1.SG-be-PRES-3.SG.OBJ 'I know him.'

The above form means 'know' as in "I don't know" as a response to a question of information,

'know something' like 'know the way to go', or 'know someone' as in (109).

Now, when negated, this verb  $\chi aq$ - shows a peculiar behavior:

(110) χak-aq t-i-s-čen know-NEG 1.SG-be-PRES-3.SG.OBJ 'I don't know that.' What is peculiar is: The negative sentence in (110) lacks the sentential negative particle qa?m (cf. (107)), even if the negative sentence appears to be a transitive verbal construction (the root in (110) has the regular transitive verbal negative suffix -aq.) The negative form of the verb itself is different as well. The final consonant of the negative form has changed to [k], which is not a predictable phonological phenomenon in Itelmen.

#### 5.3. Japanese Shiru- 'know'

The verb *shiru* 'know' in Japanese also displays a peculiar property, as pointed out by Takako Iseda (personal communication). The verb root *shir*- itself means something more like 'get to know, get acquainted' rather than 'know'. To express the meaning 'know, be aware' the verb needs to appear in the *V-te-iru* construction, resulting in *shitteiru*.<sup>31</sup>

The first peculiarity regarding this verb is that the *-te-iru* construction with *shir-* means something quite different from the ordinary paradigm. In ordinary cases, *-te-iru* turns a verb into the present progressive form:

111) Present a	nd present progressive	e forms in Japanese
	informal present	present progressive
'write'	kaku	kaiteiru
'sing'	utau	utatteiru
'read'	yomu	yondeiru
'come'	kuru	kiteiru

(111) Present and present progressive forms in Japanese

Hence, the form *shitteiru* is expected to mean 'be getting to know, be getting acquainted, be learning', the present progressive of *shiru*. But *shitteiru* refers to the state of knowing, that is 'know, be aware'.

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<sup>&</sup>lt;sup>31</sup>Phonological aspects are not considered such as the change of  $/r/ \rightarrow /t/$  (or vice versa), gemination, segment deletion, voicing, nasal assimilation, place assimilation and so on.

The negative form and the meaning of *shiru* are also unpredictable. To make a present negative form out of a regular verb, the suffix *-(a)nai* is placed after the verb. Then, the expected negative forms of *shiru* 'get to know' and *shitteiru* 'know' are *shiranai* (which would mean 'not get to know') and *shitteinai* (which would mean 'not know'), respectively. However, the form *\*shitteinai* is simply missing, and the other negative form *shiranai* means 'not know', instead.

#### 5.4. Korean Al- Revisited

This section looks into two deviant properties of al- 'know' and molu- 'not.know' in Korean. The first deviation of these verbs is that it is conjugated as a verb even if it is a state predicate. One distinguishing semantic criterion between adjectives and verbs in Korean is that all adjectives describe a state while an action or a process is expressed by a verb. Another factor distinguishing verbs from adjectives is conjugation patterns. As briefly mentioned in section 3.2.4, one formal difference between the two categories is that verbs take the (overt) present tense suffix, -(nu)n, while adjectives do not.<sup>32</sup> The two predicates al- 'know' and molu- 'not.know' are the exception. They describe a state (not an action or a process), but it is conjugated as a verb in that it takes the present tense suffix, -(nu)n.

(47) a. na-nun eysute-lul al-n-ta.
I-TOP Esther-ACC know-PRES-DECL
'I know Esther.'
b. na-nun eysute-lul molu-n-ta.
I-TOP Esther-ACC not.know-PRES-DECL
'I don't know Esther.'

Similarly, verbs and adjectives are formally distinguished by the shape of the prenominal modifier suffix (abbreviated to PNM; also called relativizer). When a predicate modifies the

<sup>&</sup>lt;sup>32</sup>This inwards-sensitive present tense allomorphy is discussed in section 6 of chapter 5.

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following noun, it takes a modifier suffix. This suffix has different shapes depending on the stem category: verbs take *-nun* and adjectives take -n:<sup>33</sup>

(112) Different forms of prenominal modifier suffix depending on the predicate stem category

Adjectives			
yeppu-n aki	eli-n sonye	noph-un san	malk-un hanul
pretty-PNM baby	young-PNM girl	high-PNM mountain	clear-PNM sky
'pretty baby'	'young girl'	'high mountain'	'clear sky'
Verbs			
ca-nun aki	ka-nun salam	sakwa mek-nun aki	cap-nun kes
sleep-PNM baby	go-PNM person	apple eat-PNM baby	grab-PNM thing
'sleeping baby'	'person who is going'	'baby eating an apple'	'something to grab'
	Adjectives yeppu-n aki pretty-PNM baby 'pretty baby' Verbs ca-nun aki sleep-PNM baby 'sleeping baby'	Adjectives yeppu-n aki eli-n sonye pretty-PNM baby young-PNM girl 'pretty baby' 'young girl' Verbs ca-nun aki ka-nun salam sleep-PNM baby go-PNM person 'sleeping baby' 'person who is going'	Adjectivesyeppu-nakieli-nsonyenoph-unsanpretty-PNMbabyyoung-PNMgirlhigh-PNMmountain'prettybaby''younggirl''high mountain'Verbssakwamek-nunakica-nunakika-nunsalamsakwamek-nunakisleep-PNMbabygo-PNMpersonappleeat-PNMbaby'sleepingbaby''personwho is going''baby eating an apple'

The two predicates *al*- and *molu*-, again, pattern as verbs:<sup>34</sup>

(113) al- and mol	u- taking -	nun as the prenomina	l modifier suffix		
al-nun	salam	(*al-(u)n salam)	molu-nun	salam	(*molu-n salam)
know-PNM	person		not.know-PNM	person	
'person whe	o knows'		'person who do	esn't kn	ow'

The two contrasting forms depending on the predicate categories (verbs vs. adjectives) tell that

al- and molu- are verbs, even if they describe a state (a property of adjectives).

The second deviant property of al- and molu- is the selection of the negator in a negative sentence with al-. Section 2.1 has discussed two different negators in Korean, an(i) and mos (each of which has two negation constructions: short-form and long-form negation). An(i) is used for general (or "naïve") negation, while mos is involved in modalities such as ability, possibility, permission or volition.

<sup>&</sup>lt;sup>33</sup>The extra vowel u after a consonant-final adjective stem in the latter two examples in (112) is an epenthetic vowel due to a pure phonological reason (to avoid a cluster of more than two consonants). Vowel-final adjectives do not have this vowel. From a morphophonological point of view, therefore, the basic form of the prenominal modifier suffix is simply *-n* for the adjectives.

<sup>&</sup>lt;sup>34</sup>A phonological rule of deleting the stem-final *l* before a suffix-initial coronal consonant yields the surface form *a-nun* from *al-nun* like *ma-nun* < *mal-nun* 'role-PNM', *sse-nun* < *ssel-nun* 'cut-PNM', *kku-nun* < *kkul-nun* 'drag-PNM', etc.

The long-form negation construction of al- contains mos as the negator (al-ci mos ha-). The deviation is that the resulting negation constructions do not mean something like 'be not able to know' or 'be not allowed to know'. Instead, both molu- and al-ci mos ha- mean general negation 'not know'. The otherwise expected general negation with an(i) (i.e., \*an(i) al- and \*al-ci an(i) ha-) are ungrammatical. The choice of the negator, mos, shows that the verb al- is different from other verbs. If 'know' is somehow associated with features of modal verbs, the choice of mos as the negator for 'know' in Korean can be considered rather natural.

#### 5.5. Summary and a Thought on Categorial Status of Pseudo-Auxiliaries

This section has surveyed special properties and behaviors exhibited by [KNOW] in several different languages. If [KNOW] is related to some functional property and hence shows the suppletive negation (in Korean), Marantz's (1997b) hypothesis that true suppletion is restricted to functional categories can be maintained. Therefore lexical categories are free of competition (and suppletion) and can be freely chosen to be inserted under a given l-morpheme node.

It might be suggested that such verbs as [KNOW] and [BE] (or [EXIST]) showing suppletion due to the proposed auxiliary(-like) properties should be treated as some kind of mixed category. The main reason is that these verbs also show properties of lexical verbs, such as taking arguments like other lexical verbs. In fact, languages seem to have this kind of verbs of mixed properties. In Dutch and German, for example, modal verbs behave also as lexical verbs. In the following German examples, (a) sentences contain a genuine modal verb in addition to a lexical verb, while (b) sentences contain a modal verb which functions as a lexical verb.

(114) a. Ich kann das beenden. I can that finish 'I can finish that.'
b. Ich kann das. 'I can do that.' Inkie Chung. 2007. Ecology of PF

- (115) a. Du musst nach Hause gehen. you must to house go 'You must go home.'
  - b. Du musst nach Hause. 'You must go home.'
- (116) a. Wir möchten Barockkantaten hören.
  we like baroque cantatas hear
  'We would like to listen to baroque cantatas.'
  - b. Wir möchten Barockkantaten.'We (would) like baroque cantatas.'

A somewhat similar behavior is observed in English as well. The verb *need* has the usage of both a lexical and an auxiliary verb. Also, the auxiliary *need* acts like a true modal verb such as *can*, *may*, *will*, etc. in that it lacks the third person singular present indicative *-s* and takes a root infinitive (as in *She need (not) finish it.*); and it acts like a pseudo-auxiliary verb such as *want*, *wish*, *try*, etc. in that it takes the third person singular present indicative *-s* and takes a *to*-infinitive (as in *She needs to finish it.*).

Further, there are several verbs in English which are originally lexical verbs but are also used as pseudo-auxiliary verbs. In the following sentences, the verbs *go*, *come* and *get* are not used as lexical verbs.

- (117) a. He is going to leave the country.
  - b. He comes/gets to realize his problems.
  - c. He (has) got to discern fact from opinion.

These verbs indicate tense, aspect or mood in a specific construction with a to-infinitive.

Perhaps, the third type of verbs needs to be recognized as mixed categories (or semifunctional verbs) in addition to functional categories (or auxiliary verbs) and lexical categories (or main or lexical verbs). Or, the definition or range of functional categories might need to be expanded to include those mixed category entries with such auxiliary(-like) features. Alternatively, it is possible to blame those relevant features directly, not categories (See Bresnan 1997, Cardinaletti and Giusti 2001, Lefebvre and Muysken 1982, Wurmbrand 2001 and references therein for discussions regarding semi-functional verbs and mixed categories.). In any case, the relevance of functional category properties still holds.

## 6. Concluding Remarks

This chapter has examined properties of the verbs 'know' and 'exist' in Korean regarding their suppletive negative forms. These suppletive forms show the same aspects as regular syntactic negation constructions (short-form) regarding negative polarity item licensing, scope interaction with respect to a quantifier, and the distribution of the syntactic negators. In this respect, syntax is expected to be uniform regardless of a predicate and its negation in a given clause. Inspired by this idea, the present study has proposed a Distributed Morphology analysis of the suppletive negative forms. It has been shown that the fusion analysis can correctly explain the suppletive forms and this postsyntactic operation is sensitive to the syntactico-semantic features in the terminal nodes and to the structural relationship of the two target nodes to be fused. Some exceptional behaviors have been considered, in Korean and a few other languages, regarding the verb 'know', to which the fusion operation is restricted along with 'exist' in Korean. These deviant properties suggest that 'know' is related to some universal functional feature.

### Chapter 5

Negation, Honorification, Causative, Allomorphy and the Morphological Structure of Predicates<sup>\*</sup>

### **1. Introduction**

The previous chapter has investigated the syntactic, semantic and morphological nature of suppletive negation in Korean, identifying suppletive negation as a variation of short-form negation. It then provided an analysis of postsyntactic fusion prior to vocabulary insertion within the framework of Distributed Morphology, and showed that this analysis maintains the syntactic and semantic identity of the two morphologically distinct non-long-form negation constructions. This chapter extends the range of the phenomena of root allomorphy to honorification and suffix allomorphy, and provides a more comprehensive study of root and suffix allomorphy in Korean morphology. Eventually, it leads to an analysis of the morphological structure of fully conjugated predicates. Some theoretical consequences are discussed.

# 1.1. Morphological Structure of Predicates in Korean

One question regarding the morphology of the derived inflected verbs is: what is the internal structure of the fully conjugated predicates? Because negation is the only element that linearly precedes the root in a fully inflected predicate form, and because the status of the negation element among prefix, clitic or free morph is not so clear, there have been numerous

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<sup>&</sup>lt;sup>\*</sup>Portions of this chapter were presented at the 36th Annual Meeting of the Michigan Linguistics Society on October 28, 2006, at Oakland University, Rochester, Michigan.

analyses and proposals. Many authors maintain that the negator is the head of the functional projection, Neg(P), through which the root undergoes head movement (up to the C<sup>0</sup> node). Depending on where the Neg projection is posited, the Neg head is located somewhere asymmetrically c-commanding the root after verb raising (H.-D. Ahn 1991, Y.-T. Hong 1992, J.-Y. Yoon 1990). Other researchers such as Y.-T. Hong (1998), J.-B. Kim (1999) M.-K. Park (1994), Sells (1994), and K.-W. Sohn (1995) treat the negation element as a prefix (or clitic) to the root, thus making the two parts sisters before, in or after syntax, depending on the author's analysis. D.-H. An (2003), J. Y.-K. Baek (1998), and Hagstrom (1996, 2000) contend that the negation element is the specifier of NegP with a null Neg head, while K. Park (1992) argues that the negation element is an adverb. The last two views do not consider the negation element as part of the inflected predicate, arguing that the negation and the predicate form separate words. Yet another treatment is a flat structure analysis (Koopman 2004, J. H. Yoon 1994), where a certain phrasal portion is linearized to make the inflected word form in one step.

This chapter supports the head-of-NegP view of (short-form) negation as assumed in chapter 4. Morphosyntactic behaviors and operations are better explained with this assumption. Additionally, section 4 will show that negation is very close to the root and that sometimes negation and the root are sisters supporting the prefix/clitic view. However, the stisterhood relationship holds only when there is no v node engaged between negation and the root. This structural relation suggests that Neg is the head of a functional category and that the morphological structure of the conjugated predicates reflect the syntactic hierarchy of the predicate and the dominating functional categories (and their projections). The crucial data are suppletive and allomorphic predicate roots in the environment of (short-form) negation and of honorification, and the interaction of these allomorphy phenomena with other suffixal features, i.e., functional heads, such as causative, agentive (associated with the "little" v) and tense.

Specifically, this chapter examines root suppletion of subject honorification with the honorific suffix. It also examines blocking of negative suppletion (examined in chapter 4) in the presence of honorific suppletion. Through root suppletion and suppletion blocking, this chapter aims to identify the morphological structure of the inflected verbs. Given that the word-internal structure of the inflected verbs are derived syntactically, this structure would provide a clue to the syntactic structure of clauses, especially verbal functional category projections. I also evaluate and discuss broader grammatical aspects including a formal treatment of contextual allomorphy, reformulation of the fusion rule for suppletive negation and its place, the role of phases (Chomsky 2000, 2001, 2004) in contextual allomorphy, and feature percolation.

### 1.2. Suppletion and Allomorphy

There are cases where vocabulary insertion, providing the (morpho-)phonological content of a morpheme with a node in a morphosyntactic structure, is dependent on the context in which the morpheme appears. These morphophonological forms are distinct from other usual forms in these contexts. In some cases, the condition is phonological or even phonetic. For example, three distinct plural suffixes in English, /s/, /z/ and /əz/, are phonologically conditioned by the final segment of the noun. But in other cases, the condition is not phonological. For example, other plural suffixes such as /ən/ as in *oxen*, /rən/ as in *children*, /tə/ as in *schemata* and *stigmata*, /tm/ as in *cherubim* and *seraphim*, the zero suffix as in *deer* and *sheep*, and a different stem vowel as in *feet* and *mice* are not phonologically related to the sibilant triplets. The /ən/, /tə/, /tə/, /tm/ and Ø allomorphs (sometimes with certain morphophonological readjustment rules such as ablaut) are morphologically conditioned in the context of the associated nouns.

Some cases of morphologically-conditioned allomorphy involve verb and adjective root allomorphy. A limited number of irregular verbs in English have the stem vowel changed when they are conjugated as their past participle form. Examples are: *break* [ey] ~ *broken* [ow], *do* [uw] ~ *done* [ $\Lambda$ ], *freeze* [iy] ~ *frozen* [ow]. These changes are not regular or predictable phonologically, but are restricted to a small number of verbs (many of which are strong verbs historically). A more illustrative case in English is the suppletive comparative and superlative forms of adjectives such as *good/well* ~ *better* ~ *best*, *bad* ~ *worse* ~ *worst*, *many/much* ~ *more* ~ *most*, and *few/little* ~ *less* ~ *least*. The roots of the suppletive comparative and superlative forms are phonologically related to each other in a way or another, but these forms together are by no means related to their positive form in a phonologically regular or predictable way. For example, the alternation between [meniy/mAč] for *many/much* and [mo/mow] for the root parts of *more/most* requires a special morphological mechanism. The morphological change is caused by the suffixes *-er* and *-est*, but such root suppletion is limited to the above cases, possibly with additional readjustments in some cases. (See Bobaljik 2006b for a Distributed Morphology treatment of suppletive comparative and relationships between these forms.)

Similarly, the infinitive suffix in Korean has three different surface forms,  $-e[\Lambda]$ , -a[a] and  $\emptyset$ , due to vowel harmony and hiatus resolution as discussed in chapter 3.

(1) Three surface forms of the infinitive suffix in Korean

a.	/k'^k'-//	[k'^k'^]	'break off
b.	/k'ak'-^/	[k'ak'a]	'clip'

		-	-	_
c.	/k'a-л/	[k'a]	'pe	el'

In the case of ha- 'do', however, the infinitive form is not ha [ha], but haye [hayA] (formal) and hay [he] (< [hæ]; casual), as discussed in section 5 of chapter 3. The relevant phonological operations for ha-, i.e., insertion of a glide without the application of vowel harmony (formal) and additionally, contraction of the root vowel and the inserted glide and the subsequent suffix vowel deletion (casual) are the responsible operations for having distinct surface vowel forms for the suffix (and the root). Although these operations themselves are phonologically quite natural and
plausible, they are restricted to the unique root *ha*-. Hence, the phonological operations and the resulting allomorphy are morphologically conditioned.

Comparable to suppletive comparative and superlative adjective forms in English, some adjectival and verbal roots in Korean show a phonologically unrelated allomorph in particular environments. The suppletive negative roots discussed in chapter 4 are such cases. Honorific suffixes also serve as an environment of root suppletion for certain adjectives and verbs. One root shows both negative suppletion and honorific suppletion. When both negation and honorification are present in the conjugation, only the effect of honorific suppletion is observed with the negative suffix playing no role. This aspect of suppletion blocking will help identify the morphological structure of the predicates and formulate the relevant morphological operations regarding these cases of suppletion.

## 1.3. Chapter Organization

Section 2 first describes the allomorphy of suppletive honorification roots, and considers a derived morphological structure of a predicate that shows both negation suppletion and honorific suppletion. Then, it highlights a paradox arising from the situation with both negation suppletion and honorific suppletion for this root regarding its morphological structure. Section 3 considers other combinations of each of the two roots ('exist' and 'know') and affix features such as negation, causative, [+agent] in v, and honorification. With the paradox unresolved in these combinations, section 4 considers independent morphosyntactic constructions of predicate repetition, and determines that (short-form) negation and the root form a smaller constituent exclusive of honorification.

Section 5 provides a formal analysis of negative suppletion and honorific suppletion to explain the paradoxical interaction of the two cases of suppletion. It establishes the mechanism of

contextual allomorphy and revises the formalism of negative suppletion and reconsiders its status and place in the grammar organization. It also considers the causative construction where honorific suppletion is blocked and provides a phase-based analysis (cf. Marantz 2001 and Pylkkänen 2002). Section 6 considers present tense suffix allomorphy, a case of inwards-sensitive allomorphy. Section 7 summarizes the chapter.

#### 2. Subject Honorification Suppletion and Negation Suppletion

This section surveys subject honorification and suppletion of roots in this environment. It identifies the morphological structure of the inflected predicates with subject honorification using the existential predicate *iss*- 'exist, be present' which exhibits both subject honorific suppletion and negation suppletion. It then contrasts this predicate with the other suppletive negative predicate *al*- 'know' which does not show honorific suppletion, and identifies a paradoxical situation resulting from the two incompatible morphological structures of these predicates.

#### 2.1. Subject Honorification

Subject honorification or subject exaltation is used when the subject of a sentence is exalted or honorified by the speaker who is lower than, or inferior to, the subject. The factors for the relative ranks between the subject and the speaker include family hierarchy, age, or social relations such as teacher-student, employer-employee, or predecessor-successor in a government, military or company hierarchy. When the subject of the clause is honorified, the predicate takes the honorific suffix *-si-* as shown below. Compare (a) and (b) sentences in each pair.<sup>1</sup>

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<sup>&</sup>lt;sup>1</sup>The vowel -u-, glossed as EV, is an epenthetic vowel inserted to break a consonant cluster. The relevant consonant cluster arises from putting a consonant-initial suffix after a consonant-final stem.

- nichey-lul ilk-ess-ta. (2) a. eysute-ka Esther-NOM Nietzsche-ACC read-PAST-DECL 'Esther read Nietzsche (non-honorific).' b. apeci-kkeyse nichey-lul ilk-u-si-ess-ta. father-HON.NOM Nietzsche-ACC read-EV-HON-PAST-DECL '(My) father read Nietzsche (honorific).' a. eysute-ka cacenke-lul tha-n-ta. (3) Esther-NOM bike-ACC ride-PRES-DECL 'Esther is riding a bike (non-honorific).' cacenke-lul tha-si-n-ta. b. apeci-kkeyse ride-HON-PRES-DECL father-HON.NOM bike-ACC '(My) father is riding a bike (honorific).' (4) a. eysute-ka khu-ta. Esther-NOM big-DECL 'Esther is big (non-honorific).'
  - b. apeci-**kkeyse** khu-**si**-ta. father-HON.NOM big-HON-DECL '(My) father is big (honorific).'

The precise location of the honorific suffix as shown in the maximal conjugation is before all other verbal suffixes except for the causative/passive slot.

Some authors contend that honorification is a syntactic phenomenon, more specifically a syntactic agreement, corresponding to the Agr-S head and its projections (H.-D. Ahn and H.-J. Yoon 1989, S.-H. Ahn 2002, H.-S. Choe 1988, K. Choi 2003, H.-S. Han 1987, S.-W. Kim 1996, D.-W. Yang 1996, J.-Y. Yoon 1990 among others; cf. Asudeh and Potts 2004, Boeckx and Niinuma 2004). There seem to be some syntactic properties for honorification in Korean. For example, when the verb takes the -si- suffix, the subject, too, takes an agreeing case marker as shown in the (b) sentences above. The usual nominative case markers are -i or -ka, and the choice depends on the final segment of the subject noun to which one of the nominative suffix allomorphs is attached (-i after a (coda) consonant and -ka after a vowel). In the environment of the subject honorification, the honorific subject case marker -kkeyse is used regardless of the final segment of the subject noun. (Readers are referred to the above authors for other arguments in favor of a syntactic view.)

However, the use of the honorific suffix and the honorific case marker seems dependent on pragmatic factors to some extent. First of all, the relevant relationship is between the speaker and the subject, and it does not care about other usual agreement factors such as person, number and gender. Second, the honorification can be suppressed. Further, it must be suppressed when the addressee is higher than the subject in the honorific hierarchy (mentioned for the subject honorification at the beginning of this section), even though the subject is higher than the speaker. For example, a daughter (or a student) should use the honorific forms when the subject (and in many cases the addressee) is her father (or teacher), but should not use those honorific forms for the same subject when she addresses her grandmother (or principal) who is higher than the subject. This relativity suggests that the honorific system is basically pragmatic.

The subject honorification has a condition on a particular person and number. While subject honorification can be used for any person and number, the first person singular subject can never be honorified.

(5) a. \*nay-ka nichey-lul ilk-u-si-n-ta. I-NOM Nietzsche-ACC read-EV-HON-PRES-DECL (I read Nietzsche.)
b. \*na-kkeyse nichey-lul ilk-u-si-n-ta. I-HON.NOM Nietzsche-ACC read-EV-HON-PRES-DECL (I read Nietzsche.)

A school principal in a school, a president of a multinational enterprise, or even a king in a monarchic country cannot honorify himself or herself.<sup>2</sup>

The unavailability of the honorific suffix with the first person singular subject is contrasted with the following case where the first person plural subject is honorified by the speaker.

<sup>&</sup>lt;sup>2</sup>This particular case can be reduced to the general condition that the subject cannot be higher than the speaker, because when the speaker is the subject the subject cannot be higher than the speaker.

(6) wuli-ka hamkkey nichey-lul ilk-u-si-ci-yo.
 we-NOM together Nietzsche-ACC read-EV-HON-HORT-HUMB
 'Let's read Nietzsche together (honorific).'

In this case, the higher addressee(s) is part of the first person plural subject.<sup>3</sup> When the addressee is not part of the first person plural subject, honorification is not appropriate as indicated below:

(7) \*wuli-ka hamkkey nichey-lul ilk-u-si-keyss-ta.
 we-NOM together Nietzsche-ACC read-EV-HON-FUT-DECL
 'We will read Nietzsche together (honorific).'

The determining factor seems to be pragmatic, because the reason for being unable to honorify the first person singular subject and the first person plural subject excluding the addressee is that one cannot respect oneself or a group of people including oneself. (See S.-J. Chang 1996 and E.-Y. Cho 1994 among others for pragmatic views.) Without discussing whether or not honorification is a syntactic agreement phenomenon as a formal feature, I assume that the honorification feature is present in syntax, and therefore in morphology and semantics, as well.<sup>4</sup>

# 2.2. Suppletive Honorific Forms

There are a few predicates whose root form is, from the morphophonological point of view, radically different from the usual root form when the honorific suffix is attached to them.

<sup>&</sup>lt;sup>3</sup>When the honorific suffix is used with the first person plural subject, the subject, i.e., the pronoun *wuli* 'we', does not take the agreeing honorific nominative case marker. Also, the final, closing suffix of the predicate is hortative.

<sup>&</sup>lt;sup>4</sup>Bobaljik (2006a) argues that the agreement features that have been long considered syntactic are in fact morphological. If this view is correct, the problem of whether subject honorification is syntactic or not would disappear.

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 (8) Suppletive roots in subject honorification non-honorific honorific mek- capswu-si- 'eat' ca- cwumu-si- 'sleep' iss- kyey-si- 'exist, be present'

ttek-ul

That is, the root for 'eat' is realized phonologically as /mek/ (or /ca/) in ordinary cases, but as /capswu/ (or /cwumu/) when the honorific suffix is present. The following sentences show this point.<sup>5</sup>

a. evsute-ka

(9)

( )								
		Esther-NOM rice cake-ACC eat-PAST-DECL						
		'Esther ate rice cake (non-honorific).'						
	b.	apeci-kkeyse ttek-ul <i>capswu-si-</i> ess-ta.						
		father-HON.NOM rice cake-ACC eat.HON-HON-PAST-DECL						
		'Father ate rice cake (honorific).'						
	c.	*apeci- <b>kkeyse</b> ttek-ul <i>mek</i> -u-si-ess-ta.						
		father-HON.NOM rice cake-ACC eat-EV-HON-PAST-DECL						
	d.	?apeci-ka ttek-ul <i>capswu-si-</i> ess-ta.						
		father-NOM rice cake-ACC eat.HON-HON-PAST-DECL						
(10)	a.	eysute-ka pang-eyse ca-n-ta.						
		Esther-NOM room-LOC sleep-PRES-DECL						
		'Esther is sleeping in the room (non-honorific).'						
	b.	apeci-kkeyse pang-eyse cwumu-si-n-ta.						
		father-HON.NOM room-LOC sleep.HON-HON-PRES-DECL						
		'Father is sleeping in the room (honorific).'						
	c.	*apeci-kkeyse pang-eyse ca-si-n-ta.						
		father-HON.NOM room-LOC sleep-HON-PRES-DECL						
	d.	?apeci-ka pang-eyse <i>cwumu-si-n-ta</i> .						
		father-NOM room-LOC sleep.HON-HON-PRES-DECL						
		-						

mek-ess-ta.

If the honorific suffix is not present in the inflected verb forms, the honorific root allomorphs must not be used. As shown in the (c) sentences above, a regular, non-honorific form appearing with the honorific suffix is not grammatical: \*mek-u-si- and \*ca-si-. When the honorific suffix is

<sup>&</sup>lt;sup>5</sup>The (d) sentences in (9) and (10), where the agreeing honorific nominative marker is not used with the honorific suffix in a given predicate, are heard more and more among younger generations. Conservative speakers would resist these sentences at least for the felicity reasons, if not for grammatical reasons.

present, the root is the suppletive honorific form, *capswu-si-*, *cwumu-si-*, etc., for 'eat', 'sleep', etc., respectively. Like non-suppletive roots, it also co-occurs with the agreeing honorific nominative case marker on the subject noun phrase.

As mentioned earlier, honorifics should be suppressed when the addressee is higher than the subject (even though the subject is higher than the speaker). In such a situation, a relevant suppletive root is realized as a non-honorific allomorph. In the following sentences uttered by, for example, a son addressing his grandfather referring to his father (the subject), the non-honorific forms are used in the absence of the honorific suffix. For the same reason as non-suppletive honorific roots, the agreeing honorific nominative case marker is not used.

(11)	a.	apeci-ka	ttek-ul	mek-ess-ta.					
		Father-NOM	rice cake-A	CC eat-PAST-DECL					
		'(Your) father ate rice cake (non-honorific).'							
	b.	apeci-ka	pang-eyse	ca-n-ta.					
		Father-NOM	room-LOC	sleep-PRES-DECL					
		'(Your) fathe	er is sleeping	g in the room (non-honorific).'					

Honorific suppletive forms are an example of root suppletion. Unlike negation suppletion examined in chapter 4, the root itself exhibits a special form in the presence of the honorific suffix. The responsible suffix surfaces as the consistent form *-si*- whether the root is suppletive or not. Hence, honorific suppletion is contextual (or conditioned) root allomorphy.

# 2.3. Honorific Root Suppletion and Blocking of Negation Suppletion

There arises an interesting situation when negation and honorification are put together for the predicate that has both a suppletive negative form and a suppletive honorific root form. The predicate *iss-* 'exist, be present' (with the negative form *eps-* 'not exist, be not present' and the honorific form *kyey-si-* 'exist/be.present-HON') is realized as *kyey-* when both negation and honorification are involved: an(i) kyey-si-.

- (12) a. apeci-kkeyse cha-ey *an(i) kyey-si-ta*. father-HON.NOM car-LOC NEG exist.HON-HON-DECL 'Father is not in the car (honorific).'
  - b. \*apeci-kkeyse cha-ey *eps*-u-si-ta. father-HON.NOM car-LOC not.exist-EV-HON-DECL

Since only one of the two competing suppletion processes operates, it can be utilized to identify the morphological structure of the inflected, morphologically complex predicate, at least with (short-form) negation and honorification.

As assumed in the Distributed Morphology literature (Bobaljik 2000, Halle and Marantz 1993, Harley and Noyer 1999, Noyer 1997, among others) and in chapter 4, vocabulary insertion is "from root outwards", i.e., vocabulary insertion takes place from the most deeply embedded terminal node (i.e., root) outward cyclically. When a terminal node is provided with the phonological features replacing the morphosyntactic features at the given cycle, this vocabulary insertion may be sensitive to the morphosyntactic features at an outer cycle. In the following (partial) structure for the *an(i) kyey-si-ess-ta* "NEG exist.HON-HON-PAST-DECL" produced by overt syntax, the root node is first provided with phonological features.

(13) Structure for an(i) kyey-si-ess-ta at the end of overt syntax (partial)



At this time, the [+hon] feature, which is at the next outer cycle from the root, is the determining factor for choosing /kyey/ for [EXIST]. Hence, the vocabulary item for the suppletive root form of

[EXIST] would look like what follows (along with other relevant vocabulary items):

- (14) Vocabulary items with feature [EXIST]
  - a. [+neg, EXIST]  $\leftrightarrow$  /eps/
  - b. [EXIST]  $\leftrightarrow$  /kyey/ / \_\_\_\_ [+hon]
  - c. [EXIST]  $\leftrightarrow$  /iss/
- (15) Vocabulary items with a functional category feature
  - a.  $[+hon] \leftrightarrow /si/$
  - b.  $[+neg] \leftrightarrow /an(i)/$
  - c.  $[+past] \leftrightarrow /ess/$

Replacing [EXIST] with /kyey/ in the environment of [+hon] in the structure (13) yields the following structure.

(16) Vocabulary insertion for the root node, [v EXIST], in [+neg]-[EXIST]-[+hon]-[+past]-



The [+hon] feature at the next cycle chooses /kyey/ (14)b over /iss/ (14)c. The negative suppletive form /eps/ (14)a is not chosen because there is no single node containing [+neg] and [EXIST] in the above structure. This point regarding the structural requirement for fusion, i.e., strict sisterhood of [+neg] and [EXIST], has been discussed in section 4.2 of chapter 4.

To ensure the choice of /kyey/ in the environment of both negation and honorification, the structure of the inflected predicate is expected to be something like (13), rather than (17) below, in that the [+hon] node is to be structurally closer to the root than the [+neg] node is.

(17) Possible alternative for [+neg]-[EXIST]-[+hon]-[+past]-



The choice of (13) over (17) is a simpler assumption in that the morphosyntactic feature responsible for root suppletion is expected to be closer to the root. Also, because the root node and the [+neg] node are sisters in (17), the fusion operation of these two nodes, as examined in chapter 4, would wrongly take place. The [+hon] feature effectively chooses the suppletive honorific form in (13).

Vocabulary insertion proceeds with Hon, Neg, T, etc. cyclically and in this order in (13). Because the fusion of [+neg] and the root node has not occurred, the Neg node with its [+neg] feature is still there as a separate node, and is provided with the regular phonological feature of negation, /an(i)/. This stepwise insertion of Hon, Neg, T is illustrated below.





The above structure and derivation neatly yield the correct surface form *an(i) kyey-si-ess-* along with the "from inside outward" vocabulary insertion.

This analysis also shows that morphological structure is contingent upon syntactic structure, and hence morphology follows (and interprets) syntax. Vocabulary insertion is sensitive to the morphosyntactic features at outer cycles. Root suppletion of honorification is explained with morphosyntactic features along with corresponding vocabulary items.

#### 2.4. Honorific Suppletion and Negation Suppletion: A Paradox

There arises a problem when the corresponding structure for [+neg]-[KNOW]-[+hon]- is taken into consideration together with the above structure (13) for [+neg]-[EXIST]-[+hon]-. If (13) is extended to the [KNOW] case, the following structure would be reached for the [+neg]-[KNOW]-[+hon]-:

(19) Structure for [+neg]-[KNOW]-[+hon]- before vocabulary insertion



Vocabulary insertion proceeds. When the root is provided with the corresponding phonological features, the morphosyntactic feature [+hon], at the next outer cycle, does not play any role in terms of root allomorphy (and hence there is no honorific suppletion for [KNOW]). Subsequently, the [+hon] feature would be replaced with /si/, and then, [+neg] with /an(i)/, and so on. This cyclic, from-inside-outward application of vocabulary insertion of these nodes yields the following structure:

(20) Structure for [+neg]-[KNOW]-[+hon]- after cyclic vocabulary insertion to (19)



The resulting phonological form for the structure (19) would be \*an(i) al-si (which further turns to \*an(i) a-si- due to the general phonological rule deleting [1] before a coronal consonant).

However, the correct form for [+neg]-[KNOW]-[+hon]- is *molu-si-*, not \*an(i) *al-si-* (> \*an(i) *a-si-*). The problem arises because the root and the [+neg] node are not sisters in (19). The two nodes are to be fused into one single node before vocabulary insertion embracing all the relevant morphosyntactic features that the two original nodes had. The structural requirement is the strict sisterhood of the two original nodes, as demonstrated in section 4.2 of chapter 4. However, these two nodes are not sisters in (19) and the rule description is not met.

In what follows in most of the remainder of the chapter, I examine different constructions which replicate the paradoxical situation. In section 3, I consider more complex morphological structures with all of negation, v (agentive or causative) and honorification. Section 4 provides independent morphosyntactic predicate iteration constructions to determine which of the two structures (19) and (20) is compatible with these iteration constructions. Section 5 formalizes the honorific suppletion process and reformulates the fusion rule for negative suppletion.

#### 3. Root Suppletion of [EXIST] and [KNOW] with [+neg], v, and [+hon]

Section 2 discusses the case of negation-root-honorification without the v element for the predicates 'exist' and 'know'. These two predicates show contradictory structures regarding

which of the two heads, Neg<sup>0</sup> and Hon<sup>0</sup>, is closer to the root. The honorific allomorph /kyey/ in [+neg]-[EXIST]-[+hon] suggests that the [+hon] node is closer to the root while the negative suppletive allomorphy /molu/ in [+neg]-[KNOW]-[+hon] suggests that the [+neg] node and the root are sisters to the exclusion of the [+hon] node.

This section considers further possible combinations of these roots and all relevant possible affixes. It starts with the cases of V-v-Hon with root allomorphy for these predicates, and then moves to the Neg-V-v-Hon cases. These constructions are to examine if the intervening v node induces any (un-)expected allomorphy of these predicates. Any such additional allomorphy or absence of previously examined allomorphy due to the intervening v node would be utilized to reconcile the two contradictory structures.

# 3.1. Root Suppletion with v and [+hon] but without [+neg]

This section considers allomorphy of the roots 'know' and 'exist' with v and [+hon] but without [+neg]. Let us first consider the case of 'know'. The morphosyntactic structure to be considered is the root with the functional category features [v+caus] and [+hon]. Because both the causative and [+hon] are suffixes, the hierarchical structure is straightforward. The root and [v+caus] are structured first and then the result is structured with [+hon]. The morphosyntactic structure yielded after Spell-Out looks like the following:

(21) Structure of [KNOW]-[v + caus]-[+hon] before vocabulary insertion



The cyclic vocabulary insertion converts the above structure to:

(22) Structure of [KNOW]-[v+caus]-[+hon] after vocabulary insertion



The resulting phonological form is /al.li.si/ as expected. There is no root allomorphy in the environment of causative, honorification or both. [KNOW] does not show allomorphy with honorification alone without causative, either, and there is no new interesting matter from this case with both [ $_{1}$  +caus] and [+hon].

Section 4.2.1 of chapter 4 discusses the case of [+neg]-[KNOW]-[ $_{v}$ +caus]. This structure is realized as /an(i) al-li/ exhibiting no negative suppletion of the root. Hence, the conclusion has been that causative is structurally closer to the root than negation is. In this case, the root does not show root allomorphy with respect to causative, either. Absence of root allomorphy with causative is consistent regardless of whether negation is present (as in the case of chapter 4 section 4.2.1) or not (as in the current case). This fact also supports the analysis of structuring the root with causative before negation. In any case, the [KNOW]-[ $_{v}$ +caus]-[+hon] has the structure in (21).

The case of [EXIST] is different. The sequence to be considered is [EXIST]-[v+agent]-[+hon] without [+neg]. Chapter 4 (section 4.2) analyzes the two homophonous predicates, the existential *iss*-1 'exist, be present' and the agentive *iss*-2 'stay intentionally', as absence and presence of the v node with the [+agent] feature, respectively. As seen in section 2 of this chapter, [EXIST] is phonologically expressed as the honorific allomorph *kyey*- in the environment of [+hon] without

[ $_v$  +agent]. There is no intervening suffix between the root and the [+hon] node structurally or linearly. The case of [EXIST]-[ $_v$  +agent]-[+hon]- is also realized as *kyey*-. The allomorphic root with -*si*- can take the present tense suffix -*n*-, which is the characteristic of verbs as shown in the following examples:

(23) Agentive kyey- occurring with honorific -si- and the overt present tense suffix -na. sensayng-nim-kkeyse-nun thoyoil-ey-to teacher-honorific.title-HON.NOM-TOP Saturday-TEMP-also hakkyo-ey kyey-si-n-ta. school-LOC exist.HON-HON-PRES-DECL '(The) teacher is (staying intentionally) at school on Saturday as well (honorific).'
b. apeci-kkeyse [Ø pang-ey kyey-si-n-ta] ha-si-ess-ta. father-HON.NOM room-LOC exist.HON-HON-PRES-DECL say-HON-PAST-DECL

'Father said that (he) would stay in the room (honorific in both clauses).'

The sentence (23)a is a statement where the speaker may be a student of the teacher, i.e., the subject who is honorified by the speaker. The sentence means that the teacher stays deliberately at school on Saturday, and not that he is simply present there. It is involved in an intentional action by the subject. The involved action, morphosyntactically encoded in the v shell, is compatible with (and requires) the overt -*n*-. The sentence (23)b embeds an indirect quotation with a null subject referring to the matrix subject. The relevant predicate appears inside the embedded clause, which is realized as the honorific allomorph *kyey*- with the honorific suffix -*si*- and is accompanied by the present tense suffix -*n*- for the action verb. The root in both cases in (23) is the action verb resulting from the root 'exist' and the v shell. In other words, the overt present tense suffix -*n*- indicates that the v shell is present with the [+agent] feature.

The agentive  $iss_{2}$  takes the overt present tense suffix -n- while the existential  $iss_{1}$  does not (as discussed in section 3.2.4 of chapter 4 and section 6 of this chapter). This contrast is retained in the case of the honorific allomorph *kyey*- correspondingly. The honorific existential *kyey*-1 along with -si- does not take the overt tense suffix -n- as in (12)a, while the honorific agentive Inkie Chung. 2007. Ecology of PF

 $kyey_{-2}$  with the meaning 'stay intentionally' does as in (23). Hence, the corresponding sentences without the overt suffix -*n*- are also possible as in (24).<sup>6</sup>

(24) Existential kyey- occurring with honorific -si- and without the overt present tense suffix -n-a. sensayng-nim-kkeyse-nun thoyoil-ey-to teacher-honorific.title-HON.NOM-TOP Saturday-TEMP-also hakkyo-ey kyey-si-ta. school-LOC exist.HON-HON-DECL '(The) teacher is at school on Saturday as well (honorific).'
b. nwuna-ka [apeci-kkeyse pang-ey kyey-si-ta] ha-y-ess-ta. big sister-NOM father-HON.NOM room-LOC exist.HON-HON-DECL say-EG-PAST-DECL

In these cases, the predicate with the same allomorphic form describes the state of the subject's presence and not the subject's (intentional) staying.

'Big sister said that father was in the room (honorific in embedded clause).'

In a similar manner, the existential kyey- and the agentive kyey- take different relativizer or prenominal modifier suffix (abbreviated to PNM). As briefly discussed in section 5.4 of chapter 4, adjectives describing a state and verbs denoting an action take different relativizer forms when they modify a following noun: -*n* before an adjective and -*nun* before a verb. Meaning "the simple presence," the honorific existential kyey-si- behaves as an adjective in that it takes -*n* before the following noun it modifies as in (25)a. When the agentive kyey-si- with the same form modifies the following noun, it patterns as a verb and takes -*nun* as in (25)b.

(25) Existential and agentive kyey-si- taking different prenominal modifiers -n or -nun

- a. apeci-kkyese kyey-si-n samusil father-HON.NOM exist.HON-HON-PNM office 'the office where father is (present) (honorific)'
  b. apeci-kkyese kyey-si-nun hotheyl father-HON.NOM exist.HON-HON-PNM hotel
  - 'the hotel where father stays (intentionally) (honorific)'

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<sup>&</sup>lt;sup>6</sup>The glide y, annotated with EG, is an epenthetic glide repairing the hiatus configuration as discussed in chapter 3 section 5 regarding the peculiar stem ha-.

Therefore, it is concluded that honorific forms, like non-honorific forms, are accompanied by the v node with the [+agent] feature in the examples in (23). This v intervenes the root and the honorific node linearly and structurally.

There is one immediate noticeable point that should be addressed. The root [EXIST] is realized as the honorific allomorph *kyey*- with v intervening between the root and the honorific node. This suggests that the  $v^0$  node with the [+agent] feature, which is the case for non-causative action verbs, be transparent (or ignored) for the purpose of vocabulary insertion for [EXIST] when [+hon] is present outside of the  $v^0$  node.

(26) Structure of [EXIST]-[ $_v$ +agent]-[+hon]



In order for the cyclic application of vocabulary insertion to yield the phonological form kyey-Ø-si- in (26), the vocabulary item (14)b would have to be revised as the following:

(27) Vocabulary item for [EXIST] in the environment of [+hon] (revision of (14)b)
 [EXIST] ↔ /kyey/ / (\_\_\_\_ [+agent] /) \_\_\_\_ [+hon]

The parentheses in (27) indicate that the feature [+agent] may, but need not, be present between the root [EXIST] and the [+hon] node at the point of vocabulary insertion of the root.

Alternatively, a different formalism may work. According to Bobaljik (2000) and Halle and Marantz (1993), contextual allomorphy requires structural government by the conditioning morphosyntactic feature in an outer cycle within the same word. In the structure (26), the root is governed by the [+hon] feature, and hence allomorphy of the root is possible even if the v node

intervenes between the root and its allomorphy-conditioning [+hon] feature. Then the vocabulary item for [EXIST] would look like the following:

# (28) Vocabulary item for [EXIST] in the environment of [+hon] (revision of (14)b) [EXIST] ↔ /kyey/ / governed by [+hon]

Bobaljik (2000) notes that the condition of allomorphy of a certain morpheme can be farther away from that allomorphy-exhibiting morpheme than the immediate outer cycle in a given word. Both formalisms above are compatible with this linguistic phenomenon. In either case, honorification in Korean shows that (outwards-sensitive) contextual allomorphy is not always strictly local (Adger, Béjar and Harbour 2003, Bobaljik 2000, Embick and Noyer 2001, Halle and Marantz 1993; contra Allen 1978, Carstairs 1987, Siegel 1977, Simpson and Withgott 1986).

The two approaches would make no practical difference in the present case. But from a theoretical perspective and also in other complicated cases, the government approach will be shown to provide a more systematic and consistent way to deal with contextual allomorphy and the optionality of certain nodes and/or features between the root and the morphosyntactic feature responsible for root allomorphy. Before that, the remainder of section 3 discusses more complicated situations.

#### 3.2. Suppletion of [KNOW] with [+neg], [+caus] and [+hon]

Consider allomorphy of the root [KNOW] with all of the relevant affix features, i.e., [+neg], [+caus] and [+hon]. The sequence [+neg]-[KNOW]-[ $_v$ +caus]-[+hon] is realized as an(i) al-li-si-. This root shows suppletion with [+neg] through the formalism of fusion (as discussed in chapter 4), but this suppletion is unavailable when the [+caus] feature is present along with the v projection. Because of this suppletion blocking, the [ $_v$ +caus] projection has been analyzed to intervene between the root node and the Neg<sup>0</sup> node.

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The root [KNOW] does not show any suppletion/allomorphy with [+caus] or with [+hon] individually or jointly. The absence of allomorphy of [KNOW] with the [+hon] feature and no blocking of negative suppletion by [+hon] suggest that [+hon] is outside of negation. Thus, the following is suggested as the morphosyntactic structure for [+neg]-[KNOW]-[ $_v$ +caus]-[+hon]-.

(29) Morphosyntactic structure of [+neg]-[KNOW]-[, +caus]-[+hon]-



Cyclic vocabulary insertion yields the following structure and the correct phonological form:

(30) Structure of [+neg]-[KNOW]-[v + caus]-[+hon]- after vocabulary insertion



In fact, the above morphosyntactic structure for the root [KNOW] has the additional Hon<sup>0</sup> layer on the structure identified for [+neg]-[KNOW]-[ $_v$ +caus]- in section 4.2.1 of chapter 4. This structure is consistent with all combinations of the root and the affixes, [+neg], [ $_v$ +caus] and [+hon] (see sections 3.1 and 4.2.1 of chapter 4 and section 3.1 of this chapter.).

# 3.3. Suppletion of [EXIST] with [+neg], [v +agent] and [+hon]

Now consider [+neg]-[EXIST]- $[_v$ +agent]-[+hon]-. In terms of the linear arrangement, it is an addition of short-form negation in front of the remaining sequence. This remaining sequence has been studied in section 3.1. The entire sequence including Neg is materialized as an(i) kyey-si-, as shown below.

- (31) Agentive kyey- occurring with an(i), -si- and the present tense -n
  - a. apeci-kkeyse ilyoil-ey-to cip-ey an(i) *kyey*-si-n-ta. father-HON.NOM Sunday-TEMP-also home-LOC NEG exist.HON-HON-PRES-DECL 'Father does not stay home on Sundays (honorific).'
  - b. apeci-kkeyse [Ø pang-cy an(i) kyey-si-n-ta](-ko)
    father-HON.NOM room-LOC NEG exist.HON-HON-PRES-DECL(-RPRT)
    ha-si-ess-ta.
    say-HON-PAST-DECL
    'Father said that (he) would not stay in the room (honorific in both clauses).'

Such forms as \*an(i) iss-u-si-n-ta with a non-suppletive root (with the epenthetic vowel -ubetween the stem-final consonant and the initial consonant of the prefix -si-) are not grammatical. In the above examples, the overt present tense suffix -n- occurs with the agentive kyey-, which is an indication of the presence of the v node with the [+agent] feature.

There is additional support for the view that the v node is involved in the agentive kyey.

Instead of the general negator an(i), the modal negator mos can be placed before the predicate

with the honorific -si-.

(32) Agentive kyey- occurring with the modal negator mos, -si- and the present tense -n-a. apeci-kkeyse ilyoil-ey-to cip-ey mos kyey-si-n-ta. father-HON.NOM Sunday-TEMP-also home-LOC NEG exist.HON-HON-PRES-DECL 'Father can/may not stay home on Sundays (honorific).'
b. apeci-kkeyse [Ø pang-ey mos kyey-si-n-ta](-ko) father-HON.NOM room-LOC NEG exist.HON-HON-PRES-DECL(-RPRT) ha-si-ess-ta. say-HON-PAST-DECL

'Father said that (he) can/may not stay in the room (honorific in both clauses).'

The above sentences indicate that the v node is present with the agentive kyey-, which is the combination of [EXIST] plus  $v^0$ . The modal negator mos in the short-form negation construction can appear only with verbs (see sections 2.1 and 5.4 of chapter 4). Hence, the v node is present in the morphosyntactic structure of an(i)/mos kyey-si-n-, and is headed by the feature [+agent] (see section 4.2.1 of chapter 4). In these cases, too, forms such as \*mos iss-u-si-n-ta with iss-, the regular non-suppletive allomoroph, are ungrammatical.

Having the honorific allomorph *kyey*- in the environment of short-form negation and v with [+agent] is quite an unexpected situation. Chapter 4 discusses allomorphy of [EXIST] in the environment of v with the [+agent] feature (hence, the agentive *iss*-) and negation, but without honorification. In this situation, the root is realized as the normal allomorph *iss*- and does not show negative suppletion of *eps*-. This fact has lead to the conclusion that the  $v^0$  node is closer to the root than the Neg<sup>0</sup> node is. If the structure [Neg [v V v]] is maintained, the sequence [+neg]-[EXIST]-[v+agent]-[+hon] will have the following morphosyntactic structure:

(33)  $[+neg]-[EXIST]-[_v+agent]-[+hon]: adding [+hon] to [[+neg] [[EXIST] [_v+agent]]]$ 



The above structure is a simple addition of [+hon] on top of the structure identified for [+neg]-[EXIST]-[ $_v$ +agent]- in chapter 4, section 4.2.3. In this structure, negation suppletion is not possible because the Neg<sup>0</sup> node and the V<sup>0</sup> node are not sisters and these two nodes cannot be fused. Honorific suppletion would not be available, either, because two nodes, v and Neg, intervene

between the root and the allomorphy-triggering Hon node. Then, the phonological form would be \*an(i) iss-u-si-, with the epenthetic vowel -u- for a phonological reason. However, the actual form is an(i) kyey-si-. The non-adjacent Hon still incurs root suppletion with the two intervening nodes between the root and the Hon node as assumed in the structure (33). The inertness of the intervening nodes and the non-local allomorphy is discussed in section 5.

An alternative structure is conceivable for the sequence [+neg]-[EXIST]- $[_r$ +agent]-[+hon]. It structures the root node and the v node first, but the resulting combination is grouped with Hon in the next cycle, and the entire constituent in turn is structured with Neg, as illustrated below:

(34) [+neg]-[EXIST]- $[_v$ +agent]-[+hon]-: structuring [+hon] prior to [+neg]



In fact, this structure is more adequate for [+neg]-[EXIST]-[+hon]- (without the  $[_{v}+agent]$  node) identified in section 2.3, repeated in part below:

(13) Structure for [+neg]-[EXIST]-[+hon]- without  $[_v$ +agent]



The structure (13) reflects the fact that the vocabulary item [EXIST] is realized as kyey-, the

honorific allomorph, due to the [+hon] feature. If Neg were structured with the root prior to Hon, then [EXIST] under the V node and Neg would fuse into a single node resulting in the negative allomorph, *eps*-. With the Hon node structured first with the root excluding the Neg node as in (13), the honorific suppletion is explained straightforwardly. This configuration structurally represents the relationship among these nodes regarding root suppletion of honorification.

The structure (34) is an insertion of the v node in (13) between the root and Hon. Because v appears between the two nodes linearly, it intervenes between them structurally as well. Section 3.1 discusses the transparency of the v node with the [+agent] feature with respect to vocabulary insertion of the root [EXIST] when the [+hon] feature is present outside of the v node. Once this transparency or non-locality with respect to v is acknowledged, the structure (34) gains an advantage over the structure (33) because (33) has Neg in addition to v between the root and Hon. However, (33) is compatible with all the cases for [KNOW] as studied in section 4.2 of chapter 4, and sections 2.4, 3.1 and 3.2 of this chapter. That is to say that when the v node is put aside, the same problem of the two contradictory structures for [KNOW] and [EXIST] identified in section 2 remains the same.

#### **3.4. Paradox Remains**

The discussions in section 3 have not been a big help to determine the correct structure of fully conjugated predicates between (33) [[Neg V] Hon] and (34) [Neg [V Hon]]. The paradox identified in section 2 still remains unresolved. Therefore, independent phenomena are to be examined. In either case, it must be acknowledged that a certain vocabulary item needs to be ignored between another vocabulary item to be inserted and a certain morpheme. The v node is to be ignored (or transparent) in either case, and so is Neg additionally if the structure (34) is proven to be correct. This means that allomorphy rules are not always strictly adjacent or local.

#### 4. Predicate Iteration Constructions and Morphosyntactic Structure of Neg-Root-v-Hon

Due to the indeterminacy of the proper structure for the Neg-V-v-Hon sequences between [[Neg [V v]] Hon] (33) and [Neg [[V v] Hon]] (34), this section looks into independent morphosyntactic constructions and determines that Neg is structured more closely to the root than Hon is. Three morphosyntactic predicate iteration constructions are examined. They are involved in a repetition of the predicate stem along with some optional affixes. The three constructions are: iterated rhetoric question, echoed verb construction, and *ha* focus construction. In each of them, predicates with both negation and honorification are examined to determine which of the two affixes is closer to the root. It is shown that all these three constructions support that (short-form) negation is structured more closely to the root than honorification is.

#### 4.1. Iterated Rhetoric Question

The first predicate iteration construction is what I call 'iterated rhetoric question'. They have a form of a *wh*-question, but they are not used to ask any question. Rather, they mean to dispute the propositional content of the sentence. In this sense, they would rather be viewed as rhetorical questions. Some examples follow below:

# (35) Iterated rhetoric question

- a. ney-ka po-ki-nun nwukwu-lul po-ass-e? you-NOM see-NMLZ-FOC who-ACC see-PAST-INF 'You did not see anybody. (lit. Who on earth did you see?)'
- b. eysute-ka ka-ki-nun eti-ey ka-ni?
  Esther-NOM go-NMLZ-FOC where-ALLA go-INTER
  'Esther does not go anywhere. (lit. Where on earth does Esther go?)'
- c. eysute-ka ka-ki-nun mues-ul ka-ni? Esther-NOM go-NMLZ-FOC what-ACC go-INTER 'Esther does not go at all. (lit. Does Esther go at all?)'

d.	ppalu-ki-nun	n nwu-ka	ppalu-ni?	
	quick-NMLZ-	-FOC who-NOM	quick-INTER	
	'Nobody is c	quick at all. (lit.	Who on earth	is quick?)'
e.	eysute-ka	ppalu-ki-nun	mues-i	ppalu-ni?
	Esther-NOM	quick-NMLZ-FC	C what-NOM	quick-INTER
	'Esther is no	ot quick at all. (li	it. Is Esther qu	ick at all?)'

This construction has a *wh*-phrase between the two instances of the predicate. The *wh*-phrase is one of the arguments of the predicate, missing in the preceding part of the entire clause with the first instance of the predicate and the remaining argument (or pseudo-argument), if any. This point is shown in (35)a,b,d.

As shown in (35)c,e, the iteration construction is possible even when there is no missing (pseudo-)argument in the first part of the entire construction. However, these sentences still have a *wh*-phrase, and in this case *mues* 'what' is used uniformly and obligatorily.<sup>7</sup> This *wh*-phrase does not mean 'what' literally, but fills the gap between the two instances of the predicate. In this case, the negative connotation is on the entire propositional content of the relevant clause, while the genuine rhetoric *wh*-question focuses on the (pseudo-) argument realized as the corresponding *wh*-phrase.

In either case, the predicate, more accurately only a part of the predicate including the root, is repeated. There is some degree of freedom as to up to what portion of the entire conjugated predicate is repeated. Relevant to the present discussion are the cases of the predicates with short-form negation and honorification. First, consider the case of a predicate with a negator:

- (36) Iterated rhetoric question with an(i) plus a verb
  a. ney-ka an(i) po-ki-nun nwukwu-lul an(i) po-ass-e?
  you-NOM NEG see-NMLZ-FOC who-ACC NEG see-PAST-INF
  'You did see somebody, indeed. (lit. Who on earth didn't you see?)'
  - b. \*ney-ka an(i) po-ki-nun nwukwu-lul po-ass-e?

<sup>&</sup>lt;sup>7</sup>The case marker of this redundant *mues* is accusative with a verb as in (35)c, and nominative with an adjective as in (35)e.

	c.	*ney-ka	po-ki-nun	nwukwu-lul	an(i)	po-ass-e?
(37)	Iter	ated rhetoric que	stion with mos	plus a verb		
	a.	ney-ka mos	po-ki-nun	nwukwu-lul	mos	po-ass-e?
		you-NOM NEG	see-NMLZ-FOC	who-ACC	NEG	see-PAST-INF
		'You were able	to see somebody	y, indeed. (lit	. Who	on earth weren't you able to see?)'
	b.	*ney-ka mos	po-ki-nun	nwukwu-lul		po-ass-e?
	c.	*ney-ka	po-ki-nun	nwukwu-lul	mos	po-ass-e?
(38)	Iter	ated rhetoric que	estion with an(i)	plus an adje	ctive	
	a.	an(i) ppalu-ki-	nun nwu-ka	a <i>an(i)</i> pp	oalu-ni	?
		NEG quick-NM	ILZ-FOC who-N	OM NEG qu	ick-N	TER
		'Somebody is q	uick, indeed. (lit	t. Who on ear	rth isn	't quick?)'
	b.	*an(i) ppalu-ki-	nun nwu-k	a pr	oalu-ni	1?
	c.	* ppalu-ki-	nun nwu-ka	a <i>an(i)</i> pp	balu-ni	l?

A negator an(i) or mos must be repeated along with each instance of the root. This shows that the

root and the negator an(i)/mos (of short-form negation) behave as a unit in this construction.

The second situation is where the root takes the honorific suffix. Consider the following:

(39)	Iterated rhetoric question with a verb plus the honorific -si-									
	a.	apeci-kkeyse	po- <b>si</b> -ki-nun	nwukwu-lul	po <b>-si-</b> ess-e?					
		father-HON.NOM	see-HON-NMLZ-FC	OC who-ACC	see-HON-PAST-INF					
	'Father didn't see anybody at all (honorific). (lit. Who on earth did fa									
	b.	?apeci-kkeyse	po- <b>si-</b> ki-nun	nwukwu-lul	po-ass-e?					
	c.	apeci-kkeyse	po-ki-nun	nwukwu-lul	po- <b>si</b> -ess-e?					
(40)	Iterated rhetoric question with an adjective plus -si-									
	a.	ppalu-si-ki-nun	nwu-ka p	palu- <b>si-</b> ni?						
		quick-HON-NMLZ	Z-FOC who-NOM c	uick-HON-INTEF	ξ					
		'Somebody is qu	ick, indeed (honor	ific). (lit. Who o	n earth isn't quick?)'					
	b.	?ppalu-si-ki-nun	nwu-ka p	palu-ni?						
			-							

c. ppalu-ki-nun nwu-ka ppalu-si-ni?

In sentences (39)b and (40)b, the first predicate has the honorific suffix -si- and the second predicate does not, while the situation is the opposite in the (c) sentences. The (b) sentences are not completely acceptable as the question mark indicates before them. However, the (c) sentences are perfectly grammatical. What the (c) sentences (and arguably the (b) sentences as well) show is that the honorific suffix is separable from the root. The distribution of -si- in (39)-(40) together with the distribution of a negator in (36)-(38) shows that short-form negation is closer to the root than honorification is. For this, one needs to see what happens if the root has both (short-form)

negation and honorification.

Below are sentences with both short-form negation and honorification in the iterated

rhetoric question construction.

(41) Iterated rhetoric question with a verb, an(i) and -si-

	a.	apeci-k	keyse	an(i)	po-si-k	i-nun	nw	ukwu-lul	an(i)	po-si-ess-e?
		father-I	HON.NOM	NEG	see-HO	N-NMLZ-FO	c wh	IO-ACC	NEG	see-HON-PAST-INF
		'Father	did see so	omebo	dy, inde	eed (honorit	fic). (l	it. Who or	earth	didn't father see?)'
	b.	*apeci-	kkeyse	an(i)	po-si-k	i-nun	nw	ukwu-lul		po-si-ess-e?
	c.	*apeci-	kkeyse		po- <b>si-</b> ki-nun		nwukwu-lul		an(i)	po-si-ess-e?
	d.	?apeci-	kkeyse	an(i)	po-si-k	i-nun	nw	ukwu-lul	an(i)	po-ass-e?
	e.	apeci-k	keyse	an(i)	po-ki-r	nun	nw	ukwu-lul	an(i)	po- <b>si</b> -ess-e?
(42)	Iter	ated rhe	toric ques	stion w	vith an a	adjective, an	n(i) an	d - <i>si</i> -		-
	a.	an(i)	ppalu-si-	ki-nun		nwu-ka	an(i)	ppalu-si-r	ni?	
		NEG	quick-HO	N-NM	Z-FOC	who-NOM	NEG	quick-HO	N-INTE	R
		'Some	ody is qu	ick, in	deed (h	onorific). (1	lit. Wł	no on earth	ı isn't d	quick?)'
	b.	*an(i)	ppalu-si-	ki-nun		nwu-ka		ppalu-si-r	ni?	- /
	c.	*	ppalu-si-	ki-nun		nwu-ka	an(i)	ppalu-si-	ni?	
	d.	?an(i)	ppalu-si-	ki-nun		nwu-ka	an(i)	ppalu-ni?		
	e.	an(i)	ppalu-ki-	nun		nwu-ka	an(i)	ppalu <b>-si</b> -i	ni?	

The above sentences show that when the sentence is negated syntactically, negation should accompany both instances of the root as shown in (a-c) above. However, when the subject is honorified, honorification is not required in both instances of the predicate. The honorific suffix can appear in both instances as in (a), only in the second instance as in (e), or marginally, only in the first instance of the predicate as in (d).<sup>8</sup>

<sup>&</sup>lt;sup>8</sup>The predicate iteration is (somewhat marginally) possible with long-form negation. Some examples are provided below with the honorific suffix.

 <sup>(</sup>i) (?)apeci-kkeyse po-si-ci an(i) ha-ki-nun nwukwu-lul po-si-ci an(i) ha-y-ess-e?
 father-HON.NOM see-HON-CI NEG do-NMLZ-FOC who-ACC see-HON-CI NEG do-EG-PAST-INF
 'Father did see somebody, indeed (honorific). (lit. Who on earth didn't father see?)'

As in the short-form negation cases, negation should be repeated along with each instance of the root in both predicates. The following examples show this point.

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The distribution of the short-form negator and of the honorific suffix from the iterated rhetoric question construction so far suggests that the negator be more closely structured with the root than the honorific suffix is. That is, the negator and the root form a constituent, which

(ii) a. \*apeci-kkeyse po-si-ki-nun nwukwu-lul po-si-ci an(i) ha-y-ess-e?
 father-HON.NOM see-HON-NMLZ-FOC who-ACC see-HON-CI NEG do-EG-PAST-INF
 b. \*apeci-kkeyse po-si-ci an(i) ha-ki-nun nwukwu-lul po-si-ess-e?
 father-HON.NOM see-HON-CI NEG do-NMLZ-FOC who-ACC see-HON-PAST-INF

On the other hand, the honorific suffix does not have to be repeated although the resulting sentences are a little bit degraded compared to (i) above, as the following examples show:

(iii)	a.	?apeci-kkeyse	po-ci an(i)	ha-ki-nun	nwukwu-lul j	po- <b>si-</b> ci	an(i)	ha-y-ess-e?
		father-HON.NOM	see-CI NEG	do-NMLZ-FOC	who-ACC s	see-HON-CI	NEG	do-EG-PAST-INF
	b.	*?apeci-kkeyse	po-si-ci	<i>an(i)</i> ha-ki-nun	nwukwu	-lul po-ci	an(i)	ha-y-ess-e?
		father-HON.NOM	see-HON-CI	neg do-nmlz·	-FOC who-ACC	c see-CI	NEG	do-EG-PAST-INF

The obligatoriness of the negator and the optionality of the honorific suffix are the same as in short-form negation. But the honorific suffix appears closer to the root than the negator in the long-form negation construction, which is the opposite to short-form negation.

However, there is a complication. In addition to (iii) with the root-honorific-negation order, the root-negation-honorific order is also possible as in (iv).

(iv) a. ?apeci-kkeyse po-ci an(i) ha-ki-nun nwukwu-lul po-ci an(i) ha-si-ess-e?
father-HON.NOM see-CI NEG do-NMLZ-FOC who-ACC see-CI NEG do-HON-PAST-INF
b. \*?apeci-kkeyse po-ci an(i) ha-si-ki-nun nwukwu-lul po-ci an(i) ha-y-ess-e?
father-HON.NOM see-CI NEG do-HON-NMLZ-FOC who-ACC see-CI NEG do-EG-PAST-INF

That is, the honorific suffix is attached to the light predicate ha- instead of the "lexical" predicate root in the long-form negation construction in (iv). However, this is not the characteristic of the iterated rhetoric questions, but of the long-form negation constructions in general. This point is shown in the following examples which all mean 'Father saw Esther (honorific).'

(v)	a.	apeci-kkeyse	eysute-lul	po- <b>si</b> -ci	an(i)	ha <b>-si-</b> ess-e.
		father-HON.NOM	Esther-ACC	see-HON-CI	NEG	do-hon-past-inf
	b.	apeci-kkeyse	eysute-lul	po-ci	an(i)	ha-si-ess-e.
		father-HON.NOM	Esther-ACC	see-CI	NEG	do-hon-past-inf
	c.	apeci-kkeyse	eysute-lul	po- <b>si-</b> ci	an(i)	ha-y-ess-e.
		father-HON.NOM	Esther-ACC	see-HON-CI	NEG	do-eg-past-inf

This fact obscures the morphosyntactic structure of long-form negation regarding the relative structuring of negation and honorification. But the implication is that the short-form negation construction and the long-form negation construction do not share the common base syntactic structure (contra D.-H. An 2003). Then, long-form negation seems to be irrelevant to the current discussion of the structure with short-form negation and honorification.

excludes the honorific suffix. This fact supports the schematic structure [[Neg [V (v)]] Hon] ((29) for [KNOW] or (33) for [EXIST]) which groups the root and negation before honorification, and the structure (13) and (34) with the [Neg [[V (v)] Hon]] (which is initially fit for [EXIST] in most cases as seen in sections 2.3 and 3.3) are to be incorrect.

#### 4.2. Echoed Verb Construction

The second predicate iteration construction is echoed verb construction. The term is after Y. No (1988), and different authors have used different terms for it: 'predicate cleft construction' (T. Chung 1994), 'in situ predicate cleft construction' (J.-S. Lee 1995), 'echo contrastive construction' (Cho, Kim and Sells 2004) and 'echo focus construction' (Aoyagi 2006) among others. In this construction, the predicate is repeated twice and the first instance of the predicate takes the nominalizer suffix followed by the focus marker. Unlike iterated rhetoric questions, there is nothing between the first and the second instances of the predicate. The examples are as follows:

- (43) Echoed verb construction
  - a. nay-ka eysute-lul po-ki-nun po-ass-e. (kulentay ...)
    I-NOM Esther-ACC see-NMLZ-FOC see-PAST-INF but
    'I certainly saw Esther. (But ...)'
  - b. eysute-ka ppalu-ki-nun ppalu-ta. (haciman ...)
     Esther-NOM quick-NMLZ-FOC quick-DECL but
     'Esther is certainly quick. (But ...)'

In addition to the propositional meaning, the construction carries some negative or concessive implication and is followed typically by an adversative conjunction such as *kulentay* 'but' and *haciman* 'but'. Hence, the sentence (43)a, along with the conjunction, is followed by a sentence meaning 'I could not talk with her', 'she did not see me', 'she ignored me', etc., and (43)b, by a sentence meaning 'she cannot catch me', 'Irene is quicker', 'she is short', etc.

The first instance of the predicate contains the root, the nominalizer and the focus marker. The second instance has exactly the same root form and all the suffixes appearing in normal conjugations. If the predicate in such a sentence has a causative or passive suffix, both instances should take the causative or passive suffix. However, other suffixes tend to appear only in the second instance, though some suffixes can appear in the first instance, as well. When a short-form negation is involved, both instances must contain it. This point is shown in the following examples. Replacing an(i) with the modal negator *mos* as in (45) containing a verb results in the same grammaticality pattern.

(44) Echoed verb construction with an(i) plus a verb a. nay-ka eysute-lul an(i) po-ki-nun an(i) po-ass-e. I-NOM Esther-ACC NEG see-NMLZ-FOC NEG see-PAST-INF 'I certainly did not see Esther.' b. \*nay-ka eysute-lul an(i) po-ki-nun po-ass-e. c. \*nay-ka eysute-lul po-ki-nun an(i) po-ass-e. (45) Echoed verb construction with mos plus a verb a. nay-ka eysute-lul mos po-ki-nun mos po-ass-e. I-NOM Esther-ACC NEG see-NMLZ-FOC NEG see-PAST-INF 'I certainly could not see Esther.' b. \*nay-ka eysute-lul mos po-ki-nun po-ass-e. c. \*nay-ka eysute-lul po-ki-nun mos po-ass-e. (46) Echoed verb construction with *an(i)* plus an adjective a. eysute-ka an(i) ppalu-ki-nun an(i) ppalu-ta. Esther-NOM NEG quick-NMLZ-FOC NEG quick-DECL 'Esther is, certainly, not quick.' b. \*eysute-ka an(i) ppalu-ki-nun ppalu-ta. c. \*eysute-ka ppalu-ki-nun an(i) ppalu-ta.

Just like the iterative rhetoric questions, a negator, an(i) or mos, must be present before each of the two instances of the predicate.

The honorific suffix, however, does not exhibit such a requirement. As shown in the following, the honorific suffix can appear with the two instances of the predicate as in (a) sentences, marginally only with the first instance as in (b) sentences, or preferably only with the second instance as in (c) sentences.

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- (47) Echoed verb construction with a verb plus -si
  - a. apeci-kkeyse eysute-lul po-si-ki-nun po-si-ess-e. father-HON.NOM Esther-ACC see-HON-NMLZ-FOC see-HON-PAST-INF 'Father certainly saw Esther.'
  - b. ?apeci-kkeyse eysute-lul po-si-ki-nun po-ass-e.
  - c. apeci-kkeyse eysute-lul po-ki-nun po-si-ess-e.
- (48) Echoed verb construction with an adjective plus -si
  - a. apeci-kkeyse ppalu-**si**-ki-nun ppalu-**si**-ta. Esther-HON.NOM quick-HON-NMLZ-FOC quick-HON-DECL 'Father is certainly quick.'
  - b. ?apeci-kkeyse ppalu-si-ki-nun ppalu-ta.
  - c. apeci-kkeyse ppalu-ki-nun ppalu-si-ta.

The same pattern of this optionality of the honorific suffix in the echoed verb construction is found in iterative rhetoric questions discussed in section 4.1. Likewise, the distribution of the honorific suffix shows that this suffix is loosely attached to the root. Translated in terms of configuration, the loosely attached honorific suffix is structured farther from the root (relative to short-form negation).

This point is clearly shown in the following examples with both negation and honorifics:

(49) Echoed verb construction with a verb, *an(i)* and *-si-*

	a.	apeci-kkeyse	eysute-lul	an(i)	po-si-ki-n	un	an(i)	po-si-ess-e.	
		father-HON.NOM	Esther-ACC	NEG	see-HON-N	MLZ-FOC	NEG	see-HON-PAST-INF	
		'Father certainly	did not see H	Esther.	,				
	b.	*apeci-kkeyse	eysute-lul	an(i)	po-si-ki-n	un		po-si-ess-e.	
	c.	*apeci-kkeyse	eysute-lul		po-si-ki-n	un	an(i)	po-si-ess-e.	
	d.	?apeci-kkeyse	eysute-lul	an(i)	po-si-ki-n	un	an(i)	po-ass-e.	
	e.	apeci-kkeyse	eysute-lul	an(i)	po-ki-nun		an(i)	po-si-ess-e.	
(50)	Echoed verb construction with an adjective, an(i) and -si-								
	a.	apeci-kkeyse	an(i) ppalu-	<b>si-</b> ki-r	nun	an(i) ppali	u-si-ta		
		Esther-HON.NOM	NEG quick-	HON-N	MLZ-FOC	NEG quicl	k-HON	-DECL	
		'Father is certain	ly not quick.	,					
	b.	*apeci-kkeyse	an(i) ppalu-	<b>si-</b> ki-r	nun	ppalı	u <b>-si</b> -ta		
	c.	*apeci-kkeyse	ppalu-	<b>si-</b> ki-r	nun	an(i) ppale	u <b>-si</b> -ta		
	d.	?apeci-kkeyse	an(i) ppalu-	si-ki-r	nun	an(i) ppali	u-ta.		
	e.	apeci-kkeyse	an(i) ppalu-	ki-nur	1	an(i) ppale	u <b>-si-</b> ta		

The same grammaticality patterns as in iterated rhetoric questions are found regarding presence

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or absence of a negator and -si-. The negator in short-form negation must appear with both instances of the root, but the honorific suffix need not.

When the predicate is copied and repeated, certain affixes need to be copied and repeated as well while other affixes need not. Such obligatorily repeated affixes are considered to form smaller constituents along with the root. Short-term negation negators are such obligatory affixes along with a valence-changing causative or passive suffix. The following examples show the obligatoriness of a causative suffix. Both instances of the predicates must include the causative suffix in addition to the negative prefix (when these affixes are involved at all).<sup>9</sup>

<sup>&</sup>lt;sup>9</sup>As causatives are involved in an additional argument, which is in many cases a beneficiary of the given event or action, the verb typically appears in a *give*-benefactive construction in Korean. Hence, the sentence (51)a becomes much more natural when the predicates are geared up with the benefactive construction of *cwu*- 'give'.

(i)	eysute	e-ka	na-eykey	chayk-ul	an(i)	po- <i>i</i> -e	cwu-ki-nun
	Esther	r-NOM	I-DAT	book-ACC	NEG	see-CAUS-INF	give-NMZ-FOC
	an(i)	ро- <i>і</i> -е		cwu-ess-e.			
	NEG	see-CA	AUS-INF	give-past-	INF		
	'Esthe	er did r	not show m	e the book	for m	y sake.'	

But causative constructions are not necessarily accompanied by the *give*-benefactive construction, as the following two sentences are perfectly fine.

(ii) –	a.	eysute-ka	na-eykey	pap-ul	(an(i))	mek-i-n-ta.	•		
		Esther-NOM	I-DAT	rice-ACC	NEG	eat-CAUS-PRE	S-DECL		
	'Esther is (not) feeding me.'								
	b.	eysute-ka	na-eykey	pap-ul	(an(i))	mek-i-e	cwu-n-ta.		
		Esther-NOM	I-DAT	rice-ACC	NEG	eat-CAUS-INF	give-PRES-DECL		
		'Esther is (not) feeding me for my sake.'							

Conversely, the give-benefactive construction can appear in a non-causative construction:

- (iii) a. eysute-ka pap-ul (an(i)) mek-nun-ta. Esther-NOM rice-ACC NEG eat-PRES-DECL 'Esther is (not) eating.'
  - b. eysute-ka pap-ul (an(i)) mek-e cwu-n-ta. Esther-NOM rice-ACC NEG eat-INF give-PRES-DECL 'Esther is (not) eating for my sake.'

(51) Echoed verb construction with a verb, an(i) and a causative suffix allomorph

a.	eysute-ka	na-eykey	chayk-ul	an(i)	po- <i>i-</i> ki-nun	an(i)	po- <i>i</i> -ess-e.
	Esther-NOM	I-dat	book-ACC	NEG	see-CAUS-NMLZ-FOC	NEG	see-CAUS-PAST-INF
	'Esther did	not show n	ne a book.'				
b.	*eysute-ka	na-eykey	chayk-ul	an(i)	po- <i>i-</i> ki-nun	an(i)	po-ass-e.
c.	*eysute-ka	na-eykey	chayk-ul	an(i)	po-ki-nun	an(i)	po-i-ess-e.
d.	*eysute-ka	na-eykey	chayk-ul	an(i)	po- <i>i-</i> ki-nun		po- <i>i</i> -ess-e.
e.	*eysute-ka	na-eykey	chayk-ul		po- <i>i</i> -ki-nun	an(i)	po- <i>i</i> -ess-e.

The above sentences are contrasted with the following with a causative and the honorific suffix.

(52)	Ecł	choed verb construction with a verb, a causative suffix and the honorific suffix					
	a.	apeci-kkeyse	na-eykey	chayk-ul	po- <i>i-</i> si-ki-nun	po- <i>i-</i> si-ess-e.	
		father-HON.NOM	I-DAT	book-ACC	see-CAUS-HON-NMLZ-FOC	see-CAUS-HON-PAST-INF	
'Father showed me a book for my sake. (honorific)'							
	b.	*apeci-kkeyse	na-eykey	chayk-ul	po- <i>i-</i> si-ki-nun	po-si-ess-e.	
	c.	*apeci-kkeyse	na-eykey	chayk-ul	po- <b>si</b> -ki-nun	po-i-si-ess-e.	
	d.	?apeci-kkeyse	na-eykey	chayk-ul	po- <i>i-</i> si-ki-nun	po-i-ess-e.	
	e.	apeci-kkeyse	na-eykey	chayk-ul	po- <i>i-</i> ki-nun	po- <i>i-</i> si-ess-e.	

The honorific suffix shows the same optionality as with negation and the same preference on the second predicate when the honorific suffix appears only once. This property is consistent with the cases discussed in this section regarding the honorific suffix and negation, and shows, along with sentences in (51), the same contrast between the honorific suffix and negation. However, the causative suffix is obligatory in any case, along with negation. The distribution of the causative suffix (and the negation prefix) on the one hand and that of the honorific suffix on the other show that the minimal constituent to be copied obligatorily includes the root, causative and negation. As chapter 4 section 4.2 shows, causative is closer to the root than (short-form) negation is. This is because the negation fusion operating under strict sisterhood is blocked by the intervening causative.

On the other hand, optional affixes are thought to be farther from the root than the

Hence, the discussion is restricted to the causatives and the give-benefactive construction is put aside.

obligatory affixes. The honorific suffix and other suffixes linearly following it (such as tense, aspect and mood suffixes) are optional and can appear only once with either instance of the predicate (or twice with both instances). For example, the causative suffix is closer to the root than the honorific suffix is. This point is consistent with the linear ordering of suffixes (Neg-Root-Caus/Pass-Hon-Tense-Aspect-Mood1-Humble-Mood2-Comp), and the obligatoriness of the causative suffix and the optionality of the honorific suffix in the echoed verb construction. Therefore, echoed verb construction supports the view that short-form negation is structured with the root prior to honorification.<sup>10</sup>

#### 4.3. Ha Focus Construction

The third predicate repetition construction is what is called VP-focus construction (M.-Y. Kang 1988), *ha* contrastive construction (Cho, Kim and Sells 2004) and *ha* focus construction (Aoyagi 2006). *Ha* focus construction also shows the same properties regarding the obligatoriness of the negator and the optionality of the honorific suffix in this construction and hence supports that the root and negation form a smaller constituent excluding the honorific suffix.

<sup>&</sup>lt;sup>10</sup>There is a potential issue related to the constituency of the root and  $Neg^0$  in the echoed verb construction. In addition to the short-form negator, some adverbs – for example, degree and manner adverbs – can appear with the second copy of the verb a bit marginally.

(i)	a.	(?)eysute-ka	chayk-ul	kkoy	ilk-ki-nun	kkoy	ilk-ess-ta.
		Esther-NOM	book-ACC	quite	read-NMLZ-FOC	quite	read-PAST-DECL
		'Esther read	the book m	uch.'			
	b.	(?)eysute-ka	chayk-ul	cal	ilk-ki-nun	cal	ilk-ess-ta.
		Esther-NOM	book-ACC	well	read-NMLZ-FOC	well	read-PAST-DECL
		'Esther read	the book we	ell.'			

Such an adverb is not considered as a prefix, but can be copied along with the predicate in the second copy. The crucial difference between these adverbs and the short-form negator is that such an adverb is not obligatory in the second copy of the predicate. Therefore, the possibility of copying these adverbs does not interfere with the establishment of the constituent of the root and Neg<sup>0</sup> excluding Hon<sup>0</sup> and the adverbs at issue.

- (53) Ha focus construction
  - a. nay-ka eysute-lul po-ki-nun ha-y-ess-e. I-NOM Esther-ACC see-NMLZ-FOC do-EG-PAST-INF 'I certainly saw Esther.'
  - b. eysute-ka ppalu-ki-nun ha-ta. Esther-NOM quick-NMLZ-FOC do-DECL 'Esther is certainly quick.'

Unlike the echoed verb construction, the *ha* focus construction does not always carry a concessive or negative implication. Depending on the nominal suffix after the root-nominalizer complex of the first predicate, different non-propositional implications are conveyed. For example, such suffixes as *-to* 'also, even' and *-man* 'only' can replace the focus marker *-nun* above. The implications are something like 'I even saw Esther' and 'Esther is quick as well' for *-to*, or something like 'I only saw Esther (but didn't talk to her)' and 'Esther is just quick (and that's all about her)' for *-man*.

The *ha* focus construction is a little different from the two previous constructions in that the second predicate, the pro-predicate *ha*- mentioned in chapter 3 section 5, does not replace the root of the first predicate. Instead, the pro-predicate replaces the grouping of the root, the short-form negation and the causative suffix (if the latter two are present in the first predicate of the construction). Focusing on the root and negation, and excluding the causative suffix, the following examples exhibit this point:

- (54) Ha focus construction with an(i) plus a verb
  - a. nay-ka eysute-lul *an(i)* po-ki-nun ha-y-ess-e. I-NOM Esther-ACC NEG see-NMLZ-FOC do-EG-PAST-INF 'I certainly did not see Esther.'
  - b. \*nay-ka eysute-lul an(i) po-ki-nun an(i) ha-y-ess-e.
  - c. \*nay-ka eysute-lul po-ki-nun an(i) ha-y-ess-e.

(55) Ha focus construction with an(i) plus an adjective

- a. eysute-ka *an(i)* ppalu-ki-nun ha-ta. Esther-NOM NEG quick-NMLZ-FOC do-DECL 'Esther is certainly not quick.'
- b. \*eysute-ka an(i) ppalu-ki-nun an(i) ha-ta.

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c. \*eysute-ka ppalu-ki-nun an(i) ha-ta.

It is not possible to repeat the negator replacing only the root with *ha*- as in the (b) sentences. The negator must appear before the first (i.e., lexical) predicate, and cannot appear before the second predicate (i.e., the pro-form). The pro-predicate replaces the complex of the negator and the root of the first predicate. It shows that the root and the negator form a constituent in the first predicate.

On the other hand, honorification does not behave like short-form negation.

(56)	<i>Ha</i> focus construction with a verb plus -si-							
	a.	apeci-kkeyse	eysute-lul	po-si-ki-nun		ha-si-ess-e.		
		father-HON.NOM	Esther-ACC	see-HON-N	MLZ-FOC	do-HON-PAST-INF		
		'Father certainly saw Esther.'						
	b.	apeci-kkeyse	eysute-lul	po-si-ki-nu	in	ha-y-ess-e.		
	c.	apeci-kkeyse	eysute-lul	po-ki-nun		ha-si-ess-e.		
(57)	Ha focus construction with an adjective plus -si-							
	a.	apeci-kkeyse	ppalu- <b>si-k</b> i-	nun	ha- <b>si</b> -ta.			
		Esther-HON.NOM	quick-HON-	NMLZ-FOC	do-HON-I	DECL		
	'Father is certainly quick.'							
	b.	apeci-kkeyse	ppalu-si-ki-	nun	ha-ta.			
	c.	apeci-kkeyse	ppalu-ki-nu	in	ha <b>-si</b> -ta.			

The honorific suffix can appear in both predicates as in (a) sentences or in either of the two predicates as in (b,c) sentences above.

In (b) sentences, the pro-predicate replaces the complex of the root and the honorific suffix, meaning that there is some degree of freedom regarding how much of the first predicate the propredicate can replaces. It can replace only the root or a bigger constituent including the root and the honorific suffix. The crucial point of the ha focus construction is that the root and the honorific suffix are loosely grouped and detachable from each other, and that the root alone can be replaced by the single pro-predicate as in (a). The (c) case shows the same pattern. The honorific suffix is present in the second predicate, but not in the first predicate. This means that the pro-predicate replaces only the root of the first predicate.

When both negation and honorifics are involved in the ha focus construction, the present

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contention is confirmed more conspicuously.

(58)	Ha focus construction with a verb, an(i) and -si-					
	a.	apeci-kkeyse	eysute-lul	an(i) po-si-ki-i	nun	ha-si-ess-e.
		father-HON.NOM	Esther-ACC	NEG see-HON-	NMLZ-FOO	C do-HON-PAST-INF
		'Father certainly did not see Esther.'				
	b.	*apeci-kkeyse	eysute-lul	an(i) po-si-ki-	nun an(i)	ha <b>-si</b> -ess-e.
	c.	*apeci-kkeyse	eysute-lul	po- <b>si</b> -ki-i	nun an(i)	ha- <b>si-</b> ess-e.
	d.	*apeci-kkeyse	eysute-lul	po <b>-si-</b> ki-i	nun	ha- <b>si</b> -ess-e.
	e.	apeci-kkeyse	eysute-lul	an(i) po-si-ki-	nun	ha-y-ess-e.
	f.	apeci-kkeyse	eysute-lul	an(i) po-ki-nu	n	ha-si-ess-e.
	g.	*apeci-kkeyse	eysute-lul	an(i) po-ki-nu	n	ha-y-ess-e
(59)	Ha focus construction with an adjective, an(i) and -si-					
	a.	apeci-kkeyse	an(i) ppalu	-si-ki-nun	ha-si-ta.	
		Esther-HON.NOM	NEG quick	-HON-NMLZ-FO	C do-HON-	-DECL
	'Father is certainly quick.'					
	b.	*apeci-kkeyse	an(i) ppalu	- <b>si-</b> ki-nun an(i	) ha <b>-si-</b> ta.	
	c.	*apeci-kkeyse	ppalu	-si-ki-nun an(i	) ha <b>-si-</b> ta.	
	d.	*apeci-kkeyse	ppalu	-si-ki-nun	ha-si-ta.	
	e.	apeci-kkeyse	an(i) ppalu	- <b>si</b> -ki-nun	ha-ta.	
	f.	apeci-kkeyse	an(i) ppalu	-ki-nun	ha <b>-si-</b> ta.	
	g.	*apeci-kkeyse	an(i) ppalu	-ki-nun	ha-ta.	

The ungrammaticality of the (g) sentences is due to the absence of the honorific suffix in the entire sentence with the agreeing honorific subject case suffix. The sentences (a-d) show that negation, along with the root, forms a constituent when this complex is replaced by the propredicate. The sentences (a,e,f) show the behavior of honorification opposite to that of negation. Honorification need not be part of the unit replaced by the pro-predicate. The *ha* focus construction shows that negation is closer to the root than honorification is.<sup>11</sup>

b. \*apeci-kkeyse eysute-eykey chayk-ul po-*i*-si-ki-nun ha-*i*-si-ess-e.

<sup>&</sup>lt;sup>11</sup>A prediction regarding a causative suffix is that this suffix should not occur in the ha- part. This is because the constituent replaced with ha- should include this suffix inside the negative prefix. This prediction is borne out correctly.

<sup>(</sup>i) *Ha* focus construction with a verb, a causative and the honorific suffix

a.apeci-kkeyseeysute-eykeychayk-ulpo-i-si-ki-nunha-si-ess-e.father-HON.NOMEsther-DATbook-ACCsee-CAUS-HON-NMLZ-FOCdo-HON-PAST-INF'Father certainly showed Esther the book for her sake.'

#### 4.4. Negation is Closer to the Root than Honorification is

From the discussions of the three predicate iteration constructions in this section, it is concluded that Neg<sup>0</sup> (of short-form negation) is structured more closely to the root than Hon<sup>0</sup> is. Short-form negation and the root (and the v node when present) form a constituent, which is smaller than the constituent including the root and the honorific suffix.

When the same phonological form of the root is repeated as in iterated rhetoric questions and the echoed verb construction, the negator should be copied independently along with the root. But the honorific suffix has an option to be copied or not in the second instance of the predicate. When the pro-predicate ha- replaces the predicate in the ha focus construction, there is some freedom regarding the suffixes that can be included in the replaced part. For example, the honorific suffix can, but need not, be part of the replaced constituent. However, negation should always be included in the replacement of the pro-predicate showing that the minimal constituent ha replaces must include the root (causative as shown in footnote 11) and negation, and that other suffixes are optional and not part of the minimal constituent.

The unity of negation and the root exclusive of the honorific suffix is translated structurally into the morphosyntactic constituent of negation and the root. The entire structure groups the root and negation first, then honorific suffix, and the following suffixes. It is consistent with the structures (33) (and (29) with [KNOW]), where the higher Neg node is the minimal constituent that

c.	*apeci-kkeyse	eysute-eykey chayk-	ul po- <b>si-</b> ki-nun	ha-i-si-ess-e.
d.	apeci-kkeyse	eysute-eykey chayk-	ul po- <i>i-</i> si-ki-nun	ha-y-ess-e.
e.	apeci-kkeyse	eysute-eykey chayk-	ul po- <i>i</i> -ki-nun	ha-si-ess-e.
f.	*apeci-kkeyse	eysute-eykey chayk-	ul po- <i>i</i> -ki-nun	ha-y-ess-e.

The sentences (b,c) are ungrammatical because the pro-predicate has the additional causative suffix. On the other hand, sentence (d,e) are grammatical. The common property in (a,d,e) is that the causative suffix is present on the lexical predicate and is absent on the pro-predicate. The (f) sentence lacks the honorific suffix in both predicates.

#### ha can replace:

### (33) Morphosyntactic structure of Neg-V-v-Hon: Final



The predicate iteration constructions, which are independent (morpho-)syntactic phenomena unrelated to root allomorphy, provide a clue to the correct structure between the two paradoxical structures, (33) vs. (34), as identified in sections 2 and 3.

In the introduction (section 1.1) of this chapter, a few different views of the status of the (short-form) negation particle an(i)/mos have been mentioned: the head of NegP, a prefix/clitic to the root, the specifier of NegP whose head is phonologically null, and an adverb. The result in this section, along with the discussion in section 4.2 of chapter 4 regarding the sisterhood of the root and v, supports the view of negation as the head of NegP. Because a negator and the root form a constituent, they could be considered as sisters (as in the prefix/clitic view). But if the fact that the v node is closer to the root than negation is taken into consideration, the prefix/clitic view is only partly correct.

Section 4.2. of chapter 4 demonstrated convincingly that the v head structurally intervenes between the root and the negation head. This structure results from the application of head movement, and reflects the syntactic hierarchy among functional categories in a clause. The vhead is present in syntax and morphology when the verb has an agent argument in a given clause. If a predicate is not involved in an agent argument, the Neg projections immediately dominate the VP/AP projections in a given clause. In this case, the root and the Neg head are sisters after head movement assumed in chapter 4. However, if the v head is involved due to the verb's agent argument, the V<sup>0</sup> and the Neg<sup>0</sup> nodes are not sisters. Consequently, fusion of these two nodes are blocked for 'know' and 'exist'. It is crucial to structurally posit v(P) between V(P)/A(P) and Neg(P) to block the fusion operation, as the root is linearly preceded by Neg<sup>0</sup> and followed by  $v^0$ . The sisterhood of the root and Neg<sup>0</sup> is dependent on the presence or absence of the intervening  $v^0$ , although Neg<sup>0</sup> and the root (and  $v^0$  as well, when present) form a constituent smaller than the constituent including Hon<sup>0</sup> as well.

The predicate iteration constructions show that a negator behaves as one of the verbal affixes forming constituent of different sizes within the fully conjugated predicate. Together with the intervening  $v^0$ , the discussion leads to the conclusion that Neg<sup>0</sup> is the head of a functional category between  $v^0$  and Hon<sup>0</sup> in morphology, and that the respective projections correspond to the same hierarchical dominance relation in syntax.

## 5. Allomorphy: Non-Locality and Blocking of Inner Suppletion

If the structure (33) is indeed correct, an immediate question arises. The structure (34) (or (13) without v) initially proposed for [EXIST] must be abandoned.

(34)



However, section 3 discusses advantages of (34) over (33) for [EXIST]. Hence, disadvantages of (33), [[Neg [V (v)]] Hon], need to be resolved regarding allomorphy of the root [EXIST] with

respect to honorification.

This section discusses this issue and proposes a solution with the government analysis of contextual allomorphy for honorific root suppletion. In short, contextual allomorphy requires a governing allomorphy-triggering morphosyntactic feature. This allows the non-locality of the root and the triggering feature, and therefore negation and some other elements behave transparently between them. Consequently, the status and the formalism of negative suppletion are reexamined. Negative suppletion is to be viewed not as contextual allomorphy but as fusion (as discussed in chapter 4, section 4.2), and it is argued that the fusion operation is part of vocabulary insertion (as opposed to pre-insertion fusion of non-phonological features). The section also addresses the causative which blocks the government of the root by the honorific feature, and proposes a derivation-by-phase analysis of contextual allomorphy.

#### 5.1. Explaining the Bleeding Interaction of Negative Suppletion and Honorific Suppletion

This section provides two possible analyses of the transparency of the intervening nodes between the allomorphic root and the allomorphy-triggering morphosyntactic feature: a parenthesis notation (section 5.1.1) and a government approach (section 5.1.2). It is argued that the government approach is more constrained and appropriate. Some theoretical consequences are discussed including the reformulation of the negation suppletion rule and its place in the grammar.

#### 5.1.1. Honorific Suppletion and the Parenthesis Notation

The problem of the structure (33), [[Neg [V (v)]] Hon], is as follows. Honorific suppletion of the root [EXIST] (*kyey*- instead of the usual *iss*- in the environment of -*si*-) is considered to operate in a local configuration. However, this suppletion is found even when (short-from) negation is engaged between the root and the environment of honorific suppletion. Hence, the structure with the root, negation and honorification would have to be such that the root and the honorific suffix are structured first and then this result is grouped with negation into a larger constituent. This structure is, [Neg [[V(v)] Hon]], (34). However, if negation and the root are combined prior to honorification as in (33), the negation node and the root node [EXIST] would be fused into a single node containing all the relevant morphosyntactic features, [+neg, EXIST], of the two original nodes resulting in the wrong form \**eps-u-si*-. Even though [+hon] is present, it is outside the Neg-root constituent and would not interfere with negation suppletion. But negative suppletion is bled by honorific suppletion.

Assuming that (33) is indeed the correct morphological structure, the suppletion rule is to be modified in order that intervening nodes are transparent or invisible for allomorphy of a root and an affix triggering that allomorphy. Section 3.1 has already dealt with such a case. In a structure such as (26) with the  $[[[_v EXIST] v] [+hon]]$  configuration for the non-negative agentive *kyey*-, the intervening v node with the [+agent] feature has to be transparent for honorific allomorphy of the root [EXIST]. In fact, the structure (34) has the same problem. In (34), the root and its allomorphy-triggering honorific feature are not adjacent, and are separated by the v node. Therefore, such transparency is necessary anyway. This is why the vocabulary item [EXIST], initially (14)b, has been revised with the parenthesis notation as follows:

# (27) Vocabulary item [EXIST] in the environment of [+hon] [EXIST] $\leftrightarrow$ /kyey/ / (\_\_\_\_[,+agent] /) \_\_\_\_ [+hon]

In the structure (33) with the [[Neg [V v]] Hon] configuration, the [+neg] feature, in addition to v, intervenes between the root and [+hon]. This additional feature must be ignored in suppletion of the root [EXIST]. Hence, the above formalism of the vocabulary item [EXIST] would be revised as (60), which is an abbreviation of the four expansions in (61):

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- (60) Vocabulary item [EXIST] in the environment of [+hon] (revision of (27))  $[EXIST] \leftrightarrow /kyey/ / (\_ [+neg] /) (\_ [_v+agent] /) \_ [+hon]$
- (61) Expansions of (60)
  - a. [EXIST]  $\leftrightarrow$  /kyey/ / \_\_\_\_ [+neg] / \_\_\_\_ [, +agent] / \_\_\_\_ [+hon]
  - b. [EXIST]  $\leftrightarrow$  /kyey/ / \_\_\_\_ [\*+agent] / \_\_\_ [+hon] c. [EXIST]  $\leftrightarrow$  /kyey/ / \_\_\_\_ [+neg] / \_\_\_ [+hon] d. [EXIST]  $\leftrightarrow$  /kyey/ / \_\_\_\_ [+hon]

Because a given morphological structure has only one of these four expansions, there is no ordering problem among them. Only one of them operates in a given configuration with [EXIST] and [+hon]. In this way, the problem of the non-locality of honorific allomorphy of [EXIST] in (33) can be handled appropriately.

There is one thing that should be acknowledged. The above formalism of having parentheses for [+neg] and [+agent] for the vocabulary item [EXIST] in (60) is not restricted to this predicate only, and can apply to all other predicates in general. The vocabulary item [EXIST], whose usual phonological form is *iss*-, is the only predicate that shows both negation suppletion with eps- and honorific suppletion with kyey-. Honorific suppletion ignoring the intervening negation is observed only with [EXIST]. Other predicates with honorific suppletion do not exhibit negation suppletion even when the conjugated form has a short-form negation prefix. Thus, these other predicates would not be interfered with negation and the parenthesis use. The transparency of v and Neg, technically implemented as the parenthesis notation, solves the problem of nonlocality in honorification suppletion.

One of the expansions in (61) needs a special explanation. (61)c with negation and honorification without v was mentioned in section 2.3 as the starting point of the whole discussion of the present chapter: allomorphy of the existential, non-agentive [EXIST] among iss-, eps- and kyey-. According to the discussion in section 3, the sequence of Neg-[EXIST]-Hon without [v + agent] has the hierarchical structure below, which is (33) without the v node:

(62) Morphosyntactic structure of Neg-[EXIST]-Hon (= (17))



The Neg node and the root node are sisters, and would fuse into a single node according to the analysis advanced in chapter 4 section 4. The fused node would then be provided with the phonological content *eps-*, which would yield the ungrammatical form \*eps-u-si- with the epenthetic vowel *-u-*. However, the actual form is *kyey-si-* which shows that the intervening [+neg] feature is ignored when the [+hon] feature is present, although [+hon] is outside of the Neg-root constituent. Therefore, [+neg] must be ignored for honorific suppletion, so that the fusion operation should not apply even though [+neg] and [EXIST] are sisters when [+hon] is in the (next) outer cycle.

There arises an interesting ordering problem. When the above structure enters the morphological component, the root is the first thing to consider for vocabulary insertion. At this point, the root [EXIST] should examine whether the [+hon] feature is present in the conjugated predicate. If [+hon] is present, [EXIST] is provided with the phonological feature /kyey/ regardless of the intervening [+neg], which would otherwise be fused with the root. When fusion is in order, it is done in the next cycle with the root and [+neg] only, excluding [+hon]. But the minimal cycle (for blocking fusion and applying vocabulary insertion for [EXIST] referring to the [+hon] feature) properly includes the cycle for the fusion operation. It means that vocabulary insertion of [EXIST] must precede the fusion operation in the environment of [+hon].

An immediate stopgap may be to impose a special condition on the fusion operation of [+neg] and specifically [EXIST]. This could be done by adding an "exception" clause to the

environment of the fusion operation (see section 4.2 of chapter 4), as in the following.

(63) Fusion of [+neg] and [EXIST] with an exception clause



Essentially, the above formalism says that [+neg] is not transparent to [r + hon] when it is the sister of the root. It overrides (61)c. This ad hoc solution describes the exceptional behavior of the peculiar predicate in the specific configuration (63).

However, there are several problems with the above parenthesis formalism. First, it seems to simply restate the situations regarding negative suppletion and honorific suppletion rather than providing an explanatory solution. Second, the vocabulary insertion rule of [EXIST] as formulated in (60) contains two optional parts in the environment. The four expansions in (61) tell that these optional parts are exploited disjunctively. The problem of disjunctivity is an unwelcome machinery in linguistic theory. It could also allow other unattested types of optionality in addition to v and Neg. There is no intrinsic reason only v and Neg are transparent, and there is no general sense of what can and cannot be transparent and when. The last problem is related to another problem. The generalization in transparency of these intervening features is that anything between the root and the [+hon] feature is ignored. Hence, the focus needs to lie on the suppletion and the relevant features/nodes. Instead, however, the parenthesis notation focuses on arbitrary individual features intervening transparent nodes become clear with causatives discussed in section 5.3. The causative is not transparent for honorific suppletion and this feature must not be parenthesized in this approach. Also, having the "\_\_\_\_ [+hon]" part in each expansion in (61)

misses the generalization between the allomorphic root and this responsible feature.

Furthermore, the exception in the fusion rule (63) is undesirable. The entire discussion of this chapter started with the paradox of negation suppletion blocked by honorific suppletion with negation closer to the root. The revised fusion rule (63) treats this key case as an exception. This problem is due to the parenthesis notation for the intervening nodes. Thus, the validity of the parenthesis notation is questioned with the exceptional fusion rule overriding the expansion (61)c. In this light, next section explores an alternative analysis.

#### 5.1.2. Government Approach to Honorific Suppletion, and Negation Suppletion as Fusion

The alternative view has already been mentioned in section 3.1: government approach. It has been argued in the Distributed Morphology literature (see Bobaljik 2000 and Halle and Marantz 1993 among others) that contextual allomorphy only requires head-internal government.<sup>12</sup> In all of the structures, (26) with [[V v] Hon], (33) with [[Neg [V v]] Hon] and (62) with [[Neg V] Hon], the [+hon] feature governs the root whether or not anything intervenes and regardless of what the intervening nodes are. All that matters is that [+hon] governs the root, and in this case, the root can show (suppletive) allomorphy for honorification. Hence, allomorphy of the root is possible even with the intervening [+neg] feature. The vocabulary item (28) formulated for [EXIST] in section 3.1 fits in this picture perfectly without any modification:

 $<sup>^{12}</sup>$ The term 'government' is from Halle and Marantz (1993), which nearly coincides with the advent of the minimalism in the generative syntactic theory. In minimalism, the notion of government has been abandoned practically. Hence, the use of this term would not be adequate (cf. Trommer 1999). However, alternative structural relations can be used such as c-command which is a less strict structural relationship. All that is needed is that the allomorphy-triggering morpheme is "structurally higher" than the allomorphyexhibiting root within the morphologically complex head (X<sup>0</sup>) word. So, a choice between government and c-command is not about content, but about terminology. In what follows, the terms 'govern', 'government' etc. can be replaced by 'c-command' etc.

(28) Vocabulary item for [EXIST] in the environment of [+hon]
 [EXIST] ↔ /kyey/ / governed by [+hon]

The government approach ensures this non-local property of contextual allomorphy without additional machinery such as the parenthesis notation. (See Adger, Béjar and Harbour 2003, Bobaljik 2000, Embick and Noyer 2001 and Halle and Marantz 1993 among others for the non-local aspect of contextual allomorphy.)

The government approach resolves problems of the parenthesis formalism pointed out in the previous section. The problem of disjunctivity disappears along with the parentheses. The arbitrariness of the intervening transparent features does not arise. Such intervening features do not have to be individually listed as transparent, because any feature intervening structurally between the root and [+hon] is ignored. The government approach provides a more intuitive and elegant explanation of honorific root suppletion.

Furthermore, the exception environment in the revised fusion rule (63) is not necessary. This point becomes obvious when suppletive negation enters the picture, which is discussed later in this section. Consider the structure (62), [[Neg V] Hon]. The [+neg] feature is between the root and the [+hon] feature. Each of the affix features causes their own root allomorphy. Structurally, [+neg] is closer to the root than [+hon] is. However, when both the potential suppletion environments are put together in the same word, the outer [+hon] feature wins imposing the honorific allomorph upon the root morpheme.

For this apparently paradoxical situation, a broader issue of the grammar architecture is to be considered. Halle and Marantz (1993) propose four major morphological processes in the morphological component: merger, impoverishment, fission and fusion. All of them are to operate before vocabulary insertion. However, instead of ordering all morphological operations before vocabulary insertion (and phonological operations), some operations may be viewed as being interleaved with cyclic vocabulary insertion. An informal way of putting this view is as follows. The root [EXIST] first examines whether [+hon] is present in the entire conjugated predicate. If [+hon] is present, vocabulary insertion (28) applies to the root and provides [EXIST] with the honorific allomorph /kyey/. If [+hon] is not present, [EXIST] looks for [+neg]. If [+neg] is present as the sister of the root in question, fusion of the two nodes applies.

To implement this idea in a formal way, an important difference between suppletive negation and suppletive honorifics needs to be highlighted. Namely, all the honorifics cases are suppletion of a root. That is, there is a special root exhibiting a different morphophonological form in the environment of honorification. But the entire structure is preserved regardless of the special morphophonological realization of the root, and, more importantly, the honorific morpheme surfaces as the expected form *-si*-. Therefore, honorific suppletion is contextual allomorphy. On the other hand, the suppletive negations involve fusion, i.e., it is a portmanteau form. (This issue that suppletive negation is not to be treated as contextual allomorphy is discussed in section 5.2.)

Honorific suppletion is not strictly local, but requires, as contextual allomorphy, only a [+hon] feature governing the allomorphy-exhibiting root in the same word. Negative suppletion is more local, requiring a strict sisterhood configuration. However, negative suppletion is bled by honorific suppletion. This effect can be obtained without stipulation such as parentheses or an exception clause, if contextual allomorphy and fusion are treated distinctly. The root can show suppletive allomorphy for honorification whether or not [+neg] or anything else intervenes, because [+hon] governs the root.

On the other hand, fusion is to operate cyclically, thus interleaved with vocabulary insertion, and, crucially, is triggered by the higher head (in this case, the higher Neg node containing only [+neg] and the root). Then, the bleeding effect will follow automatically, if fusion makes reference to vocabulary items of the root node (post-insertion) rather than abstract "morphemes" (pre-insertion). In the current case, the fusion rule is to be formulated as follows:

(64) Fusion of [+neg] and /iss/ to /eps/



If the rule is part of the cycle with the root and the [+neg] node, the root node must be stated as /iss/, not as [EXIST], because vocabulary insertion has already applied in the inner cycle.<sup>13</sup>

Cyclic vocabulary insertion to morphosyntactic representation [[Neg [EXIST]] Hon] with the reformulated fusion rule (64) applies as follows:

(65) Vocabulary insertion of [+neg]-[EXIST]-[+hon]-



In (65)b, the root is provided with /kyey/ due to the vocabulary item (28) because [+hon] governs this node. In this way, the choice of root allomorph (honorific suppletion) must be determined in the root cycle. But because this is contextual allomorphy, the triggering morphosyntactic feature can "see" across negation (and any other intervening nodes). The governing [+hon] feature

<sup>&</sup>lt;sup>13</sup>Footnote 28 in chapter 4 considered a few possible conditions controlling the fusion operation: vocabulary-driven, top-down vocabulary insertion and presyntactic bundling. The revised formulation of fusion suggests that the vocabulary-driven approach be the most appropriate because the fusion rule refers to morphophonological aspect of the root rather than the abstract morpheme. Fusion is a language-specific surface-level operation.

simply serves as the context of root allomorphy operating in the first cycle. Subsequently, the [+hon] node is provided with /si/ in (65)c as usual, and vocabulary insertion in this step yields the form an(i) kyey-si-.

On the other hand, however, the negative suppletion happens crucially in the second cycle. This fusion operation makes reference to the output of vocabulary insertion in the first cycle. Therefore, if the output of the first cycle is /kyey/ as in (65), the negation fusion rule will not apply. When the [+hon] feature is not engaged in a given word, the fusion applies to [+neg] in the next outer cycle along with the root item /iss/. This is because vocabulary insertion converts the root morpheme into /iss/ in the first cycle and the rule description is met only in the next cycle. This aspect is illustrated in the following, where the next higher node of [[+neg] V] is not (a segment of) Hon<sup>0</sup>:

(66) Vocabulary insertion of [+neg]-[EXIST]-T- with fusion (64)



Then, the analysis presented in chapter 4 remains almost the same. In particular, if the fusion operation is restricted to sisters, a null v (giving the agentive *iss*-2 'stay intentionally' in a negative clause as well) will still block the fusion rule in the way advocated in chapter 4 section 4.2.3. When the [ $_r$  +agent] feature is present, it is the sister of the root and makes the [+neg] feature asymmetrically command the root. This point is shown in the following vocabulary insertion process where there is no [+hon] feature present.

(67) Vocabulary insertion of [+neg]-[EXIST]-[, +agent]-T-



In the step from (c) to (d), the [+neg] and the root, now with the phonological feature /iss/, are not sisters. Hence, the fusion rule does not apply and the [+neg] node is provided with the usual /an(i)/ separately. The intervening v node effectively blocks the fusion operation, and this situation is as identified in chapter 4. The only change in the new fusion rule is that the root is represented as the vocabulary item instead of the abstract morpheme, i.e., the non-phonological feature bundle [EXIST]. Then, the rule finds its place accordingly. It does not apply before vocabulary insertion, but applies cyclically interleaved with vocabulary insertion.

If the above line of reasoning is correct, one more step can be taken. That is, if fusion is interleaved with vocabulary insertion, it is considered as part of vocabulary insertion in a broader sense. Related to this conclusion, other views on fusion are worth considering. In Halle and Marantz (1993), fusion was considered to apply prior to vocabulary insertion. However, there have been several different proposals regarding the location and the status of fusion. For example, Trommer (1999) treats fusion (along with all other morphological operations that have been

assumed to be pre-insertion) as part of vocabulary insertion. He argues, "most fusion analyses can be replaced by analyses without it" (p. 10) employing, for example, impoverishment and contextual allomorphy with the use of a zero form of the environment morpheme. Even though the Korean case of suppletive negation cannot be analyzed as, for example, contextual allomorphy (See section 5.2.), the fusion operation is formulated in a way different from what Halle and Marantz (1993) propose. Discussing tone phenomena in Nupe, Kandybowicz (2006) proposes that post-insertion fusion processes should be possible (in addition to pre-insertion fusion). Bobaljik and Thráinsson (1998) present the (presyntactic) bundling theory as an alternative to fusion. All these considerations together raise a question regarding the status of fusion in PF. Future studies would explore this issue of the status and nature of fusion. For the present purpose, fusion is characterized as being interleaved with vocabulary insertion.

This section has provided an analysis of honorific suppletion. The interaction of it with negative suppletion shows that honorific suppletion is contextual allomorphy that is better analyzed with the government approach. The governing honorific feature is not part of the responsible suppletion process but serves as the environment of it in an outer cycle. With the government apparatus, no other machinery or exceptions need to be introduced. On the other hand, negative suppletion is to be viewed as fusion that operates in a bigger cycle than just the root. Thus, it was reformulated in a way that it refers to the output of vocabulary insertion in the previous cycle. The fusion rule, therefore, is understood to be interleaved with vocabulary insertion. In this way, the apparent paradox between the two cases of suppletion can be resolved.

## 5.2. Suppletive Negation is Not Contextual Allomorphy

The interaction of negative suppletion and honorific suppletion has confirmed the fusion analysis of negative suppletion. The difference of the revised fusion rule compared to the rule formulated in chapter 4 is that the new rule takes the vocabulary item of the root – not the preinsertion morpheme – and the morphosyntactic feature [+neg]. In any case, it is crucial that the two nodes are fused into one single node and at the same time a single vocabulary item is inserted to the resulting node. However, there is a possibility of treating suppletive negation as contextual allomorphy (e.g. Trommer 1999). Specifically, it would be conceivable that the root node and [+neg] each undergoes vocabulary insertion separately and that [+neg] is realized as a phonologically null form with a suppletive root allomorph for [EXIST] and [KNOW]. In fact, section 4.1 of chapter 4 mentioned this possibility, but denied it contending that the null negator is motivated only for these suppletive negation cases. This section considers this scenario and argues that suppletive negative cases in Korean must not be viewed as contextual allomorphy.

The morphosyntactic structure at issue is the following which is realized as an(i) kyey-si-.

(62) Morphosyntactic structure of Neg-[EXIST]-Hon (= (17))



In the government approach, the vocabulary items for [EXIST] and [+neg] would look like the following:

- (68) Relevant vocabulary items for the morpheme [EXIST] in the contextual suppletive allomorphy view in the government approach
  - a. [EXIST]  $\leftrightarrow$  /kyey/ / governed by [+hon] (= (28))
  - b. [EXIST]  $\leftrightarrow$  /eps/ / governed by [+neg] c. [EXIST]  $\leftrightarrow$  /iss/ (= (14)c)
- (69) Relevant vocabulary items for [+neg] in the contextual suppletive allomorphy view
   a. [+neg] ↔ Ø / /eps/\_\_\_\_
  - b.  $[+neg] \leftrightarrow /an(i)/$  (= (15)b)

The contextual allomorphy view works for the case of [Neg [EXIST]]. The vocabulary item (68)a provides the root [EXIST] with /eps/ in such a structure, and then in the next cycle, a zero form is inserted for [+neg] in the environment of the morphophonologically peculiar root /eps/ due to the vocabulary item (69)a. The resulting morphophonological form is the correct  $\emptyset$ -eps-.

First, consider the vocabulary item (69)a along with "[+neg]  $\leftrightarrow \emptyset$  / /molu/ \_\_\_\_\_" for the other suppletive negative root *molu*- 'not.know'. The environment of these two vocabulary items could be considered as some kind of diacritic feature particular to those two items. Such a diacritic feature is responsible for the allomorphs, /eps/ and /molu/. Now, this feature is as idiosyncratic as the fusion rule feature of the roots, /iss/ and /al/, in the fusion analysis advanced in the previous section. In either analysis, a peculiar morphological diacritic feature is necessary.

However, there are several problems. A major problem is the indeterminacy between /kyey/ and /eps/ when both negation and honorification are present in a given conjugated form as in (62). Both (68)a and (68)b govern the root. Furthermore, neither of the two vocabulary items' environments, i.e., "governed by [+hon]" and "governed by [+neg]", is a subset of the other, and hence, they are not in a competition relationship. Therefore, an extrinsic ordering is necessary. It is not unreasonable to argue that the allomorphy-triggering feature closer to the root, in this case [+neg], wins when there is an outer allomorphy feature, i.e., [+hon]. When there is more than one governor for a given governee, the (structurally) closer governor is expected to be the actual governor. However, the situation is the reverse. This raises a question about the validity of the contextual allomorphy view of suppletive negation with the government approach.

Another serious problem is that it wrongly predicts that any intervening node between the root and the negation node would be ignored just as any intervening nodes between the same root and the honorific feature are ignored in honorific allomorphy. Specifically, the vocabulary item (68)b wrongly ignores the null v with [+agent] which, in fact, blocks negation fusion of the root

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[EXIST]. This would result in the ungrammatical form \**eps-nun-ta* 'not.exist-PRES-DECL' for the negative agentive [[Neg [[EXIST] v]] T] (See sections 3.2.4 and 4.2.3 of chapter 4.). The contextual allomorphy analysis of suppletive negation does not work in the government approach, theoretically and empirically.

A similar but somewhat different problem arises in the parenthesis formalism considered in section 5.1.1. Consider the following vocabulary items for [EXIST] in the parenthesis approach along with [+neg] items in (69):

(70) Relevant vocabulary items in the contextual suppletive allomorphy view with parentheses
a. [EXIST] ↔ /kyey/ / (\_\_\_ [+neg] /) \_\_\_ [+hon] (= (27))
b. [EXIST] ↔ /eps/ / \_\_\_ [+neg]
c. [EXIST] ↔ /iss/ (= (14)c)

In the structure (62) [[Neg [EXIST]] Hon], the root node is first provided with /kyey/ due to (70)a. (70)b will not be inserted because then the root is already filled with the vocabulary item /kyey/. However, (70)a and (70)b are not in a relationship of proper inclusion because of the optionality of the parenthesized part in (70)a, and hence these two vocabulary items are not ordered adequately. In the case of (62), both [+neg] and [+hon] are present and parenthesized part is present in (70)a. When there is no [+neg] feature involved, i.e., as in [[EXIST] [+hon]] for example, the shorter expansion without the parenthesized part will apply and (70)b will not be relevant at all. In this way the surface form *kyey-si*- can be derived correctly. When there is only [+neg], but no [+hon], (70)b will insert /eps/ into the root and (69)a will provide a null negator, resulting the correct *eps-* for [[+neg] EXIST]. Hence, the vocabulary items in (70), along with [+neg] vocabulary items, can yield the correct surface forms in the contextual allomorphy view.

The problem is that not only [+neg] but also  $[_v + agent]$  can intervene between the root and [+hon]. So the proper formulation of the vocabulary item referring to the [+hon] in its context must be (60):

(60) Vocabulary item [EXIST] in the environment of [+hon] [EXIST]  $\leftrightarrow$  /kyey/ / (\_\_\_ [+neg] /) (\_\_\_ [, +agent] /) \_\_\_ [+hon]

Similar to the problems pointed out in section 5.1.1 regarding the parenthesis notation, the problem of arbitrariness arises concerning the optionality of the intervening nodes between the root and [+neg] on one hand and between the root and [+hon] on the other hand. That is, any and all intervening nodes for allomorphy by [+hon] is ignored, while no single node is for allomorphy by [+neg]. More specifically, the intervening [ $_{v}$ +agent] node blocks suppletive negation, but not suppletive honorification. In other words, negation suppletion operates under the strict sisterhood configuration while honorific suppletive phenomena are of different kinds.

Section 4.2 of chapter 4 briefly mentioned that the fusion analysis of suppletive negation explains why there is no separate negator. This same argument applies to the revised fusion formalism of suppletive negation. If suppletive negation were contextual allomorphy, the [+neg] feature would be realized as the normal negator an(i) in the suppletive negation cases, just as the [+hon] feature is realized as its normal phonological form -si- with a suppletive honorific root. Because suppletive negation is a portmanteau case while suppletive honorifics is a case of root suppletion, the two suppletion cases are to be treated differently.

The problem of locality between the allomorphy-triggering feature and the allomorphyexhibiting root arises as in the government approach. When there is more than one allomorphytriggering feature for the root, the (structurally) closer feature is expected to cause its allomorphy. The fact is the opposite. This point also supports the view that suppletive negation is different from suppletive honorifics and that it is not to be viewed as contextual allomorphy.

Hence, the [+neg] does not serve as (part of) the environment of the suppletion phenomenon, but must be (part of) the phenomenon itself. That is, the negative suppletion takes

the root and negation, and provides a single vocabulary item for them. To embrace the two nodes, a cycle bigger than the root cycle must be referred to, while contextual allomorphy only refers to the very relevant cycle in the part of the vocabulary item, excluding the allomorphy-triggering feature from the vocabulary insertion operation. In this way, the apparent paradox noted in sections 2 and 3 can be resolved.

This aspect of referring to the [+neg] feature and the root in a single vocabulary insertion operation is explained when the suppletive negation process is understood as fusion as formulated in (64). Therefore, negation suppletion must not be analyzed as root allomorphy plus a null negator, but as fusion of [+neg] and a vocabulary item of the root (/iss/ or /al/) in the smallest cycle containing these two sister entities.

## 5.3. Causative as an Impenetrable Spell-Out Domain for Vocabulary Insertion

Discussions so far have established that honorific root suppletion is contextual allomorphy formally characterized by means of government within a word. Hence, the governing [+hon] in a given word triggers root suppletion. The government approach allows any intervening node(s) to be ignored. However, there is one element that blocks honorific allomorphy in the very same situation and it is the only element behaving in this way: causative. This section contrasts the two features, [+agent] and [+caus], under the same v node regarding allowing or blocking of honorific contextual allomorphy. In short, the intervening [+caus] feature serves as a phase head and makes the [+hon] feature outside the phase domain unavailable at the point of vocabulary insertion.

Section 4 of chapter 4 has attributed the same behavior of the agentive and causative features with respect to blocking of the negation fusion process to the identical structural position of these two features: locating both of them under the v node. The agentive verbs have a v(P) shell with the [+agent] feature related to their agent argument, and adjectives and non-agentive verbs

do not have a v(P) shell because they do not involve any agent argument. When such non-agent predicates appear in a (suffixal) causative construction, the responsible functional category housing the [+caus] feature is merged with the V/A projection. This feature is to be accommodated under the v node, with the added agent argument placed in the Spec-vP. The [+agent] feature for an agentive verb and the [+caus] feature for any given predicate share the same v category.

This treatment desirably captures the different behaviors of short-form negation forms for the predicate 'exist'. The existential *iss*- has the suppletive negative form *eps*-, while the agentive *iss*- has the usual short-form negation form an(i) *iss*-. The [+agent] feature has been posited under the v node in the agentive construction. This additional feature with a phonologically null form intervenes structurally between the root node and the negation node, and successfully blocks the fusion operation of the root and the negation node available to the suppletive negative form of the existential 'exist'. This morphosyntactic treatment has also been used to explain the homophony between the existential and the agentive.<sup>14</sup>

Once the [+agent] v node is established, there arises an interesting contrast between [+agent] and [+caus] regarding honorific root allomorphy. Consider the following interactions of causative, [+agent] and honorification for *mek*- 'eat' and *ca*- 'sleep' (from (8)).<sup>15</sup>

(i) a. khu-iwu-n-ta big/grow (intrans.)-CAUS-PRES-DECL 'make big, raise' (phonologically:  $/k^{h}ui-i-u-n-ta/ > [k^{h}iunda]$ )

<sup>&</sup>lt;sup>14</sup>The difference of the agentive and causative features with respect to root allomorphy with the honorific feature may establish the structure with split nodes for the two features. This idea is compatible with Pylkkänen's (2002) elaborated phrase structure with separate agentive, causative, applicative heads. The following observation and analysis of contrasting behaviors of agentive vs. causative, based on phasehood is readily translatable into her proposed structure.

<sup>&</sup>lt;sup>15</sup>The vowel sequence -*iwu*- [iu] in the causative form in (72)d,e is a result of a regular phonological aspect due to the root-final vowel. After the usual causative vowel -*i*- [i], a redundant vowel -*wu*- [u] is added when the root ends in a central, i.e., back unround, vowel such as -*u*- [uɪ], -*e*- [ $\Lambda$ ], and -*a*- [a].

- (71) Aspects of honorific allomorphy for *mek* 'eat': [+agent] vs. [+caus]
  - a. mek-Ø-nun-ta eat-[+agent]-PRES-DECL 'is eating (non-honorific)'
  - b. capswu-Ø-si-n-ta eat-[+agent]-HON-PRES-DECL 'is eating (honorific)'
  - c. \*mek-Ø-u-si-n-ta eat-[+agent]-EV-HON-PRES-DECL
  - d. mek-i-n-ta eat-CAUS-PRES-DECL 'is feeding (non-honorific)'
  - e. mek-i-si-n-ta eat-CAUS-HON-PRES-DECL 'is feeding (honorific)'
  - f. \*capswu-i-si-n-ta eat-CAUS-HON-PRES-DECL
- (72) Aspects of honorific allomorphy for *ca* 'sleep': [+agent] vs. [+caus]
  - a. ca-Ø-n-ta sleep-[+agent]-PRES-DECL 'is sleeping (non-honorific)'
  - b. cwumu-Ø-si-n-ta sleep-[+agent]-HON-PRES-DECL 'is sleeping (honorific)'
  - c. \*ca-Ø-si-n-ta sleep-[+agent]-HON-PRES-DECL
  - d. ca-iwu-n-ta sleep-CAUS-PRES-DECL 'is putting to sleep (non-honorific)'
  - e. ca-iwu-si-n-ta sleep-CAUS-HON-PRES-DECL 'is putting to sleep (honorific)'
  - f. \*cwumu-i-si-n-ta sleep-CAUS-HON-PRES-DECL

The pattern is that the [+agent] feature is ignored and does not interfere with honorific allomorphy of the root while a causative blocks the same allomorphy at issue. The following structure with these features illustrates the contrasting behaviors.

(73) Different behaviors of [+agent] and [+caus] in V-v-Hon- for [EAT]



b.	se-iwu-n-ta stop (intras.)/stand-CAUS-PRES-DECL 'stop (tras.), make stand'	(phonologically: /sʌ-i-u-n-ta/ > [seunda])
c.	tha-iwu-n-ta burn (intrans.)-CAUS-PRES-DECL 'burn (trans.), raise'	(phonologically: /t <sup>h</sup> a-i-u-n-ta/ > [t <sup>h</sup> eunda])

This vowel stacking is often called causative doubling, but only in a phonological sense. Semantically or syntactically, there is only one causative feature involved just like other usual cases with only one vowel and an optional consonant preceding the vowel: -*i*-, -*hi*-, -*li*-, -*ki*-, -*wu*- and -*chwu*-.

Considering that both the [+agent] and the [+caus] features reside in the v node, an immediate solution for the contrast between the two features is to stipulate that certain features are transparent in such a situation while other features are not, even though these features occupy the same morphosyntactic node. The v node with the [+agent] feature is transparent for the purpose of non-local honorific allomorphy of the root, while the same v node with the [+caus] feature is not.

Instead of stipulating that certain arbitrary features such as [+caus] block honorific allomorphy employing, for example, the parenthesis notation, a more general explanation is possible. Chomsky (2000, 2001, 2004) proposes phases akin to barriers (Chomsky 1986a) or complete functional complexes (Chomsky 1986b). Phases, i.e., heads introducing an external argument, define the (in)accessibility of a certain element by a higher element when these elements are separated too remotely. When a phase is formed in the course of syntactic derivation, its complement is sent over to PF and LF. Then, syntactic operations in the next higher phase cannot make reference to the elements inside the domain that has already been sent over to the interfaces. Hence, phases are domains for cyclic Spell-Out. In this sense, the derivation is phase by phase. Chomsky proposes that CPs and (causative and transitive) *v*Ps are such (strong) phases. However, different authors have different views on what counts as a phase and what does not. For example, Legate (1999, 2003) and Sigurðsson (2000) argue that passives and unaccusatives are phase heads, as well.

Adopting the phase mechanism in syntax, Marantz (2001) and Pylkkänen (2002) propose that there are phase-based domains for root allomorphy. Words are a primary domain for root allomorphy (See Bobaljik 2006b for the generalization, the Synthetic Suppletive Generalization, that contextual allomorphy is restricted within words). However, they are sometimes too large and smaller domains need to be recognized. That is, causatives provide a second phase, i.e., Spell-Out domain, and serve as a smaller domain for contextual allomorphy. If causative is a phase head, it will trigger Spell-Out of the lower domain before the higher inflections are added. In the present discussion, the root inside the domain of the [+caus] phase head is not visible for honorific contextual allomorphy triggered by [+hon] because this domain has been sent to PF and at this time [+hon] is not present in the structure. To the extent of the present discussion, not all v nodes serve as a phase head. The simple agentive, that does not interfere with honorific root allomorphy, under the same v node must not count as a phase head.<sup>16</sup>

This phase theory can describe the relevant vocabulary items, as follows, without further stipulation regarding the difference between [+agent] and [+caus].

- (74) Vocabulary items for [EAT]
  a. [EAT] ↔ /capswu/ / governed by [+hon]
  b. [EAT] ↔ /mek/
- (75) Vocabulary items for [SLEEP]
  a. [SLEEP] ↔ /cwumu/ / governed by [+hon]
  b. [SLEEP] ↔ /ca/

Hence in (73) with the [+agent] feature under v, the entire word containing the root, v, [+hon] and further functional heads as a whole is sent to PF from syntax. In this structure, the root takes the expected honorific allomorph *capswu*- in the vocabulary item (74)a (and *cwumu*- in (75)a in the case of [SLEEP]) due to the triggering [+hon] feature in the same way as presented in section 5.1.2

<sup>&</sup>lt;sup>16</sup>This may be rather unexpected as transitive v's are considered a canonical phase in syntax (See above authors). One way of reconciliation may be found in Pylkkänen (1999, 2001, 2002) who proposes that the causative heads and the simple agent-introducing heads are distinct. She proposes that there is a structurally separate causative head that takes the shell v(P) as its complement. This structural distinction could be used to differentiate the status of the phase head of simple agentives as opposed to the causatives (or possibly the stacking of the causative and the agentive).

Another possible way is the notion of relativized phase. Bobaljik and Wurmbrand (2005) argue against the absolute view of phases, and propose that the phasehood of a certain phrase is induced by certain higher heads. Then, establishing causatives, but not agentives, as phase heads is a certain possibility along with appropriately structuring these features. This issue awaits more research.

for the *kyey*- allomorph.

When the structure (73) appears with [+caus] instead, the derivation and vocabulary insertion operate differently. As soon as [+caus] is added as in (76)a in syntax, the higher v constituent forms a phase and its domain (76)b, i.e., the V root, is sent to PF before higher functional heads are added. In this structure, the root does not have the context [+hon] and vocabulary insertion of (74)a (or (75)a) does not operate. Rather, the "regular" vocabulary item (74)b provides /mek/ for [EAT] (or (75)b, /ca/ for [SLEEP]) as in (76)c.

(76) Vocabulary insertion in a causative phase



Subsequently, the next phase, with [+hon] and other higher nodes up to C, is added to the lower phase whose nodes have already been provided with a vocabulary item. This is illustrated in (76)d. Vocabulary insertion for the added nodes in this next phase follows, resulting in a structure such as (76)e (omitting irrelevant nodes higher than Hon).

(76) Vocabulary insertion in the added phase higher than the causative



Vocabulary insertion of the lower domain has been completed before the higher nodes are added in (76)d, and will not be affected at later stages of the derivation (except for phonological or readjustment operations).

One prediction is that adding short-form negation should not interfere with the above pattern. This prediction is borne out correctly.

(77)	Honorific allomorphy for mek- 'eat' in negation			
	a.	an(i) mek-Ø-nun-ta	NEG eat-[+agent]-PRES-DECL	
	b.	an(i) capswu-Ø-si-n-ta	NEG eat-[+agent]-HON-PRES-DECL	
	c.	*an(i) mek-Ø-u-si-n-ta	NEG eat-[+agent]-EV-HON-PRES-DECL	
	d.	an(i) mek-i-n-ta	NEG eat-CAUS-PRES-DECL	
	e.	an(i) mek-i-si-n-ta	NEG eat-CAUS-HON-PRES-DECL	
	f.	*an(i) capswu-i-si-n-ta	NEG eat-CAUS-HON-PRES-DECL	
(78)	Honorific allomorphy for ca- 'sleep' in negation			
	a.	an(i) ca-Ø-n-ta	NEG sleep-[+agent]-PRES-DECL	
	b.	an(i) cwumu-Ø-si-n-ta	NEG sleep-[+agent]-HON-PRES-DECL	
	c.	*an(i) ca-Ø-si-n-ta	NEG sleep-[+agent]-HON-PRES-DECL	
	d.	an(i) ca-iwu-n-ta	NEG sleep-CAUS-PRES-DECL	
	e.	an(i) ca-iwu-si-n-ta	NEG sleep-CAUS-HON-PRES-DECL	
	f.	*an(i) cwumu-i-si-n-ta	NEG sleep-CAUS-HON-PRES-DECL	

The reason is that these roots do not exhibit negative suppletion. Hence, the added [+neg] feature does not cause any difference. Honorific suppletion and its blocking due to [+caus] operate in the same way as in the cases without negation. However, the real reason is that negation appears outside the causative node. Hence, even if negation triggered root allomorphy without causative, it would not affect the blocking of negative allomorphy because the causative phase domain does not contain negation (or honorification). The added [+neg] feature does not affect the behaviors of contextual allomorphy of honorifics regarding the contrast between [+agent] and [+caus].<sup>17</sup>

If the phase analysis is correct, it serves as a further support for Distributed Morphology, a theory employing late insertion. In lexicalist frameworks (especially strong lexicalism) where

<sup>&</sup>lt;sup>17</sup>One remark is that the case of *iss-/kyey-* is (trivially) partly consistent with [EAT] and [SLEEP]. The reason is that unlike [EAT] and [SLEEP], the existential/agentive [EXIST] does not have a corresponding suffixal causative construction derived by adding a causative suffix allomorph to the root. If *iss-/kyey-* had such a causative construction, it should look like \**iss-i-(si-)* (and not \**kyey-i-(si-)*) and the negative counterpart should look like \**an(i) iss-i-(si-)* (and not \**an(i) kyey-i-(si-)*).

word formation processes occur prior to syntax, the contrast between causative and agentive on one hand and between causative and other intervening affixes under other than v would have to be stipulated arbitrarily, because these contrasts are inherited from syntax. The connection between the phasehood of the causative in syntax and in phonology and the causative-agentive contrast in presyntactic morphology would be a mere coincidence. In the Distributed Morphology view, on the other hand, syntactic causatives can have morphological effects transparently, because morphology and phonology follow syntax (See Marvin 2002 and Piggott and Newell 2006, for example, for the effect of syntactic phases on phonological aspects such as stress and syllabification). The causative-agentive contrast follows automatically from the phase-based multiple Spell-Out mechanism in Distributed Morphology. The phase theory, which is independently motivated in syntax and other components of grammar, neatly explains the contrasting behaviors between [+agent] and [+caus] regarding whether to trigger root allomorphy in apparently the same environments with [+hon].

## 5.4. Summary

To conclude this section, certain features behave as if they were not present and hence they are ignored for certain non-local allomorphy rules. This transparency is formally characterized by the government mechanism that resolves the paradoxical situation identified in sections 2 and 3 regarding the interaction of negative suppletion and honorific suppletion. The paradoxical situation leads to a different formalization of suppletive negation, i.e., fusion rather than contextual allomorphy. Another important recognition is that contextual allomorphy is subject to phases. The causative feature establishes a phase which isolates its domain for contextual allomorphy within words.

## 6. Inwards-Sensitivity of Present Tense Allomorphy

So far, the discussions have focused mostly on outwards-sensitive allomorphy. That is, the allomorphy-exhibiting morpheme is inside in a given structure and the allomorphy-triggering element is in an outer cycle of the word/phase. This section considers a case of inwards-sensitive allomorphy: allomorphy of the present tense suffix depending on the predicate root category. This allomorphy has been mentioned briefly in several places in chapter 4 and this chapter. It also considers the situation where allomorphy is obliterated when a v node (either causative or agentive) is added and only the verbal tense suffix allomorph is available. The purpose of this section is to contrast an aspect of inwards- vs. outwards-sensitive allomorphy with respect to v.

Recall that Korean has two different kinds of predicates: verbs and adjectives. Adjectives are conjugated by themselves and do not require an additional element such as a copula.<sup>18</sup> As briefly mentioned in section 5.4 of chapter 4, one difference between verbs and adjectives is allomorphy of the present tense suffix. The present tense suffix for verbs is -n-, while adjectives take a zero form for the same morpheme.

(79) Two allomorphs of the present tense suffix
a. Verbs take -n-.
eysute-ka cal ca-n-ta. (\*ca-Ø-ta)
Esther-NOM well sleep-PRES-DECL
'Esther is sleeping well.'

(i) eysute-nun haksayng-i-Ø-ta. Esther-TOP student-COP-PRES-DECL 'Esther is a student.'

<sup>&</sup>lt;sup>18</sup>Korean does have a copula, -*i*-, which is used only when a noun (or a nominal equivalent) is used as a predicate. It is conjugated basically as an adjective: for example, it takes the zero form of the present tense suffix.

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b. Adjectives take Ø.
eysute-ka acwu ppalu-Ø-ta. (\*ppalu-n-ta)
Esther-NOM very quick-PRES-DECL
'Esther is very quick.'

To formalize present tense allomorphy, the following vocabulary items are needed.<sup>19</sup>

- (80) Allomorphy of the [+pres] feature
  - a. [+pres]  $\leftrightarrow /n//V$
  - b.  $[+pres] \leftrightarrow \emptyset / A$ \_\_\_\_\_

Three affixes can appear between the root and the present tense suffix individually or jointly, but they do not interfere with present tense allomorphy. They are honorification, negation and the v node.

Honorification as a transparent affix for tense suffix allomorphy is illustrated below.

(81) Two allomorphs of the present tense suffix with the intervening honorifics

а.	Verbs take -n	
	apeci-kkeyse cal cwumu- <i>si</i> - <b>n</b> -ta.	(*cwumu-si-Ø-ta)
	father-HON.NOM well sleep.HON-HON-PRES-DECL	
	'Father is sleeping well (honorific).'	
b.	Adjectives take Ø.	
	apeci-kkeyse acwu ppalu-si-Ø-ta.	(*ppalu-si-n-ta)
	father-HON.NOM very quick-HON-PRES-DECL	
	'Father is very quick (honorific).'	

Hence, whether the honorific suffix is present or not, the appropriate present tense suffix form is

determined by the root category between verb and adjective.

This transparency is not restricted to honorification. The same verb-adjective distinction is

(i)  $[+pres] \leftrightarrow /(nu)n/ / V$ 

This phonologically predictable aspect is not to be taken care of as morphological allomorphy.

<sup>&</sup>lt;sup>19</sup>To be more precise, there two variants of the verbal present tense suffix: -*n*- and -*nun*-. The choice depends on purely phonological factor: a vowel-final stem takes -*n*- and a consonant-final stem takes -*nun*-. Then, the vocabulary item (80)a is to be revised as follows:

exhibited with the intervening negation and the v node. Consider the following:<sup>20</sup>

- (82) Two present tense allomorphs with (short-form) negation (and  $[_v + agent]$ )
  - a. Verbs take -n-.
    - an(i) talli-Ø-**n**-ta NEG run-[+agent]-PRES-DECL 'is not running'
  - b. Adjectives take Ø.
     an(i) ppalu-Ø-ta
     NEG quick-PRES-DECL
     'is not quick'

The negator an(i) is present in both examples. In addition, the action verb *talli*- in (82)a has the [+agent] v node. When all three of these suffixes appear with an action verb, they show the same behavior (the honorific suppletive roots show the same behavior):

- (83) Present tense suffix allomorph -n- for a verb with negation, honorifics and [r +agent]
  a. an(i) talli-Ø-si-n-ta.
  NEG run-v-HON-PRES-DECL
  - 'is not running (honorific).'
  - b. an(i) capswu-Ø-si-**n**-ta. NEG sleep.HON-*v*-HON-PRES-DECL 'is not sleeping (honorific).'

Therefore, the agentive v (for action verbs), honorification and negation can intervene between the root and the present tense node. Still, the choice of the present tense suffix allomorphs is consistent regardless of these intervening affixes. The choice is dependent solely upon the category information of the root.

Adopting the percolation convention (Lieber 1981, 1992; cf. di Sciullo and Williams 1987, Selkirk 1982, Spencer 1991) as a means of inwards-sensitivity to incorporate the transparency of the intervening vocabulary items, the category feature of the root goes up (at least to the Hon

<sup>&</sup>lt;sup>20</sup>The verbs in (79)a and (81)a process verbs where v is not involved. Action verbs as in (82)a has this additional v node with the [+agent] feature. See section 2.3 of chapter 4.

(84) Root category feature percolation

node) in a maximally possible conjugation as below (omitting nodes higher than T):

Т Т b. a. Hon<sub>A</sub> T Hon<sub>v</sub> Hon Neg<sub>v.</sub> [+pres] Hon [+pres] Neg<sub>A</sub> Neg Neg [+hon]  $(v_V)$ [+hon] [+neg] [+neg] (v)([+agent])

When the higher Hon node is combined with T as the sister node of T, it bears the category feature percolating from the root. At this point, the V/A feature is available in the sister node of T regardless of how deep this feature of the root is embedded. The percolating feature at the sister node then serves as the context of the present tense allomorphy. The vocabulary items in (80) are sustained without modification.

There is a noticeable exception to the transparency of the intervening nodes. If a causative suffix is involved, the root category distinction disappears and -n- is found as the uniform present tense suffix.

(85) The only present tense allomorph -n- with the causative

a. Causatives of verbs

mek-nun-ta	mek- <i>i</i> - <b>n</b> -ta
eat-PRES-DECL	eat-CAUS-PRES-DECL
'is eating'	'is feeding'
ca-n-ta	ca- <i>iwu-</i> n-ta
sleep-PRES-DECL	sleep-CAUS-PRES-DECL
'is sleeping'	'is making sleep'

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b.	Causatives of adjectives		
	nelp-Ø-ta	nelp- <i>hi</i> - <b>n</b> -ta	
	wide-PRES-DECL	wide-CAUS-PRES-DECL	
	'is wide'	'is widening'	
	khu-Ø-ta	khu- <i>iwu-</i> n-ta	
	big-pres-decl	big-CAUS-PRES-DECL	
	ʻis big'	'is making big/is raising'	

In the cases of verbs, the change is not visible because both the V root and the causative result in the same present tense allomorph, -*n*-, as in (85)a. As (85)b shows, however, adjective roots without a causative suffix on the one hand and suffixal causatives with the same adjective root on the other hand take distinct present tense suffixes. The intervening causative suffix blocks the present tense allomorphy by the root and the added causative determines the shape of the uniform present tense suffix allomorph.

One possible way of formalizing the behavior of [+caus] blocking the V/A root distinction may be the use of [+caus] as a phase head. In this view, the domain of  $[_v$ +caus] would limit percolation of the root category feature within this domain, while the absence of this node would have the root category feature pass on to higher nodes. The phase head, when present, would initiate percolation of its own category feature.

However, this conclusion is not so definite. The first point is that the same result can be obtained without appealing to the phase mechanism. Suppose that the entire structure in (84)a with [+caus] instead of [+agent] enters PF at a single point of derivation. In this structure, the  $[_v$ +caus] node will percolate its own category feature up to higher nodes, making the category feature of the root unavailable. The only requirement is that the  $v^0$  head with the [+caus] feature is the head of the constituent  $[_v [V v]]$ . This condition neither supports nor rebuffs the causative phase head's status of intercepting the root category feature percolation.

The second point is that not only the [+caus] feature of suffixal causatives but also the [+agent] feature of action verbs in general play the same role of choosing the allomorph *-n*-. The

role of [v+agent] is not obvious in action verbs, because in these cases both the root category V and the v node with [+agent] yield the same allomorph. However, section 4.2.3 of chapter 4 analyzed the homophony of *iss*- between 'exist' and 'stay intentionally' as lacking and holding the [v+agent] node. This structural and featural difference causes the two divergent present tense suffix forms: *iss-O-ta* 'exist-PRES-DECL' vs. *iss-nun-ta* 'stay-PRES-DECL'. The v node of the phonologically null [+agent] feature plays the same role of intercepting percolation of the root category feature as [+caus] does. The added v node percolates its own category feature regardless of its feature, [+agent] vs. [+caus], annulling the V/A distinction. Then, the category of action verbs responsible for the allomorph *-n*- seems to be v, not the V root. Therefore, it appears that what matter is the v node, not the causative phase head, and that there is no percolation of A when the additional v node is present with either [+caus] or [+agent].

If this line of reasoning is correct, it may be that phases are only relevant to outwardssensitive allomorphy and not to inwards-sensitive allomorphy. That is, phase boundaries may be transparent to inwards-sensitive allomorphy. However, the [+caus] feature, as a v node, does percolate its own category feature. Since the [+caus] feature is a phase head, one cannot tell if phases block percolation of the lower category feature or not. Phases are not sufficient for understanding inwards-sensitive allomorphy, but it is not clear if they are relevant. This issue is to be explored in future research.

This section has considered the aspect of tense suffix allomorphy, a case of inwardssensitive allomorphy, due to the root category distinction, and discussed the behavior of the added v node with either [+agent] or [+caus] identical to the behavior of the V root in choosing the allomorph -*n*-. The homogeneity between these two categories, V and v, suggests that they share a common feature, for example [-N] (cf. Hale and Keyser 1993, Harada 1999, Larson 1988, Ramchand 2003). For the cases with a v node, the minimum requirement is to percolate the category feature of v, the head – the higher category – of the constituent [v [V/A v]] (Lieber 1981, Marantz 1984, Spencer 1991: 265), especially when the root category and the v category are in conflict with respect to their category features. This issue awaits more research.

## 7. Conclusion

This chapter has investigated suppletion of [KNOW] and [EXIST] for negation and honorification, and the interaction of the two suppletion cases. From these phenomena, a paradoxical situation was identified between negation and honorification regarding which of the two is structurally closer to the root. Based on the predicate iteration constructions, the structure [[Neg [V (v)]] Hon] grouping the root with negation prior to honorification has been determined to be the correct structure. The following morphological structure of a fully conjugated predicate is sent to PF phase by phase:

(33) Morphosyntactic structure of a fully conjugated predicate up to T (final): fed by phase



All other conjugational affixes are suffixes, and the placement of them relative to the highest node in (33) in the entire structure is straightforward.

To replicate the paradox, different formalisms have been adopted for negative suppletion

and honorific suppletion. Honorific suppletion was analyzed as contextual allomorphy equipped with the government relationship. Since the honorific feature serves as the non-local context governing the root, the negation feature can intervene between the root and the honorific feature. This non-local aspect of contextual allomorphy (Bobaljik 2000, Halle and Marantz 1993) for honorific suppletion leads to the revision of the fusion rule. The new formalism refers to the vocabulary item in the root cycle and the negative feature, thus making it interleaved with vocabulary insertion (See Halle 1997 and Trommer 1999 for a similar view on fission). This aspect makes the fusion operation special in that the process targets two sister nodes in one single operation of vocabulary insertion, while vocabulary insertion takes a single terminal node.

Meanwhile, contextual allomorphy of honorific suppletion is subject to phases. The causative phase forms an impenetrable Spell-Out domain smaller than a word (Marantz 2001, 2006, Pylkkänen 2002), and makes the honorific feature unavailable in this domain at the point of vocabulary insertion to the verb/adjective root. On the other hand, present tense allomorphy was analyzed in terms of percolation of root category feature (V vs. A) or the v head. It appears that this inwards-sensitive allomorphy is different from outwards-sensitive allomorphy such as honorific suppletion in that causative phases are irrelevant to inwards-sensitive allomorphy.
## Chapter 6

## Der Abschied und die ewige Reise

The aim of the dissertation was to study the aspects of PF in Korean in derivational approaches, focusing on inflected conjugations. Different theoretical frameworks were adopted for different subcomponents in PF. The morphosyntactic analyses in chapters 4 and 5 adopted Distributed Morphology, while the morphophonological study in chapter 3 employed Dynamic Phonology. However, they share the fundamental thesis that the entire grammar and its subcomponents have the same framework, that is, derivationalism.

The order of the presentation of the aspects of PF in Korean is the reverse of the derivation I exposed the entire discussion in the order of surface level phonetics, phonology, morphology and morphosyntax, i.e., from the subcomponent closest to the surface forms to the subcomponent farthest from the surface forms (thus the deepest in the entire PF derivation). This was intended in order to present arguments for the phonological and morphological processes and constraints using the surface forms. Inside each component, however, the derivational order was respected.

This dissertation is in no way claimed to be a flawless or perfect study of Korean phonology and morphology, and there is unquestionably more to explore. For example, identifying the proper harmonic feature(s) and the behavior of neutral vowels in vowel harmony constitutes topics regarding the Korean vowel system. Chapter 2 mentioned the two different ways of adapting consonant sequences in loanwords: epenthesis and consonant-glide contraction. This issue needs investigating to identify what factor chooses what (repair) operation. Within Dynamic Phonology, a more constrained way of utilizing premium value is to be looked into.

In the area of morphology and morphosyntax, passive is to be studied. The passive morpheme shares the same slot as the causative morpheme and these two are in complementary distribution. Also, they share the property of changing the predicate's argument structure. Interestingly, the passive morpheme also blocks root allomorphy with respect to subject honorification. Perhaps, the passive also constitutes a phase head. This issue is to be explored in future research. Another issue is the role of phase heads in inwards-sensitive allomorphy as briefly discussed in chapter 5. Phases would provide further clues with issues of the syntax-phonology interface, including the relationship between causative/passive morphosyntax and phonology.

Even though there is more to explore, I contend again that derivationalism is better than a purely constraint-based parallel version of grammatical theory, as I started the dissertation with this thesis. The phenomena and discussions in the dissertation have shown this point. Even recent proposals in Optimality Theory, a constraint-based, non-derivational theory, admit the necessity of derivations in grammatical theory (Bermúdez-Otero 1999, Kiparsky 2000, McCarthy 2006, Rubach 2000, among others). The main empirical issue of opacity in phonology and morphology can be captured with derivationalism. They included the usual phonological opacity cases and the interaction of negative suppletion and honorific suppletion. In this respect, this dissertation has reached its goal of providing the ecological study of PF in Korean. The above-mentioned topics are to be examined in connection with my initial thesis in favor of derivationalism.

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