

THE MORAIC REPRESENTATION OF KOREAN TENSE CONSONANTS IN APERTURE THEORY*

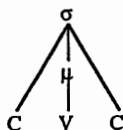
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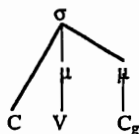
1 Introduction

This paper pursues a comprehensive approach to account for the phonological nature of Korean tense consonants within Aperture Theory.¹ Even though the current literature in Korean phonology attests to a fair amount of work on this issue, still there is a controversy regarding the status of tense consonants as either geminate or singleton. In this paper, I will show that non-derived tense consonants and derived tense consonants behave differently regarding the issue of whether or not they are underlyingly geminates. Most current work on tense consonants in Korean claims that these are underlyingly geminate plain consonants and thus are considered to be moraic (J-H Jun 1991, 1993, 1994, J-I Han 1992, and Silva 1992). However, building on Tak & Davis (1994), I will argue that Korean tense consonants are of two types: (i) non-derived tense consonants that are nonmoraic and phonologically pattern as single consonants, and (ii) derived tense consonants that are moraic and function as geminates. In my discussion, I follow Hayes (1989) in assuming that a coda consonant is underlyingly nonmoraic, whereas a geminate consonant is underlyingly moraic, as shown in (1).

(1) a CVC syllable

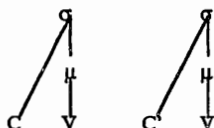


b CVC_g syllable (closed by a geminate)

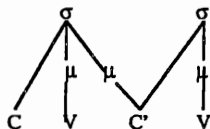


I will demonstrate that the first syllable in an underlying CVC'V--where C' is a tense consonant--sequence acts monomoraic, as shown in (2a). However, I will also show that in instances where the tense consonant in a CVC'V sequence is derived from phonological processes, the first syllable in such a sequence acts bimoraic, as seen in (2b).

(2) a The syllabification of an underived CVC'V sequence



b The syllabification of a derived CVC'V sequence



This then offers a new approach to tense consonants in Korean that allows for distinguishing the different weight properties between derived and underived tense consonants.

This paper is organized as follows. Section 2 reviews the data that motivated the conclusion of J-I Han (1992), J-H Jun (1991, 1993, 1994), and others that tense consonants are underlyingly geminate. Section 3 presents some of the phonological characteristics of true geminate consonants in Korean. Subsequently, it will be demonstrated that underived tense consonants do not pattern as such. Section 4 offers an alternative analysis of Korean tense consonants that distinguishes between derived and underived tense consonants. Section 5 presents the conclusion.

2 Evidence for the Analysis of Tense Consonants as Geminates

Recent studies of Korean tense consonants (J-H Jun 1991, 1993, 1994, J-I Han 1992, Silva 1992) have developed an analysis of tense consonants in which they are described as underlying geminates. Such consonants surface with the feature [c g] through Geminate Reinforcement²

(3) Geminate Reinforcement (GR)

Add [constricted glottis] to geminate obstruents

Given this analysis, single plain consonants in Korean are represented as underlyingly nonmoraic, while the geminate tense consonants bear a mora, as illustrated in (4). The rule of Geminate Reinforcement (henceforth GR), which assigns the feature [c g] to moraic obstruents, is shown in (5). (R=Root Node)

(4) a Plain consonant /p/

p

b Tense consonant /p'/

μ

|

p

(5) Geminate Reinforcement

μ

|

R [-son]

→

μ

|

R [-son]

|

Laryngeal

|

[+c g]

To account for the representation of tense consonants in (5), H-S Sohn (1987) claims that a sequence of obstruents in Korean is articulated in the same manner as a sequence of tense consonants. These tense consonants are phonetically characterized as involving the release of compressed air in the pharynx while glottal closure is maintained. This combination of articulatory

behavior involved in the production of tense consonants is partially created by the articulation of a sequence of obstruents in Korean. One characteristic of Korean is that obstruents are unreleased in the coda position. When another obstruent follows, there is air pressure build-up in the pharynx for the two-consonant duration. This increase of air pressure, because of the unrelease of the obstruent in the coda position, has the same effect as glottal closure, in which the air in the pharynx is compressed. According to this view, GR after the unreleased consonant is explained as the phonological equivalent to the articulatory constriction of the glottis.

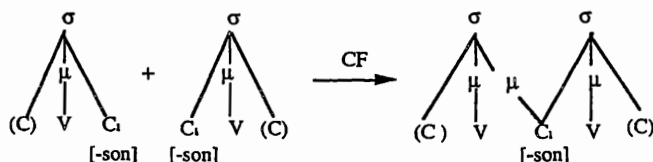
Evidence has been collected by various researchers to support the claim that surface tense consonants are in fact underlying geminate plain consonants. First, according to J-I Han (1992), when two identical obstruents come together over a morpheme boundary, they are realized phonetically as a tense consonant. Sample data are in (6).³

(6) a	/tat/	'to close'	+	/ta/	→	[tat'a]	'to close'
b	/os/	'cloth'	+	/sol/	→	[os'ol]	'cloth brush'
c	/ak/	'music'	+	/ka/	→	[ak'i]	'instrument'
d	/kuk/	'nation'	+	/ka/	→	[kuk'a]	'country'
e	/nap/	'to pay'	+	/pu/	→	[nap'u]	'payment'
f	/cap/	'sundry'	+	/pi/	→	[cap'i]	'incidentals'
g	/pic/	'debt'	+	/cɛŋ/	→	[pic'ɛŋ]	'creditor'

GR in (5) will apply to the output in (6), so that the moraic geminate surfaces as tense. This process is traditionally referred to as Geminate Formation (henceforth GF), which I formulate in (7).⁴

(7) Geminate Formation (GF)

Assign a mora if two identical obstruents occur over a morpheme boundary



A second type of evidence in support of the underlying geminate analysis of Korean tense consonants is the historical data discussed by H-Y Hwang (1986) and J-H Jun (1991, 1993). They note that consonant clusters that existed in Korean until the sixteenth century later developed into tense consonants, as shown by the historical data in (8)

(8) The diachronic change of clusters into tense consonants (around the 16th century)

a clusters beginning with /p/

A	tʰis	<	ptʰis	'meaning'
B	sʰi	<	psʰi	'seed'
C	tʰe	<	pstʰe	'time'
D	sʰal	<	psal	'rice'

b clusters beginning with /s/

E	pʰul	<	spul	'horn'
F	pucʰkʰe	<	putʰskʰu	'to Buddha'
G	tʰəl	<	stʰəl	'rice cake'
H	kʰol	<	skol	'pasture'

The data in (8) illustrate that the tense consonants in Modern Korean were developed through the historical merger of plain consonants. Consequently, it would not be unexpected if tense consonants displayed geminate characteristics.

Third, J-I Han (1992), Silva (1992), and J Yu (1989) also present phonetic and durational evidence for the geminate analysis of tense consonants. J-I Han (1992) shows that, in terms of their closure duration, tense consonants in intervocalic position are much longer than their plain counterparts. Some of her results are shown in (9).

(9) Closure Duration (in msec)

phonation	plain	tense
speaker A	57	172
speaker B	51	118
average	54	145

The longer duration of tense consonants, compared to plain consonants, can be accounted for under the proposal that tense consonants are geminate, whereas plain consonants are not

Silva (1992) examined the acoustic properties of bilabial plain and tense consonants. His findings are in (10)

(10) Closure duration of bilabial stops

phonation	plain [p]	tense [p']
Word-internal	48	128
Word-edge	50	81

Silva reports results similar to J-I Han's, mainly, that tense consonants exhibit a twice longer closure duration at intervocalic ("word-internal") position than do plain consonants. In other words, the tense consonants exhibit geminate-type length. Moreover, J Yu (1989) demonstrates that both an underived tense consonant and a derived tense consonant have identical duration. Thus, J Yu shows that there is no durational difference in the two tense [k]'s in (11), despite their different derivational history.

- (11) a /ak'i/ 'to hold dear'
 b /ak+ki/ → [ak'i] 'instrument'

Fourth, J-I Han (1992) mentions a description of accent patterns in standard Korean from J Yu (1988), in which the primary accent falls on the leftmost heavy syllable, as shown in (12).

(12) The accent rules of standard Korean (J Yu 1988)

The primary accent falls on

- a the left most heavy syllable
 b the rightmost light syllable if there is no heavy syllable

If tense consonants are actually geminates, her accent rule predicts that words with tense consonants should surface with the primary accent on the vowel preceding the tense consonant. According to J. Yu, this prediction is correct, as indicated in (13).

- (13) a /kʰ/ 'moss' cf /kʰ/ 'baby'
 b óp'a 'older brother'
 c kɨpɨm 'pleasure' cf kɨpɨn 'mood'
 d akás'i 'young lady'
 e acúk'ali 'castor-bean plant'

The reason why the first syllable of /kʰ/ 'moss' gets the primary accent is that /kʰ/ is underlyingly geminate. Therefore, the first syllable is heavy, closed by the left member of the underlying geminate. In contrast to /kʰ/ 'moss', is /kʰ/ 'baby' with the primary accent assigned to the second syllable because of the lightness of the first syllable.

Fifth, evidence from Korean compounding cited by J-I Han (1992) and E-D Cook (1987) supports the geminate analysis of Korean tense consonants. The relevant data are shown in (14). (Data come from E-D Cook 1987.)

- (14) Korean compounding
 a /t/ 'teeth' + /mɔm/ 'body' → [immon] 'gum'
 /næ/ 'river' + /mul/ 'water' → [næmmul] 'water'
 /kʰo/ 'nose' + /nal/ 'line' → [kʰonnal] 'nose line'
 b /næ/ 'river' + /ka/ 'side' → nækka → [næk'a] 'riverside'
 /cʰa/ 'sun' + /can/ 'cup' → cʰaccan → [cʰac'an] 'tea cup'
 /pam/ 'night' + /cam/ 'sleep' → pamccam → [pamc'am] 'night sleep'
 /san/ 'water' + /kɨl/ 'noise' → sankkɨl → [sank'i] 'mountain pass'

The data in (14a) show that Korean compounding involves gemination. The data in (14b) show that when an obstruent is to be geminated it surfaces as a tense consonant. This analysis can be verified further by investigating the compounds given in (15). (Data are from E-D Cook 1987.)

- | | | |
|--------|--------------------------------|----------------------------------|
| (15) a | /say/ 'bird' + /al/ 'egg' | → [sayal] *[saytal] 'bird's egg' |
| b | /pi/ 'rain' + /os/ 'clothes' | → [piot] *[pitot] 'rain gear' |
| c | /nwun/ 'eye' + /al/ 'ball' | → [nwunal] *[nwuntal] 'eyeball' |
| d | /cam/ 'sleep' + /os/ 'clothes' | → [camot] *[camtot] 'sleep wear' |

In (15), the second word begins with a vowel, therefore, since the second word does not have an initial consonant to geminate, gemination cannot occur. The various surface realizations of compounded words, as seen in (14) and (15), can be explained in a uniform way by gemination.

Thus, in recent research on Korean tense consonants, the data and phenomena outlined in (6)-(15) have been used to support the underlying geminate analysis of Korean tense consonants.

3 The Phonological Nature of Undersived Tense Consonants

In the previous section, various kinds of evidence from the recent literature were presented in support of the geminate analysis of tense consonants. However, virtually none of this evidence is directly applicable to the phonological nature of undersived tense consonants. First, the historical evidence in (8) and the phonetic evidence in (9), (10), and (11) provide no information concerning the phonological patterning of undersived tense consonants. Second, the phenomena illustrated in (6), (7), and (14) are only relevant for derived tense consonants, and do not inform us about the nature of undersived tense consonants. Finally, the accent pattern provided in (12) and exemplified in (13), which would constitute relevant evidence concerning the phonological nature of undersived tense consonants, is highly controversial. For example, J-K Kim (1993), based on H-B Lee (1985), describes the Seoul dialect as having an accent pattern similar to (11). However, for words like those in (13), the undersived tense consonant does not make a preceding syllable heavy and so would not be geminated. Thus for forms like in (11), J-K Kim (1993) gives second syllable stress. Moreover, Davis & Lee (1994) provide phonological evidence for the traditional view that the Seoul dialect has initial accent, at least at the deeper levels of the phonology. Thus, I conclude that the evidence in (6)-(15), cited in support of the geminate analysis of tense consonants, does not really reveal the phonological nature of undersived tense consonants. In the remainder of this section, I show that undersived tense consonants pattern as singletons.

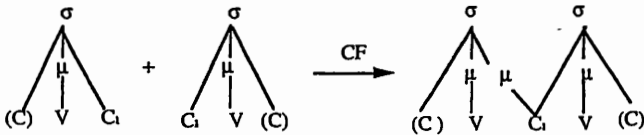
Before mentioning the problems for the geminate analysis of underived tense consonants, I will revise GF and GR. According to J-I Han (1992), GF applies only when two identical obstruents come together over a morpheme boundary. However, there is no reason it cannot also apply to two sonorant consonants over a morpheme boundary, as illustrated in (16)

- | | | | | | | |
|--------|----------------|---|---------------|---|----------|--------------------|
| (16) a | /im/ 'forest' | + | /mok/ 'tree' | → | [immok] | 'forest tree' |
| b | /pəm/ 'public' | + | /min/ 'race' | → | [pəmmin] | 'commoner' |
| c | /ʃil/ 'loss' | + | /lɪ/ 'profit' | → | [ʃilli] | '(financial) loss' |

The new GF rule is illustrated in (17)

(17) Geminate Formation (GF)

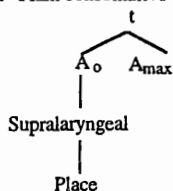
Assign a mora if two identical consonants occur over a morpheme boundary



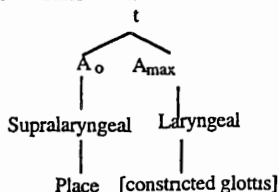
I put this analysis into the framework of Aperture Theory, proposed by Sterade (1992, 1993)

Before the way GR is represented in this framework is shown, first compare (18) with (4)

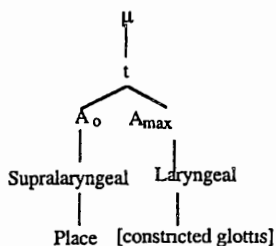
(18) a Plain consonant /t/



b Underived /t/



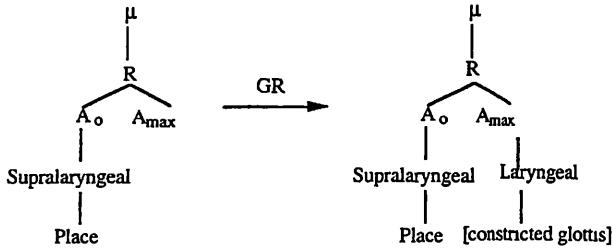
c Derived /t/



As seen in (18a), a plain consonant has a release, but is not specified for any laryngeal features. However, as shown in (18b) and (18c), both a derived tense consonant and an underived consonant consist of A_o and A_{max}, specified for [c g]. However, they differ in moraic status, whereby a derived consonant is attached to a mora, while an underived one is not.

Given this, a new version of GR is given in Aperture Theory.

(19) Geminate Reinforcement (GR)

Add [constricted glottis] under the A_{max} to geminate obstruents

J-I Han (1992) suggests that all outputs of GF are subject to Geminate Reinforcement, as shown in (3) and (5). However, based on Structure Preservation (Kiparsky 1986), I posit that GR applies only when the plain geminates are obstruents, so that the derived geminate is realized as [c g]. Structure Preservation prevents sonorant consonants and vowels from being assigned laryngeal features such as [c g] or [s g]. Therefore, underlying obstruent geminates are realized as tense, while underlying sonorant geminates are realized as plain. This is illustrated in (20).

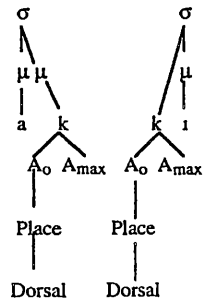
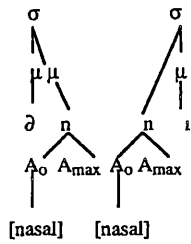
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Korean Tense Consonants

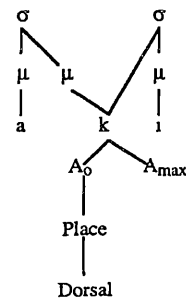
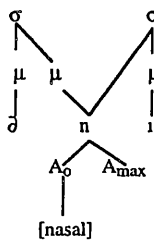
(20) a /ðnni/ 'elder sister' → [ðnni]

b /akki/ 'instrument' → [ak'i]

Syll

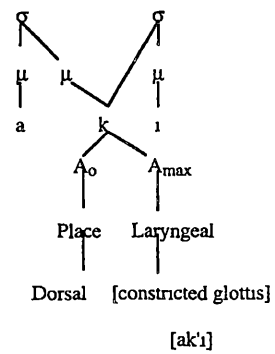


GF



GR

NA



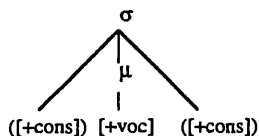
SR

[ðnni]

[ak'i]

Now, let us consider a potential problem for the geminate analysis as it relates to undervived tense consonants. One immediate problem for the geminate analysis of undervived tense consonants is the observation that Korean does not allow a syllable to begin with a geminate or moraic onset.

(21) Korean syllable template



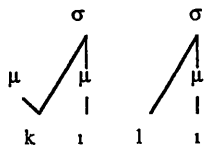
If tense consonants are considered geminate, tense consonants in absolute onset position are problematic because these would then violate Korean syllable structure. This is shown by the words in (22).

(22) Tense consonants in (absolute) onset position

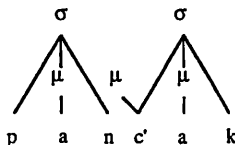
- a /k'iɭi/ 'together'
- b /p'aɭi/ 'fast'
- c /pʰanc'ak/ 'sparkling'
- d /cʰamk'æ/ 'sesame'

Consider the syllabification of (22a) and (22c), shown in (23a) and (23b), respectively, within the framework proposed by J-H Jun (1991). Here, tense consonants are considered underlyingly moraic.

(23) a [k'iɭi]



b [pʰanc'ak]



There is no motivation for the unattached mora to the syllable in Korean, as seen in (21), since no process seems to be sensitive to its presence. For that matter, there is no explanation for why an unattached mora would be realized as a tense consonant, instead of, for example, as a trigger for epenthesis. While the representations in (23) can be fixed up by Stray Erasure, as suggested by J-I Han (1992), there is no phonological evidence that these onset consonants are ever moraic.

A second problem for the geminate analysis of underived tense consonants is that underived tense consonants do not pattern phonologically like geminate consonants. Consider Korean umlaut, which optionally fronts a back vowel when the vowel /i/ is in the following syllable, as seen in (24). (The data are from Y-S Lee 1993, and reflect the Seoul dialect.)

(24) a	/aku/	→	[agu] or [ægu]	'baby'
b	/omu/	→	[omu] or [emu]	'mother'
c	/soncapu/	→	[soncabi] or [soncæbi]	'handle'
d	/s'ilu/	→	[siri] or [sɪri]	'to be sick'
e	/tanu/	→	[tani] or [tæni]	'to go to and from'
f	/matu/	→	[madi] or [mædi]	'knot'
g	/tali/	→	[tari] or [tæri]	'to iron'

Notice, however, that the words in (25) fail to undergo umlaut. The difference between (24) and (25) is that in (24), the consonants between the target and the trigger of umlaut are single consonants, whereas in (25), they are geminates to which a mora is assigned. In short, umlaut is blocked by an intervening mora assigned to a geminate.

(25) a	/alli/	→	[alli]	*[ælli]	'to inform'
b	/ðnni/	→	[ðnni]	*[enni]	'sister'
c	/kðlli/	→	[kðlli]	*[kelli]	'to be hung'
d	/kammi (lop-ta)/	→	[kammi]	*[kæmmi]	'to be sweet'
e	/malli/	→	[malli]	*[mælli]	'to dry'
f	/p'alli/	→	[p'alli]	*[p'ælli]	'to be sucked'

With respect to umlaut, Y-S Lee (1993) argues that only when the target and trigger are adjacent on the moraic tier can umlaut occur. He refers to this as the Moraic Adjacency Condition. Since geminate consonants are moraic, they block umlaut in (25) because the target vowel and the

trigger vowel are not moracally adjacent. This is illustrated in (26) by a comparison of the moraic syllable structures of /aku/ 'baby' and /allu/ 'to inform'.

- (26) a. /aku/ 'baby' (Umlaut occurs)
- | | | |
|----------|---|----------|
| σ | | σ |
| | | |
| μ | | μ |
| | | |
| a | k | ɪ |
- b. /allu/ 'to inform' (Umlaut does not occur)
- | | | | | |
|----------|--|-------|--|----------|
| σ | | μ | | σ |
| | | | | |
| μ | | μ | | μ |
| | | | | |
| a | | l | | ɪ |

Umlaut occurs in (26a). However, no umlaut occurs in (26b) since the target and the trigger are not moracally adjacent. It is the moraicity of the intervening consonant or long vowel that is crucial. If a (nongeminate) consonant cluster intervenes between the target and the trigger, umlaut still applies, as seen in (27).

- (27) a. /nampi/ → [nambɪ] or [næmbɪ] 'kettle'
 b. /palk+hu/ → [palkʰɪ] or [pælkʰɪ] 'to brighten'
 c. /anku/ → [aŋgi] or [æŋgi] 'to be embraced'
 d. /ðŋku/ → [ðŋkɪ] or [æŋkɪ] 'to be curdled'

If tense consonants are underlyingly geminate or moraic, it is presumed that they should block umlaut, since the target and trigger would not be adjacent on the moraic tier, similar to (26b).

However, umlaut applies across underived tense consonants, as seen in (28).

- (28) a. /ʰokʰɪ/ → [ʰʰokʰɪ] or [ʰʰokʰɪ] 'rabbit'
 b. /akʰɪ/ → [akʰɪ] or [ækʰɪ] 'to hold dear'

The data in (24)-(28) argue that an underived tense consonant patterns as a nonmoraic consonant. Geminate consonants block umlaut, while underived tense consonants and non-geminate clusters

as singleton consonants do not. I take this as strong evidence that underived tense consonants are not underlyingly geminate.

A third problem for the geminate analysis of underived tense consonants relates to certain suffixes that can impose prosodic requirements on the stems to which they attach. For example, when the effective suffix */-ɪnɪ/* attaches itself to a monosyllabic stem that is also bimoraic, the stem can surface as monomoraic, as shown in (29). An underlying monomoraic verb stem does not change, as seen in (30). (Data come from Davis & Lee 1994.)⁵

- | | | | | |
|--------|-------------|---|-----------|-------------|
| (29) a | /kəɭɭ-ɪnɪ/ | → | [kəɭɭɪnɪ] | 'to filter' |
| b | /nʌɭɭ-ɪnɪ/ | → | [nʌɭɭɪnɪ] | 'to press' |
| c | /sʰɪ p-ɪnɪ/ | → | [sʰɪbɪnɪ] | 'to chew' |
| d | /kəɭ t-ɪnɪ/ | → | [kəɭɪnɪ] | 'to walk' |
| (30) a | /mut-ɪnɪ/ | → | [mudɪnɪ] | 'to bury' |
| b | /kup-ɪnɪ/ | → | [kubɪnɪ] | 'to bend' |

This phenomenon is called *Mora Shift* by J-S Lee (1991). If the effective suffix */-ɪnɪ/* attaches to a monosyllabic stem that is bimoraic, a mora of the stem shifts to */ɪ/*, under the view of J-S Lee (1991), who considers the suffix-initial */ɪ/* weightless. However, if it attaches to a monosyllabic stem which is also monomoraic, a mora is assigned to */ɪ/* by default.⁶ As seen in (29), if stems contain a long vowel or a geminate (i.e. contain two moras), one of the stem moras is available and shifts to */ɪ/*. This is reflected by the degemination of the verb stems, as in (29a) and (29b), and by the vowel shortening in (29c) and (29d). In other words, underlying bimoraic stems result in monomoraic stems after */-ɪnɪ/* attaches to them. In all other cases where the verb stem is monomoraic, as in (30), Default Mora Insertion is applied.

If underived tense consonants are geminates which are underlyingly moraic, then they should lose their tenseness when augmented by the effective suffix. However, tense consonants do not lose their tenseness, as shown in (31). They behave the same as the single consonants in (30), not like the geminates in (29a) and (29b). (Data are from Davis & Lee 1994.)

- (31) a /nak'-ɪnɪ/ → [nak'ɪnɪ] *[nakɪnɪ] 'to fish'
 b /muk'-ɪnɪ/ → [muk'ɪnɪ] *[mukɪnɪ] 'to tie together'
 c /pok'-ɪnɪ/ → [pok'ɪnɪ] *[pokɪnɪ] 'to mix'

This strongly supports the view that underived tense consonants are not underlyingly geminate

The evidence presented in (21)–(31) from syllabification, umlaut, and suffixation illustrates that Korean underived tense consonants are not geminates. Such tense consonants do not pattern phonologically as geminate consonants, but rather as singletons. Nonetheless, as I show in the following section, derived tense consonants do pattern phonologically as geminate or moraic

4 Distinguishing Between Derived and Underived Tense Consonants

While I have argued that underived tense consonants are singletons, I nonetheless would maintain that derived tense consonants pattern as moraic or geminate. This view is consistent with the data from J-I Han (1992) on morpheme concatenation, in (6), and the data from E-D Cook (1987) on compounding, in (14). Here, I present three additional arguments for the geminate nature of derived tense consonants.

The first argument that derived tense consonants are geminate or moraic comes from their effect on umlaut. While underived tense consonants pattern like singletons in that they do not block umlaut, derived tense consonants pattern like geminates and do block umlaut. A crucial example is given in (32) with the derived form [ak'i] 'instrument' in (32a) and the underived [ak'i] 'to hold dear' in (32b).

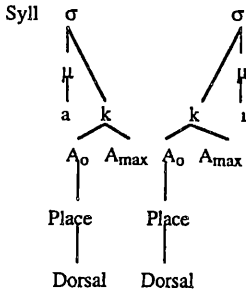
- (32) a /ak+ki/ → [ak'i] *[æk'i] 'instrument'
 b /ak'ɪ/ → [ak'i] or [æk'i] 'to hold dear'

The derived tense consonant [k'] in (32a) becomes moraic and tensed through the processes of GF and GR shown in (17) and (19). The different derivations of (32a) and (32b) are shown in (33a) and (33b), respectively.

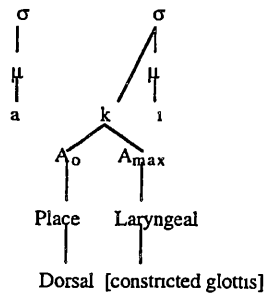
Tak

Korean Tense Consonants

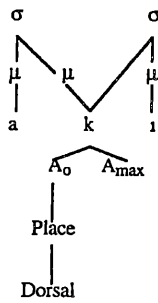
(33) a /ak+ku/ 'instrument'



b /ak'i/ 'to hold dear'

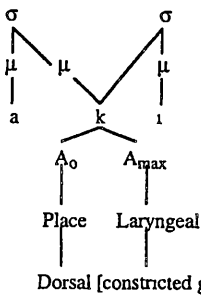


GF



NA

GR



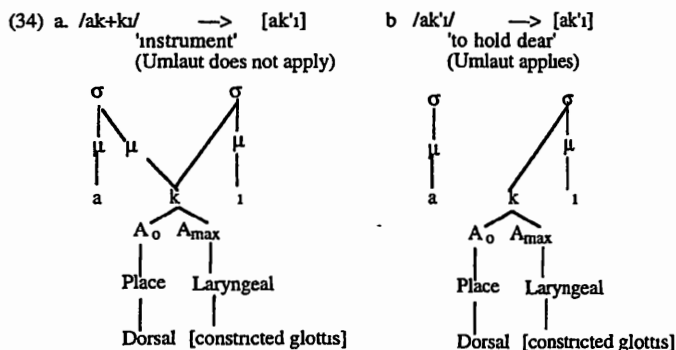
NA

SR

[ak'i]

[ak'i]

Consequently, when umlaut applies, the forms in (33a) and (33b) would have the representations shown in (34a) and (34b), respectively



Given the representations in (34), it can be correctly predicted that the derived tense consonant in (34a) blocks umlaut, while the underlying tense consonant in (34b) does not. Notice that the derived tense consonant parallels the umlaut blocking behavior of true geminates, as seen in (25). This is evidence that derived tense consonants are phonologically moraic and geminate.

Second, as presented earlier, J-I Han (1992) proposes that /ak+ki/ 'instrument' and /ak'i/ 'to hold dear' are pronounced identically. However, they can be pronounced differently according to speech pattern. The term *casual speech* is used to refer to utterances that are observable in highly informal speech. *Allegro speech* is slower than casual speech and somewhat more formal. In allegro speech, an articulatory pause can occur between the first and the second syllable of /ak+ki/ 'instrument', and then Post-obstruent Tensification occurs. In casual speech, this is not the case.⁷ This cannot happen with /ak'i/ 'to hold dear', as is shown in (35).⁸

- (35)
- | | | | | | | |
|---|---------|---|---------------|----|----------------|----------------|
| a | /ak+ki/ | → | <u>casual</u> | | <u>allegro</u> | |
| | | | [ak'i] | or | [akk'i] | 'instrument' |
| b | /ak'i/ | → | [ak'i] | * | [akk'i] | 'to hold dear' |

This difference is consistent with derived tense consonants being geminate or moraic, and with underived ones being singletons

Third, data from Korean stress can be used to support the difference between derived and underived tense consonants. Even though the version of Korean stress put forward by J. Yu (1988) was mentioned earlier in (13) and (14) as supporting the underlying geminate analysis of all tense consonants, H-B. Lee (1974) provides a slightly different version based on the following data in (36)

(36) a	núnmul	'tear'	kámgi	'cold'
	somún	'rumor'	kəlsaŋ	'chair'
b	ó hu	'afternoon'	sá muso	'office'
c	urí	'we'	akí	'baby'
	noræ	'song'	bagún	'basket'

H-B. Lee (1974) proposes the following Korean stress rule in (37)

(37) Korean Stress Rule

Stress falls on

- a a syllable with a long vowel, if there is a long vowel⁹
- b the first syllable, when this syllable is (C)VC
- c or else, the second syllable

Given the stress rule in (37), specific predictions are made about the stress pattern of words beginning with a CVCV sequence. If the tense consonant is underived, then stress should fall on the second syllable. However, if the tense consonant is derived or geminate, then stress should fall on the initial syllable, since it would be heavy. The data in (38), showing the stress pattern of words containing underived tense consonants, illustrates that stress in such words is correctly predicted as falling on the second syllable. This thus supports the view that underived tense consonants are not geminate. (Data are drawn from J-K. Kim 1993)¹⁰

- (38) a /op'a/ → [op'á] 'brother'
 b /ik'i/ → [ik'í] 'moss'
 c /ak'i/ → [ak'í] 'to hold dear'
 d /tok'i/ → [tok'í] 'axe'

Contrasting with underlying tense consonants, derived tense consonants illustrate a different stress pattern as in (39)

- (39) a /ak+ku/ → [ák'i] 'instrument'
 b /tok+ku/ → [tók'i] 'spite'

A derived tense consonant, as shown in (39), does make the first syllable heavy, as predicted, and so primary stress falls on the first syllable in the words in (39). Thus, the stress pattern as reported by J-K Kim (1993) distinguishes between derived tense consonants, which pattern as geminate or moraic, and underived tense consonants, which pattern as singletons.

5. Summary

In this paper, I reject the recently proposed analysis of Korean tense consonants as being uniformly geminates, regardless of whether they are underived tense or derived tense consonants. Instead, I propose that Korean tense consonants are underlyingly single consonants or nonmoraic, and that only tense consonants that are derived function as geminate or moraic.

My evidence was primarily phonological, based on the patterning in syllable structure, umlaut, suffixation, and Korean stress. First, since Korean syllable structure does not allow consonant clusters, if a syllable-initial tense consonant is regarded as moraic, it results in a violation of Korean syllable structure. Second, the vowel fronting phenomenon—umlaut—is blocked if the trigger and the target are not adjacent on the moraic tier. An intervening geminate consonant between the target and the trigger blocks umlaut, thus providing evidence for their moraicity. The fact that derived tense consonants block umlaut, whereas underived tense consonants do not, is evidence that derived tense consonants are moraic, but that underived tense

consonants are not. Third, attaching the effective suffix /-ani/ to a monosyllabic stem that is also bimoraic results in a monomoraic stem in the surface representation. However, attaching the effective suffix /-ani/ to monomoraic stems does not result in a change. If underived tense consonants are moraic, when this suffix attaches to a monosyllabic stem, the underived tense consonant should lose its tenseness. In reality, however, it remains the same. This evidence shows that underived tense consonants are not moraic. Fourth, even though there are controversies concerning Korean stress rules, underived tense consonants seem to behave differently from derived tense consonants in such a way that underived tense consonants cannot make the preceding syllable heavy, meaning that they are nonmoraic, however, derived tense consonants can make a preceding syllable heavy meaning that they are moraic. Therefore, in a CVCV sequence, if the C' is underived, then the stress falls on the second syllable, whereas if a C' is derived, then the stress falls on the first syllable.

Given the evidence, I have shown that despite the phonetic similarity between derived and underived tense consonants, the phonology treats them differently: the derived tense consonants pattern as geminate or moraic, while the underived ones do not.

NOTE

¹This paper is a revision of an earlier version of paper that appeared in CLS 30. I would especially like to thank the co-author of the earlier paper, Stuart Davis, for his constant support so that I could finish this paper. Also, I am indebted to Robert Botne, Jonni Kanerva, and Jong-kyoo Kim for discussing various aspects of this paper. All the errors are my responsibility.

¹In this paper, I assume familiarity with Aperture Theory.

²Silva (1992) calls this Tensification in his dissertation. GR does not apply to geminate sonorants since sonorants with the feature [+c g] are prohibited in Korean.

³Y-K Kim-Renaud (1987) shows that a sequence of homorganic plain obstruents such as /-tt-/ may be transcribed as either a tense consonant or a sequence of a plain and tense consonant.

such as /-t'-/ or /-t'-/, respectively, in allegro speech. However, in my paper, I will adopt the former transcription

⁴This rule, modified from J-I Han (1992), will be revised later, since she does not recognize that Geminate Formation also applies if two sonorant consonants occur over a morpheme boundary

⁵In Korean, voiceless obstruents do not contrast phonemically with their voiced counterparts, nor do lateral liquids contrast with non-lateral liquids. A voiceless obstruent is usually realized intervocally as voiced. The lateral liquid changes into the non-lateral one between vowels. However, there are some exceptions categorized as irregular verbs, which conjugate irregularly, as seen in (29d). These verbs belong to the class known as /l/-irregular verbs, in which /l/ morphophonemically changes into /r/ between vowels. The example (29a) is a regular verb. Whether a verb is conjugated regularly or irregularly is not phonologically predictable.

⁶I assume in this paper that the suffix initial /h/ is weightless, considering the following data (J-S Lee 1991)

<u>Indicative</u>	<u>Connective</u>	<u>Stative</u>	<u>Effective</u>	
/se + ta/	/se + ko/	/se + ə/	/se + ɪn/	'to count'
[seta]	[seko]	[seə]	[seni]	
/kup + ta/	/kup + ko/	/kup + ə/	/kup + ɪn/	'to bend'
[kupta]	[kupko]	[kubə]	[kubɪni]	

/h/ is deleted only if the stem ends with a vowel, as seen in [seni], however, /h/ remains if the stem ends with a consonant as illustrated in [kubɪni]. In other words, /h/ functions to break up consonant hiatus in order for the output to conform to Korean syllable structure. Therefore, J-S Lee argues that there is no motivation for assigning a mora to /h/ in suffix initial position since it deletes when preceded by vowel-final stems.

⁷According to E-J Baek (1991), Post-obstruent Tensification assigns [c g] to the surface representation. E-J Baek argues that this is not a phonological rule, but a phonetic realization.

process

⁸These judgments are mine

⁹Long vowels occur only in the initial syllable in standard Korean

¹⁰The stress judgments match my own as well as those of two other Korean students at

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