Leveling in Korean

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Kim, Gyung-Ran. 1998. Leveling in Korean. *Studies in Phonetics, Phonology and Morphology* 4, 89-108. The purpose of this paper is to provide an explanation for a new tendency in casual speech of Korean related with coda condition and cluster simplification: paradigm leveling. Difference between careful and casual speech is shown to result from difference in constraint ranking in the framework of Optimality Theory. The availability of stems as independent words is crucial to asymmetries between nouns and verbs and the relevant constraint is an output-to-output constraint Base-Identity(Kenstowicz, 1995). The relative position in the constraint hierarchy of Base-Identity and other constraints determines speech style difference. Functionalism is seen to be working behind this leveling phenomenon. Both ease of articulation in s-neutralization and ease of perception in Base-Identity play a role in casual speech. **(Yeungnam University)**

1. Introduction

In this paper we look at a leveling phenomenon in recent casual speech of Korean. Leveling is defined as a historical process that reduces or completely eliminates allomorphy within a paradigm, usually achieved by generalization of one morphemic variant (Jeffers and Lehiste 1979: 55). As a consequence, the alternations that are the result of phonetic change are eliminated or leveled out, and the uniformity is restored to the paradigm. The following Greek data in (1) show an example.

(1)	Homeric Greek		Doric Greek	
nom.(sg.)	poli-s (pl.)	pole-es	poli-s	poli-es
acc.	poli-n	pole-ns	poli-n	poli-ns
gen.	pole-os	pole-ōn	poli-os	poli-ōn

| dat. | polē-i | pole-si | poli-i | poli-si |
| voc. | poli | pole-ēs | poli | poli-es |

Compared with Homeric Greek which has three different forms of the stem meaning 'city', *poli-*, *polē-*, and *pole-*, Doric Greek has a uniform stem form *poli-* replacing *polē-* and *pole-* in the paradigm.

This kind of leveling is taking place in Korean, related with consonant cluster simplification and coda condition. In casual speech noun stems tend to have the same form regardless of phonological environments in which they are situated. As shown in (2a,b), *kaps* 'price' is uniformly realized as [kap] and *puək^h* 'kitchen' as [pu.ək] even when followed by a suffix beginning with a vowel. However, verb stems in such cases do not follow suit and both consonants in /ps/ cluster in *əps-* 'not have' surface and aspirated /p^h/ in *kap^h-* 'pay back' is realized as it is on the surface.[1]

(2c) shows examples where coronal obstruents at the end of noun stems uniformly surface as [s] in the onset, while it is not the case with verb stems. On the other hand, the peculiarity of the /lC/ cluster simplification applies to verb stems, where the second consonant deletes instead of the first one /l/, contrary to what happens in careful speech. The period mark(.) represents a syllable boundary. The surface forms of careful speech are given on the left side of a slant line, while those of casual speech are on its right side.

(2) noun   verb
  a. kaps [kap] 'price' stem   əps- 'not have' stem
      kaps+i [kap.s'i]/[ka.pi] nom.[2] əps+ini [əp.s'i.ni] (*[ə.pi.ni]) con.
      kaps+il [kap.s'il]/[ka.pil] acc. əps+ə [əp.s'ə] (*[ə.pə])   stative

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[1] These tendencies in cluster simplificatioon and coda condition are common enough to be found in T.V. news and dramas as well as everyday speech of ordinary people. Casual speech is made when a speaker makes an utterance fast and casualy with no particular attention paid to what (s)he says, while careful speech is made with attention paid to what is spoken.
[2] Voiceless stops become voiced when flanked by voiced segments: [ka.pi] → [ka.bi]. Voicing will be ignored here, since it is not relevant to our discussioon.

kaps+e [kap.s'e]/[ka.pe] loc.   cf. əps+ko [əp.k'o] (con.)
cf. kaps+kwa [kap.k'wa] (con.)

b. puək^h [puək] 'kitchen' stem   kap^h- 'pay back' stem
    puək^h+i [pu.ə.k^hi]/[pu.ə.ki]   kap^h+ini [ka.p^hi.ni](*[ka.pi.ni])
    puək^h+il [pu.ə.k^hil]/[pu.ə.kil]   kap^h+a [ka.p^ha] (*[ka.pa])
    puək^h+e [pu.ə.k^he]/[pu.ə.ke]   cf. kap^h+ko [kap.k'o]
    cf. puək^h+kwa [pu.ək.k'wa]

c. pic+i [pi.si] 'debt(nom.)'   pic+ini [pi.ci.ni] 'brew(con.)'
    pic+e [pi.se] (loc.)   pic+ə [pi.cə] (stat.)
    cf. pic+kwa [pit.k'wa]3)   pic+ko [pit.k'o]

d.   palp+ko [pal.k'o] 'tread(con.)'
            malk+ko [mal.ko] 'be clear'
            halt^h+ko [hal.k'o] 'lick'
            ilp^h+ko [il.k'o] 'recite'

In this paper we are going to deal with the asymmetries between noun stems and verb stems in casual speech within the couch of the Optimality Theory and see that difference in speech style will be explained by difference in constraint ranking.

The paper is organized as follows. Section 2 treats the phenomena in (2a,b) with an output-to-output faithfulness constraint, Base-Identity. Regarding the case in (2c) where coronal obstruents /t^h, s, s', c, c', c^h/ surface uniformly as [s] even in the onset where the underlying features are expected to retain in careful speech, we will call this phenomenon "s-neutralization" and see in Section 3 how this is accounted for. A phonological word(Pw), an independent necessary unit in phonology, will be seen to play a crucial role in s-neutralization. Again, verb stems in the same environments do not behave the same way. A new tendency in (2d) in verb stems ending in the /lC/ clusters is treated in Section 4, where /lp, lk, lt^h, lp^h/ clusters uniformly simplify to [p, k, t, p] due to the constraint ranking of I-Contig over lC-Cluster. Section 5 is allotted to other conditions relevant to Base-Identity in the explaining of paradigm leveling. The conclusion of this paper is given in

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3) [t] can be totally assimilated to the following obstruent: [pit.k'wa] → [pik.k'wa].

Section 6, where we suggest that new tendencies in coda conditoon and consonant cluster simplification be subsumed as instances of paradigm leveling.

2. Base-Identity

Using the term "base" for the citation form of a stem as an independent word, Kenstowicz(1995) accounts for the asymmetries in cluster simplification and coda condition between nouns and verbs in Korean. Noun stems *kaps* [kap] 'price' and *puək^h* [puək] 'kitchen' are used as independent words with no suffixes following and the citation form of the stem, the base form, apprears in its morphologically related words regardless of phonological environments as in (2a,b). On the other hand, verb stems *əps-* 'not have' and *kap^h-* 'pay back' cannot stand in isolation and they have to be followed by suffixes in order to be words. There are no words like *əps-* [əp] or *kaps-* [kap] and consequently there are no base forms in verbs. Thus cluster simplification and coda condition in verbs apply the way they do in the right column examples of (2a,b).

In short, one of the allomorphs of the stem is singled out as the model to which the others are adjusted and the model allomorph is the citation form of the stem. An identity constraint in charge is called Base-Identity (Kenstowicz 1995: 8).

(3) Base-Identity
Given an input structure [X Y] output candidates are evaluated for how well they match [X] and [Y] if the latter occur as independent words.

What is important here is whether the immediate constituents of [X Y] are available as independent words [X] and [Y] or not. For instance, the immediate constituent *kaps* [kap] of a word /kaps + i/ occurs as an independent word and consequently [ka.pi] is allowed as the surface form. On the other hand, the immediate constituent *əps-* [əp] of a word

/əps + ni/ 'not have(effective)' does not occur as an independent word and *[ə.pi.ni] is not allowed as the surface form.

In Optimality Theory this asymmetry is dealt with by constraint ranking. In cases like /kaps + i/ [kap.s'i], cluster simplification takes place in the coda. The optimal output is obtained by the ranking *Complex ≫ M$_{AX}$-IO. The relevant constraints are as follows:

(4) *Complex: No complex codas and onsets are allowed.

    M$_{AX}$-IO: Every input segment has a correspondent on the output.

(5) a. /kaps/ → [kap] 'price(citation form)'[4]

	kaps		*Complex	M$_{AX}$-IO
☞	kap			*
	kaps		*!	

    b. /kaps + i/ → [kap.s'i] 'price(nom.)' (careful speech)

	kaps + i	*Complex	M$_{AX}$-IO
☞	kap.s i		
	ka.pi		*!

The first candidates in the above tableaux win, since they fare better than the second ones in terms of constraint violation.

As for the second surface forms in (2a), Base-Identity ranking above M$_{AX}$-IO takes effect and [ka.pi] is the winner as shown in (6a). The form marked with & is the base form: that is, the citation form of a stem. Tableau (6b) shows that since verb stems alone cannot be independent words, there is no base form with which the input form /əps + ini/ can be compared. Base-Identity works vacuously and the first

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[4] *[kat] (from [kas] via neutralization) is prevented as the output form of /kaps/ due to the constraint I-C$_{ONTIG}$, which requires a portion of input to be contiguous in the output candidates, allowing no skipping of the input segments. Since /a/ and /p/ are contiguous in the output form too, [kap] does not violate this constraint and thus wins over *[kat].

The application of this constraint is not relevant in deciding the optimal form and is omitted here. We will see in (20) how this constraint works crucially.

candidate violating no constraints wins as the optimal output form.

(6) a. /kaps + i/ → [ka.pi] 'price(nom.)' & kap (casual speech)

	kaps + i	*Complex	Base-Identity	M$_{AX}$-IO
	kap.si		*!	
☞	ka.pi			*

b. /əps + ini/ → [əp.s'i.ni] 'not have(effective)'

	əps + ini	*Complex	Base-Identity	M$_{AX}$-IO
☞	əp.s'i.ni			
	ə.pi.ni			*!

Let us turn to the examples of coda condition in (2b), which show another instance of asymmetry between nouns and verbs. Since only plain stops are allowed in the coda, aspirated consonants become unaspirated as in the citation form of *puək^h* [puək]. However, the plain [k] appears uniformly even before a vowel-initial suffix in data (7), which are repeated from (2b). This is not the case in verbs.

(7) <u>noun</u>   <u>verb</u>
     puək^h 'kitchen' stem   kap^h- 'pay back' stem
     puək^h [<u>pu.ək</u>]   citation form   _____   no citation form
     puək^h+i [pu.ə.k^{h}i]/[<u>pu.ə.ki</u>]   kap^h+ini [ka.p^{h}i.ni] effective
     puək^h+il [pu.ə.k^{h}il]/[<u>pu.ə.kil</u>]   (*[ka.pi.ni])
     puək^h+e [pu.ə.k^{h}e]/[<u>pu.ə.ke</u>]

The difference in coda condition between nouns and verbs lies also in the availability of stems as independent words. Noun stems like *puək^h* [puək] 'kitchen' are independent words, while verb stems like *kap^h-* 'pay back' are not. Thus as in (9a) when I$_{DENT}$-IO(asp), which requires the input feature [aspirated] to be identical in the output correspondents, outranks Base-Identity, we get the careful surface forms on the left side of a slant line in (7). On the other hand, as in (9b) when Base-Identity ranks above I$_{DENT}$-IO(asp), we get the casual surface

form or the right side of a slant line in (7). Constraint $^*C^h]\sigma$ is in charge of disallowing aspirated sounds in the coda.

(8) I$_{\text{DENT}}$-IO(asp): Correspondent segments have the identical value for the feature [aspirated].

$^*C^h]\sigma$: Segments do not have [+aspirated] feature in the coda.

(9) a. /puək^h + i/ → [pu.ə.k^{h}i] 'kitchen(nom.)' & puək (careful speech)

puək^h + i	$^*C^h]\sigma$	I$_{\text{DENT}}$-IO(asp)	Base-Identity
☞ pu.ə.k^{h}i			*
pu.ə.ki		*!	

b. /puək^h + i/ → [pu.ə.ki] & puək (casual speech)

puək^h + i	$^*C^h]\sigma$	Base-Identity	I$_{\text{DENT}}$-IO(asp)
pu.ə.k^{h}i		*!	
☞ pu.ə.ki			*

Due to lack of the citation forms of verb stems, the results are the same in the realization of aspirated /p^h/ in verb stems regardless of the ranking between Base-Identity and I$_{\text{DENT}}$-IO(asp).

(10) a. /kap^h + ini/ → [ka.p^{h}i.ni] 'pay back(effective)'

kap^h + ini	$^*C^h]\sigma$	I$_{\text{DENT}}$-IO(asp)	Base-Identity
☞ ka.p^{h}i.ni			
ka.pi.ni		*!	

b. /kap^h + ini/ → [ka.p^{h}i.ni]

kap^h + ini	$^*C^h]\sigma$	Base-Identity	I$_{\text{DENT}}$-IO(asp)
☞ ka.p^{h}i.ni			
ka.pi.ni			*!

So far we have seen that the availability of the base form accounts for asymmetries in cluster simplification and coda condition between nouns and verbs. To recapitulate, noun stem can stand alone as an

indepencent word and thus the base form of a noun appears in its morphologically related words. Thus the output forms of nouns in a paradigm become similar. On the other hand, verbs have no base forms, since verb stems cannot stand alone as independent words. As a result, a uniform form of verb stem does not appear in a verb paradigm.

3. s-Neutralization

As briefly introduced in (2c), noun stem-final coronal obstruents tend to surface uniformly as [s] in the onset of the following suffix, where normally they are expected to retain their underlying features except for /t/ and /tʰ/ which change into [c] and [cʰ] in front of /i/ due to the process of palatalization. But verb stem-final coronal obstruents behave normally. Here are more examples with stem-final coronal obstruents /tʰ, c, cʰ/.

(11) noun   verb
  a. patʰ [pat] 'dry field' stem   katʰ- 'be similar'   stem
     patʰ+i [pa.cʰi]/[pa.si]   katʰ+i [ka.cʰi] (*[ka.si])   adverbial
     patʰ+e [pa.tʰe]/[pa.se]   katʰ+ini [ka.tʰi.ni] (*[ka.si.ni]) effective
     patʰ+il [pa.tʰil]/[pa.sil]   katʰ+a [ka.tʰa] (*[ka.sa])   stative
  b. pic [pit] 'debt' stem   pic- 'brew(rice wine)'   stem
     pic+i [pi.ci]/[pi.si]   pic+ini [pi.ci.ni] (*[pi.si.ni])
     pic+e [pi.ce]/[pi.se]   pic+ə [pi.cə] (*[pi.sə])
     pic+il [pi.cil]/[pi.sil]
  c. picʰ [pit] 'light' stem   cocʰ- 'chase'   stem
     picʰ+i [pi.cʰi]/[pi.si]   cocʰ+ini [co.cʰi.ni] (*[co.si.ni])
     picʰ+e [pi.cʰe]/[pi.se]   cocʰ+a [co.cʰa] (*[co.sa])
     picʰ+il [pi.cʰil]/[pi.sil]

The availability of stems as independent words is attributable to the difference in s-neutralization between nouns and verbs: while the citation forms of noun stems themselves are words, those of verb stems are not. For instance, both noun stem /patʰ/ 'dry field' and the stem

plus a suffix /pat^h + e/ 'dry field(locative)' are words. In the case of verbs, verb stem /kat^1-/ 'be similar' alone cannot be a word, while the stem plus a suffix /kat^h + ini/ 'be similar(effective)' is a word.

In order to explain this asymmetry, we propose that a phonological word(Pw) of Korean has one of the following structures:

(12) a. Pw → stem$_{N/V}$ + suffix
     b. Pw → stem$_N$

That is, noun stems alone as well as those with suffixes are phonological words, while verb stems should be with suffixes in order to be phonological words.

The reason for introducing the term "phonological word" is that the term "base" has no effect in verbs and that although the stem specified with a syntactic category such as *stem$_N$* and *stem$_V$* can do the job, we prefer a phonological word since it is an independent prosodic unit necessary in phonology. The citation form of a noun stem is a Pw, whose boundary is marked by braces { }, and so is a noun consisting of a stem and a suffix. However, this is not the case in verbs.

(13) a <u>noun</u>
        /pat^h/ 'dry field'   stem
        {pat^h}   citation form
        ({pat^h} e)   locative
     b <u>verb</u>
        /kat^h/ 'be similar'   stem
        _____   no citation form
        {kat^{h}ini}   effective

Our main concern is over how [pa.se] as well as [pa.t^{h}e] is allowed as the surface form of /pat^h + e/ and how not *[ka.si.ni] but [ka.t^{h}i.ni] is allowed as the surface form of /kat^h + ini/. This difference in s-neutralization is taken care of by the constraint s-Neu which does not allow a noncontinuant segment at the end of Pw, which is in turn

followed by a vowel.[5] In other words, the coronal segment in question becomes continuant.

(14)   s-Neu(tralization)
       [-son, +cor]
            |
       C}$_{Pw}$ V
          \/
       [+cont]
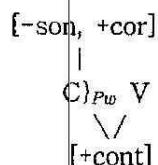
When this constraint ranks above I$_{DENT}$-IO(asp), s-neutralization takes place and we get [pa.se] as the surface form of /pat^h + e/. With the opposite ranking I$_{DENT}$-IO(asp) ≫ s-Neu, we get the careful pronunciation [pa.t^{h}e]. Since *C^h]σ ranking above I$_{DENT}$-IO(asp) has no crucial effect in deciding the optimal output form, we do not include it in the tableaux below.

(15) a   /pat^h + e/ [pa.t^{h}e] 'dry field(locative)' & pat (careful speech)

pat^h + e	I$_{DENT}$-IO(asp)	s-Neu	Base-Identity
☞ {pa.t^h} e}		*	*
{pa.s} e}	*!		*
{pa.t} e}	*!	*	

   b.   /pat^h + e/ [pa.se] & pat (casual speech)

pat^h + e	s-Neu	Base-Identity	I$_{DENT}$-IO(asp)
{pa.t^h} e}	*!	*	
☞ {pa.s} e}		*	*
{pa.t} e}	*!		*

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[5] This may be called Spirantization as in Rubach(1996), where /t/ becomes [s] in an intervocalic position as in the derivation of procession from *proceed + tion*:

prose:d.ti(on)	
prosed.ti(on)	*Syllabic Shortening*
proset.ti(on)	*Voice Assimilation*
prose.ti(on)	*Degemination*
prose.si(on)	*Spirantization*
prose.š(on)	*Palatalization*

All candidates in (15) violate two constraints each but the point is whether the highest ranking constraint is obeyed or not. Since the first candidate in (15a) satisfies the highest ranking constraint I_DENT-IO(asp), it wins even when the lower ranking constraints are violated. The same can be said of the situation in (15b), where the second candidate wins.

In the case of verbs, the results are the same regardless of ranking between s-Neu and Base-Identity, since they apply vacuously as the following tableaux show.

(16) a. /kat^h + ini/ [ka.t^hi.ni] 'be similar(effective)'

kat^h + ini	I_DENT-IO(asp)	s-Neu	Base-Identity
☞ {ka.t^hi.ni}			
{ka.si.ni}	*!		
{ka.ti.ni}	*!		

b. /kat^h + ini/ [ka.t^hi.ni]

kat^h + ini	s-Neu	Base-Identity	I_DENT-IO(asp)
☞ {ka.t^hi.ni}			
{ka.si.ni}			*!
{ka.ti.ni}			*!

The environment of s-Neu is not met and s-neutralization applies vacuously. Because of lack of the base form in verbs, Base-Identity takes no effect either. As a result, the surface form of /kat^h + ini/ is always [ka.t^hi.ni].

4. Cluster Simplification

As we saw briefly in (2d), when verb stems end in the /lC/ cluster, /l/ tends to survive in the coda in casual pronunciation, contrary to careful pronunciation where it gets deleted. Let us take a verb stem *palp-* 'tread' and its related forms for examples.

(17) /lp/: palp- 'tread' stem

   a. palp+ko   [pap.k'o]/[pal.k'o]   connective

       palp+kes'ta [pap.k'et.t'a]/[pal.k'et.t'a] presumptive

       palp+ca   [pap.c'a]/[pal.c'a]   persuasive

   b. palp+ini   [pal.pi.ni]   effective

       palp+a   [pal.pa]   stative

       palp+ala   [pal.pa.ra   imperative

Both consonants in the /lp/ cluster surface when followed by a vowel-initial suffix as in (17b), while only /p/ in the cluster surfaces when followed by a consonant-initial suffix as in (17a).

Interestingly, more people are found to pronounce the /lC/ cluster as on the right side of a slant line in (17a). This tendency can be said to conform to the way other clusters like /nc/ and /ps/ simplify in the coda, where the first consonant survives.

(18) /nc/:

    anc- 'sit down' stem

    anc+ko [an.k'o] connective[6)]   anc+ini [an.ci.ni] effective

    anc+ca [an.c'a] persuasive   anc+a [an.c'a] stative

    anc+kes'ta [an.k'et.t'a] presumptive

    /ps/:

    əps- 'not have' stem

    əps+ko [əp.k'o] connective   əps+ini [əp.si.ni] effective

    əps+kes'ta [əp.k'et.t'a] presumptive   əps+ə [əp.sə] stative

In the careful pronunciation of the /lC/ cluster, a structure changing constraint works, skipping /l/ in the coda and making V_1 adjacent to C_3.

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[6] Alveolar nasal [n] becomes velar nasal [ŋ] before velar stop [k]. The process is ignored here to show clearly that the first segment /n/ of the /nc/ cluster is linked as the coda.

(19) *IC*-Cluster:

$$\sigma$$

$$V_1 \; C_2 \; C_3]$$

$$[+lateral]$$
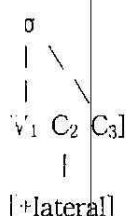
What this constraint says is that /l/ of the /lC/ cluster in the coda position is skipped, making the second consonant C_3 the coda. This is a violation of Faithfulness constraint, which is called Contiguity constraint, requiring a portion of the input to be contiguous in the output correspondents. Here, the relevant constraint is I-C$_{ONTIG}$, which prevents no skipping of the input segments, making sure that V_1C_2 of $V_1C_2C_3$ in the input is contiguous in the output. The following tableaux show how the careful pronunciation of /palp + ko/ [pap.k'o] and that of /anc + ko/ [an.k'o] are obtained. Since the highest ranking constraint ˙Complex cannot be violated, we omit the constraint in the tableaux below.

(20) a. /palp + ko/ [pap.k'o] 'tread(connective)' (careful speech)

$pa_1l_2p_3$ + ko	*IC*-Cluster	I-C$_{ONTIG}$	M$_{AX}$-IO
☞ $pa_1p_3.k'o$		*	*
$pa_1l_2.k'o$	*!		*

b. /anc + ko/ [an.k'o] 'sit(connective)'

$a_1n_2c_3$ + ko	*IC*-Cluster	I-C$_{ONTIG}$	M$_{AX}$-IO
☞ $a_1n_2.k'o$			*
$a_1c_3.k'o$		*!	*

In the second candidate [pa$_1$l$_2$.k'o] of (20a), the contiguity of a_1 and l_2 in the input is retained in the corresponding output form, but this sequence violates the higher constraint *IC*-Cluster which requires V_1 to be contiguous to C_3, skipping C_2. Thus the first candidate [pa$_1$p$_3$.k'o] wins, although it violates I-C$_{ONTIG}$.

According to Pāṇini's theorem, the ranking hierarchy *IC*-Cluster $\gg$

I-C$_{\text{ONTIG}}$ is normal, The specific constraint *IC*-Cluster which forces contiguity violation ranks above the general constraint I-C$_{\text{ONTIG}}$. In passing, neither *[palp.k′o] nor *[pal.pk′o] in (20a) is the optimal output, since both forms violate the highest constraint *Complex. In (20b) *IC*-Cluster applies vacuously since there is no /lC/ cluster in the input.

When the ranking hierarchy between *IC*-Cluster and I-C$_{\text{ONTIG}}$ is reversed, casual pronunciation results.

(21) a. /palp + ko/ [pal.k′o] 'tread(connective)'   (casual speech)

pal$_2$p$_3$ + ko	I-C$_{\text{ONTIG}}$	*IC*-Cluster	M$_{\text{AX}}$-IO
pal$_1$p$_3$.k′o	*!		*
☞ pal$_1$l$_2$.k′o		*	*

b. /anc + ko/ [an.k′o] 'sit(connective)'

a$_1$n$_2$c$_3$ + ko	I-C$_{\text{ONTIG}}$	*IC*-Cluster	M$_{\text{AX}}$-IO
☞ a$_1$n$_2$.k′o			*
a$_1$c$_3$.k′o	*!		*

The ranking I-C$_{\text{ONTIG}}$ ≫ *IC*-Cluster makes no difference in selecting the optimal output form of /anc + ko/, where *IC*-Cluster applies vacuously again. However, in (21a) the second candidate [pal$_1$l$_2$.k′o] is the optimal output of /pal$_1$l$_2$p$_3$ + ko/ since it obeys I-C$_{\text{ONTIG}}$, which ranks above *IC*-Cluster. The ranking hierarchy takes care of the difference between careful and casual pronunciation of consonant cluster in verbs.

The overall picture of a new tendency in the verb stem cluster pronunciation is that whatever the following segment is, the sequence ~V$_1$C$_2$C$_3$ of verb stems tends to be realized in the order of V$_1$C$_2$ regardless of whether C$_3$ is realized or not. C$_3$ gets linked to the onset of a following vowel-initial suffix as the line in (22b) indicates. Otherwise, as a stray segment, it gets deleted before a consonant-initial suffix, due to *Complex as in (22a).

(22) a.   σ   σ   b.   σ   σ
         / | \   +   / | / | \   +   / |
      (C)V$_1$ C$_2$ C$_3$ C V   (C) V$_1$ C$_2$ C$_3$ V

This phenomenon can be thought of as a case of uniformity in the direction of syllabification of cluster, where the process goes indiscriminately from left to right regardless of the type of clusters.

In the case of nouns whose stem ends in the /lC/ cluster, the place of Base-Identity in constraint ranking with respect to I-C_{ONTIG} and *lC*-Cluster determines the surface forms.

(23) a. talk [tak] 'chicken(citation form)'

tɛ₁l₂k₃	*lC*-Cluster	I-C_{ONTIG}	M_{AX}-IO
tɛ₁l₂	*!		*
☞ tɛ₁k₃		*	*

b. talk + i [tal.ki] 'chicken(nom.)' & tak (careful speech)

tɛ₁l₂k₃+i	*lC*-Cluster	I-C_{ONTIG}	Base-Identity	M_{AX}-IO
☞ tɛ₁l₂.k₃i			*	
tɛ₁.k₃i		*!		*

c. talk + i [ta ki] & tak (casual speech)

tɛ₁l₂k₃+i	Base-Identity	*lC*-Cluster	I-C_{ONTIG}	M_{AX}-IO
tɛ₁l₂.k₃i	*!			
☞ tɛ₁.k₃i			*	*

d. talk + i [ta.ki] & tak (casual speech)

tɛ₁l₂k₃+i	Base-Identity	I-C_{ONTIG}	*lC*-Cluster	M_{AX}-IO
tɛ₁l₂.k₃i	*!			
☞ tɛ₁.k₃i		*		*

When Base-Identity ranks lower than I-C_{ONTIG} and *lC*-Cluster, careful pronunciation results as in (23b). On the other hand, when the ranking is the other way around as in (23c,d), casual pronunciation is obtained.

Although the ranking between *lC*-Cluster and I-C_{ONTIG} makes no difference in deciding the optimal form as we can see in (23c) and (23d), we choose the order in (23d): I-C_{ONTIG} ≫ *lC*-Cluster in accordance with the ranking hierarchy in (21) showing casual

pronunciation of verb stem clusters.

So far, the hierarchy for the careful and casual pronunciation of the /lC/ clusters is as follows:

(24) a. careful: *Complex ≫ *lC*-Cluster ≫ I-C$_{ONTIG}$ ≫
               Base-Identity ≫ M$_{AX}$-IO
   b. casual: *Complex, Base-Identity ≫ I-C$_{ONTIG}$ ≫
               lC-Cluster ≫ M$_{AX}$-IO

Verbs do not have the base form and thus it does not matter where Base-Identity constraint applying vacuously is positioned in the above hierarchy. However, we place it as in (24) on a par with the constraint hierarchy of nouns, leading to one set of hierarchy for nouns and verbs at once.

When we compare the hierarchy in (24) with that in (6) for casual pronunciation of other clusters, *Complex, Base-Identity ≫ M$_{AX}$-IO, we can see that the hierarchy in (24) takes care of all types of clusters. For the constraint *lC*-Cluster applies only in the /lC/ clusters, applying vacuously elsewhere.

5. Paradigm Leveling

So far we have used the word uniformity without giving any proper definition of it. According to Kenstowicz(1995: 21), the relevant condition, Uniform Exponence, is defined as follows.

(25) Uniform Exponence
     Minimize the difference in the realization of a lexical item
     (morpheme, stem, affix, word).

The condition says that whether it is a morpheme, stem, affix, or word, its surface form should be identical in all related words.

We saw in (2a,b) relating to coda condition and cluster simplification that Base-Identity requires the base form, the citation form of stem, to

appear in nouns sharing the same stem and that due to lack of the base form in verbs, Base-Identity plays no role in determining the optimal output. Base-Identity makes sure that the base form appear uniformly in noun paradigms, and thus Base-Identity can be said to be an instance of Uniform Exponence.

Steriade(1996) refers to paradigm leveling to represent the systematic generalization of one allomorph to positions where it is phonologically unjustified or unexpected, as a means of satisfying paradigm uniformity condition. Here we need to know what paradigm uniformity condition is. It is a condition which promotes invariance of some sound property within a given paradigm and is defined as follows:

(26) Paradigm Uniformity
    All surface realizations of μ, where μ is a morpheme shared by
    the members of paradig m x, must have identical values for
    property P.

Paradigm Uniformity can be said to subsume Base-Identity in the sense that the base form as a whole is *the identical values for property P* in (26). [kap] *kaps* 'price' and [puək] *puək^h* 'kitchen', for instance, appear in all nouns where each constitutes a stem. Paradigm leveling is in progress in nouns, where the citation form appears uniformly in phonologically unexpected positions like in front of a vowel-initial morpheme.

Can we say the same thing to the data (2c), where s-neutralization is involved so that noun stem-final coronal obstruents become [s] even before a vowel-initial morpheme? Although noun stems ending in coronal obstruents such as /t, t^h, c, c^h/ do not form a paradigm in its strict sense, they have one thing in common: those obstruents are realized as [t] in the base form (and in the coda). What is noticeable here is that noun stem-final /s/ is also realized as [t] in the base form and in the coda. When followed by a vowel-initial morpheme, it remains intact as [s].

(27) mas [mat] 'taste'   stem   cf. pat^h [pat] 'dry field' stem
     mas+kwa [mat.k'wa] con.   pat^h+kwa [pat.k'wa]
     mas+i [ma.si]   nom.   pat^h+i   [pa.si]
     mas+il [ma.sil]   acc.   pat^h+il   [pa.sil]
     mas+e [ma.se]   loc.   pat^h+e   [pa.se]
                              cf. pic^h [pit] 'light'
                                 pic [pit] 'debt'

Stem-ending /s/ and /t^h, c, c^h/ behave the same way both in the coda and before a vowel-initial morpheme as we see by comparing /mas/ with /pat^h/, /pic^h/, and /pic/. We may regard this as a case of paradigm analogy whereby the base form-final [t] is realized uniformly as [s] before a vowel-initial morpheme in accordance with those noun stems whose original stem-final segment is /s/.

The reason for this phenomenon is assumed to be that the base form-final [t] between vowels, which are continuants, tends to be similar to its neighboring vowels in continuancy and that the obstruent which is the same as [t] except for its [continuant] feature is [s]. From a functional point of view, s-neutralization can be said to be related with ease of articulation. It takes more articulatory effort for the tongue blade to touch the palate or the alveolar ridge to make affricates or stops like [c], [c^h] or [t^h] in the middle of a vowel sequence than not to touch the palate: [pi.si] vs. [pi.ci], [pi.c^{h}i], or [pa.t^{h}e].

Kirchner(1998: 21) offers an effort-based explanation for spirantization. According to him, reduction of oral constriction in a singleton stop (e.g. by spirantization) constitutes a reduction of effort, implicit in the effort-based treatment of spirantization. As mentioned in footnote 5, if we follow Rubach(1996) and regard the process of /t/ becoming [s] intervocalically as spirantization, this functional aspect of s-neutralization makes sense. For more information, see Kirchner(1998).

Let us turn to the final set of data where syllabification process takes place uniformly from left to right in the /lC/ cluster, as in the case of other clusters of verb stems. Casual pronunciation of the /lC/ cluster results from ranking hierarchy difference: the more general constraint

I-C_{ONTIG} ranks above the more specific constraint *IC*-Cluster. Encompassing the /IC/ cluster as well as other clusters in noun stems, we see that the place of Base-Identity in the constraint hierarchy with respect to I-C_{ONTIG} and *IC*-Cluster determines casual and careful pronunciation.

To sum up, the constraint hierarchy relevant to coda condition on the one hand and to cluster simplification on the other hand is as follows:

(28) a. <u>Coda condition</u>

careful: $^*C^h]\sigma$ ≫ I_{DENT}-IO(asp) ≫ s-Neu ≫ Base-Identity

casual: $^*C^h]\sigma$ ≫ s-Neu ≫ Base-Identity ≫ I_{DENT}-IO(asp)

b. <u>Cluster Simplification</u>

careful: *Complex ≫ *IC*-Cluster ≫ I-C_{ONTIG} ≫ Base-Identity ≫ M_{AX}-IO

casual: *Complex, Base-Identity ≫ I-C_{ONTIG} ≫ *IC*-Cluster ≫ M_{AX}-IO

The reason Base-Identity ranks higher than either I_{DENT}-IO(asp) or I-C_{ONTIG} and *IC*-Cluster in casual speech can be explained by functionalism: ease of perception. The uniform surface form of a morpheme is easier to perceive distinctly and quickly than several different forms of the same morpheme. Since the speaker is the listener at the same time, it is easy and convenient to remember a uniform output form for an input.

6. Conclusion

What we propose here is that although the above four sets of data showing tendencies in the recent casual pronunciation of Korean look different, they can be explained as the same phenomenon, that is a paradigm leveling.

Difference between careful and casual speech is explained by difference in constraint ranking within the framework of Optimality Theory. According to the theory, individual languages are different in terms of how language universal constraints are ranked. In addition, this paper shows that difference in speech styles results also from difference in

constraint ranking hierarchy. Functional aspects of the leveling phenomenon is considered: both ease of articulation and ease of perception.

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