Ambisyllabicity across a prosodic juncture*

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Hong, Soonhyun. 1998. Ambisyllabicity across a Prosodic Juncture. *Studies in Phonetics, Phonology and Morphology* 5, 237-256. This paper reilluminates the role of resyllabification across morpheme boundaries. One of the contingent problems in Optimality Theory is how resyllabification is interpreted in the theory. As the analysis in OT is based on the output structure, interpretation of intermediate syllabification has not been an easy program in OT. In this paper, we will adopt the concept of ambisyllabicity in Kahn 1976, and show that ambisyllabicity actually takes place across a PrWd juncture in both Korean and English when we consider the data for Coda Neutralization and Palatalization in Korean on the one hand and the data for Flapping in American English. Furthermore, we are going to suggest that ambisyllabicity also takes place across Root boundaries in Sino-Korean. Based on these, we will show that intermediate syllabification and resyllabification can be reinterpreted in Optimality Theory without positing an intermediate stage. **(Inha University)**

Keywords: Ambisyllabicity, Prosodic juncture, Prosodic Word, Alignment, Resyllabification

1. Introduction

Since Kahn 1976 and Selkirk 1972 who emphasize the role of ambisyllabicity of a segment, linguists have tried to dispense with the conception of ambisyllabicity in phonology (Kiparsky 1979, Selkirk 1982, Borowsky 1986, Myers 1985, 1987) by appealing to Resyllabification. In this paper, however, we are going to demonstrate that ambisyllabicity arises at prosodic boundaries: for example, the final consonant of a PrWd is realized as ambisyllabic when followed by a vowel at a PrWd juncture in Korean (and also in English). We will demonstrate that

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ambisyllabicity is necessary to explain some phonological phenomena especially in OT where Resyllabification is not possible.

2. Coda Neutralization

In Korean, there is a Coda Neutralization (hereafter, CN) phenomenon, in which all labial and velar stops change to homorganic plain stops (/p, p', p^h/->[p] and /k, k', k^h/->[k]) and all coronal obstruents to [t] (/t, t', t^h, s, s', c, c', c^h/->[t]), in coda position.

(1) a.	/sup^h/	sup	'forest'
	/sup^h-e/	sup^h-e	'forest-at'
b.	/nac/	nat	'day'
	/nac-e/	nac-e	'day-during'
c.	/nas/	nat	'a scythe'
	/nas-il/	nas-il	'a scythe-Acc'

Given the data, we observe that an obstruent can retain in coda neither of [+sg], [+cg], [+cont], or [-ant]. In a constraint approach, this can be explained via the following negative NO-CODA constraints, since an obstruent cannot retain [lar]/[+cont]/[-ant] in coda (Hong 1996).

(2) NO-CODA[lar]/[+cont]/[-ant]
[lar]/[+cont]/[-ant] are not allowed in coda.

We can say that the NO-CODA constraints outrank IDENT-IO[lar]/[+cont]/[-ant] to explain the loss of underlying [lar]/[+cont]/[-ant] in a non-syllable-initial consonant on the surface. Namely, it is more important for a consonant to avoid violation of either of the NO-CODA constraints than to avoid violation of the IDENT-IO constraints. This explains CN of a Root-final obstruent in word-final position. In this paper, note that the term "Root"(Rt) refers to both traditional bare noun Stems and verb Roots whereas the term "Stem"(Stm) refers to the maximal projection of a verb or noun Root with possible suffixation.

(3) /os/ [ot] 'clothes'

/os/	NO-CODA[+cont]	IDENT-IO[+cont]
os	*!	
☞ot.		*

In the tableau above, the first candidate fatally violates higher ranked NO-CODA[+cont] whereas the optimal second candidate violates lower ranked IDENT-IO[+cont]. Hence, the second candidate is optimal.

The following demonstrates a case in which a Root-final [+cont] consonant is followed by a vowel-initial Suffix:

(4) /os-i/ [osi] 'clothes-Nom'

/os-i/	NO-CODA[+cont]	IDENT-IO[+cont]
☞o.s-i		
o.t-i		*!

Since the second candidate which loses [+cont] feature in the output, receives a fatal violation mark for IDENT-IO[+cont], the first candidate with no violation mark is optimal.

When a vowel-initial inflectional Suffix is attached to a Root, [lar]/[+cont]/[-ant] of the Root-final obstruent are retained (as shown in (a)'s below). And this has been explained by ranking IDENT-IO constraints below NO-CODA constraints. However, overapplication of CN is observed in the final obstruent of the left member of a compound (as shown in (b)'s below). The final obstruent of the left member of a compound always is neutralized, regardless of whether it is followed by a consonant or a vowel.

(5) a. /kɛtʰ-il/->kətʰ-il 'outside-Acc' Rt-Sfx[1)]
b. /kətʰ+os/->kət+ot 'outer garment' Rt-Rt
(6) a. /os-i/->os-i 'clothes-Nom' Rt-Sfx
b /os+an/->ot+an 'clothes' inside' Rt-Rt
(7) a. /nac-i/->nac-i 'day-Nom' Rt-Sfx

[1)]We use "Rt" for a Root, "Sfx" for a Suffix, and "Pfx" for a Prefix in examples in this paper.

b. /nac+os/->nat+ot 'day clothes' Rt-Rt

Since a PrWd juncture is formed at the inner compound boundary, we observe that a C before a V across a PrWd juncture is also subject to CN, though it seems to be syllabified as an onset of a following syllable (overapplication of CN).

The Prefix-final consonant before a vowel-initial Root patterns together with the final consonant of the first member of a compound before a vowel-initial second member, with respect to overapplication of CN.

(8) Prefixed Roots[2)]

a. /tət-os/	tət-ot	'outer garment'	Pfx-Rt
b. /tət-os-il/	tət-os-il	'outer garment-Acc'	Pfx-Rt-Sfx
c. /hot-ipul/	hot-ipul (or hon-nipul)	'single-layer quilt'	Pfx-Rt
d. /nit-yəlim/	nit-yəlim (or nin-nyəlim)	'late summer'	Pfx-Rt

The proposed ranking of NO-CODA[lar]/[+cont]/[-ant] >> IDENT-IO[lar]/[+cont]/[-ant] cannot predict the overapplication case of CN in the final /tʰ/ of the left member of a compound (/kətʰ+os/ -> kə t-ot) since the final /tʰ/ of the left member of a compound appears as onset before a vowel.

(9) /kətʰ+os/ kət+ot 'outer garment'

/kətʰ+os/	NO-CODA [lar]/[+cont]	IDENT-IO [lar]/[+cont]
☞kə.tʰ+ot.		*
*☞kə.t+ot.		**!

[2)] [hotipul] and [nityəlim] in (8c) and (8d) are the pronunciations in Kyungsang Dialect whereas [honnipul] and [ninnyəlim], in which /n/-insertion has occurred, are the pronunciations in the Standard Korean.

The tableau above shows that the proposal incorrectly predicts that the first candidate is optimal rather than the second candidate.

A Prefix prosodically behaves the same way as the first member of a compound does with respect to overapplication of CN. As the inner compound boundary is identified as a PrWd juncture, this observation suggests that Prefix-Root boundary may be identified also as a PrWd juncture.

3. Primary Palatalization

Underapplication of Primary Palatalization (hereafter, PriPal) as well as overapplication of CN is observed at the morphological boundaries in question.

Consider the following two examples in which PriPal of /t/ to [c] before /i/ occurs across a suffixal boundary:

(10) PriPal

a. /mat-i/	mac-i	'the oldest son'	Rt-Sfx
b. /kut-i/	kuc-i	'stubbornly'	Rt-Sfx

However, PriPal is not observed at the prefixal boundary of a prefixed word or at the inner compound boundary in Kyungsang Dialect:

(11) Underapplication of PriPal in prefixed words in Kyungsang Dialect

a. /hət-ipul/ ('single' 'comforter')	hət-ipul (or hən-nipul)	'unlined comforter'
b. /tət-ipul/ ('outer' 'comfort')	tət-ipul (or tən-nipul)	'additional comforter'
c. /hət-insim/ ('futile' 'charity')	hət-insim	'futile charity'

(12) Underapplication of PriPal in compounds in Kyungsang Dialect

a. /pat^h-ilaŋ/	pat-iraŋ (or pan-niraŋ)	'field ridge'	Rt-Rt
cf /pat^h-i/	pac^h-i	'field-Nom'	Rt-Sfx
b. /pət-ilim/	pət-irim	'friend's name'	Rt-Rt

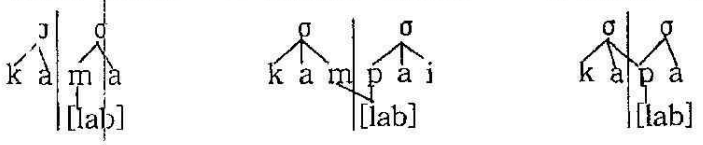
cf. /pəs-ilaŋ/ pəs-iraŋ 'friend-and' Rt-Cltc

We observe from the data that a Prefix-final coronal C behaves the same way as the final coronal consonant of the first member of a compound in that both show underapplication of PriPal. This also suggests that a Prefix forms a separate prosodic domain from the following Root the same way as the first member of a compound forms a separate prosodic domain from the following second member of the compound.

4. "Noncrisp" Alignment in Itô & Mester 1994

In dealing with multiply linked CPlace or features in coda, Itô & Mester 1994 proposes a revised type of Alignment to replace the Alignment defined in McCarthy & Prince 1993b. Consider the following examples in Axininca Campa:

(13) a. kama 'kettle' b. kampai 'cheers' c. kappa 'water'



The alignment defined in McCarthy & Prince 1993b requires a "crisp" edge alignment (hereafter, "crisp" alignment). Given the Align-Left([lab], σ) constraint, for example, (13b) and (13c) receive a violation mark under the definition of "crisp" alignment. Itô & Mester 1994, however, propose a modified version of alignment, "noncrisp" alignment, to make Align-Left([lab], σ) count as fulfilled in (13b) and (13c):

(14) Dfn. Align(Cat1, Edge1, Cat2, Edge2) ("noncrisp" alignment)

Let Edge1, Edge2 be either L or R. Let S be any string. Then, for any substring A of S that *is-the-content-of-a* Cat1, there is [a] substring B of S that *is-the-content-of-a* Cat2, such that there is a decomposition D(A) of A and a decomposition D(B) of B, both sub-decompositions of a decomposition D(S) of S, such that Edge1(D(A))=Edge2(D(B)). (Itô and Mester 1994:38)

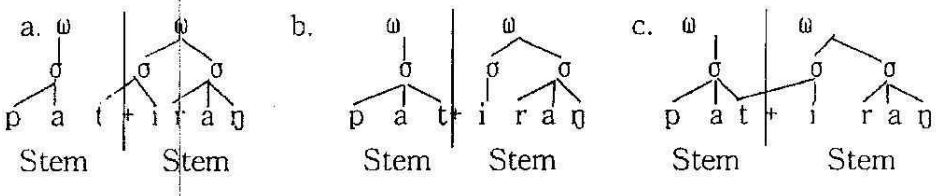
Given this "noncrisp" alignment definition, Align-Left([lab], σ) counts as fulfilled in all three cases in (13). [lab] and a Root are multiply linked to two codas in (13b) and two syllables in (13c), respectively. And hence [lab] is "noncrisply" left aligned with the second syllable. On the other hand, [lab] is "crisply" left aligned with the second syllable in (13a). Align-Left([lab], σ) is not violated in (13a) since "noncrisp" alignment subsumes "crisp" alignment according to the "noncrisp" alignment definition in (14)[3].

5. Proposal: Ambisyllabic C

Since overapplication of CN and underapplication of PriPal occur at a prefixal boundary and inner compound boundary, it is probable to assume that there is a PrWd juncture at these morphological boundaries in question. The followings are potential prosodic structures for a compound:

(15) Potential prosodic structures of a compound

/patʰ+ilaŋ/ pat+iraŋ 'field ridge' (compound)



As noted previously, we will use the term Stem to refer to the maximal projection of a verb or noun Root in which all Suffixes are attached to the Root. This is because we would like to avoid any potential confusion due to the fact that Suffixes form a PrWd together with a

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[3]To fill the gap between "crisp" alignment and "noncrisp" alignment, Itô & Mester 1994 propose a separate constraint: CrispEdge[*PCat*] (PCat is crisp):

> Dfn. Let A be a terminal (sub)string in a phonological representation, C a category of type PCat, and A *be-the-content-of* C. Then C is *crisp* (or: *has crisp edges*) if and only if A *is-a* PCat (Itô & Mester 1994:38)

In later sections, we are going to crucially follow the "noncrisp" alignment definition. However, we are going to assume that CrispEdge constraints are lower ranked in Korean and are ignored in constraint ranking.

preceding Root whereas Prefixes form an independent PrWd from a following Root. The (first) Stem-final consonant which is followed by a vowel-initial Stem shows the characteristic of being in coda. We crucially observe in the data of overapplication of CN and underapplication of PriPal that the (first) Stem-final consonant is not allowed to retain [lar]/[+cont]/[-ant] node/features regardless of whether it is followed by a V or C. We previously showed that those features are not allowed in coda (CN).

However we cannot say that the (first) Stem-final consonant is syllabified uniquely as a coda when it is followed by a vowel-initial Stem as in (15b), since ONSET is highly respected in Korean. If we assume that the (first) Stem-final C is realized as ambisyllabic when followed by a vowel-initial Stem, as shown in (15c), violation of ONSET will not arise. Furthermore, overapplication of CN and underapplication of PriPal will be naturally explained since appearance of either of [lar]/[+cont]/[-ant] in an ambisyllabic consonant will violate higher ranked NO-CODA[lar]/[+cont]/[-ant][4]. However, a problem we come across is that it is difficult to define the left edge of a PrWd by referring to the morphological structure. The left edge of the second Stem is aligned with neither the left edge of a syllable or the left edge of a PrWd. There is no way to define the left edge of a PrWd by referring to the left edge of a Stem (for a different view, see Kang

[4]A reviewer notes that (15a) is preferred to (15c) according to his/her intuition. S/he further suggests that there may arise difference in length betweem a unique onset or coda and ambisyllabic consonant. However, this suggestion may not be correct in that an ambisyllabified consonant is linked to only one timing slot, which in turn is linked to two distinct syllables simultaneously. For this reason, we are going to appeal only to phonological evidence: overapplication of CN and underapplication of PriPal. Kahn's 1976 proposal for ambisyllabicity in English is based on two pieces of phonological evidence: Aspiration and Flapping. He observes how a stop is realized on the surface and tries to explain it by appealing to syllable structure. However, he does not crucially appeal to English Stress for ambisyllabicity. Our proposal for Korean ambisyllabic structure, on the other hand, is going to be based on two pieces of phonological evidence: CN and PriPal. In this paper, we are trying to explain why a prefix-final C and the final C of the first member of a compound do not follow CN and PriPal before a V whereas a Root-final C does before a V-initial suffix. As this is just the beginning of the study of ambisyllabicity, we would like leave further complications in phonetics and phonology for further study.

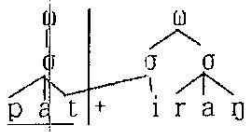
1992). On the other hand, the right edge of the (first) Stem is observed to be "noncrisp" aligned with the right edge of a PrWd under the "noncrisp" alignment definition in Itô and Mester 1994.

When we consider potential prosodic structures including syllable structures of compounds and prefixed words, we believe that the optimal prosodic structure should encode a PrWd juncture of them. Keeping this in mind, we will reconsider the following potential prosodic structure for compounds and prefixed words, based on the prosodic structure in (15c):

(16) Morphological and Prosodic structures of a compound and a prefixed word

a. /pat^h+ilaŋ/ pat+iraŋ 'field ridge' (noun compound)

b. /tə:-ipul/ tət-ipul 'additional comforter' (prefixed word)
('outer' 'comfort')



Stem (or Prefix /tət/ in (16b))

In the prosodic structure above, the (first) Stem- or Prefix-final consonant is ambisyllabic. The ambisyllabicity of the Stem- or Prefix-final consonant can explain why the (first) Stem- or Prefix-final C cannot retain [lar]/[+cont]/[-ant], since it is syllabified as a coda. On the other hand, since the (first) Stem- or Prefix-final C is syllabified also as an onset, it does not violate ONSET. Based on the discussion so far, we argue that a PrWd-final C is ambisyllabic before a V across a PrWd juncture (see also Hong 1997a, b for discussions for ambisyllabicity of a PrWd-final).

We propose that ambisyllabicity of the (first) Stem- or Prefix-final C which is followed by a V-initial Stem, is ensured by the conspiracy of the following constraints:

(17) a. ONSET

b. ALIGN-R(Stem/Prefix, PrWd): a Stem or Prefix is "noncrisp"

right aligned with a PrWd

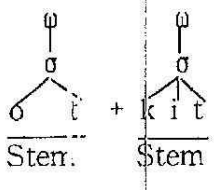
c. Ranking:

NO-CODA[lar]/[+cont]/[-ant], ONSET,
ALIGN-R(Stem/Prefix, PrWd)
>> IDENT-IO[lar]/[+cont]/[-ant]

As for the alignment constraint ALIGN-R(Stem/Prefix, PrWd) in (17b), note that we follow the definition of "noncrisp" alignment in Itô & Mester 1994 in which ("crisp") alignment in McCarthy & Prince 1993b is subsumed under "noncrisp" alignment.

On the other hand, when a Stem- or Prefix-final consonant is followed by a C-initial Stem, the right edge of a Stem or Prefix is "crisp" aligned with the right edge of a PrWd:

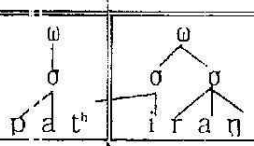
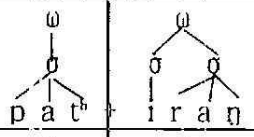
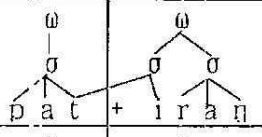
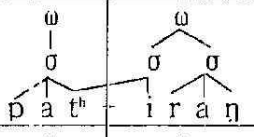
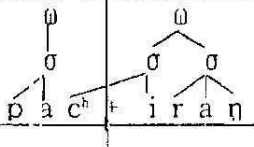
(18) /os+kis/ ot+kit 'coat collar' (noun compound)



Since "noncrisp" alignment subsumes "crisp" alignment, the structure also observes ALIGN-R(Stem, PrWd).

In the tableau below, we assume that NO-CODA[lar]/[+cont]/[-ant], ONSET and Align-R are unranked since there is no evidence for their relative ranking. On the other hand, we have already shown that NO-CODA[lar]/[+cont]/[-ant] are ranked higher than the IDENT-IO[lar]/[+cont]/[-ant]. The following tableau shows how the proposed constraints interact with one another in a case in which both overapplication of CN and underapplication of PriPal are observed at a PrWd juncture:

(19) /pat^{h}+ilaŋ/ pat+iraŋ 'field ridge'

/pat^{h}+ilaŋ/	NO-CODA [lar]	ONSET	Align-R (Stem, PrWd)	IDENT-IO[lar]
a. 			*!	
b. 	*!	*		
c.☞ 				*
d. 	*!			
e. 			*!	

In the tableau above, candidate (19c) is optimal since it violates only lower ranked IDENT-IO[lar], the violation of which is compelled by avoiding violation of NO-CODA[lar]. Candidate (19a), in which the right edge of the Stem is not aligned with the right edge of a PrWd (violation of higher ranked Align-R) and is eliminated. Candidate (19b) violates higher ranked NO-CODA[lar] and ONSET. Candidate (19d) fatally violates higher ranked NO-CODA[lar]. As a result, candidate (19c), which violates lower ranked IDENT-IO[lar], is optimal.

Before concluding this section, we note interesting phonotactics in Prefixes: no laryngeality/anteriority/continuancy distinction is observed in a Prefix-final C in Korean. And this is naturally explained in our proposal. A Prefix-final C followed by a C-initial Root across a PrWd juncture is realized as a unique coda. A Prefix-final C followed by a V-initial Root is realized as ambisyllabic according to our proposal. Hence, Prefix-final C's are always linked to a coda, regardless of a following segment across a PrWd juncture, and are subject to CN.

Hence, laryngeality/anteriority/continuancy distinction is never realized in Prefix-final C on the surface. As a result, the distinction is never posited in the input. On the other hand, a Root-final C does not behave this way since suffixal boundaries are not identified as PrWd junctures and ambisyllabicity does not arise.

These phonotactics will turn out to be important as similar phonotactics arise in American English and in Sino-Korean, as is to be shown in later sections.

6. Ambisyllabic PrWd-final C and Flapping in English

The proposal that a C before a V across a PrWd juncture is realized as ambisyllabic is also supported in American English Flapping (Kahn 1976). Consider the following examples:

(20) a. sought[ɾ] Ed
saw T[tʰ]ed
(from McCarthy & Prince 1993b and Itô & Mester 1994)
b. meet[ɾ] Ánn (where ' represents the primary stress)
me t[tʰ]oo

The case at point is that PrWd-initial [tʰ] in "saw Ted" is syllabified uniquely as an onset (due to surface aspiration (Selkirk 1982)). However, the PrWd-final [ɾ] seems to be syllabified as ambisyllabic, as /t/ is realized as flapped (Kahn 1976, Selkirk 1982). This observation is consistent with the proposed ambisyllabicity of a C before a V across a PrWd juncture. Kahn 1976:59 observes that /t/ gets flapped before a primarily stressed vowel in "meet[ɾ] Ánn" in (20b). He notes that the necessary condition for Flapping within a word in American English is that the vowel preceded by /t/ should be unstressed, and he falsifies the requirement for Flapping in the literature that the preceding vowel should be stressed.

(21) Flapping between a stressed V and unstressed V
a. bútt[ɾ]er, cít[ɾ]y, creát[ɾ]ing, lát[ɾ]er
b. creat[tʰ]ívity, att[tʰ]ack, lát[tʰ]èx

The failure of /t/ to flap in "lát[tʰ]èx" in (21b) suggests that not only a following main stress (ex. creat[tʰ]ívity) but in fact any [+stress] vowel prevents Flapping, as noted by Kahn 1976:57. Hence, Kahn concludes that the sole requirement for Flapping within a word is that the following vowel should be unstressed. Kahn further observes that Flapping across a word juncture does not pattern together with that within a word, as shown in (20b) in which /t/ gets flapped before a stressed vowel across a word juncture or PrWd juncture. Kahn's observation suggests that Flapping across a PrWd juncture may have to be analyzed differently from that within a PrWd, though we are not going to analyze Flapping within a PrWd in this paper and will leave this problem for further study[5].

McCarthy & Prince 1994 try to explain the surface realization of /t/ at the PrWd juncture as follows:

(22) Constraints

a. ONSET: *$[_{\sigma}$V
(Every syllable has an onset.)

b. ALIGN-LEFT: Align(Stem, L, PrWd, L)
(A Stem is left aligned with a PrWd)

c. FINAL-C: *V)$_{PrWd}$
(A PrWd should ends in a consonant.)

d. Constraint Ranking
ONSET >> ALIGN-LEFT >> FINAL-C

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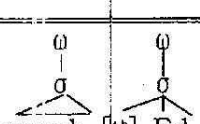
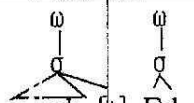
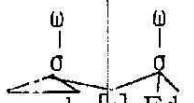
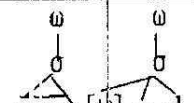
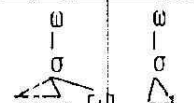
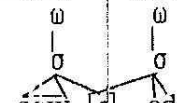
[5] There is another difference in the distribution of the phonetic realizations of /t/ between at a PrWd juncture and at a syllable juncture. Word-internal /t/ after a vowel is realized either as [t] before a C, or as [tʰ] or [ɾ] before a vowel: three-way distinction. However, word-final /t/ is realized either as [t] before a C or [ɾ] before a vowel across a PrWd juncture: two-way distinction. The latter observation is spelled out as a phonotactic condition in details at the end of this section.

(23) sought Ed [sɔ:ɾɛd]

	ONSET	ALIGN-LEFT	FINAL-C
 sough [tʰ] Ed		*	*!
 sough [t] Ed	*!		
☞  sough [ɾ] Ed		*	

(24) saw Ted [sɔ:tʰɛd]

	ONSET	ALIGN-LEFT	FINAL-C
☞  saw [tʰ] e d			*
 saw [t] ed	*!	*	
 saw [ɾ] ed		*!	

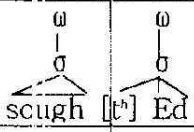
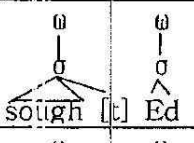
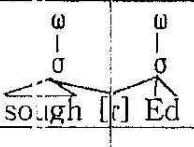
As shown in the tableaux above, McCarthy & Prince use ALIGN-LEFT constraint in their analysis, which depends on "crisp" alignment.

Rather than appealing to ("crisp")Align-L(Stem, PrWd), We propose in English that the right edge of a Stem should be ("noncrisp") aligned with the right edge of a PrWd (This idea is due to Itô & Mester 1994: fn.5), under the "noncrisp" definition of alignment:

(25) ("noncrisp")ALIGN-R(Stem, PrWd)

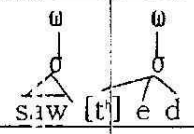
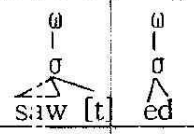
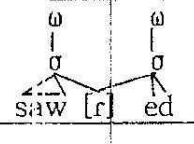
This ("noncrisp") alignment constraint and ONSET conspire to force the PrWd-final C before a V across a PrWd juncture to be realized as ambisyllabic. The following tableau shows how this conspiracy works:

(26) sought Ed [sɔ:ɾɛd]

	ALIGN-R	ONSET
 sough [tʰ] Ed	*!	
 sough [t] Ed		*!
☞  sough [ɾ] Ed		

On the other hand, the following tableau shows how the word-initial /t/ is realized as [tʰ]:

(27) saw Ted [sɔ:tʰɛd]

	ALIGN-R	ONSET
☞  saw [tʰ] e d		
 saw [t] ed	*!	*
 saw [ɾ] ed	*!	

In the tableau above, the third candidate violates ALIGN-R(Stem, PrWd) since the right edge of the first Stem is not noncrisp aligned with the right edge of a PrWd. The second candidate violates both ALIGN-R(Stem, PrWd) and ONSET. Hence the first candidate is optimal.

Flapping and Aspiration across a PrWd juncture in American English suggest that the our proposed ambisyllabicity of a C before a V across a PrWd juncture is correct in American English, too.

Before concluding this section, we observe an interesting phonotatic

constraint in English in conjunction with ambisyllbicity across a PrWd juncture, due to Kahn 1976. In English, an aspiration distinction in /t/ never appears in a word-final C both underlyingly and on the surface, though it does in a word-initial C. Word-initial /t/ is always realized in a unique onset and is never realized in a coda. Hence, it is thus always aspirated. On the other hand, word-final /t/ is never aspirated (in a normal speech) accrording to Kahn 1976:61: "Syllable-initial non-sy lable-final voiceless stops are aspirated." Namely, word-final /t/ before a C across a PrWd juncture is realized as [t] in a normal speech, since it is syllabified as a unique coda (ex. Sought[t] Mary). Word-final /t/ before a V across a PrWd juncture surfaces as flapped [ɾ] due to ambisyllabicity across the juncture according to the proposal. Hence, word-final /t/ is always realized as unaspirated regardless of a following segment across the PrWd juncture. As a result, aspiration distinction in /t/ is observed only in word-initial position but it is not in word-final position. Hence, the aspiration distinction in word-final /t/ is never posited in the input. This explains the phonotatic of word-final /t/ in English: no aspiration in word-final /t/. In the next section, we are going to show that similar phonotactics are also found in Sino-Korean due to ambisyllabicity across a prosodic juncture.

A natural extension of this proposal predicts that aspiration distinction does not exist at all in a word-final C in American English since a word-final C is always syllabified either as a unique coda or as an ambisyllabic consonant, regardless of the following segment across a PrWd juncture.

7. Ambisyllabic Root-final C before V-initial Root-initial C in Sino-Korean

In this section, we are going to propose that a Sino-Korean Root-final C before a V across a Root juncture is realized as ambisyllabic. This is motivated by some unusual phonotactic constraints in Sino-Korean. In Sino-Korean, a laryngeality/anteriority distinction never appears in a Root-final C both underlyingly and on the surface. Namely, a Root-final C can only be one of /k, n, l, m, p, ŋ/. However,

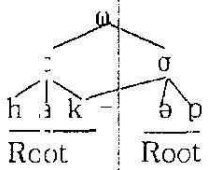
a laryngeal/anteriority distinction is observed in a Root-initial C: i.e., *t͡ʰa-ca* 'batter', *p͡ʰan-sa* 'judge', *kʰwælak* 'pleasure', *kəm-sa* 'prosecutor', *ca͡c-kok* 'composing', *c͡ʰaŋ-ko* 'warehouse'. As for continuancy distinction, /s/ never appears in a Root-final C underlyingly and on the surface: there is no Root ending in /s/. However, underlying Root-initial /s/ is realized on the surface: *sa-ko*. Namely, continuancy distinction is observed in Root-initial position, but it is unattestable in Root-final position. Hence, it is safe to say that a continuancy distinction in coda may not exist in Sino-Korean.

We previously demonstrated in Korean that [lar]/[+cont]/[-ant] are not allowed in coda:

(28) NO-CODA[lar]/[+cont]/[-ant]

NO-CODA constraints are undominated in Korean and violation of any is fatal. The ambisyllabicity of a Root-final C before a V across a Root juncture predicts that Sino-Korean will not have the distinction in laryngeality, continuancy, and anteriority in a Root-final C. A Sino-Korean Root is maximally (C)(G)V(C) (where G is a glide). A Root-final C is syllabified as a coda in word-final position (e.g., *sam-kak* 'triangle'). It is syllabified also as a coda when it is followed by a C-initial Root (e.g., *ip-caŋ* 'position'). Finally, a Root-final C must be syllabified as ambisyllabic when it is followed by a vowel-initial Root according to our proposal that a Root-final C is realized as ambisyllabic before a V at a Root juncture, i.e., the ambisyllabicity of a Root-final C before a V satisfies NO-CODA[lar]/[+cont]/[-ant] and ONSET.

(29) /hak-əp/ hak-əp 'study'



As a result, a Root-final consonant will always have to be realized either as a coda or as an ambisyllabic consonant, regardless of a

following segment. It then is predicted that [lar]/[+cont]/[-ant] are never realized in Root-final position on the surface, since those features are not allowed in coda. Hence, [lar]/[+cont]/[-ant] in a Root-final C never surface and the distinction in continuancy, anteriority and laryngeality in a Root-final C is never posited in the input.

On the other hand, consonants with [lar]/[+cont]/[-ant] can appear in Root-initial position. This is because those consonants can be uniquely syllabified as an onset and [lar]/[+cont]/[-ant] in Root-initial position are allowed (e.g., /t͡ʰa-ca/ 'hitter', /sa-ki/ 'fraud', /koŋ-sa/ 'construction').

This strongly motivates the proposal that the Root-final C before a V across a Root juncture is realized as ambisyllabic. Based on this proposal, we further argue in Sino-Korean that the right edge of a Root is ("noncrisp") aligned with the right edge of a syllable.

(30) a. Align-R(Root, σ)
b. ONSET
c. DEP-IO
d. Ranking:
ALIGN-R(Root, σ), NO-CODA[lar]/[+cont]/[-ant], ONSET >> DEP-IO

The high ranking status of ALIGN-R(Root, σ) and ONSET forces the Root-final C before a Root-initial V to be realized as ambisyllabic.

(31) /kuk-ik/ kuk-ik 'national interests'

/kuk-ik/	ALIGN-R	NO-CODA	ONSET	DEP-IO
kuk.-ik			*!	
ku.k-ik	*!			
kuk-Cik				*!
☞ ku·k·-ik				

("·k·" is ambisyllabic; "C" is epenthetic)

8. Summary and Conclusion

We have so far demonstrated that the concept of ambisyllabicity of a

consonant is necessary in the framework of OT to analyze phonological phenomena on prosodic structures. In our proposal, we crucially depend on the definition of ("noncrisp") alignment in Itô & Mester 1994. We have proposed that the final C of a Stem or a Prefix before a vowel-initial Stem at a PrWd juncture is realized as ambisyllabic in native Korean, a C of a Root before a vowel-initial Root as ambisyllabic in Sino-Korean, and a C before a vowel across a PrWd juncture as ambisyllabic in English. If the morphological Root is identified as the prosodic Root in Sino-Korean as in Kang 1992, though not clear at this point, we may say that ambisyllabicity occurs at prosodic junctures.

We have also demonstrated that our proposal predicts interesting phonotactics in Korean, American English, and Sino-Korean morphemes. Namely, laryngeality/continuancy/anteriority distinction do not exist in Prefix-final C in Korean, aspiration distinction does not in word-final obstruent in American English, and laryngeality/continuancy/anteriority distinction do not in Root-final C in Sino-Korean.

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