

Syllable Contact and Correspondence in Correspondence Theory¹

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Abstract

This paper investigates patterns of manner assimilation in Toba Batak, Sanskrit, Ponapean and Korean. Based on cross-linguistic patterns of manner assimilation, I develop the constraint, Syllable Contact (SyllCon), as a type of a markedness constraint in Correspondence Theory. With the establishment of high-ranking SyllCon, I argue that several patterns of manner assimilation result from the interaction of high-ranking SyllCon and correspondence constraints such as Ident[sonorant].

1. Preliminaries

Along with place assimilation, nasalization and lateralization are common phonological phenomena cross-linguistically. For example, In Sanskrit, an oral stop coda becomes nasalized or lateralized when the following onset is nasal or lateral, respectively.

(1) Manner Assimilation in Sanskrit (data from Whitney 1924:55-56)

- | | | |
|--------------|-------|-----------|
| a) tat namas | ----> | tan namas |
| b) út lupdam | ----> | úl lupdam |
| c) vak.me | ----> | vaŋ.me |

On the contrary, an oral stop stays unchanged when it follows a nasal or a lateral as in (2).

(2) No Phonological Process applied in Sanskrit (data from Cho 1989:19)

- | | | |
|-------------------|-------|--------------|
| a) mahan + kavih | ----> | mahan kavih |
| b) mahan + bhagah | ----> | mahan bhagah |

Moreover, in Toba Batak (Nababan: 1981:59, Percival 1981:30 Hayes 1986:479), a nasal coda fully assimilates to a liquid onset, and a coda [r] is also assimilated to the following lateral coda as illustrated in

(3). Otherwise, any sequence of liquid followed by nasal does not undergo the assimilation.

(3) Sonorant Assimilation in Samosir Toba Batak (data from Percival 1981:32-35)

- | | | | | | | |
|-------|-------|-----|-------------------|-------|-------------------|--------------|
| a) nr | ----> | rr: | di bagásan rohána | --> | di bagásar rohána | 'to himself' |
| b) nl | ----> | ll: | lâNanlaNán | ----> | lâNallaNán | 'pale' |
| c) rl | ----> | ll: | malláNe | ----> | marláNe | 'to swim' |

Similarly as in Toba Batak, Ponapean invokes similar sonorant assimilation in casual speech as in (4).

(4) Manner Assimilation in Ponapean (data from Rehg 1981:57)

- | | | | | | | |
|-------|-------|-----|---------|-------|---------|--------------------|
| a) nl | ----> | ll: | nanleng | ----> | nalleng | 'heaven' |
| b) nr | ----> | rr: | nanrek | ----> | narrék | 'season of plenty' |

Ponapean /l/ and /r/, nevertheless, do not assimilate to following nasals.

Another very interesting type of manner assimilation is found in Korean. Korean invokes several types of nasalization and lateralization as illustrated in (5).

- | | | | | | |
|--------------------------|---|--------|-------|-----------|----------------|
| (5) a) Stop-Nasalization | : | kukmul | ----> | [kuŋ.mul] | 'broth' |
| b) l-nasalization | : | kamli | ----> | [kam.ni] | 'supervision' |
| c) n-lateralization (I) | : | nonli | ----> | [no.li] | 'logic' |
| d) n-lateralization (II) | : | pulniŋ | ----> | [pul.liŋ] | 'incapability' |

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Other types of obstruent-lateral sequences are interesting in that the output results in a nasalized sequence even though no nasal segment appears to trigger it.

(6) Nasalization of the *Ol* cluster (*O*:obstruent, *l*:lateral): /kyəkli/ → [kyəŋ.ni] 'separation'

As illustrated in (6), unexpectedly, an obstruent-lateral sequence undergoes nasalization and surfaces as [Nn].

What makes the assimilation particularly interesting is that some consonant sequences such as /lm/, /NO/ (*N* = nasal) and /IO/ in (7) do not undergo any type of assimilation unlike the examples in (5).

(7) Consonant sequences with no phonological processes applied

a) lm	----->	lm :	/kalmaŋ/	----->	[kal.maŋ]	'desire'
b) NO	----->	NO :	/kamki/	----->	[kam.ki]	'flu'
c) IO	----->	IO :	/kalpi/	----->	[kal.bi]	'rib'

The main goal of this paper is to provide a unified analysis of several types of nasalization and lateralization within the framework of Correspondence Theory (McCarthy and Prince 1995, McCarthy 1996). I argue that these phonological phenomena are the result of the interaction of the Syllable Contact constraint (SyllCon) and correspondence constraints. I also argue that the Ident-Onset constraint dominates the Ident-Coda constraint with respect to the feature [sonorant] which is consistent with the universal (see Prince and Smolensky (1993) and Lombardi (1995)) that an onset is stronger than a coda.

2. Syllable Contact Constraint in Correspondence Theory

The traditional accounts for the patterns of manner assimilation so far are problematic. First, a rule-based approach does not address why certain sequences trigger lateralization and nasalization, based on the assumption that they are unrelated to each other. Analyses positing the spreading of the specified feature [+lateral] (Rice and Avery 1991), [+son, -nasal] or [+son] (Cho 1991) or [+continuant] (Kim 1987) to an empty slot within a Feature Geometry framework are also controversial since they are contrary to the general underspecification framework. For example, [+nasal] rather than [-nasal] should be specified and [+continuant] should be unspecified (e.g. Sohn 1987) in Korean where /t/ is the most unmarked consonant. More importantly, the *Ol*-sequence which undergoes nasalization in (6) is problematic within the framework since it does not have the feature [nasal] to spread.

Based on the all relevant facts in Toba Batak, Sanskrit, Ponapean and Korean, I argue that the patterns of assimilation respect the constraint SyllCon which is modified from the Syllable Contact Law of Murray and Vennemann (1983) and Vennemann (1988) and requires segment sequences not to be rising in sonority over a syllable boundary as stated in (8).

(8) Syllable Contact Constraint (SyllCon) (# refers to a syllable boundary)

In any sequence A # B, the sonority of A should not be less than that of B.

Consequently, based on the well-known sonority value (e.g. Selkirk 1984) which can be slightly different depending on the language as in (9), I argue that various patterns of nasalization and lateralization should be characterized as instances of respecting syllable contact unmarkedness.

(9) Sonority Hierarchy in Toba Batak, Sanskrit, Ponapean and Korean

a) vowel > glide > l > r > nasal > fricative > stop: Toba Batak

b) vowel > glide > liquid > nasal > fricative > stop: Sanskrit, Ponapean, Korean

Consequently, the high-ranking SyllCon constraint forces ON and OL in (1), /nr/, /nl/ and /rl/ in (3) and *Ol*, ON and /nl/ sequences in (5) which have rising sonority to be changed to NN and [ll] as in (1), and [rr], [ll] as in (3) and Nn, NN and [ll] as in (5), respectively. However, the sequences such as NO, NN, rN, /lr/, /ln/, /lm/, NO and IO which do not have rising sonority satisfy the constraint and thus maintain perfect correspondence identity.

The notion of Syllable Contact which is developed as a type of markedness constraint in Correspondence Theory is supported by phonological processes. For example, in the reduplication process in Ponapean, a vowel is inserted between a sequence of two consonants with rising sonority over a syllable boundary as in (10) while correspondence is maintained in a sequence of two consonants with even or falling sonority as in (11), thus respecting SyllCon.

(10) No Vowel Insertion in Reduplication (data from Rehg 1981:60)

<i>Word</i>	<i>Reduplicant</i>	<i>Gloss</i>
sinom	sinsinom	sink in
dune	dundune	tie together

(11) Vowel Insertion in Reduplication (data from Rehg 1981:61)

lus	lusulus	jump
net	netenet	smell
setik	setisetik	quick in performing action

Additional evidence can be found in Korean. In Korean, when a morpheme- or word-final consonant is followed by a vowel, those sequences with rising sonority (e.g. /*(C)VC*⁺ *V(C)*/ or /*(C)VC*/ + *V(C)*/) may respect the constraint and become unmarked in terms of syllable contact in two ways. First, a morpheme-final (or word-final) consonant can be realized as an onset in the output, which was called resyllabification by traditional analysis as in (12).

(12) No [C.V] in Korean (data from Choi 1991:92)

/nap/ 'to receive'	+	/ip/ 'to enter'	(Sino-Korean morphemes)
Input:	/nap+ip/		
Output:	[na.bip]	'payment'	

The example in (12) illustrates that a morpheme-final consonant in Korean is realized as an onset when it is followed by a vowel, thus resulting in a sequence of vowel-consonant with falling sonority over a syllable boundary. This has been considered as the result of high-ranking NoCoda and Onset in Optimality Theory. In this paper, I argue that Syllable Contact is responsible for the process.

The other way of respecting syllable contact with underlying (C)VC + V(C) input in Korean is to insert a nasal consonant which triggers nasalization of the preceding oral stop immediately before the suffixal vowel. The result is that a sequence of stop coda and a vowel becomes a sequence of homorganic nasal and [n] which has even sonority. Hence, the examples in (13) which have two outputs, one where the original coda of the stem surfaces as an onset and one with an inserted nasal as an onset, provide further evidence of high-ranking constraint, SyllCon.

(13) *n/ø* alternation in Korean (data from Han 1993:53)

a) Noun Compounds

/cip+il/	[cim.nil]	or	[ci.bil]
'house' 'work'	'house work'		

b) Prefix-Verb or Prefix-Noun

/hot ^h -ipul/	[hon.ni.bul]	or	[ho.di.bul]
'single' 'comforter'	'unlined comforter'		

One potential problem of the analysis based on the high-ranking SyllCon, however, is the case of /*m*/ in Samosir Toba Batak and /*ln*/ Korean. That is, in Samosir Toba Batak, the sequence of /*m*/ which has a rising sonority over a syllable boundary maintains correspondence to its output [m], and in Korean, the cluster /*ln*/ has the correspondent [l.l] in its output even though it has falling sonority.

Careful examination, however, in Samosir Toba Batak illustrates that correspondence to [place] is ranked higher than SyllCon. That is, even if SyllCon is high-ranking in the language, correspondents

should maintain their place features. Hence, if the sequence of /m/ in the language changed to [l], [labial] from the input segment /m/ would not be realized, thus violating high-ranking Ident[labial]. As a consequence, /m/ does not undergo the assimilation, but instead maintains correspondence with respect to the feature [place].

As for the case of /ln/ in Korean, I propose that a phonological constraint, 'Similarity' accounts for the exception. The constraint, Similarity, is stated in (14)

- (14) Similarity: A sequence of sonorants cannot have different sub-features if they share the same place of articulation.

The notion of the Similarity constraint, is further supported by /l/-irregular verbs in Korean which lose the stem-final /l/ when they are followed by a grammatical (verbal) morpheme beginning with /n/ as in (15).

- (15) /pul-/ 'to blow' + /-nin/ 'noun-modifying form' ----> [pu.nin] 'blowing'

Given the patterns that SyllCon is respected by changing the sonority value of a coda rather than that of an onset, I divide Identity[sonorant] into two types of constraints as in (16).

- (16) Two types of Ident[sonorant]
 a) Ident-Onset[sonorant]: Onset must be faithful to the underlying [sonorant] value.
 b) Ident-Coda[sonorant]: Coda must be faithful to the underlying [sonorant] value.

In the following section, I will examine the cases described above by means of constraint hierarchy and their interaction.

3. Constraint Interaction

Based on the generalization that languages tend to prefer falling sonority over a syllable boundary, I assume that the SyllCon constraint is ranked high for the languages we are considering. In addition, as mentioned above, given that the coda position is much weaker than the onset, Ident-Onset[sonorant] is high-ranking while Ident-Coda[sonorant] is low-ranking. Accepting the realization of [l] rather than [nn] from /ln/ in Toba Batak, Ponapean and Korean, I assume that Max-lateral dominates Max-nasal. The sequence of /ml/ in the input, however, surfaces as [mn] in the output (and not [ll]) even with the domination of Max[lateral] over Max-nasal. This suggests that Ident[place] is higher-ranked than Max-lateral.

The constraint ranking that I assume is given in the table in (17) which examines the obstruent-nasalization case in Sanskrit illustrated by the data in (1).

(17) The case of obstruent-nasalization in Sanskrit

/vakme/	SyllCon	Ident-Onset [sonorant]	Ident [place]	Ident [lateral]	Ident- nasal	Ident-Coda [sonorant]
a. vak.me	*!					
b. vam.me			*!			
c. ^{va} vaṅ.me						
d. vak.pe		*!				

In the table in (17), the most faithful candidate to its input, candidate (a), respects all correspondence constraints at the expense of violating the higher-ranking SyllCon. Candidate (b), with [m] in the coda in place of /k/, on the other hand, respects both SyllCon and identity constraints with respect to [sonorant] constraints. Nevertheless, this form violates the identity constraint, Ident[place] since the place feature of

/k/ in the input is not realized. Candidate (d) does not have an identical feature value with its correspondent with respect to [sonorant], thus violating the high-ranking correspondence constraint, Ident-Onset[sonorant]. Consequently, candidate (c) which has even sonority over the syllable boundary and is faithful to its underlying place feature emerges as the optimal output.

The following table in (18) accounts for the Korean pattern illustrated by the data in (5) and will illustrate why the underlying /k/ and /l/ are both nasalized even though they look like they do not have the appropriate environment for nasalization.

(18) The case of /Ol/-sequence nasalization

/kyəkli/	SyllCon	Ident-Onset [sonorant]	Ident-Coda [place]	Max-lateral	Max-nasal	Ident-Coda [sonorant]
a. kyək.li	*!					
b. kyək.ni	*!					
c. kyəl.li			*!			
d. kyəŋ.ni						
e. kyək.ti		*!				

Since Ident-Onset[sonorant] is high-ranking, candidate (b) which has a sonorant onset [n] as a correspondent of /l/ seems to be the most optimal candidate. However, it crucially violates the high-ranking constraint, SyllCon. Another candidate we may think should surface is candidate (c), where the onset of the second syllable has the same value as its correspondent with respect to [sonorant]. The candidate also respects SyllCon, having the sequence of [l.i]. Nevertheless, it is ruled out since the correspondents /k/ and [l] are not identical with respect to the place feature. Candidate (a) is also eliminated by violation of the SyllCon constraint. The choice then is between candidate (d) and candidate (e). Both violate Max-lateral. They differ in that candidate (d) violates Ident-Coda[sonorant] and candidate (e) violates Ident-Onset[sonorant]. Given that an onset position is stronger than a coda position, Ident-Coda[sonorant] is lower ranked; thus candidate (d) emerges as the winner. The table illustrates that even the underlying /l/ should be nasalized in order to respect the high-ranking SyllCon constraint, thereby resulting in a more unmarked structure with respect to the sonority value over a syllable boundary.

In sum, I argued that several patterns of manner assimilation result from the interaction of high-ranking SyllCon and correspondence constraints. I also proposed that a sonorant in an input must have a sonorant correspondent in its output if it is realized as an onset by means of the dominance of Ident-Onset[sonorant] over Ident-Coda[sonorant]. As a conclusion, I argue that the patterns of manner assimilation is the result of respecting the markedness constraint, SyllCon, while trying to retain to the extent possible faithfulness to the underlying input.

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