

English Palatalization In A Feature Organization

Shinsook Lee

In this paper I examine the process of palatalization in English and show that this process can be accounted for in a principled way under Constriction Theory advanced by Clements and Hume (1994). The consonant and vowel inventories of English are given in (1) (Conklin and Lourie, 1983):

(1) a. The Consonantal Inventory of English

	Bilabial	Labiodental	interdental	Alveolar	Palatal	Velar	Glottal
Stop							
voiceless	p			t		k	
voiced	b			d		g	
Fricative							
voiceless		f	θ	s	ʃ		h
voiced		v	ð	z	ʒ		
Affricate							
voiceless					ç		
voiced					ǰ		
Nasal	m			n		ŋ	
Liquid					l, r		
Glide	w				y		

b. The Vowel Inventory of English

	Front	Center	Back
Monophthongs			
High	i:		u:
	i		u
Mid	e	ə	o
	ɛ		
Low	æ	a	ɔ
Diphthongs		ai, au	ɔi

Palatalization is an independent rule of English which replaces alveolar obstruents by their palatoalveolar counterparts before /y/. Some representative examples are

given in (2) (all data are taken from Halle and Mohanan, 1985; Borowsky, 1986; Jensen, 1992):

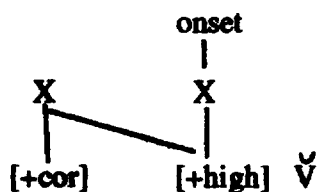
(2)	a.	capacious/ capacity	atrocious/ atrocity	social/ society
	b.	racial	partial	official
		social	residential	torrential
		confusion	tension	expression
		division	reaction	exemption
		officious	spacious	malicious
	c.	natural	actual	residual
		gradual	habitual	sensual
		arduous	deciduous	sensuous
	d.	[č, ʝ]	[t/ d] or [ty/ dy]	
		perpétual	perpetúity	
		fórtune	fortúitous	
		constítutive	constítúte	
	e.	residency/ residential	presidency/ presidential	
	f.	[ʝ, ʃ, č]	* [j, ʃ, č]	
		did you	did it	
		miss you	miss it	
		got you	got it	

The examples in (2a) show that the palatalizing segment must be a /y/, and not an /i/; that is, palatalization occurs in examples like *capacious* and *atrocious* in which the triggering segment is /y/, whereas palatalization does not occur in examples like *capacity* and *atrocity* in which the triggering segment is /i/. The unstressed vowel /i/ in *capacity* and *atrocity* is reduced to a schwa. The examples in (2b) and (2c) illustrate that the conditioning /y/ can be either underlying (2b) or inserted by a rule (2c), indicating that palatalization occurs after y-insertion. Note here that since we need the rule of y-insertion for palatalization to occur in (2c), palatalization is unpredictable in a sense. More interesting are the examples in (2d), which show that obstruents palatalize in non-initial unstressed syllables.

Thus, palatalization occurs only in the examples of the first column in (2d) in which a target segment is in an unstressed syllable. Examples in (2e) (in addition to the examples above) indicate that the /y/ must be followed by a vowel for palatalization to apply, as evidenced by examples like *residential* and *presidential*. Palatalization can occur postlexically, as shown in (2f) (here again the triggering segment is a /y/ but not an /i/). Moreover, the examples in (2b) and (2e) show that spirantization, which turns stops into continuants, is distinct from palatalization (Halle and Mohanan, 1985; Borowsky, 1986)¹. Thus, we have [+continuant] palatoalveolar consonants in (2b) and (2e) as the result of spirantization and palatalization, while we find [-continuant] palatoalveolar segments in (2c) and (2d) as the result of palatalization. In addition, the examples in (2c) and (2d) indicate that the conditioning /y/ for palatalization should be inserted after spirantization; otherwise, we would get the wrong [+continuant] segments here by the application of spirantization.

Based on these facts, Borowsky (1986) assumes that spirantization applies before y-insertion, which in turn precedes palatalization. She proposes the following rule of palatalization (1986: 302, 311):²

(3) Palatalization Rule



Borowsky's rule in (3) states that coronals are palatalized only when followed by a heterosyllabic glide /y/. Her arguments are based on the following facts. First,

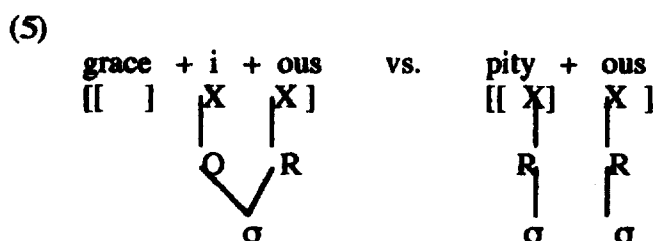
¹ Spirantization is blocked if it creates a [+continuant] sequence because of the Obligatory Contour Principle (e.g., *suggestion*) (cf. Borowsky, 1986). Here note that [+continuant] of /y/ is underspecified under the theory of radical underspecification. Thus, we have to assume that spirantization inserts [+continuant] before /y/.

² In Borowsky's (1986) analysis, the conditioning high vowel segment in an onset position is interpreted as a glide.

in the examples below, palatalization occurs only in (4b) but not in (4a) (ibid.: 308):³⁾

- | | | | | |
|-----|----|---------------|-------------------|-------------------|
| (4) | a. | pity, piteous | beauty, beauteous | melody, melodious |
| | b. | gracious | spacious | infectious |
| | | atrocious | fallacious | |

Borowsky accounts for this contrast in terms of syllabification. That is, /i/ in the examples in (4a) is syllabified as rime (i.e., vowel) on the first cycle, hence blocking the application of the palatalizing rule on the next cycle, because /i/ and the preceding coronal are tautosyllabic. But the /i/ in the examples in (4b) is a type of stem extension⁴⁾ and it is not syllabified until the cycle on which the suffix is added. In this suffixal cycle /i/ is syllabified as the onset (i.e., glide) of the following suffix, and thus it is not tautosyllabic with the preceding coronal. As a result, palatalization can apply in these examples, as illustrated in (5) (ibid.: 309):



Second, the examples of the first column in (2d) undergo palatalization while those of the second column do not. Borowsky explains this fact in terms of resyllabification (and heterosyllabicity) (cf. Selkirk, 1982).⁵⁾ According to her, English phonology has a rule of resyllabification, which shifts a single consonant

^{3.} /y/ in (4a) is basic to the stem.

^{4.} Halle and Mohanan (1985) opt for allomorphy of the suffixes: *ious*; *ous*; *nous*; etc.

^{5.} Selkirk (1982) proposes resyllabification as a way of accounting for stop allophones in English without resorting to ambisyllabicity, such as proposed by Kahn (1976).

from the onset of a stressless syllable into the coda of the preceding syllable. Hence resyllabification shifts the italicized consonant of the first column in (2d) into the preceding syllable, making it heterosyllabic with respect to the following glide /y/. In contrast, resyllabification is blocked in the examples of the second column in (2d), either because the consonant in question begins a word (e.g., *tune*) or because it begins a stressed syllable (e.g., *perpetúity*, *fortúitous*). As a consequence, palatalization applies only in the examples of the first column in (2d).

Jensen (1992), however, claims that Borowsky's analysis suffers from serious problems. First, he points out that the resyllabification required for palatalization is quite counter-intuitive. For example, palatalization requires the word *tincture* to be resyllabified as [tinct.yure], but few speakers would syllabify the word in this way. Second, if resyllabification applied in the examples of the first column in (2d), we would get the syllable-final glottalized allophone of /t/ in words like *perpetual* since English phonology contains a rule of glottalization which glottalizes syllable-final voiceless stops (e.g., *butler*, *button*, *great*). Jensen argues that the absence of the glottalized allophone in (2d) indicates that we cannot appeal to resyllabification as a way of explaining palatalization. Thus, he concludes that we must consider higher prosodic units such as the foot for the environment for palatalization. In particular he claims that palatalization in English occurs when coronal obstruents are followed by /y/ and when they are not foot-initial, hence dispensing with resyllabification.

Recently, it has been assumed that prosodic categories play an important role in delimiting the application of a phonological rule (Nespor and Vogel, 1986; Inkelas, 1989). For instance, Nespor and Vogel claim that by restricting aspiration to foot-initial position as in (6), we can account for why it applies in the examples in (7a) whereas it does not in (7b) (1986: 91):

(6) Aspiration Rule

/t/ → [+asp] / [_____]Σ

(7) a. Application of Aspiration:

time	>	[t ^h]ime	[time]Σ
typhoon	>	[t ^h]yphoon	[ty]Σ [phoon]Σ
entire	>	en[t ^h]ire	[en]Σ [tire]Σ
longitude	>	longi[t ^h]ude	[longi]Σ [tude]Σ
sweet tooth	>	sweet [t ^h]ooth	[sweet]Σ [tooth]Σ

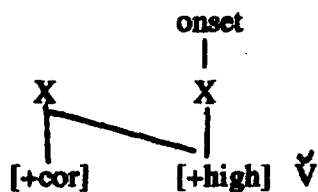
b. Non-application of Aspiration:

sting	>	*s[t ^h]ing	[sting]Σ
austere	>	*aus[t ^h]ere	[au]Σ [stere]Σ
after	>	*af[t ^h]er	[after]Σ
hospital	>	*hospi[t ^h]al	[hospital]Σ
night owl	>	*nigh[t ^h] owl	[night]Σ [owl]Σ

Thus, I assume that English palatalization is constrained by the prosodic unit, the foot, rather than by resyllabification (and heterosyllabicity).⁶

Now let us look at Borowsky's rule of palatalization in (3), which is repeated below for convenience (1986: 302, 311):

(8) Palatalization Rule



The rule in (8) states that the feature [+high] of a glide /y/ spreads to a preceding coronal before an unstressed vowel. The rule formalism has the following problems, however. First, there have been many arguments in English phonology for the theory of radical underspecification (Kiparsky, 1985; Stemberger, 1991). For instance, Kiparsky (1985) argues for radical

⁶ Kahn (1976) employs ambisyllabicity in order to account for the non-application of aspiration rule in examples such as *happy*.

underspecification based on the fact that unmarked coronals (underspecified for place features) are more susceptible to rules like place assimilation (e.g., *impossible* > *impossible*). Similarly, Stemberger (1991) also argues for radical underspecification based on language performance. According to him, consonants that are underspecified for a feature are prone to errors in which the feature becomes specified. For example, /t/ (underspecified for place feature) tends to be replaced by /p/ (specified as labial). These facts show that there is evidence for the theory of radical underspecification in English. The feature matrix for radically underspecified consonants in English can be represented, as in (9) (“%” designates the presence of articulator nodes) (Stemberger, 1991: 75):

(9) Underspecification of English Consonants

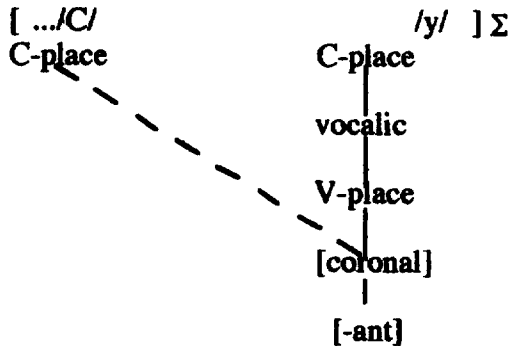
	p	t	k	b	d	g	f	v	θ	ð	s	z	ʃ	ʒ	m	n	ŋ	l	r	w	y			
cons																								
son																								
cont																					+	+	+	+
voice																								
nasal																								
labial	%		%			%	%								%		+	+	+			%		
coronal														%	%							%	%	
dorsal		%			%														%					
ant																								
dist																								

As can be seen in (9), the feature [+high] of the glide /y/ is redundant, and it cannot be specified until the default rule, which specifies the feature value for /y/, applies. This suggests that palatalization should be explained by the spreading of a feature other than [+high]. Second, the rule in (8) cannot capture the fact that palatalization affects only coronal consonants (Clements and Hume, 1994). That is, the front glide /y/ and coronal consonants form a natural class in the process of palatalization, but Borowsky's rule of palatalization cannot express this generalization.⁷) Thus, I propose that English palatalization involves the

7. As shown in Lee (1994), several phonological processes in Korean such as the interaction between palatalization and umlaut, vowel palatalization, and vowel harmony provide independent evidence for representing front vowels and glides as coronal.

spreading of the coronal node from /y/ to a preceding coronal consonant. But the rule is constrained by a particular prosodic unit, the foot, as Jensen (1992) notes. The rule of English palatalization is given in (10):⁸

(10) English Palatalization Rule

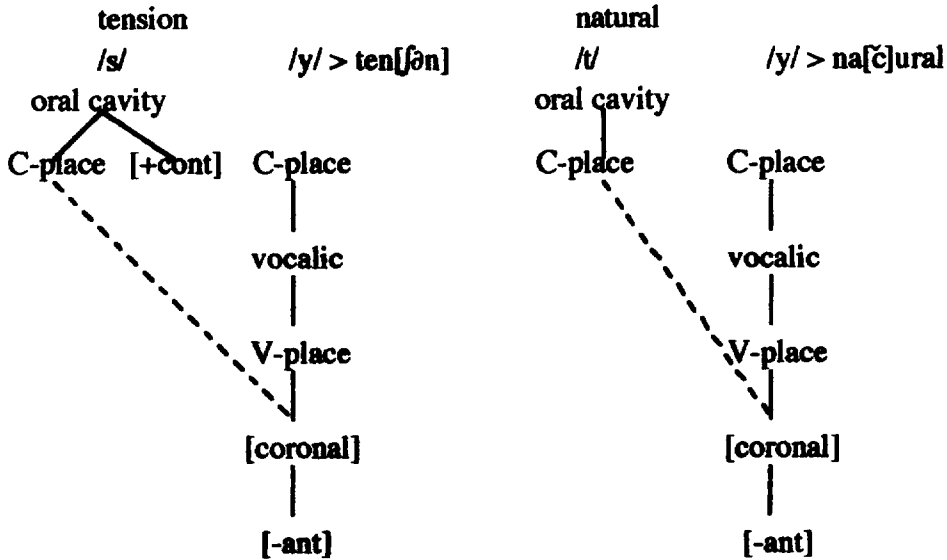


As can be seen in (10), palatalization spreads the coronal node of /y/ to a neighboring coronal consonant, which is unspecified for place (Kiparsky, 1985; Stemberger, 1991), in non foot-initial position. Here note that if we do not specify [-anterior] for the front glide /y/, the spreading of the coronal node for palatalization results in an alveolar segment but not a palatal segment. In other words, the alveolar segment /s/, for example, is [+anterior] coronal while /ʃ/ is [-anterior] coronal. Thus, in order to get the correct output [ʃ] by the application of palatalization, the specification of [-anterior] for the glide /y/ is required. Some sample derivations are given in (11):⁹

⁸ Palatalization in English is triggered by the front glide /y/ but not the front vowel /i/. Thus, we need to distinguish between /y/ and /i/ in underlying representation. This can be done by the weight bearing unit, the mora, because only vowels bear moras in underlying representation.

⁹ The /y/, which triggers palatalization, is deleted by a later rule of y-deletion after palatal obstruents, although not after sonorants: [ʃ] in *official*, *partial*, and *tension*; [ly] in *familiar*, and *rebellion*. But y-deletion rule should apply after y-vocalization, by which /y/ becomes [i] between stressed vowels in order to avoid stress clash (e.g., *artificial/ artificiality*; *social/ sociality*).

(11) Some Examples of Palatalization



Therefore, by representing a front glide with a coronal node, we can capture the fact that palatalization affects only coronal consonants. Moreover, by appealing to the prosodic category of the foot, we can delimit the domain of English palatalization in a more natural way than in the resyllabification (and heterosyllabicity) analysis offered by Borowsky (1986).

References

- Archangeli, D. and D. Pulleyblank. 1992. *Ground Phonology*. MIT Press.
- Borowsky, T. 1986. *Topics in the Lexical Phonology of English*. Ph.D. Dissertation, Univ. of Massachusetts-Amherst.
- _____. 1993. *On the Word Level*. *Studies in Lexical Phonology*. Academic Press.
- Clements, N. and E. Hume. 1994. *The Internal Organization of Speech Sounds*. In J. Goldsmith (eds.). *A Handbook in Phonological Theory*.
- Conklin, N. and M. Lourie. 1983. *A Host of Tongues*. New York: Free Press.

- Davis, S. 1990. An argument for radical underspecification in English. *Linguistic Inquiry* 21, 301-6
- Halle, M. and K.P. Mohanan. 1985. Segmental phonology of modern English. *Linguistic Inquiry* 16, 57-116.
- Hayes, B. 1982. Extrametricality and English stress. *Linguistic Inquiry* 13, 227-276.
- Inkelas, S. 1989. *Prosodic Constituency in Prosodic Phonology*. Ph.D. Dissertation, Stanford University.
- Jensen, J. 1992. Resyllabification vs Prosodic structure in English vowel shortening. *NELS*. 22
- Kahn, D. 1976. *Syllable-Based Generalizations in English Phonology*. Ph.D. Dissertation, MIT.
- Kiparsky, P. 1985. Some Consequences of Lexical Phonology. *Phonology Yearbook* 2, 85-138.
- Lee, S. 1994. *Theoretical Issues in Korean and English Phonology*. Ph.D. Dissertation, University of Wisconsin-Madison.
- Myers, S. 1987. Vowel shortening in English. *Natural Language and Linguistic Theory* 5, 485-518.
- Nespor, M. and I. Vogel. 1986. *Prosodic Phonology*. Foris. Dordrecht.
- Selkirk, E. 1982. The syllable. In Harry van der Hulst and Norval Smith (eds.). *The Structure of Phonological Representations (Part II)*. Foris. Dordrecht.
- Stemberger, J.P. 1991. Radical underspecification in language production. *Phonology* 8: 73-112.
- Yip, M. 1991. Coronals, consonant clusters and the coda condition. *The Special Status of Coronals*, 61-79. Academic Press.

**Department of English Language and Literature
Korea University**