

Coronal palatalization without dorsal palatalization

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I. Introduction

- (1) **Palatalization** is a term that has been used to refer to a number of phonological processes. Strictly speaking, *palatalization* refers to a consonant's acquisition of a secondary palatal articulation, such as /t/ → [tʲ]; however, in practice, other processes, such as coronalization, raising, and spirantization, are included in the term.
- (2) Bateman (2007) organizes the phonological processes described in (1) into two categories: **full palatalization** and **secondary palatalization**. The following definitions and examples are from Bateman (2007: 2–3).
 - a. *Full palatalization* is operationally defined as “[a]ny instance where a consonant changes its place feature to palatal-like, regardless of the nature of the trigger” (Bateman 2007: 5). This change is often accompanied by spirantization (e.g. /dɒnt ju/ → [dɒntʃju] ‘don’t you’ in some idiolects of English).
 - b. *Secondary palatalization* refers to the classical case of palatalization in (1) where a consonant receives a secondary palatal articulation (e.g. /yamati/ → [yamati] ‘a person’ in Watjarri).
- (3) Palatalization is typically **triggered** by a vowel or a vowel-like glide. In instances of full palatalization, the combination of a consonant such as /k/ or /t/ and a trigger such as /j/ creates an articulatory overshoot or undershoot, resulting in a palatal primary articulation. In instances of secondary palatalization, however, the primary place of articulation of the consonant is preserved, and the tongue body is raised to produce a secondary palatal articulation. (Bateman 2007: 6–8)

- (4) This project will focus on full palatalization in English. Specifically, we will examine Chen (1973)'s hierarchy of consonants that palatalize, and we will use English examples to both falsify and corroborate the universal. In section VI, we will discuss whether falsification or corroboration of the universal is more convincing. We will conclude with the implications of our decision for phonological theory, as well as with directions for future research.

II. The language universal

- (5) Chen (1973) makes two predictions regarding palatalization, one regarding the consonants that undergo palatalization, and another regarding which vowels trigger palatalization. Figures 1 and 2 accompany the rule in Figure 3 summarizing the proposed language universal for palatalization. m and n are language-specific values.

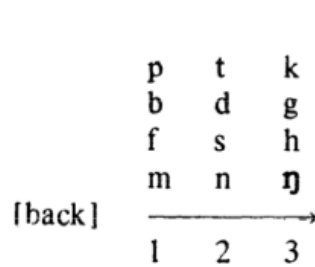


Fig. 1.

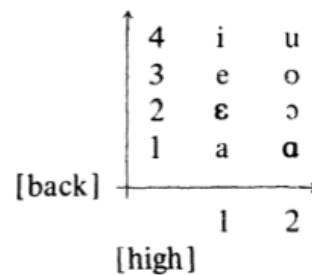
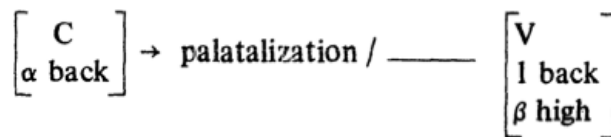


Fig. 2.



$$\text{lg-univ. constraint: } \begin{array}{l} \alpha \geq m \\ \beta \geq n \end{array}$$

Fig. 3.

- (6) The language universal, then, is the prediction that, for any given value of m or n , the values greater than or equal to that value must be allowed to either palatalize or trigger palatalization in the language. That is, if a language allows coronals (level 2) to palatalize, then any levels above it (i.e., level 3, dorsals) must also be allowed to palatalize. If a language allows low front vowels (level 1) to trigger palatalization, then mid vowels (levels 2 and 3) and high vowels (level 4) must also trigger palatalization.
- (7) Although it is not indicated in the diagram, /j/ is also noted as being an even stronger trigger for palatalization than /i/. Some languages, such as English, only palatalize before /j/ and do not palatalize before /i/.

- (8) In this project, we will not be exploring the vowel trigger hierarchy in Figure 2. We will focus only on the hierarchy of which consonants palatalize within a language given in Figure 1.

III. Language data

- (9) Bateman (2007) notes that the glide /j/ (but not any other vowels, such as /i/) triggers palatalization in coronals, and only coronals, in English. Velars do **not** palatalize, meaning that English appears to violate the language universal given by Chen (1973).
- (10) In this section, I provide examples of palatalization in English both within lexical items and across word breaks. Palatalization across word breaks typically only occurs in rapid speech.
- (11) /t + j/ = [tʃ] or [ʃ]

Palatalization required:

UR	Surface	Gloss
/pæstju:/	[pæstʃə]	'pasture'
/pɪktju:/	[pɪktʃə]	'picture'
/æmətju:/	[æmətʃə]	'amateur'
/kwɛstjən/	[kwɛstʃən]	'question'
/əb.ɪvɪeɪtʃən/	[əb.ɪvɪeɪʃən]	'abbreviation'
/pælətəlaɪzɪjən/	[pælətəlaɪzɪʃən]	'palatalization'

Roots ending in /t/ that are then suffixed with *-ion* /jən/ palatalize to [ʃən].

- (12) *Palatalization in rapid speech:*

UR	Surface	Gloss
/hɪt#ju/	[hɪtʃu]	'hit you'
/majt#ju/	[majtʃu]	'might you'
/lɛt#ju/	[lɛtʃu]	'let you'
/θɔt#ju/	[θɔtʃu]	'thought you'

Rare palatalization in some idiolects—most American English speakers do not have the glide after the initial /t/ and thus would not have the environment for palatalization:

UR	Surface	Gloss
/tjub/	[tʃub]	'tube'
/tjusdeɪ/	[tʃusdeɪ]	'Tuesday'
/tjun/	[tʃun]	'tune'
/tjumɪd/	[tʃumɪd]	'tumid'

No palatalization—palatalization does not occur before /i/ despite its phonetic similarity to /j/:

UR	Surface	Gloss
/ti/	[ti]	‘tea’
/fəlɪsɪti/	[fəlɪsɪti]	‘felicity’
/ti#ænd#bɪskɪts/	[tiændbɪskɪts]	‘tea and biscuits’

(13) /d + j/ = [dʒ]

Palatalization required:

UR	Surface	Gloss
/gɪændʒu/	[gɪændʒu]	‘grandeur’
/kɔɪdʒəl/	[kɔɪdʒəl]	‘cordial’
/gɪændʒʊl/	[gɪændʒʊl]	‘gradual’

Palatalization in rapid speech:

UR	Surface	Gloss
/dɪd#ju/	[dɪdʒu]	‘did you’
/haɪd#ju/	[haɪdʒu]	‘hide you’
/faɪnd#ju/	[faɪndʒu]	‘find you’
/lænd#ju/	[lændʒu]	‘lend you’

No palatalization—despite the phonetic similarity to /j/, /i/ in these words acts as a nucleus (i.e., /.di./) and not as a glide in a cluster (i.e., /.dj__./) and thus does not trigger palatalization:

UR	Surface	Gloss
/əkɔɪdiən/	[əkɔɪdiən]	‘accordion’
/kɑɪdiæk/	[kɑɪdiæk]	‘cardiac’
/gɑɪdiən/	[gɑɪdiən]	‘guardian’

(14) /s + j/ = [ʃ]

Palatalization required:

UR	Surface	Gloss
/sʒʊgə/	[ʃʊgə]	‘sugar’
/sensʒʊəl/	[sensʃʊəl]	‘sensual’
/dɪpɹɛsʒən/	[dɪpɹɛʃən]	‘depression’
/ɛkstɛnsʒən/	[ɛkstɛnʃən]	‘extension’
/tɛnsʒən/	[tɛnʃən]	‘tension’

Roots ending in /s/ that are then suffixed with *-ion* /jən/ palatalize to [ʃən].

Palatalization in rapid speech:

UR	Surface	Gloss
/ðɪs#jɪr/	[ðɪʃɪr]	'this year'
/mɪs#ju/	[mɪʃu]	'miss you'
/blɛs#ju/	[blɛʃu]	'bless you'

No palatalization—/i/ does not trigger palatalization:

UR	Surface	Gloss
/si/	[si]	'see'
/səsid/	[səsid]	'succeed'
/sil/	[sil]	'seal'
/silɪŋ/	[silɪŋ]	'ceiling'

(15) /z + j/ = [ʒ]

Palatalization required:

UR	Surface	Gloss
/sizju/	[sizʒə]	'seizure'
/æzju/	[æzʒə]	'azure'
/kənʃuzjən/	[kənʃuzʒən]	'confusion'
/ʃuzjən/	[ʃuzʒən]	'fusion'
/vɪzjən/	[vɪzʒən]	'vision'

Roots ending in /z/ that are then suffixed with *-ion* /jən/ palatalize to [ʒən].

Palatalization in rapid speech:

UR	Surface	Gloss
/bɛz#ju/	[bɛʒu]	'buzz you'
/plɪz#ju/	[plɪʒu]	'please you'
/kənʃuz#ju/	[kənʃuzʒu]	'confuse you'

Optional palatalization—the difference in palatalization between speakers may be due to whether they analyze *z*ier as /zjə/ or /zi.ə/:

UR	Surface	Gloss
/glejzjə/	[glejʒə]	or [glejziə] 'glazier'

No palatalization—/i/ does not trigger palatalization:

UR	Surface	Gloss
/zil/	[zil]	'zeal'
/zink/	[zink]	'zinc'

(16) /k + j/ = [kj]

No palatalization:

UR	Surface	Gloss
/kjuɪ/	[kjuɪ]	'cure'
/kju/	[kju]	'cue'
/likjuə/	[likjuə]	'liqueur'
/kɪk#ju/	[kɪkju]	'kick you'
/læk#junivə-sælɪti/	[lækjunivə-sælɪti]	'lack universality'
/leɪdbæk#juθ/	[leɪdbækjuθ]	'laid-back youth'

Crucially, there are no roots ending in /k/ that appear before *-ion*.

(17) /g + j/ = [gj]

No palatalization:

UR	Surface	Gloss
/langjuɪ/	[langjuɪ]	'longueur'
/gjozə/	[gjozə]	'gyoza'
/lag#junɪt/	[lagjunɪt]	'log unit'
/hʌg#ju/	[hʌgju]	'hug you'
/dʒɪʌg#jus/	[dʒɪʌgjus]	'drug use'
/mʌg#juzə/	[mʌgjuzə]	'mug user'

Note also that the following lexical items are *not* examples of palatalization before /i/, but rather of lexical /dʒ/ before an /i/ or /ɪ/:

UR	Surface	Gloss
/dʒɪst/	[dʒɪst]	'gist'
/bajələdʒɪ/	[bajələdʒɪ]	'biology'
/dʒɪm/	[dʒɪm]	'gym'

Although the following four words (which are the only ones in which *g* appears before *-ion*) appear to palatalize, I believe that they follow the same pattern as the previous three examples and are actually lexically roots ending in /dʒ/, not /g/, and are thus *not* palatalized, but rather retain their segment value before the suffix:

UR	Surface	Gloss
/kəntejdʒən/	[kəntejdʒən]	'contagion'
/ˌɹəlɪdʒən/	[ˌɹəlɪdʒən]	'religion'
/lɪdʒən/	[lɪdʒən]	'legion'
/ˌɹɪdʒən/	[ˌɹɪdʒən]	'region'

IV. Falsifying the universal

- (18) We will use an SPE-style analysis to account for this data. The following rule is modified from Chen (1973)'s palatalization rule in Figure 3; [α back] is the same notation used to indicate the class of sounds to a language-specific backness. For English, since coronals are allowed, $m = 2$; 2 back indicates coronals, and 3 back indicates dorsals.

$$\begin{bmatrix} + \text{ cons} \\ - \text{ son} \\ \alpha \text{ back} \\ \beta \text{ cont} \end{bmatrix} \rightarrow \begin{bmatrix} \beta \text{ cont} \\ - \text{ dist} \end{bmatrix} / \text{_____} (\#) \begin{bmatrix} - \text{ cons} \\ \text{DORSAL} \\ - \text{ labial} \end{bmatrix}$$

Rule 1.

- (19) Additionally, we need two more rules: one that specifically transforms /t/ into [ʃ] before the suffix /jən/, and one that deletes the trigger glide after palatalization has occurred. Those rules are rules 2 and 3, respectively.

$$\begin{bmatrix} + \text{ cons} \\ - \text{ son} \\ + \text{ dist} \\ \text{CORONAL} \\ - \text{ cont} \end{bmatrix} \rightarrow \begin{bmatrix} + \text{ cont} \\ - \text{ dist} \end{bmatrix} / \text{_____} \begin{bmatrix} - \text{ cons} \\ \text{DORSAL} \\ - \text{ labial} \end{bmatrix} \begin{bmatrix} - \text{ high} \\ - \text{ low} \\ - \text{ front} \\ - \text{ back} \\ - \text{ round} \end{bmatrix} \begin{bmatrix} + \text{ cons} \\ + \text{ son} \\ \text{CORONAL} \\ - \text{ cont} \end{bmatrix} \#$$

Rule 2.

$$\begin{bmatrix} - \text{ cons} \\ \text{DORSAL} \\ - \text{ labial} \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} + \text{ cons} \\ - \text{ son} \\ - \text{ dist} \\ \alpha \text{ back} \end{bmatrix} \text{_____}$$

Rule 3.

- (20) The rule ordering is as follows: Rule 2, Rule 1, Rule 3. Note that *question* is an exception and does not undergo Rule 2.
- (21) We can now apply the rules to a number of examples. According to our rules and rule ordering, coronals should undergo palatalization:

UR	/əb.iiviejtjən/	/kɑɪdjəl/	/hɪt#ju/	/sensjuəl/
Rule 2	əb.iiviejtjən	—	—	—
Rule 1	—	kɑɪdʒjəl	hɪtʃju	sɛnʃjuəl
Rule 3	əb.iiviejtjən	kɑɪdʒəl	hɪtʃu	sɛnʃuəl
Result	[əb.iiviejtjən] ✓	[kɑɪdʒəl] ✓	[hɪtʃu] ✓	[sɛnʃuəl] ✓

UR	/kənfjuzjən/
Rule 2	—
Rule 1	kənfjuzjən
Rule 3	kənfjuzən
Result	[kənfjuzən] ✓

- (22) However, according to the way we have written and defined our rules, dorsals should also undergo palatalization:

UR	/kju/	/kɪk#ju/	/langjuɪ/	/hʌg#ju/
Rule 2	—	—	—	—
Rule 1	tʃju	kɪtʃju	lʌndʒjuɪ	hʌdʒju
Rule 3	tʃu	kɪtʃu	lʌndʒuɪ	hʌdʒu
Result	[tʃu] ✗	[kɪtʃu] ✗	[lʌndʒuɪ] ✗	[hʌdʒu] ✗

- (23) We have seen very clearly in the language data that dorsals do *not* palatalize in English, either word-internally or across word boundaries. Since the application of our rules produces false results, our rules must be modified.
- (24) Furthermore, since the data shows that coronals can palatalize without dorsals palatalizing as well, the language universal must be rejected.
- (25) We can easily rewrite our rules to accommodate the change in the language description by changing the [α back] feature in Rule 1 and Rule 3 to a specific place feature. This means that, if coronals *and* dorsals were able to palatalize in a language, the rules would need to be expanded via brace notation to include both places of articulation. For English, however, we can simply rewrite the rules as follows:

$$\left[\begin{array}{c} + \text{ cons} \\ - \text{ son} \\ \text{CORONAL} \\ \beta \text{ cont} \end{array} \right] \rightarrow \left[\begin{array}{c} \beta \text{ cont} \\ - \text{ dist} \end{array} \right] / \text{_____} (\#) \left[\begin{array}{c} - \text{ cons} \\ \text{DORSAL} \\ - \text{ labial} \end{array} \right]$$

Rule 1'.

$$\left[\begin{array}{c} - \text{ cons} \\ \text{DORSAL} \\ - \text{ labial} \end{array} \right] \rightarrow \emptyset / \left[\begin{array}{c} + \text{ cons} \\ - \text{ son} \\ - \text{ dist} \\ \text{CORONAL} \end{array} \right] \text{ —————}$$

Rule 3'.

- (26) Our rule ordering remains the same: Rule 2, Rule 1', Rule 3'. As we can see, this modified rule produces the same outputs for coronals as the original:

UR	/əb.iiviejtjən/	/kɑɪdjəl/	/hɪt#ju/	/sensjuəl/
Rule 2	əb.iiviejʃjən	—	—	—
Rule 1'	—	kɑɪdʒjəl	hɪtʃju	senʃjuəl
Rule 3'	əb.iiviejʃən	kɑɪdʒjəl	hɪtʃu	senʃuəl
Result	[əb.iiviejʃən] ✓	[kɑɪdʒjəl] ✓	[hɪtʃu] ✓	[senʃuəl] ✓

UR	/kənfjuzjən/
Rule 2	—
Rule 1'	kənfjuzjən
Rule 3'	kənfjuzən
Result	[kənfjuzən] ✓

- (27) Furthermore, the modified rule prevents palatalization from occurring on dorsals, as the place feature does not match the one specified by the rule:

UR	/kju/	/kɪk#ju/	/langjuɪ/	/hʌg#ju/
Rule 2	—	—	—	—
Rule 1'	—	—	—	—
Rule 3'	—	—	—	—
Result	[kju] ✓	[kɪkju] ✓	[langjuɪ] ✓	[hʌgju] ✓

- (28) In this section, we have provided a falsification of the language universal. We have shown that, with rules written to reflect the universal, the process of deriving the final output produces palatalized outputs for dorsals that do not appear in the language data. We have thus rejected the language universal in favor of a set of unlinked rules for palatalization: that is, we have one rule for coronals palatalizing and another for dorsals palatalizing, and having one does not necessarily mean having the other.

V. Corroborating the universal

- (29) In this section, we will first discuss word-internal palatalization, then turn our attention to palatalization that occurs across word boundaries.
- (30) At first glance, it appears that there is a lot of data supporting word-internal palatalization within English. However, when we break down the data, we notice that one suffix is overly

represented in palatalized words: *-ion*. While there are hundreds of words ending in *-ion* that feature palatalized consonants preceding the suffix, lexical items featuring palatalization that do *not* end in *-ion* are few and far between. Only 10 words in this sample (*pasture*, *picture*, *amateur*, *grandeur*, *cordial*, *gradual*, *sugar*, *sensual*, *seizure*, and *azure*, and possibly *glazier* depending on the individual) feature palatalization without the *-ion* suffix, compared to hundreds of words that palatalize with *-ion*.

- (31) It is possible, then, that those 10 words are exceptions that for whatever historical or idiosyncratic reason have undergone palatalization, and that word-internal palatalization now is *only* productive lexically with *-ion*: *-ion* is then a special morpheme that requires palatalization when it is attached to another morpheme. It is possible that there are other suffixes, such as *-ual* in *gradual* and *sensual*, that also trigger palatalization; however, those suffixes are no longer productive.
- (32) Note that dorsals /k/ and /g/ *never* occur before *-ion* (cf. (15) and (16)), and so we do not know whether *-ion* would trigger palatalization for dorsals or not.
- (33) In this secondary analysis, then, we can change the underlying representations for the ten/eleven exceptions to reflect a palatal derived from some historical or idiosyncratic process that is stored lexically with the word, rather than a palatal that is derived by some kind of rule:

Original UR	Updated UR	Gloss
/pæstjuɪ/	/pæstʃə/	'pasture'
/pɪktjuɪ/	/pɪktʃə/	'picture'
/æmətjuɪ/	/æmətʃə/	'amateur'
/gɹændjuɪ/	/gɹændʒə/	'grandeur'
/kɔɪdjəl/	/kɔɪdʒəl/	'cordial'
/gɹædjul/	/gɹædʒul/	'gradual'
/sjuɡə/	/ʃuɡə/	'sugar'
/sensjuəl/	/senʃuəl/	'sensual'
/sizjuɪ/	/sizə/	'seizure'
/æzjuɪ/	/æzə/	'azure'
/gleɪzjə/	/gleɪzə/ or /gleɪziə/	'glazier'

- (34) The rest of our data can then be accounted by a single rule that captures the morphophonological process that roots undergo when they are attached to *-ion*. This morphophonological process is reflected in Rule 4 below.

$$\begin{bmatrix} + \text{ cons} \\ - \text{ son} \\ - \text{ cont} \end{bmatrix} \rightarrow \begin{bmatrix} + \text{ cont} \\ - \text{ dist} \end{bmatrix} / \text{_____} + \begin{bmatrix} - \text{ cons} \\ \text{DORSAL} \\ - \text{ labial} \end{bmatrix} \begin{bmatrix} - \text{ high} \\ - \text{ low} \\ - \text{ front} \\ - \text{ back} \\ - \text{ round} \end{bmatrix} \begin{bmatrix} + \text{ cons} \\ + \text{ son} \\ \text{CORONAL} \\ - \text{ cont} \end{bmatrix} \#$$

Rule 4.

We can carry over Rule 3 from the previous section, as we still need to delete the trigger glide after palatalization has occurred.

- (35) The order of the rules for this section is Rule 4, followed by Rule 3. As our ten/eleven exceptions now have palatals in their underlying representations, they will pass through the rules unchanged and have the right output:

UR	/ʃʊgə/	/pɪktʃə/	/sɛnʃuəl/	/æzə/	/gɪædʒʊl/
Rule 4	—	—	—	—	—
Rule 3	—	—	—	—	—
Output	[ʃʊgə] ✓	[pɪktʃə] ✓	[sɛnʃuəl] ✓	[æzə] ✓	[gɪædʒʊl] ✓

- (36) Now, we must modify the URs of our *-ion* words as well to reflect the morphological process. Once we have added the breaks in and apply Rule 4 and Rule 3, we see that palatalization occurs as usual:

UR	/əbɪvɪejt+jən/	/dɪpɪɛs+jən/	/kənfjuz+jən/
Rule 4	əbɪvɪejʃjən	dɪpɪɛʃjən	kənfjuzjən
Rule 3	əbɪvɪejʃən	dɪpɪɛʃən	kənfjuzən
Output	[əbɪvɪejʃən] ✓	[dɪpɪɛʃən] ✓	[kənfjuzən] ✓

- (37) Our rules have been written such that, if /k/ or /g/ were to appear before *-ion*, we would expect them to turn into [ʃ] and [ʒ] respectively. Since dorsals do not appear before *-ion*, we have a gap in our data that looks as if dorsals do not palatalize; however, they may in fact palatalize if they were able to appear in this context.
- (38) Next, we turn to the question of palatalization across word boundaries. As we have seen, coronal palatalization across word boundaries is highly productive in English; however, dorsal palatalization across word boundaries does not occur. There are two explanations that can account for this discrepancy.
- (39) The first possible explanation for the coronal-dorsal discrepancy is that there, in fact, is not a coronal-dorsal discrepancy: the two segments /t/ and /k/ are actually both palatalizing, but in different ways. According to Bateman (2007), /k/ is fronted before a /j/ or an /i/, and backed before back vowels. The phonetic line between fronting a /k/ and palatalizing it to

a /c/, however, is blurry: although English does not fully palatalize /k/ to /tʃ/, it may be fronting /k/ to the point of fully palatalizing it to /c/. /k#j/ may, then, actually be produced as [c#j] due to the fronting. Thus, although we do not see an affricate between words, we might still be seeing a palatal. We can write this difference into two palatalization rules, Rule 5 and Rule 6:

$$\left[\begin{array}{c} + \text{ cons} \\ - \text{ son} \\ \text{CORONAL} \\ \beta \text{ cont} \end{array} \right] \rightarrow \left[\begin{array}{c} \beta \text{ cont} \\ - \text{ dist} \end{array} \right] / \text{---} \# \left[\begin{array}{c} - \text{ cons} \\ \text{DORSAL} \\ - \text{ labial} \end{array} \right]$$

Rule 5.

$$\left[\begin{array}{c} + \text{ cons} \\ - \text{ son} \\ \text{DORSAL} \\ - \text{ cont} \end{array} \right] \rightarrow \left[\begin{array}{c} \text{CORONAL} \\ + \text{ dist} \end{array} \right] / \text{---} \# \left[\begin{array}{c} - \text{ cons} \\ \text{DORSAL} \\ - \text{ labial} \end{array} \right]$$

Rule 6.

The rule order is then Rule 4, Rule 5 & Rule 6. This ordering produces the full palatalizing process across word boundaries:

UR	/hit#ju/	/kik#ju/
Rule 4	—	—
Rule 5	hitʃju	kicju
Rule 6	—	—
Output	[hitʃju]	[kicju]

Note here that the glide is preserved in this interpretation of palatalization across word boundaries—after a palatalized coronal, glide retention may be optional for some speakers, and it tends to be mandatory after dorsals.

- (40) The second possible explanation for the coronal-dorsal discrepancy is also a phonetic one: Zsiga (1994) investigated the phonetics of /s#j/ and /sj/ sequences and found that, word-internally, palatalization is categorical; however, across word boundaries, palatalization is gradient. This result suggests that there are in fact two disparate processes occurring: that is, word-internal palatalization may be an entirely different process than palatalization occurring across word boundaries. Zsiga (1994) argues that palatalization across word boundaries occurs as a result of overlapping gestures. Note that /j/ and /k/ are both dorsal, and thus production of /k#j/ does not require much movement of the tongue; however, /t/ is coronal and /j/ is dorsal, meaning that co-production of /t/ and /j/ may be more likely to result in an overshoot of /t/, and thus, palatalization of /t/. So, the palatalization of coronals and not dorsals across word boundaries may not be a phonological process at all like word-internal palatalization, but rather a gradient phonetic one that may vary in degree

from speaker to speaker.

- (41) In this section, we have supported the language universal by arguing that palatalizing words are either (1) exceptions, or (2) the result of a palatalizing suffix *-ion*. Since dorsals do not appear before *-ion*, we have no way of knowing whether or not they palatalize; thus, there is a gap in our data that falsely suggests that dorsals do not palatalize. We explained the discrepancy in palatalization across word boundaries by (1) arguing that /k/ is, in fact, palatalizing, just not affricating, and/or (2) arguing that the two processes are entirely different, and that palatalization across word boundaries does not resemble palatalization word-internally.

VI. Discussion

- (42) Both arguments have their merits. However, in this section, we will evaluate both arguments and decide which one is more convincing. We will rely on two criteria to evaluate the arguments: (1) descriptive adequacy, and (2) simplicity.
- (43) *Descriptive adequacy*: The first analysis accounts for all the data provided. The second analysis accounts for most of the data provided; however, it tends to be weak on its analysis of palatalization across word boundaries. Although there is some description of the process, the description is not as thorough as in the first analysis. The first analysis thus wins with regards to this aspect of descriptive adequacy.
- (44) *Descriptive adequacy*: There does appear to be something special about the suffix *-ion* and its relationship to palatalization. That relationship is not captured particularly well in the first analysis, where the suffix is treated as an exception rather than a rule, and is captured much better in the second analysis. The second analysis thus wins with regards to this aspect of descriptive adequacy.
- (45) *Simplicity*: The first analysis ends with three rules describing all of the data, while the second analysis ends with four rules describing all the data, with the rules for palatalization across word boundaries being somewhat weaker than the ones in the first analysis. The first analysis, with fewer rules capturing more data, wins with regards to this aspect of simplicity.
- (46) *Simplicity*: The first analysis is much less long-winded with regards to palatalization across word boundaries than the second analysis. It seems much simpler to conclude that dorsals do not palatalize than to conclude that they either palatalize to a sound that English does not have or that they undergo a completely different process than regular palatalization—that is, it seems extraneous to posit that there are actually two palatalization processes; the first analysis unifies both forms of palatalization, providing a simpler analysis than the second analysis. The first analysis thus wins with regards to this aspect of simplicity.
- (47) Overall, when we evaluate both arguments according to these diagnostics, it appears that although the first argument falsifying the universal may not capture the uniqueness of the suffix *-ion*, it still captures the data better with fewer rules that describe and unify both

word-internal palatalization and palatalization across word boundaries. The first analysis thus seems more sound overall and provides a better description of palatalization in English.

VII. Conclusion

- (48) Ultimately, we have evaluated both theories and determined that the first one falsifying the universal is both simpler and more descriptively adequate for the data than the second explanation corroborating the universal.
- (49) In preferring the first analysis, we are falsifying the universal and stating that the hierarchy of palatalizing consonants is inaccurate at best. We remove the link between coronals and dorsals, suggesting that they may palatalize independently of each other.
- (50) Cross-linguistic data supports this de-linking. Bateman (2007) notes that coronals palatalizing is actually the more common pattern for palatalization across the board; if coronals and dorsals were linked, we would expect to see more instances of dorsals palatalizing than coronals.
- (51) However, we have not necessarily refuted the entire universal. Chen (1973) also includes labials, which are said to palatalize only if coronals and dorsals also palatalize. Bateman (2007)'s survey does not have examples of languages that palatalize labials on their own without palatalizing dorsals and/or coronals, suggesting that there is still some kind of hierarchy or linkage that exists until proven otherwise.
- (52) Further research can be done to investigate both the analysis falsifying the universal and the analysis corroborating the universal. We can investigate whether there are languages that palatalize labials without palatalizing coronals or dorsals, which would suggest a complete de-linking of Chen (1973)'s hierarchy.
- (53) Additionally, we can perform experiments with dorsals and the suffix *-ion*: we can ask native speakers to pronounce made-up words where a dorsal occurs before the suffix *-ion* and see if they palatalize the dorsals or not. Palatalization of the dorsals would provide evidence for the analysis corroborating the universal and would suggest that English does, in fact, palatalize velars. We can also perform acoustic analyses to see if fronted dorsals are actually palatals, again providing evidence for the second theory corroborating the universal.
- (54) In this project, we have provided two separate analyses of palatalization in English. We have weighed the pros and cons of both analyses and decided to reject the language universal that, if coronals palatalize, then dorsals must also palatalize. However, we have not dismantled the hierarchy entirely, and further research can be done to provide more evidence for either theory.

VIII. Bibliography

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