Word-initial Yod Coalescence in British English:

Why does *tune* coalesce, but *sue* does not?[1]

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Abstract. In British English, word-initial plosives as in *tune* and *deuce* coalesce with the following yod, whereas word-initial fricatives as in *sue* and *Zeus* do not, with a small number of exceptions such as *sugar* and *sure* attested. This paper discusses, based on the microanalysis of palatalization and on intrasyllabic structure, why plosives are susceptible to the process and why the exceptions underwent coalescence.

1. Introduction

Yod Coalescence is a process in which the alveolar obstruents in English, [t, d, s, z], coalesce with the following [j], producing palato-alveolar obstruents [tʃ, dʒ, ʃ, ʒ], respectively. Typical examples are exhibited in (1), where the phenomenon occurs in word-medial, post-tonic position. The phonetic forms here and hereafter are cited from Wells (2008), with the transcriptions altered.[2]

(1) Word-medial Yod Coalescence

		Uncoalesced →	Coalesced
a.	statue	[ˈstatjuː]	[ˈstatʃuː]
b.	educate	[ˈɛdjukeɪt]	[ˈɛdʒukeɪt]
c.	issue	[ˈɪsjuː]	[ˈɪʃuː]
d.	visual	[ˈvɪzjuəl]	[ˈvɪʒuəl]

Regarding this type of word, Borowsky (1986: 299−315) states that Yod Coalescence takes place when the obstruent and yod are heterosyllabic, which means that the obstruent is in the syllable coda. Jensen (1993: 177−9) argues against her claim and maintains that "[p]alatalization affects coronal obstruents which are followed by *y* and which are *not foot*

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2) For Yod Coalescence and Yod Dropping, see Wells (1982: 20−68, 247−8).

initial," stating that her claim would syllabify the word *tincture* as *tinct.ure*, which is "highly counterintuitive."

In relatively recent British English, however, Yod Coalescence is also attested in word-initial position, though the plosives and fricatives behave differently. [t, d] coalesce as word-medially (2a, b), whereas [s, z] do not (2c, d).

(2) Word-initial Yod Coalescence

		Uncoalesced →	Coalesced
a.	tune	[ˈtjuːn]	[ˈtʃuːn]
b.	deuce	[ˈdjuːs]	[ˈdʒuːs]
c.	sue	[ˈsjuː]	*[ˈʃuː]
d.	Zeus[3]	[ˈzjuːs]	*[ˈʒuːs]

Moreover, there are a small number of words in which [s] and [j] have coalesced in word-initial position; Wells (2008) records only coalesced forms for the words in (3a) and uncoalesced forms besides coalesced forms for those in (3b).

(3) Exceptional word-initial fricative Yod Coalescence

a. assure, insure, sugar, sure

b. ensure, sumac/sumach

For the types of coalescence as in (2a, b) and (3), it is clear that neither Borowsky's nor Jensen's analysis accounts for the process. This paper discusses why word-initial plosives, but not fricatives, undergo coalescence and what happened to the exceptional fricative coalescence cases.

2. Discussion

2.1 What motivates Yod Coalescence?

It is obvious that Yod Coalescence is a palatalizing process of alveolar obstruents triggered by the following [j]. As we saw in the introduction, Borowsky (1986) and Jensen (1993) regard the phenomenon as occurring in heterosyllabic and non-foot-initial environments, respectively. Neither Borowsky nor Jensen mentions why those contexts trigger coalescence, but it is reasonable to attribute it to the susceptibility of consonants, especially coronals, in non-foot-initial position. It is well known that consonants in

3) Disyllabic [ˈziːəs] is also found, which is irrelevant to Yod Coalescence.

non-foot-initial position are less robust than those in foot-initial position and subject to various weakening processes including debuccalization, i.e., place loss, which may be followed by place assimilation. The following examples are taken from Wells (2008: 51−2).

(4) Examples of place assimilation of non-foot-initial alveolars (Wells 2008: 51−2)

te<u>n</u> men; down<u>n</u>beat	/n/ → [m]
fi<u>n</u>e grade; incredible	/n/ → [ŋ]
re<u>d</u> paint, a<u>d</u>mit	/d/ → [b]
ba<u>d</u> guys	/d/ → [g]
eigh<u>t</u> boys	/t/ → [ʔ ~ p]
thi<u>s</u> shape; thi<u>s</u> unit; unle<u>ss</u> you...	/s/ → [ʃ]
the<u>s</u>e shoes; a<u>s</u> you see	/z/ → [ʒ]

The susceptibility of non-foot-initial consonants explains word-medial coalescence cases in (1) adequately; but, obviously, it does not account for word-initial plosive coalescence in (2a, b), where the target obstruents are clearly in foot-initial position.

2.2 How does Yod Coalescence proceed?

Why are plosives more susceptible to coalescence than fricatives? To answer this question, let us consider how the process proceeds in different situations. We will find that, while plosives are readily palatalized wherever they are, fricatives behave differently depending on the environment.

When Yod Coalescence occurs, [tj, dj] turn into affricates [tʃ, dʒ], while [sj, zj] coalesce into single fricatives [ʃ, ʒ]. As schematized in (5) below, affricates are contour segments as diphthongs are, containing two articulatory gestures in succession: plosive coalescence involves no change in the number of articulatory gestures, whereas fricative coalescence causes a change from two to one. One possibility is that a process with a change in the number of articulatory gestures is less likely to occur than a process without such a change, but it should be noted that word-medial fricative Yod Coalescence involves such a change as indicated in (1c, d) above.

(5) Word-initial Yod Coalescence

a. Plosives

Uncoalesced → Coalesced

GG	GG
[tj]	[tʃ]
[dj]	[dʒ]

b. Fricatives

Uncoalesced → *Coalesced

GG	*G
[sj]	*[ʃ]
[zj]	*[ʒ]

However, it appears that word-medial fricative Yod Coalescence is more complicated than as assumed in (5b). In addition to uncoalesced and coalesced forms, Wells (2008) records intermediate stages in some fricative cases, though he records no such forms for plosive cases.

(6) Intermediate stages in word-medial Yod Coalescence

		Uncoalesced	→	Intermediate	→	Coalesced
a.	statue	[ˈstatjuː]		*[ˈstatʃjuː]		[ˈstatʃuː]
b.	educate	[ˈɛdjukeɪt]		*[ˈɛdʒjukeɪt]		[ˈɛdʒukeɪt]
c.	issue	[ˈɪsjuː]		[ˈɪʃjuː]		[ˈɪʃuː]
d.	casual	[ˈkazjuəl]		[ˈkaʒjuəl]		[ˈkaʒuəl]

It is considered that intermediate stages are produced only if the number of articulatory gestures is unchanged. The fact that they are attested in the case of fricatives serves as another piece of evidence that fricatives are more resistant to coalescence than plosives, indicating that a decrease in the number of articulatory gestures is somewhat costly.

(7) Word-medial Yod Coalescence

a. Plosives

Uncoalesced → *Intermediate → Coalesced

GG	*GGG	GG
[tj]	*[tʃj]	[tʃ]
[dj]	*[dʒj]	[dʒ]

b. Fricatives

Uncoalesced → Intermediate → Coalesced

GG	GG	G
[sj]	[ʃj]	[ʃ]
[zj]	[ʒj]	[ʒ]

A similar kind of asymmetry between plosives and fricatives is also observed in phrase-level coalescence, judging from Gimson's following statement.

(8) Gimson (1962: 272)

"The coalescence is more complete in the case of /t, d/ + /j/ (especially in question tags, e.g., *didn't you?*, *couldn't you?*, etc.); in the case of /s, z/ + /j/, the coalescence into /ʃ, ʒ/ may be marked by extra length of friction, e.g. *Don't miss your train* /ˈdəʊmp ˈmɪʃʃɔː ˌtreɪn/, cf. *I can't be sure* /aɪ ˈkɑːmp bɪ ˌʃɔː/."

As schematized in (9) below, both plosives and fricatives are affected by the following [j] just as in word-medial cases exemplified in (1), but, whereas plosives and yod completely coalesce into affricates, fricatives exhibit incompleteness. Fricatives seem to be more resistant to palatalization than plosives also in word-final position.

(9) Phrase-level Yod Coalescence

a. Plosives

Uncoalesced → Coalesced

GG	GG
[tj]	[tʃ]
[dj]	[dʒ]

b. Fricatives

Uncoalesced → Coalesced

GG	GG
[sj]	[ʃʃ]
[zj]	[ʒʒ]

The observations of word-medial and phrase-level coalescence, shown in (7) and (9), respectively, allow us to assume that plosive and fricative Yod Coalescence proceed in the following ways. Yod Coalescence of fricatives requires more steps than that of plosives.

(10) Yod Coalescence

a. Plosives

Uncoalesced → Coalesced

GG	GG
[tj]	[tʃ]
[dj]	[dʒ]

b. Fricatives

Uncoalesced → Intermediate 1 → Intermediate 2 → Coalesced

GG	GG	GG	G
[sj]	[ʃj]	[ʃʃ]	[ʃ]
[zj]	[ʒj]	[ʒʒ]	[ʒ]

2.3 Plosives and fricatives compared

To explore the difference in behavior toward Yod Coalescence between plosives and fricatives, i.e., the difference of their inclinations toward palatalization, it is reasonable to scrutinize the above segment-based analysis in terms of distinctive features. In what follows, a dashed arrow indicates the direction of the spreading of the feature, a strikeout indicates that the feature is overridden in the next stage, and italics indicate that the feature has appeared in the stage by spreading. Fricative coalescence is analyzed as in (11).

(11) Fricative Yod Coalescence

Stage 1		→	Stage 2		→	Stage 3		→	Stage 4
G	G		G	G		G	G		G
[+cont]	[+cont]		[+cont]	[+cont]		[+cont]	[+cont]		[+cont]
[−son]	[+son]		[−son] ⇢	~~[+son]~~		[−son]	*[−son]*		[−son]
[COR]			[COR] ⇢			[COR]	*[COR]*		[COR]
⇠	[DOR]		*[DOR]*	[DOR]		[DOR]	[DOR]		[DOR]
[s]	[j]		[ʃ]	[j]		[ʃ]	[ʃ]		[ʃ]
[z]	[j]		[ʒ]	[j]		[ʒ]	[ʒ]		[ʒ]

The process basically consists of a place assimilation[4] followed by a degemination. Word-initially, the alveolar fricative, [s] or [z], is in foot-initial position, hence not palatalized by the following yod. Word-medially or word-finally, it is in non-foot-initial

4) Yod is assumed here to have only dorsality as its major place feature. Hammond (1999: 5) regards it as having coronality in addition to dorsality. However, this difference does not affect our argument.

position and assimilated to a palatoalveolar (stage 2). In the resultant [ʃj] or [ʒj], the obstruency of the fricative spreads progressively and replaces the sonorancy of the glide, creating a geminate fricative, [ʃʃ] or [ʒʒ] (stage 3). Geminates are only allowed across a word boundary, or a word-level morpheme boundary as in *mean<u>n</u>ess* or *who<u>l</u>ly*, thus observed in phrase-level coalescence. However, they are prohibited within a morpheme, resulting in degemination within a word (stage 4).

We assumed that plosive coalescence had just two stages, uncoalesced and coalesced, as shown in (10a). However, what has been clarified about fricative coalescence enables us to consider that plosive coalescence has an intermediate stage as shown in the following.(12)

Plosive Yod Coalescence

Stage 1		→	Stage 2		→	Stage 3	
G	G		G	G		G	G
[−cont]	[+cont]		[−cont]	[+cont]		[−cont]	[+cont]
[−son]	[+son]		[−son] ⇢	~~[+son]~~		[−son]	*[−son]*
[COR]			[COR] ⇢			[COR]	*[COR]*
⇠	[DOR]		*[DOR]*	[DOR]		[DOR]	[DOR]
[t]	[j]		[t̲]	[j]		[t̲]	[ʃ]
[d]	[j]		[d̲]	[j]		[d̲]	[ʒ]

In contrast to fricatives, for which alveolars and palatoalveolars are phonemically contrastive, alveolar plosives and palatoalveolar plosives do not form a phonemic contrast. Therefore, the retraction of alveolar plosives is likely to be unnoticed and considered more apt to occur than that of alveolar fricatives, which leads to coalescence.[5] Furthermore, plosives appear to have a stronger tendency than fricatives to replace the sonorancy of the following approximant with their obstruency, which may be evidenced by Gimson's treatment of /tr, dr/ as affricates (1962: 171−2).

Cruttenden (2014: 178) and Lindsey (2019: 56) mention the tendency for the alveolar plosives to be affricated in British English as follows, which may further facilitate the spread of obstruency.

(13) Cruttenden (2014, 178)

5) This retraction of alveolar plosives seems to go further. See Lindsey (2019: 61−2).

". . . it should be noted that /t, d/ are especially liable to affrication and even replacement by the equivalent fricative in weakly accented situations, e.g. *time* [tˢaɪm], *important* [ɪmˋpɔːtˢənt] or even [ɪmˋpɔːsənt]."

(14) Lindsey (2019, 56)

"The alveolar plosive /t/ differs somewhat from /p/ and /k/, in that it's generally released into a period of /s/-like friction. This is called 'affrication', and can be transcribed as [tˢ]. Affrication is also common with /d/, producing [dᶻ]. Affrication was less noticeable in RP, but in contemporary speech it's common in both stressed and unstressed syllables; it can be heard both in words like *tea* and and in words like *city*."

2.4 Exceptional word-initial fricative Yod Coalescence: *Sugar* and *sure*

We saw in (2) that word-initial [s, z] are not palatalized, with *sue* and *Zeus* as examples, but we also pointed out that there are sporadic exceptions such as *sugar* and *sure* as given in (3). Why did those words undergo coalescence?[6]

It is widely accepted that the English syllable has three slots in the onset. Below is Roach's syllable template for British English (1983: 61), where the pre-initial consonant is [s] and the post-initial consonant is one of [l, ɹ, w, j] (p. 59).

(15) Roach's syllable template (1983: 61)

pre-initial	initial	post-initial	VOWEL	pre-final	final	post-final 1	post-final 2	post-final 3
ONSET				TERMINATION				

However, the above model allows some ambiguity. Roach states the following.

(16) Roach (1983: 60)

"Two-consonant clusters of **s** plus **l**, **w**, **j** are also possible (e.g. **slip**, **swɪŋ**, **sju**:), and even perhaps **sr** in 'syringe' **srɪndʒ** for some speakers. These clusters can be analysed *either* as pre-initial **s** plus plus initial **l**, **w**, **j**, **r** *or* as initial **s** plus post-initial **l**, **w**, **j**, **r**. There is no clear answer to the question of which analysis is better. . . ."

This ambiguity is illustrated by [sj] below, which is of relevance to our discussion.

6) According to Nakao (1985), [sj] in word-initial position was palatalized to [ʃ] and then reverted because of orthography except for *sugar* and *sure*.

(17) Two possibilities of [sj] in the onset

	pre-initial	initial	post-initial
	ONSET		
a.		s	j
b.	s	j	

We saw above that Yod Coalescence is the palatalizing process of alveolar obstruents in non-foot-initial position, where alveolars are more susceptible to place assimilation than in foot-initial, thus onset, position. However, the "onset" intended here is regarded as Roach's initial slot, in which alveolar obstruents are normally placed (17a). It is considered that [s], when moved into the pre-initial slot, becomes more susceptible to palatalization, resulting in the structure where [ʃj] is accommodated in the pre-initial and initial slots. However, because [ʃ] is disallowed in the pre-initial slot, it moves into the initial slot and absorbs the [j], possibly through the third stage indicated in (11) above, leading to Yod Dropping.

Cruttenden (2014: 202) mentions the place assimilation of [s] to [ʃ] before [tɹ, t, k] as follows, where the target [s] is located in the pre-initial position as we assume for exceptional word-initial fricative Yod Coalescence.

(18) Cruttenden (2014: 202)

"Alternative pronunciations for words beginning /str-/ are commonly heard with /ʃtr-/, in, for example, *strawberries, string, strap*. This is evidently the influence of the /r/ which retracts both /t/ and /s/. Similar alternative pronunciations are increasingly, though not as commonly, heard where initial /st, sk/ become /ʃt, ʃk/, e.g. in *stink, score* (/sp/ seems not to be affected)."

The reason for the shift from [s] to [ʃ] before [tɹ] is evident as mentioned in the above quotation.[7] By comparison, the cause of the shift before [k] as in *score* is not so clear, but it would not be absurd to think that the dorsality of the velar spreads to the preceding alveolar fricative. The change before [t] as in *stink* is much more mysterious, but it might be ascribed to the spread of the dorsality of the following vowel.

The structural ambiguity about [s] and approximant sequences is also evidenced in child language. Cruttenden (2014: 267) states the following.

7) See also Wells (2014: 38) and Lindsey (2019: 61−2).

(19) Cruttenden (2014: 267)

"Children often have special problems with the acquisition of consonant clusters in syllable-initial positions, even after they have acquired the individual members of the clusters. With two-term clusters consisting of fricative + C (most commonly /s/) and C + /l, r, w, j/, there is often a reduction to the single C, e.g. *smoke* → [məʊk], *spin* → [pɪn], *please* → [pi:], *queen* → [ki:n]. Clusters of /s/ + /l, r, w, j/ may be reduced to either element, e.g. *slow* → [səʊ] or [ləʊ]."

It seems that, in child language cluster simplification, consonants in the initial position is intact and those in the pre- or post-final position are susceptible to deletion: /s/ in *smoke* and *spin* is unambiguously in the pre-initial position because [m, p] are only allowed in the initial position, whereas that in *slow* is allowed both in the pre-initial and initial slots.

(20) Onset cluster simplification in child language

	pre-initial	initial	post-initial		
	ONSET				
a.	~~s~~	m		/sm/*oke*	[m]
b.		p	~~ɬ~~	/pl/*ease*	[p]
c.	~~s~~	l		/sl/*ow*	[l]
		s	~~ɬ~~	/sl/*ow*	[s]

3. Conclusion

In this paper, we argued that Yod Coalescence of plosives is more likely to occur than that of fricatives because plosives require fewer steps for the process to be completed, are more apt to be retracted, and have a stronger tendency to spread their obstruency to the following approximant than fricatives. We also argued that Yod Coalescence of fricatives only occurs when the target fricative is accommodated in phonologically weak positions, which include the pre-initial slot, where [s] is considered to be located in exceptional word-initial cases.

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