Is [nuz] really the new [njuz]? Yod dropping in Toronto English[1]

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Abstract: Previous work on yod dropping has shown that the merger of /ju/ and /u/ after the coronals /t, d, n/ is nearly complete in most North American varieties of English, including Canadian English (Chambers 1998). However, most of this work has drawn on self-reported data rather than actual speech (Scargill 1974; Chambers 1998), and few studies have taken word frequency into consideration, although it has been shown to play a major role during earlier stages of the merger, where low frequency words were leading the change towards the yod-less pronunciation (Phillips 1981, 1994). This study fills this gap in the research literature by investigating production data from a stratified sample of 20 speakers from the Greater Toronto Area. Participants were asked to read a word list including 42 test words controlled for historical yod presence (categorical yod vs. variable yod vs. no yod), place of articulation, and frequency. Results indicate that the change towards the yod-less pronunciation is mostly complete, but remnants of the previously attested frequency effect are still visible, with highly frequent variable yod words having much higher F2 values (in Hz) at 20% of vowel duration than low frequency variable yod words and no yod words with preceding /t, d, n/. This supports the idea that lexically gradual sound changes can also be phonetically gradual (Phillips 1994, 2006), and is in line with Pierrehumbert's (2016) hybrid model of phonological representation, which assumes that there is both an abstract level of representation and a level where words are stored with detailed phonetic and contextual information.

Key words: yod dropping, /u/-fronting, Toronto English, word frequency

1 INTRODUCTION

Previous work on yod dropping, i.e., the merger of /ju/ and /u/ after the coronals /t, d, n/, as in (1a–c), has shown that this change is nearly complete in in most North American varieties of English, including Canadian English (Chambers 1998).

(1) (a) tube: [tjub] ~ [tub]
(b) due: [dju] ~ [du]
(c) new: [nju] ~ [nu]

For a long time, scholars believed that speakers of Canadian English, similar to speakers of standard British English, retained the yod as a sign of "a distinct Anglo-Canadian linguistic identity" (Clarke 2006: 226). However, recent work suggests that yod dropping is fairly common, and has been for some time (Scargill 1974, Owens & Baker 1984, Nylvek 1992, Clarke 1993, Chambers 1998, Boberg 2004, Dollinger 2012, Roeder et al. 2018, *inter alia*).

Unfortunately, there has not been much recent inquiry into the current state of yod dropping in Canadian English (but see Roeder et al. 2018). Most previous work relies on reported language use and is therefore limited to a few words, such as *new* and *student* (Scargill 1974) or *news* and *student* (Chambers 1998).[2] Moreover, the situation is complicated by the fact that /u/ itself is fronting in many inner circle varieties of English (Godinez Jr. & Maddieson 1985, Fought 1999, Hawkins & Midgley 2005, Fridland & Bartlett 2006, Labov et al. 2006, Harrington et al. 2008, Hall-Lew 2011, Baranowski 2017, *inter alia*), including Canadian English (Boberg 2011, Hall & Maddeaux 2018, Umbal 2019). As Roeder et al. (2018: 104) point out, this is problematic because "it is possible that what looks like retention of yod overlaps acoustically with a bona fide ongoing change" – namely, the fronting of /u/, which has been shown to be particularly advanced in postcoronal position (ibid.).

Keeping the problematic relationship between retention and /u/-fronting in mind, this paper investigates the current state of yod dropping in Toronto English. First, it compares words which historically had a yod in postcoronal contexts (henceforth called DUDE words) to words which historically did not have a yod, but include the phoneme /u/ after the coronals /t, d, n/ (henceforth DO words) to determine whether there is still a contrast between /ju/ and /u/ in this context. Second, it investigates to what extent the F2 values of variable yod words overlap with no yod words with different preceding segments and words which categorically include yod (henceforth called FEUD words) to determine if there is any acoustic overlap between words which are participating in yod dropping and words which are participating in /u/-fronting. In both cases, the response variable is F2 (in Hz) at 20% of vowel duration, which has been shown to be a good indicator of yod presence in previous work (Roeder et al. 2018).

Results indicate that the change towards the yod-less pronunciation is mostly complete, with both older and younger speakers showing no statistically significant differences in F2 at 20%. While more frequent words generally have higher F2 values at 20%, this effect is stronger for DUDE words, which is consistent with previous work on yod dropping showing that high frequency DUDE words lag behind in the change towards the yod-less pronunciation, and that yod dropping is both lexically and phonetically gradual (Phillips 1981, 1994). Results further show that the F2 of DUDE words is virtually identical to that of DO words, suggesting that there is considerable overlap between yod dropping and /u/-fronting in Toronto English (see also Roeder et al. 2018).

2 Background

2.1 Diachronic perspective

In this paper, yod dropping refers to the loss of contrast between /ju/ and /u/ after the coronals /t, d, n/. However, the term is often used more broadly to describe the merger in other contexts. According to Wells (1982: 207), yod dropping started in the seventeenth century in three contexts: "(i) after palatals (including palato-alveolars), as in *chute*, *chew*, *juice*, *yew*; (ii) after /r/, as in *rude*, *crew*, *shrew*, *grew*; and (iii) after consonant plus /l/, as in *blue*, *flue*, *flew*, *glue*." This process is usually referred to as "Early Yod Dropping" (Wells 1982: 206). Nowadays, the loss of yod is also common following other coronal consonants, as in *tune*, *dew*, and *suit* (Chambers 2002). This so-called “Later Yod Dropping” (Wells 1982: 207) is considered a stereotypical feature of American English. In fact, the research literature abounds with metalinguistic commentary about this feature from researchers and laypeople alike. For example, Pringle (1985: 190) noted that

> [t]here is one shibboleth of pronunciation which Canadians use to mark their difference from Americans: the pronunciation of ‘‘u’’ and ‘‘ew’’ spellings after t, d, and n. Canadians think they know that Americans invariably say ‘‘toon’’ for ‘‘tune’’, ‘‘doo’’ for ‘‘dew’’, ‘‘nooz’’ for ‘‘news’’. They also believe that the British do not do these things. Consequently when they want to stress how their English differs in sound from American English, they are particularly likely to settle on these sounds. (also cited in Clarke 2006: 230)

However, research has shown that this description does not reflect what speakers of Canadian English actually do. In the following, I will briefly review the existing literature on yod dropping in Canadian English in more detail.

2.2 Synchronic perspective

As mentioned earlier, most research on yod dropping is based on reported language use. Two studies stand out: Scargill's (1974) *Survey of Canadian English*, examining over 14,000 postal surveys by grade nine students and their parents from all over Canada, and Chambers’ (1998) *Dialect Topography Project*, which also used postal surveys to sample over 1,000 speakers from the Golden Horseshoe region. Both surveys showed a decline in reported yod usage in Ontario, with younger speakers reporting far less retention than older speakers, suggesting that yod was rapidly disappearing in both real and apparent time. Even among the older speakers, the yod-full pronunciation was rare (19% for *news*, 20% for *student*); among younger speakers, only 9% reported yod in the words *news* and 14% in the word *student*. Using comparable methods, Clarke (2006) found similar results for speakers from Newfoundland.

One drawback of these studies is that they only provide information about a handful of words. Moreover, they risk being unreliable, since speakers are often unaware of what they actually do. Chambers (1998) argued that it is unlikely that speakers would report yod dropping given the prestigious connotations of retention. Yet, Dollinger (2012) found that speakers consistently under-report their use of yod in written questionnaires. At first sight, these two positions seem to be at odds. However, given that /u/ is fronting in Canadian English, it is possible that at least some of the instances Dollinger coded as retention are actually instances of /u/-fronting. Be that as it may, one thing is clear: Even if the large survey studies underestimate retention, there is a general trend towards the yod-less pronunciation. Evidence for this comes from Clarke (1993), who found extremely low retention rates (10% or less) in a word-list task conducted with students from Ontario and Newfoundland, and a number of large-scale studies of Canadian English from the turn of the century, such as Gregg's (2004) study of Vancouver English and Woods' (1999) survey of Ottawa English. As Clarke (2006) observed, all three studies point to the same conclusion, namely that yod dropping seems to be a “change from below” (Labov 1994: 196), i.e., a change below the level of consciousness. Interestingly, this change was not led by females, as is frequently the case, but by males and blue-collar workers. An additional layer of complexity comes from stylistic variation (here operationalized in the Labovian sense as attention paid to speech), which showed that upper-class women tend to retain yod in more formal styles. Clarke (2006) interpreted this as a change in indexicality. More precisely, she argued that different parts of the population have different realization targets: Upper-class women aim for the yod-full pronunciation, which is associated with culture and erudition, while lower class men aim for the yod-less pronunciation, which is seen as modern and progressive.

It is unclear to what extent this interpretation matches listeners’ perceptions and whether it still holds up today, more than ten years after Clarke’s findings were published. Recent work from Victoria, British Columbia, suggests that yod dropping may be more common than previously assumed: Examining a stratified community corpus consisting of sociolinguistic interviews with 162 speakers, Roeder et al. (2018) found an unusually high rate of retention (39.5% overall, N = 440), with rates for individual words ranging from 22.3% for d*ue* (N=112) to 51.0% for *student* (N=104). The authors offer two possible explanations: For one thing, it’s possible that speakers of Victoria English are holding on to the yod despite the nationwide trend towards deletion. Given Victoria’s geographic isolation and the constant influx of immigrants from England during the late nineteenth and early twentieth century, this would not be surprising. Another possibility is that what looks and sounds like retention is actually /u/-fronting. Indeed, Roeder et al. (2018: 104) found that no yod words with preceding coronals (i.e., CHEW and DO words) occupy almost the same F2 space as DUDE words with preceding coronals, esp. among young speakers. The resulting phonetic overlap makes it almost impossible to distinguish between yod retention and /u/-fronting.

The relationship between the two changes is addressed by Sóskuthy et al. (2015). Examining a corpus of Derby English, they found that /u/ is fronting both in categorical yod words (i.e., FEUD words) and no yod words, but not when it is followed /l/, regardless of the preceding segment. In their data, F2 was highest in categorical yod words (i.e., FEUD words) and lowest in words that historically did not have yod (in contrast to this paper, they did not distinguish by place of articulation of the preceding segment), with DUDE words patterning in between. Words that seem to have a surface yod based on impressionistic coding tended to display higher degrees of fronting than words without a surface yod. The degree of fronting also seems to be modulated by frequency, with high frequency DUDE words displaying more advanced fronting than low frequency DUDE words. The authors attributed these patterns to two factors: The fact that highly frequent words tend to lead in coarticulatory changes (as in the fronting of /u/ in postcoronal position), and the “‘binding force’ of word-level presentations” (Sóskuthy et al. 2015: 1005), i.e., the idea that words that are realized without a surface yod undergo fronting along with their yod-full counterparts.

An alternative explanation for the high degree of fronting among high frequency words comes from Phillips (1981). Studying yod dropping among 60 young speakers from the University of Georgia, she found that low frequency words were losing the yod first. In a follow-up study including both young and old speakers from Telfair County, Georgia, she found that low frequency words were still leading in the change, but that the results were not as clear-cut as before, presumably because the change was nearing completion (Phillips 1994). Assuming that the change towards the yod-less pronunciation followed a similar pattern in Toronto English, it would not be surprising to find higher F2 values among high frequency variable yod words – rather than leading the change towards /u/-fronting, as Sóskuthy et al. (2015) argue, they might be lagging behind in the change towards the yod-less pronunciation.

Unfortunately, very few studies of yod dropping in Canadian English (or /u/-fronting, for that matter) have taken word frequency into account. One notable exception is Serendiak & D'Arcy's (2015) study of yod dropping in synchronic and diachronic data from Victoria, British Columbia. They found that retention was particularly high with preceding nasals, but there were high rates of inter-speaker variability. While they noted that word frequency is one possible explanation for this variability, frequency did not turn out to be a significant predictor in their study.[3] There are two possible explanations for this result: First, the change may be complete, and all words are affected to the same extent. However, given the high rates of retention in the synchronic data, this seems unlikely. A more plausible explanation is that the materials they used did not include a sufficiently large number of low frequency words to find an effect. In order to avoid this pitfall, this study used a wordlist to collect data, with frequency being controlled for both variable yod words and no yod words with preceding alveolars. This is crucial because it allows me to put Sóskuthy et al.'s (2015) and Phillips' (1981, 1994) interpretations to the test. Both accounts would predict higher F2 values at 20% for more frequent DUDE words than less frequent DUDE words– the former because of high frequency words leading the change towards more fronted /u/, the latter because of high frequency words lagging behind in the change towards the yod-less pronunciation. However, only Sóskuthy et al. (2015) would predict the same frequency effect for DO words. If high frequency words had higher F2 values for both vowel types, this would support Sóskuthy et al.'s (2015) interpretation; if, on the other hand, only highly frequent DUDE words had higher F2, we would expect Phillips' (1981, 1994) account to be more accurate. Of course, the two accounts are not mutually exclusive: In fact, it is quite likely that both of them account for the phonetic overlap that has been observed in other varieties of English.

3 DATA AND METHODS

3.1 Speakers

The data come from 20 speakers from the Greater Toronto Area (GTA), who have lived in the GTA between the ages of 5 and 18. The sample is balanced for sex (female vs. male) and age (over 40 (mean age = 55.6) vs. under 40 (mean age = 22)). The speakers come from a variety of ethnic backgrounds. All of them identify as native speakers of English, but six of them report speaking an additional language at home.

3.2 Materials

Speakers read a randomized wordlist of 142 words, including 42 test words and 100 distractor items (Appendix A).[4] Following Sóskuthy et al. (2015), test items were grouped into three categories:

1) words which historically contained /ju/ in primary stress position (i.e., DUDE words)[5], such as *numeral*, *dude*, and *Tudor*;
2) words which categorically include /ju/ in primary stress position (i.e., FEUD words), such as *feud* and *hewed*; and
3) words which historically contained /u/ in primary stress position (i.e., no yod words).

The latter were further divided into three subcategories:

3a) no yod words with preceding alveolars (i.e., DO words), such as *noon*, *doom*, and *too*;
3b) no yod words with preceding postalveolars (i.e., CHEW words), such as *chew* and *juice*; and
3c) no yod words with other preceding segments (i.e., FOOD words), such as *food* and *who'd*.

The DUDE words were adapted from Phillips' studies on yod dropping in the Southern US (Phillips 1981, 1994), and are roughly balanced for frequency and preceding consonant (/n/ vs. /d/ vs. /t/). DO words (also balanced for frequency and preceding consonant) were added to test whether the merger was complete.

Both the FEUD words and the FOOD words were adapted from Harrington et al. (2008) and were included to see if the DUDE words pattern more closely to a diphthongal /ju/ (as in FEUD words) or a monophthongal /u/ (as in FOOD words). The CHEW words were added to get a better idea of how words with preceding postalveolars, which lost the yod during the early stages of yod dropping, compare to words with preceding /t, d, n/, which lost the yod much later (Wells 1982: 206).

Since previous research has shown that words where /u/ is followed by /l/ tend to have much lower F2 values than those with other following consonants (ibid.), the words *duel* and *tulips*, which were included in Phillips' (1981, 1994) work, were excluded from the analysis. Words where /u/ is followed by /ɹ/, such as *durable* and *during*, were also excluded because /u/ is usually realized as [ʊ] in this context (Rogers 2013: 76). For an overview of test words, please see Table 2.

Table 2
Overview of test words

Categorical yod	**Variable yod**			**No yod**				
FEUD *Other POA*	**DUDE** *Alveolar POA* */d/*	*/n/*	*/t/*	**DO** *Alveolar POA* */d/*	*/n/*	*/t/*	**CHEW** *Post-alveolar POA*	**FOOD** *Other POA*
feud	dude	numeral	Tudor	doom	noon	too	chew	food
hewed	duke	nude	tuba	do	snoop	tomb	choose	who'd
queued	duty	nutrients	tuber				juice	cooed
used	due	nucleus	tunic				Jewish	swoop
		neutron	tune					
		nuisance	Tuesday					
		neutral	tube					
		numerous	tutor					
		knew	students					
		news						

	new			

3.3 Procedure

All participants met with the author in a quiet area of their choice. First, they were presented with a brief background questionnaire (see Appendix B). Then, they were asked to read each word from the word list presented in random order with PsychoPy (Peirce 2007), clicking on any key to move from one item to the next. Sessions were recorded using a Zoom H4n Pro handy recorder with an AT832R lavalier microphone. The sampling frequency was set to 44,100 Hz.

3.4 Measurements

Following Roeder et al. (2018), F2 at 20% of vowel duration was used as the dependent variable in all analyses.[6] The F2 measurements were obtained as follows: First, the test words were segmented manually in Praat (Boersma & Weenink 2018). Then, the vowel under investigation was coded impressionistically as retaining (/ju/) or not retaining yod (/u/). Since previous research has shown that there is a third possibility, where speakers palatalize preceding /d/ and /t/ and delete the yod (Clarke 1993), preceding coronal obstruents were further coded for whether or not they are palatalized.[7] Subsequently, a Praat script was used to extract F2 measurements at ten evenly-spaced points throughout the vowel, whereby the script referred to a manually determined formant ceiling. Whenever necessary, formant measurements were hand-corrected by determining a more appropriate formant range and rerunning the script. Measurements distorted by background noise or affected by mispronunciations were excluded. This approach yielded 1,185 tokens for analysis 1 (i.e., the comparison between variable yod words and no yod words with preceding alveolars) and 1,651 tokens for analysis 2 (i.e., the comparison between categorical yod words, variable yod words, and no yod words with different preceding segments).

4 Coding and analysis

4.1 Coding schema

4.1.1 The dependent variable

Rather than choosing a predetermined threshold for determining yod presence, F2 was treated as continuous, so as to avoid superimposing an arbitrary cut-off point. If the contrast between /ju/ and /u/ was retained, F2 at 20% was expected to be higher for DUDE words than for DO words, especially among older speakers who are more likely to retain the distinction and for high frequency words, which have been shown to lag behind in the change towards the yod-less pronunciation (Phillips 1981, 1994).

Following Hay et al. (2015: 86), the F2 values used were not normalized because "normalization can make changes in one vowel manifest as adjustments to another vowel's formants." In order to account for individual differences in formant values, random by-subject intercept and a random by-subject slope for vowel type were included in the mixed effects models instead.

4.1.2 The independent variables

The data were coded for a variety of linguistic and social predictors. Each of these are addressed in turn (for an overview of the coding schema, please see Table 4).

The first predictor is **vowel type**. As mentioned above, the test words fall into five categories: FEUD words, DUDE words, and no yod words, which can further be divided into DO, CHEW, and FOOD words.

For the first part of the analysis, which seeks to determine whether there is still a contrast between /ju/ and /u/ in words with preceding alveolars, only DUDE and DO words were included. Given that the merger seemed to be in its final stages over twenty years ago (Chambers 1998), no significant differences between the two vowel types are expected.

To determine whether there is any difference between the preceding alveolars, the data was further coded for the **preceding consonant** (/n/ vs. /d/ vs. /t/). Following Serendiak

& D’Arcy (2015), preceding /n/ is expected to have higher F2 values at 20% than preceding /d/ and /t/.

For the second part of the analysis, which focuses on how the potentially merged sound compares to categorical yod words and no yod words, all five vowel types were considered. Following Sóskuthy et al. (2015), DUDE words are expected to pattern in between FEUD and FOOD words. Given that /u/-fronting is particularly advanced in postcoronal position, no statistical difference in F2 at 20% is expected between DUDE, DO, and CHEW words (Boberg 2011, Roeder et al. 2018).

Test words were also coded for **word frequency**, based on the logarithmic frequency measure in CELEX, a lexical database based on the COBUILD corpus (Baayen, et al. 1995).[8] Whenever a word was associated with more than one frequency, e.g. when it can occur both as a noun or a verb, the higher frequency was chosen, assuming that participants would associate the word with the most frequent use. An overview of the frequency values is provided in Table 3.[9] In order to improve readability, the values were divided into four groups. Please note that the grouping is arbitrary and should not be interpreted as meaningful.

Following Phillips (1981, 1994) and Sóskuthy et al. (2015), high frequency words are expected to have higher F2 values at 20% than low frequency words. Assuming that the change towards the yod-less pronunciation proceeded similarly to the Southern US, this effect is expected to be more pronounced for DUDE words, since they have been previously shown to lag behind in the change (Phillips 1981, 1994).

The data was further coded for **age** (over 40 vs. under 40) and **sex**. Given that the merger between /ju/ and /u/ has been almost complete for over 20 years, while the change towards /u/-fronting is still ongoing, an interaction between vowel type and age is anticipated, with younger speakers having significantly higher F2 values at 20% for DO words. Since speakers’ F2 values were not normalized, a sex effect is expected, with men having significantly lower F2 values at 20% vowel duration than women.

Both test **word** and **subject** were included as random intercepts in the analysis. Also, a random slope for vowel was included for both analyses.

Table 3

Test words by word frequency

Logarithmic frequency	FEUD words	DUDE words	DO words	CHEW words	FOOD words
0	feud hewed queued	Tudor[10] dude numeral tuba tuber	snoop	chew	cooed swoop
0.001-0.999		tunic nude nutrients nucleus neutron	doom		
1-1.999	used	nuisance tune neutral tube tutor Tuesday numerous duke duty due	tomb noon	choose juice Jewish	who'd
2-3.03		knew news students new	do too		food

Table 4[11]
Coding schema

Linguistic factors	Levels	Coding
Vowel type (Analysis 1 only)	DO DUDE	simple coded, with DO = -0.5
Preceding consonant (Analysis 1 only)	/n/ /d/ /t/	forward difference coded; comparison 1: n-d, comparison 2: t-d
Vowel type (Analysis 2 only)	FEUD CHEW DUDE DO	forward difference coded; comparison 1: FEUD-CHEW, comparison 2: CHEW-DUDE, comparison 3: DUDE-DO,

	FOOD	comparison 4: DO-FOOD
Frequency	Continuous, log-transformed, then centered around the mean	
Word		(Random by-word intercept)
Vowel		(Random by-subject slope)
Social factors	**Levels**	**Coding**
Age	Over 40 Under 40	simple coded, with over 40 = -0.5
Sex	Male Female	simple coded, with male = -0.5
Subject		(Random by-subject intercept)

4.2 Analysis procedures

In order to investigate the question whether the contrast between /ju/ and /u/ between DUDE and DO words still exists in Toronto English, F2 values at 20% were analyzed statistically using the *lme4* package (Bates et al. 2015) in R (R Core Team 2018) to examine the effect of vowel type (DUDE vs. DO), preceding consonant (/n/ vs. /d/ vs. /t/), word frequency (log-transformed and centered around the mean), age (over 40 vs. under 40), and sex (female vs. male). The lmerTest package (Kuznetsova & Christensen 2017) was used to determine degrees of freedom and p-values. Given that older speakers and high frequency words are more likely to retain the contrast, the model included interactions between vowel and age and between vowel and frequency. The model further included random intercepts for subject and word as well as a random slope for vowel (by subject). In order to investigate the second question, namely how the potentially merged phoneme compares to categorical yod words (i.e., FEUD words) and no yod words with different preceding segments, a similar analysis was run with all test words included. Frequency was not included since three of the five vowel types (FEUD, CHEW, and FOOD) did not include any high frequency words (see Figure 1).

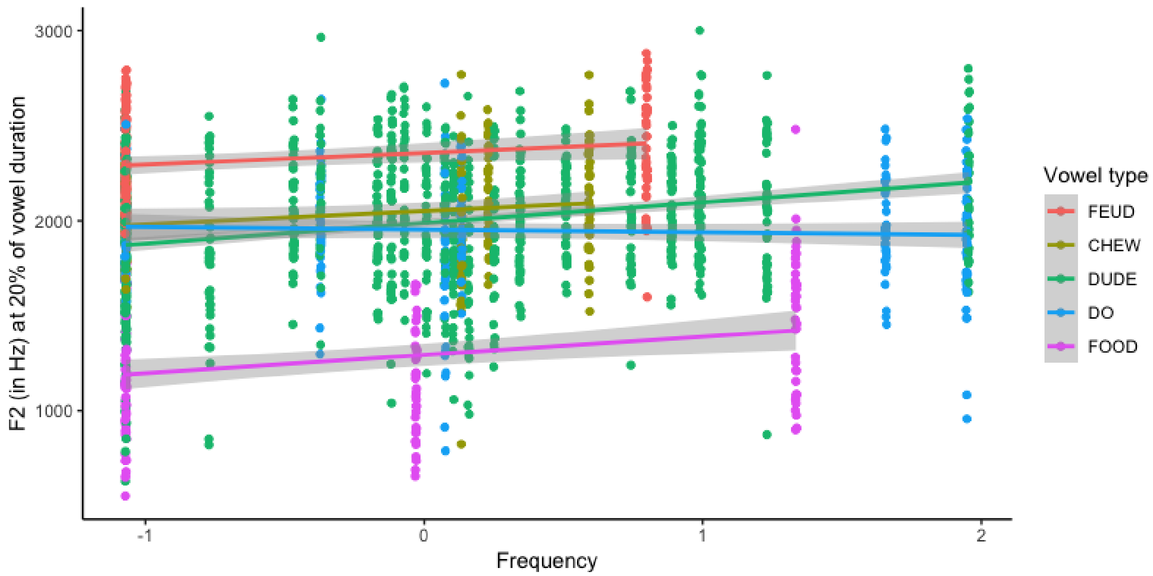

Figure 1. F2 at 20% (in Hz, non-normalized) by vowel type (5-way) and frequency (log-transformed and centered around the mean).

5 RESULTS

5.1 Analysis 1: Overall distribution based on perceptual coding

As mentioned in section 3.4, all DUDE words were coded impressionistically for whether a yod was present (/ju/) or not (/u/). The results in Table 5 show that the overall rate of yod dropping is very high, at 94.32%. Of the 54 words where the yod is retained (at least perceptually), 38 have a preceding /n/, 3 have a preceding /d/, and 13 have a preceding /t/. The majority of words which retain the yod are high frequency items, such as *knew* (N = 9), *news* (N = 9), *new* (N = 7), and *Tuesday* (N = 5). The very high rate of yod dropping suggests that the contrast between /ju/ and /u/ has indeed all but disappeared.

Table 5
Overall distribution of yod dropping in Toronto English (based on perceptual coding)

Yod retention		**Yod dropping**		**Total N**
N	%	N	%	
54	5.68	896	94.32	950

5.2 Analysis 1: Results of the linear mixed effects model

Results of the linear mixed effects model are presented in Table 6 (for the complete model output, please see Appendix C). The fixed effect for frequency is statistically significant, suggesting that high frequency words generally have higher F2 values at 20% than low frequency words (p = .001).[12] The interaction between vowel type and frequency is not (p = .086); however, it is trending into the direction predicted by Phillips (1981, 1994), with DUDE words having higher F2 increases for every one unit of frequency than DO words (77 Hz vs. 24 Hz, respectively; see Figure 2).

The model further shows that men have significantly lower F2 values than women (1801 Hz vs. 2140 Hz; see Figure 3). This is expected due to physiological differences in vocal tract length between males and females. The model also shows that words with preceding /t/ have significantly lower F2 values at 20% than words with preceding /d/ (estimated difference: 185 Hz; see Figure 4). As mentioned earlier, it is unclear why this would be the case. The most likely explanation is that the coarticulation effects of the preceding coronal is mitigated by the presence of aspiration: Following the release of /d/ and /n/, there is little to no aspiration, meaning the F2 values for the vowel are necessarily high due to coarticulation; following the release of /t/, there is usually at least some aspiration (at least at the beginning of stressed syllables), which results in a short delay between stop release and vowel onset, during which F2 goes down.

Table 6
Mixed-effects linear regression on F2 values (in Hz, non-normalized) at 20% of vowel duration by vowel type (DO = -0.5), age (over 40 = -0.5), sex (male = -0.5), preceding consonant (comparison 1: difference between /d/ and /n/; comparison 2: difference between /t/ and /d/), frequency (continuous, log-transformed and centered around 0), the interaction between vowel type and age, and the interaction between vowel type and frequency. Random intercepts for speaker and word are included as well as a by-subject slope for vowel. N = 1,185.

	Estimate	Std error	df	t value	Pr(>|t|)	
Intercept	1970.68	37.01	20.92	53.246	< 2e-16	***
Fixed effects:						
Vowel	65.32	34.62	27.16	1.887	0.06991	.
Age	59.47	70.11	17.20	0.848	0.40794	
Frequency	50.66	14.12	24.21	3.589	0.00146	**
Sex	339.09	64.94	17.00	5.221	6.92e-05	***
Preceding 1	16.58	31.06	24.11	0.534	0.59847	
Preceding 2	184.79	31.95	24.11	5.784	5.71e-06	***
Vowel:Age	-10.51	51.15	18.30	-0.205	0.83949	
Vowel:Frequency	52.68	29.40	24.21	1.792	0.08569	

Random effects:	**Variance**	**N**
Subject	23074	20
Word	2308	30
Vowel	7078	

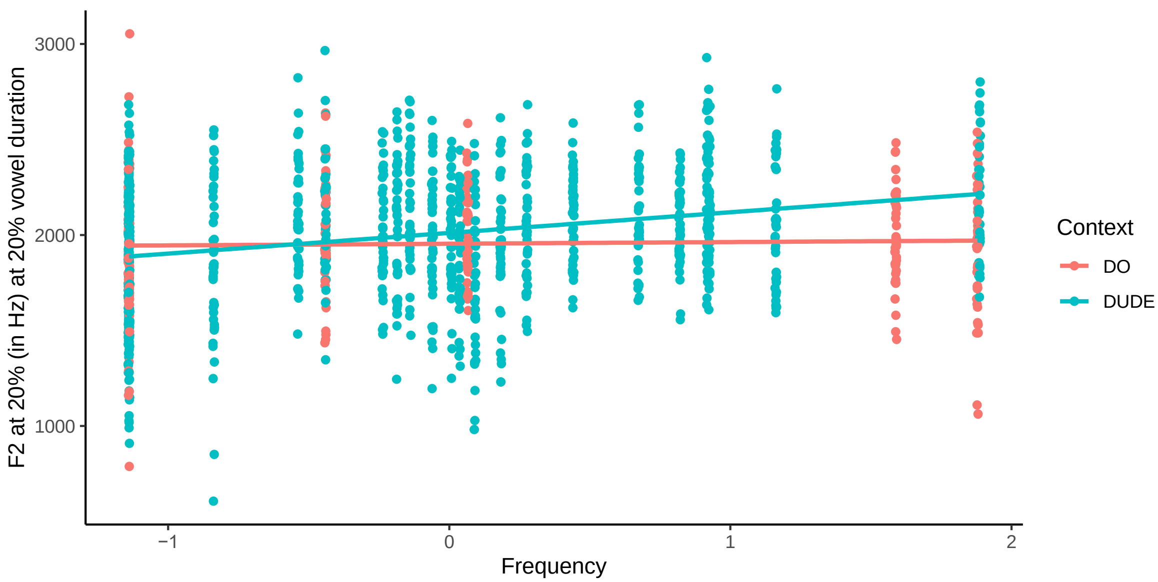

Figure 2. The effect of frequency on F2 (in Hz) at 20% of vowel duration by vowel type.

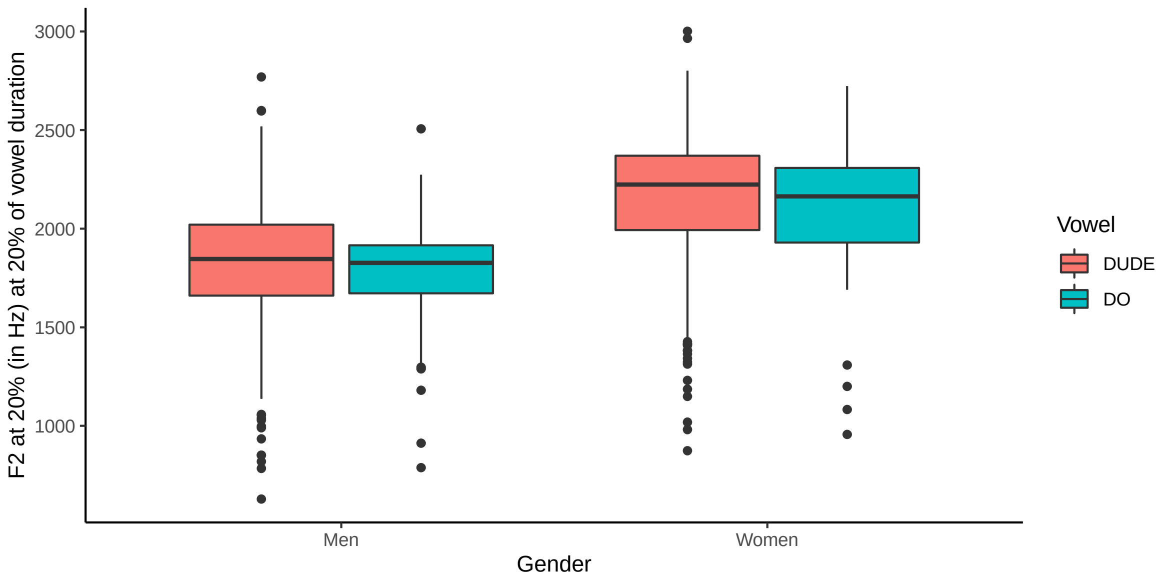

Figure 3. F2 (in Hz) at 20% of vowel duration by vowel type and gender.

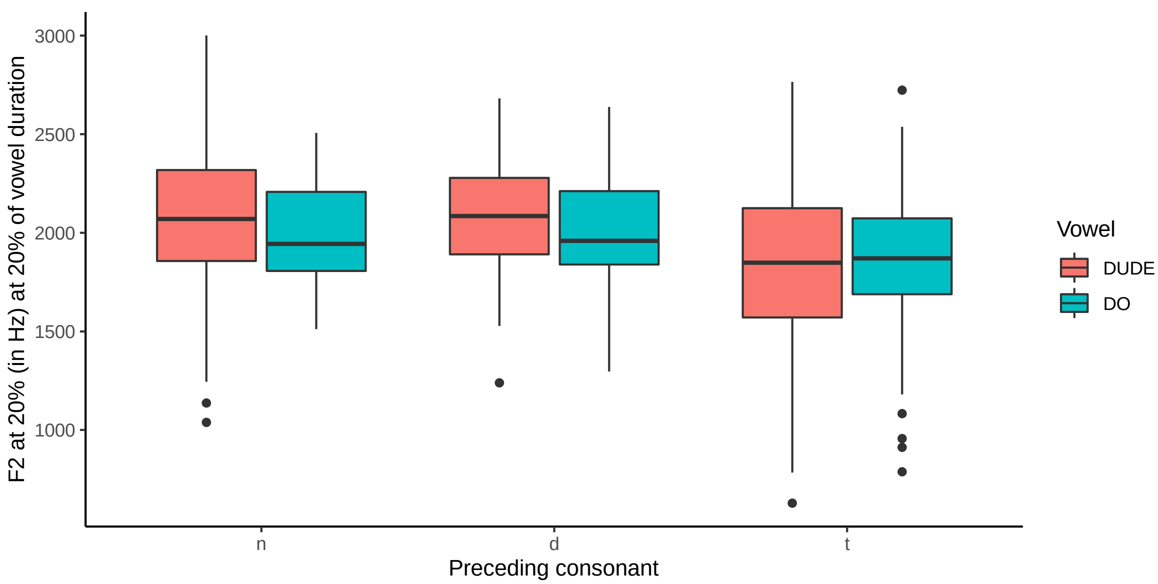

Figure 4. F2 (in Hz) at 20% of vowel duration by vowel type and preceding consonant.

In order to determine whether the differences between /n/ and /t/ was significant, a pairwise comparison between the different levels of preceding consonant was conducted using the testInteractions functions in the phia package (De Rosario-Martinez 2015) in R (R

Core Team 2018) (see Table 7). The results indicate that the difference between /n/ and /t/ is indeed significant (estimated difference: 201 Hz).

Table 7. Pairwise comparison between preceding consonants in analysis 1. P-value adjustment method: Holm.

Pair	Value	df	Chisq	Pr(>Chisq)	
d-n	16.576	1	0.2848	0.5936	
t-n	201.363	1	58.0501	7.666e-14	***
t-d	184.787	1	33.4540	1.459e-08	***

Taken together, the results of the linear mixed effects model suggest that the contrast between /ju/ and /u/ has almost disappeared in Toronto English. This leads to the question how the merged phoneme compares to categorical yod words (i.e., FEUD words) and no yod words, and what role the place of articulation plays in this context, which is investigated in analysis 2. Since no yod words have been shown to pattern quite differently depending on the place of articulation of the preceding segment, they were broken up into no yod words with alveolar place of articulation (i.e., DO words), no yod words with postalveolar place of articulation (i.e., CHEW words) and no yod words with other place of articulation (i.e., FOOD words).

5.3 Analysis 2: Results of the linear mixed effects model

Table 8 presents the results of the linear mixed effects model for analysis 2 (for the complete model output, please see Appendix D). The results confirm that FEUD words have significantly higher F2 values at 20% than CHEW words (estimated: difference: 272 Hz). CHEW words, in turn, have higher F2 values than DUDE words (estimated difference: 55 Hz), which in turn have higher F2 values than DO words (estimated difference: 48 Hz). However, neither of these differences is statistically significant. The difference between DO words and FOOD words is statistically significant, however (estimated: difference: 676 Hz). As in analysis 1, males have significantly lower F2 values than females (1741 Hz for males, 2088 Hz for females).

In order to find out if the contrasts between the other vowel types are significant as well, it is necessary to test different types of contrasts. As a consequence, a pairwise comparison between all vowel types was conducted using the testInteractions function in the phia package (De Rosario-Martinez 2015) in R (R Core Team 2018) (Table 9). Results indicate that all vowel types are significantly differently from each other with three exceptions: 1) the contrast between CHEW and DUDE words ($X^2 = 0.5713$, df = 1, p = 0.898), 2) the contrast between CHEW and DO words ($X^2 = 1.3933$, df = 1, p = 0.714), and 3) the contrast between DUDE and DO words ($X^2 = 0.5736$, df = 1, p = 0.898).

Table 8. Mixed-effects linear regression on F2 values (in Hz) at 20% of vowel duration by vowel type (comparison 1: difference between FEUD and CHEW; comparison 2: difference between CHEW and DUDE; comparison 3: difference between DUDE and DO; comparison 4: difference between DO and FOOD), age (over 40 = -0.5), sex (male = -0.5), and the interaction between vowel type and age. Random intercepts for speaker and word are included as well as a random by-subject slope for vowel. N = 1,651.

	Estimate	**Std error**	**df**	**t value**	**Pr(>|t|)**	
Intercept	1914.54	38.61	39.89	49.580	< 2e-16	***
Fixed effects:						
Vowel 1	272.49	94.56	38.96	2.882	0.0064	**
Vowel 2	54.68	72.34	38.84	0.756	0.4543	
Vowel 3	47.53	62.76	41.87	0.757	0.4531	
Vowel 4	675.97	91.51	44.95	7.387	2.75e-09	***
Sex	346.59	45.23	22.39	7.663	1.06e-07	***
Random effects:	**Variance**	**N**				
Subject	16555	20				
Word	15912	42				
Vowel 1	6023					
Vowel 2	3861					
Vowel 3	6691					
Vowel 4	22995					

Table 9. Pairwise comparison between vowel types in analysis 2. P-value adjustment method: Holm.

Pair	**Value**	**df**	**Chisq**	**Pr(>Chisq)**	
FEUD-CHEW	272.49	1	8.3044	0.0158193	*

FEUD-DUDE	327.16	1	19.8333	5.070e-05	***
FEUD-DO	374.69	1	17.8932	0.0001168	***
FEUD-FOOD	1050.66	1	106.3649	< 2.2e-16	***
CHEW-DUDE	54.68	1	0.5713	0.8976476	
CHEW-DO	102.21	1	1.3933	0.7135504	
CHEW-FOOD	778.17	1	60.5410	5.765e-14	***
DUDE-DO	47.53	1	0.5736	0.8976476	
DUDE-FOOD	723.50	1	86.5245	< 2.2e-16	***
DO-FOOD	675.97	1	54.5656	1.052e-12	***

As expected, the results show that there is no significant difference between the F2 values at 20% for DUDE, DO, and CHEW words (i.e., words with preceding coronals). Based on these findings, we can conclude that in Toronto English, there is significant overlap between the F2 values of DUDE words and no yod words with preceding coronals, which makes it difficult to determine whether the high F2 values are due to retention or /u/-fronting. This is in line with previous findings from Victoria, British Columbia, where there are no significant differences between the two types for the youngest speakers. Unfortunately, it was impossible to see if there was an interaction with age in this data set because the model would not converge when an interaction between vowel and age was included.

6 Discussion

In the following, I will briefly review my findings and relate them back to the original research questions. For the first question, which is whether or not there is still a contrast between /ju/ and /u/ after the coronals /t, d, n/, I found that the change towards the yod-less pronunciation is almost complete for all age groups. Both gender and preceding /t/ have a significant effect on F2 at 20%. While the former is expected due to physiological differences between men and women, the latter was surprising. The most likely explanation is that the coarticulation effect from the preceding coronal is mitigated due to the presence of aspiration.

Interestingly, the interaction between vowel type and age is not significant. This is also surprising, since we would expect strong age differences for /u/ fronting, which is an ongoing change in Canadian English, while we would not expect to see any age differences (or at least, not very strong ones) for yod dropping, which is a change that was almost complete 20 years ago. It is unclear why this might be the case, but it is possible that this is related to the low number of DO words in the sample. Another possibility is influence from other languages. Recall that six participants said they speak an additional language at home, four of whom are part of the younger age group. It is unclear what influence these languages have on their participation in /u/-fronting, if any. More research with a wider variety of monolingual and bilingual speakers from different language backgrounds will be needed to address this question (for existing work on this topic, see Hoffman 2016, Umbal 2019).

The most intriguing finding relates to word frequency. Highly frequent words have significantly higher F2 values at 20% than less frequent words. According to Sóskuthy et al. (2015), this is expected, since highly frequent words are more likely to undergo coarticulatory sound changes like /u/-fronting. I further found that this effect is larger for DUDE words than for DO words. While this effect is not statistically significant, it trends into the right direction. There are several potential explanations for the lack of significance: For one thing, it is possible that the difference is coincidental. Given Phillips' (1981, 1994) findings that the change towards the yod-less pronunciation was led by low frequency words, this seems unlikely, though. Another possibility is that the change towards the yod-less pronunciation is almost complete, and the F2 differences between more frequent and less frequent words have levelled. Given that the change seemed to be at its tail end over 20 years ago, this seems to be a viable explanation. Last but not least, there might be a power issue. The word list included fewer DO words and DUDE words, so it is possible that there simply was not enough power to find the effect. Yet another possibility is that the two effects are additive, and that we would have found a significant effect at an earlier point in time and with a more balanced sample. Further research drawing in real time data could help to eludicate this issue. For the time being, it seems like both Sóskuthy et al. (2015) and Phillips' (1981, 1994) seem to be right. But since there is no theoretical reason to expect the frequency effect to be stronger for DUDE words, I argue that the higher F2 values for DUDE words are indeed a remnant of these words lagging behind in the change towards the yod-less pronunciation.

Yod dropping after the coronals /t, d, n/ is not the only change which is led by low frequency words. As Phillips (2006, 2015) noted, a similar effect was found for the stress shift in noun-verb pairs like EXploit-exPLOIT and EXtract-exTRACT. Originally, both word forms were stressed on the final syllable; over time, the stress for nouns shifted to the first syllable, but this change took much more time in high frequency words. This is in stark contrast to so-called neo-grammarian (or regular) sound changes, which are usually led by high frequency words. Against this background, Phillips (2006, 2015) argued that word frequency has a systematic influence on lexical diffusion, with high frequency words leading in changes that involve phonetic realizations of phonemes (such as /u/-fronting or other vowel shifts), and low frequency words leading in changes that require detailed structural information about a word (such as yod dropping, which has slowly but slowly started to spread in different contexts).

One thing that is remarkable in this context is how gradual the change towards the yod-less pronunciation seems to be. Even at the tail-end of the change, there are still very subtle differences between DUDE and DO words. For a long time, scholars believed that this was actually not possible, and that sound changes were either phonetically gradual (meaning all words are affected at the same time)[13] or lexically gradual (meaning that some words are affected before others, with frequent words leading in some cases and infrequent ones leading in others) (Phillips 1994: 124). As Phillips (2006, 2015) points out, yod dropping clearly refutes this idea. Recent models of phonological representation, such as Pierrehumbert's (2016) hybrid model, do not just account for this pattern, but almost expect it, because they assume that "mental representations of phonological forms are extremely detailed […] and include word-specific phonetic characteristics that have arisen from contextual factors" (Pierrehumbert 2016: 48).

Overall, the results of this study support Phillips' idea that word frequency plays a crucial role in lexical diffusion, and that the change towards the yod-less pronunciation is both phonetically and lexically gradual. As Hay et al. (2015) note, one issue with Phillips' interpretation is that all of the studies she draws on are either based on written diachronic data or synchronic experimental studies. This makes it difficult to determine whether the changes she observed actually took place as gradually as she suggested. One way to overcome this drawback would be to trace the development of yod dropping in a naturalistic setup using real time data. This would also allow for a closer examination of /u/-fronting over time, and how the two changes may have influenced each other.

This brings me to the second question, namely to what extent the F2 values of DUDE words overlap with categorical yod words (i.e., FEUD words) and no yod words, and what role the place of articulation of the preceding segment plays in this context. As expected, DUDE words pattern in between FEUD and FOOD words, but there are no significant differences between them and DO and CHEW words. This is in line with recent work from Victoria, British Columbia, which showed that there was significant phonetic overlap between these categories (Roeder et al. 2018). As a consequence, it almost impossible to distinguish between yod retention and /u/-fronting (ibid.). Given that the acoustic correlates of yod dropping remain largely unexplored (ibid.), it is unclear how one could disentangle the two processes. Similar to analysis 1, analysis of longitudinal would make it possible to determine how we got to this point and how the two changes may have influenced each other over time. Particularly, it would be interesting to see if the contrast between /ju/ and /u/ was neutralized before /u/ began to front. Future research should also address to what extent the contrast between /ju/ and /u/ is also neutralized at other measurement points. In order to determine this, it would be necessary to control for the preceding as well as the following segment. Last but not least, it would be interesting to investigate the social meaning of yod dropping. As mentioned in section 2, the distribution of yod dropping in apparent time suggests that retention may carry different social meanings for different segments of the population. Work on the perception of yod retention could shed light on whether these findings still hold up and to what extent they overlap with the social meanings of /u/-fronting, which, to my knowledge, have not been explored in the research literature.

7 Conclusion

This paper examined the current status of yod dropping in Toronto English. Using word list data from 20 speakers from the Greater Toronto Area, it found that the change towards the yod-less pronunciation after the coronals /t, d, n/ is complete; words which historically had a yod in this context and words which did not now occupy virtually the same F2 values at 20%. Highly frequent DUDE words have higher F2 values than low frequency DUDE words, which suggest they are still lagging behind in the change, even as it has been largely completed. This shows that word frequency has long lasting effects on lexical diffusion. It further supports the idea that lexically gradual sound changes can also be phonetically gradual (Phillips 1994, 2006), which is in line with Pierrehumbert's (2016) hybrid model of phonological representation, which assumes that there is both an abstract level of representation and a level where words are stored with detailed phonetic and contextual information.

Comparing the F2 values of words that historically had a yod to those of words that still have it and those that never had it, this paper further showed there is significant phonetic overlap between variable yod words and no yod words with preceding coronals (including the postalveolars /tʃ/ and /dʒ/). This makes it difficult to distinguish between retention and /u/-fronting. Future research should address if there are any acoustic cues which may help to tell the two processes apart. It should also try to determine how these two changes may have influenced each other. It would be particularly interesting to see to what extent the contrast between /ju/ and /u/ was already neutralized by the time /u/ started to front. In order to address these questions, researchers should ideally draw on natural synchronic and diachronic data from the same speech community. While these kinds of corpora are far and few between, they would provide an excellent starting point for disentangling the two changes and clarifying what role word frequency plays in this context.

APPENDIX

A. Complete word list. Bolded words were included in both analyses, bolded and italicized words only in analysis 2. Words in square brackets were used in Phillips (1981, 1994), but were excluded from the analysis in this paper.

back
bag
bail
beak
beam
bean
bed
bib
big
bike
bin
book
boot
bribe
bud
cape
cat
chew
choose
coat
code
cone
cooed
cow
cup
dad
dawn
deck
deep
dime
dine
do
dome
doom
down
duck

down
duck
dude
due
[duel]
dug
duke
dull
[duly]
[durable]
[during]
duty
fade
fame
feud
file
fire
fog
food
foul
fun
gain
gate
get
good
gut
hall
hem
hewed
hill
him
hit
hole
hoop
hope
hour

hum
jam
Jewish
job
juice
kid
knew
league
leg
loud
milk
mom
moon
neutral
neutron
new
news
nod
noon
nucleus
nude
nuisance
numeral
numerous
nutrients
pal
peel
poke
pull
put
queued
ran
robe
seat
seed
shot

shot
shout
six
snoop
sock
spook
step
students
swoop
tab
take
tap
ten
tide
tie
tight
tip
tomb
too
top
tub
tuba
tube
tuber
Tudor
Tuesday
[tulips]
tune
tutor
type
used
vague
web
who'd
yell

B. Background questionnaire

Thank you for helping us with our project. Your participation is anonymous, but we need some general information about you.

Please state town and province/country where applicable.

Gender: __________

Age: __________

When did you learn English? ________________________________

Where were you born? ________________________________

Where do you live now? ________________________________

Where were you raised from ages 5 to 18? ________________________________

Please indicate all places you have lived for six months or more and when you lived there:
____
____
____

Education (check all that apply):
❒ grades 1-8
❒ grades 9-12
❒ community college
❒ university

What is your occupation? ________________________________

Where was your father born? ________________________________

Where was your mother born? ________________________________

What is/was your father's occupation? ________________________________

What is/was your mother's occupation? ________________________________

What is/was your father's first language? ________________________________

What is/was your mother's first language? ________________________________

Do you speak any other languages? ❒ yes ❒ no

If so, what are they? Where and when did you learn them (e.g., at home as a child, in school starting at age 6)? What is your level of proficiency on a level from 1-5 (1 = elementary proficiency, 5 = native or bilingual?

Language:
Where?
When?
Proficiency:

Language:
Where?
When?
Proficiency:

If you speak any other languages, please list them on the back of this sheet.

What is your ethnicity? ________________________________

C. Complete R output analysis 1

```
Linear mixed model fit by REML. t-tests use
  Satterthwaite's method [lmerModLmerTest]
Formula:
value ~ Vowel*Age + Vowel*Frequency + Sex + Preceding +
(1+Vowel|Subject) + (1|Word)
   Data: data.analysis1

REML criterion at convergence: 16344

Scaled residuals:
    Min      1Q  Median      3Q     Max
-5.8659 -0.4718  0.0516  0.5765  3.6075

Random effects:
 Groups   Name                 Variance Std.Dev. Corr
 Word     (Intercept)           2308     48.04
 Subject  (Intercept)          23074    151.90
          Vowel1variable.yod  7078     84.13   -0.39
 Residual                      56451    237.59
Number of obs: 1185, groups:  word, 30; filename, 20

Fixed effects:
                               Estimate Std. Error      df
(Intercept)                     1970.68      37.01   20.92
Vowel1variable.yod                65.32      34.62   27.16
Ageunder40                        59.47      70.11   17.20
Frequency                         50.66      14.12   24.21
SexF                             339.09      64.94   17.00
Preceding11                       16.58      31.06   24.11
Preceding12                      184.79      31.95   24.11
Vowelvariable.yod:Ageunder40     -10.51      51.15   18.30
Vowelvariable.yod:frequency       52.68      29.40   24.21
                               t value Pr(>|t|)
(Intercept)                     53.246  < 2e-16 ***
Vowelvariable.yod                1.887  0.06991 .
Ageunder40                       0.848  0.40794
Frequency                        3.589  0.00146 **
SexF                             5.221 6.92e-05 ***
Preceding11                      0.534  0.59847
Preceding12                      5.784 5.71e-06 ***
Vowelvariable.yod:Ageunder40    -0.205  0.83949
Vowelvariable.yod:Frequency      1.792  0.08569 .
---
Signif. codes:
```

```
0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Correlation of Fixed Effects:
            (Intr) Vwl1v.  Age40   Freq   SexF Prcd11 Prcd12
Vwl1vrbl.yd -0.386
Ageunder40   0.000  0.001
Frequency   -0.080  0.165  0.002
SexF         0.000  0.000  0.000  0.000
Preceding11 -0.081 -0.100  0.001  0.149 -0.001
Preceding12  0.047  0.109 -0.001 -0.086  0.000 -0.648
Vwl1v.:A240  0.002 -0.002 -0.377 -0.004  0.000 -0.001  0.002
Vwl1vrbl.:.  0.093 -0.142 -0.001 -0.392  0.001 -0.134 -0.129
            v1.:A2
Vwl1vrbl.yd
Ageunder40
Frequency
SexF
Preceding11
Preceding12
Vwl1v.:A40
Vwl1vrbl.:.  0.006
```

D. Complete R output analysis 2

```
Linear mixed model fit by REML. t-tests use Satterthwaite's
method ['lmerModLmerTest']
Formula: f2_20 ~ V5 + Sex + (1 + Vowel | Subject) + (1 |
Word)
   Data: data.analysis2

REML criterion at convergence: 22890.3

Scaled residuals:
    Min      1Q  Median      3Q     Max
-6.0984 -0.4591  0.0516  0.5448  4.2065

Random effects:
 Groups   Name        Variance Std.Dev. Corr
 Word     (Intercept) 15912    126.14
 Subject  (Intercept) 16555    128.66
          V51          6023     77.61   -0.90
          V52          3861     62.14   -0.08 -0.29
          V53          6691     81.80   -0.35  0.29 -0.46
          V54         22995    151.64   -0.02  0.02  0.42 -
0.40
 Residual             54321    233.07
Number of obs: 1655, groups:  word, 42; filename, 20

Fixed effects:
            Estimate Std. Error      df t value Pr(>|t|)
(Intercept)  1914.54      38.61   39.89  49.580  < 2e-16 ***
V51           272.49      94.56   38.96   2.882   0.0064 **
V52            54.68      72.34   38.84   0.756   0.4543
V53            47.53      62.76   41.87   0.757   0.4531
V54           675.97      91.51   44.95   7.387 2.75e-09 ***
SexF          346.59      45.23   22.39   7.663 1.06e-07 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’
1

Correlation of Fixed Effects:
         (Intr)   V51    V52    V53    V54
V51     -0.123
V52      0.247 -0.642
V53     -0.255  0.016 -0.184
V54     -0.089  0.002  0.030 -0.545
SexF     0.000  0.001  0.000  0.000  0.001
convergence code: 0
```

`singular fit`

REFERENCES

Baayen, Harald R., Richard Piepenbrock & Leon Gulikers. 1995. *CELEX 2 LDC96L14* (Version 2). Philadelphia, PA: Linguistic Data Consortium.

Baranowski, Maciei. 2017. Class matters: The sociolinguistics of GOOSE and GOAT in Manchester English. *Language Variation and Change* 29(3), 301–39.

Bates, Douglas, Martin Maechler, Ben Bolker & Steve Walker. 2015. Fitting linear mixed-effects models using Lme4. *Journal of Statistical Software* 67(1), 1–48.

Boberg, Charles. 2004. The dialect topography of Montreal. *English World-Wide* 25(2), 171–98.

Boberg, Charles. 2010. *The English language in Canada: Status, history and comparative analysis*. Cambridge, UK: Cambridge University Press.

Boberg, Charles. 2011. Reshaping the vowel system: An index of phonetic innovation in Canadian English. *Penn Working Papers in Linguistics: Selected Papers from NWAV 39* 17(2), Article 4.

Boersma, Paul & David Weenink. 2018. *Praat: Doing phonetics by computer* (Version 6.0.43). http://praat.org.

Chambers, J.K. 1998. Social embedding of changes in progress. *Journal of English Linguistics* 26(1), 5–36.

Chambers, J.K. 2002. Yod-dropping in an English accent. *Journal of the Phonetic Society of Japan* 6(3), 4–11.

Clarke, Sandra. 1993. The Americanization of Canadian pronunciation: A survey of palatal glide usage. In Sandra Clarke (ed.), *Varieties of English around the World: Focus on Canada*, 85–108. Amsterdam: John Benjamins.

Clarke, Sandra. 2006. Nooz or nyooz? The complex construction of Canadian identity. *Canadian Journal of Linguistics* 51(2–3), 225–46.

De Rosario-Martinez, Helios. 2015. *Phia: Post-hoc interaction analysis* (Version 0.2-1). https://CRAN.R-project.org/package=phia.

Dollinger, Stefan. 2012. The written questionnaire as a sociolinguistic data gathering tool: Testing its validity. *Journal of English Linguistics* 40(1), 74–110.

Fought, Carmen. 1999. A majority sound change in a minority community: /u/-fronting in Chicano English.” *Journal of Sociolinguistics* 3(1), 5–23.

Fridland, Valerie & Kathy Bartlett. 2006. The social and linguistic conditioning of back vowel fronting across ethnic groups in Memphis, Tennessee. *English Language and Linguistics* 10(1), 1–22.

Godinez Jr., Manuel & Ian Maddieson. 1985. Vowel differences between Chicano and General Californian English? *International Journal of the Sociology of Language* 53(1), 43–58.

Gregg, Robert J. 2004. *The survey of Vancouver English: A sociolinguistic study of urban Canadian English*. Kingston, ON: Queen’s University.

Hall, Erin & Ruth Maddeaux. 2018. /u/-fronting and /æ/-raising in Toronto families. Paper presented at New Ways of Analyzing Variation 47. New York, NY.

Hall-Lew, Lauren. 2011. The completion of a sound change in California English. *Proceedings of the 17th International Congress of Phonetic Sciences*, 807–10.

Harrington, Jonathan, Felicitas Kleber & Ulrich Reubold. 2008. Compensation for coarticulation, /u/-fronting, and sound change in Standard Southern British: An acoustic and perceptual Study.” *Journal of the Acoustical Society of America* 123(5), 2825–35.

Hawkins, Sarah & Jonathan Midgley. 2005. Formant frequencies of RP monophthongs in four age groups of speakers. *Journal of the International Phonetic Association* 35(2), 182–99.

Hay, Jennifer, Janet B. Pierrehumbert, Abby Walker & Patrick LaShell. 2015. Tracking word frequency effects through 130 years of sound change. *Cognition* 139(1), 83–91.

Hoffman, Michol. 2016. ‘Back to front’: The role of ethnicity in back vowel fronting in Toronto English.” Paper presented at New Ways of Analyzing Variation 45. Vancouver, BC.

Kuznetsova, Alexandra & Per B. Christensen. 2017. LmerTest package: Tests in linear mixed effects models. *Journal of Statistical Software* 82(13), 1–26.

Labov, William. 1994. *Principles of linguistic change, Volume 1: Internal factors*. Oxford, UK: Blackwell.

Labov, William, Sharon Ash & Charles Boberg. 2006. *The atlas of North American English: Phonetics, phonology, and sound change*. Berlin: Mouton de Gruyter.

Nylvek, Judith A. 1992. Is Canadian English in Saskatchewan becoming more American? *American Speech* 67(3), 268–78.

Owens, Thompson W. & Paul M. Baker. 1984. Linguistic insecurity in Winnipeg. *Language in Society* 13(3), 337–50.

Peirce, Jonathan W. 2007. PsychoPy - Psychophysics software in Python. *Journal of Neuroscience Methods* 162(1–2), 8–13.

Phillips, Betty S. 1981. Lexical diffusion and Southern *tune*, *duke*, *news*. *American Speech* 56(1), 72–78.

Phillips, Betty S. 1994. Southern English glide deletion revisited. *American Speech* 69(2), 115–27.

Phillips, Betty S. 2006. *Word frequency and lexical diffusion*. New York, NY: Palgrave Macmillan.

Phillips, Betty S. 2015. Lexical diffusion in Historical Phonology. In Patrick Honeybone and Joseph Salmons (eds.), *Oxford Handbook of Historical Phonology*, 123–36. Oxford, UK: Oxford University Press.

Pierrehumbert, Janet B. 2016. Phonological representation: Beyond abstract versus episodic. *Annual Review of Linguistics* 2(1), 33–52.

Pringle, Ian. 1985. Attitudes to Canadian English." In Sidney Greenbaum (ed.), *The English Language Today: Public Attitudes to English*, 183–205. Oxford, UK: Pergamon Press.

R Core Team. 2018. *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for statistical computing.

Roeder, Rebecca, Sky Onosson & Alexandra D'Arcy. 2018. Joining the western region: Sociophonetic shift in Victoria. *Journal of English Linguistics* 46(2), 1–26.

Rogers, Henry. 2013. *The sounds of language: An introduction to Phonetics*. New York, NY: Routledge.

Scargill, Matthew Henry. 1974. *Modern Canadian English usage: Change and reconstruction*. Toronto, ON: McClelland & Stewart.

Serendiak, Janelle & Alexandra D'Arcy. 2015. Old njooz or new njooz? A diachronic look at yod dropping. Paper presented at the Annual Meeting of the American Dialect Society. Portland, OR.

Sóskuthy, Márton, Paul Foulkes, Haddican, Bill, Jennifer Hay & Vincent Hughes. 2015. Word-level distributions and structural factors codetermine GOOSE fronting. *Proceedings of the 18th International Congress of Phonetic Sciences*, 1001–6.

Umbal, Pocholo. 2019. /u/-fronting and cross-language influence: Evidence from Filipinos in Toronto." Paper presented at the 2nd Annual Buffalo-Toronto Workshop on Linguistic Perspectives on Variation Within and Across Languages. Toronto, ON.

Wells, John C. 1982. *Accents of English*. Volume 1: An introduction. Cambridge, UK: Cambridge University Press.

Woods, Howards B. 1999. *The Ottawa survey of Canadian English*. Kingston, ON: Queen's University.

FOOTNOTES

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[2] Please note that the Dialect Topography project also looked at words like *avenue* and *coupon*. However, yod dropping is progressing quite differently in words with secondary stress and words preceded by non-coronals (Chambers 2002). As a consequence, the results for these two words will not be discussed here.

[3] Please note that frequency was operationalized as number of occurrences per one million words in the lexical database CELEX (Baayen et al. 1995), with words occurring more than 35 times classified as 'frequent' and words occurring less than 35 times classified as 'infrequent'.

[4] I would like to thank Ruth Maddeaux who generously allowed me to adapt one of her existing word lists for this purpose.

[5] Secondary stress environments were not included since these tend to have much higher rates of retention in North America (Boberg 2004, Chambers 2002).

[6] The choice of F2 at 20% in Roeder et al. (2018: 96) was determined as follows: First, the authors independently coded a subset of their data for whether or not a yod was present.

Whenever the authors could not agree, the token was excluded. Then, they took F2 measurements at twenty separate points in the vowel. Using ANOVA testing, they found that the difference between yod-full and yod-less pronunciations was best reflected at the 25% of vowel duration; however, since the forced aligner they used does not extract F2 at 25%, they opted to go for 20% of vowel duration instead. This paper follows their approach to make the results of the two studies more comparable.

[7] Unfortunately, palatalization is rarely discussed in the research literature (but see Clarke 1993). The few studies that do mention it suggest that it is rare (Phillips 1981, Clarke 1993). This impression is confirmed in the in the present study, where only 38 tokens (7.36%) are palatalized. Of these 38 tokens, 3 have an underlying /d/, while 35 have an underlying /t/, with the lexical item *Tuesday* (N = 13) making up the bulk of the data. Due to the lack of information on these patterns in other varieties of Canadian English, and the limited scope of this paper, palatalization will not be discussed any further. When coding the tokens impressionistically, all palatalized tokens were coded as absent (i.e., not retaining yod).

[8] While the COBUILD corpus mainly contains British English texts, and therefore may not be the most accurate frequency measure for Canadian English, its size (~17,9 million words) and the lack of frequency information for Canadian English make it the best source of information available.

[9] Please note that the adjusted frequency measures are not provided because they slightly vary between analysis 1 and analysis 2 since the sample mean is slightly different.

[10] CELEX does not include any frequency information for the word *Tudor*, which is uncommon in everyday conversation. As a consequence, logarithmic frequency was assumed to be 0.

[11] Please note that age and frequency were not included in the final model. The former was excluded because it did not significantly improve model fit. The latter was excluded because the FEUD, CHEW, and FOOD words did not include any high frequency words.

[12] It is possible that the frequency effect found here is actually a duration effect in disguise, meaning it is not the frequent words which are retaining the yod, but the shorter ones. However, even when controlling for duration, the main effect of frequency is present ($p = 0.018$). Since including vowel duration as a predictor did not significantly improve the model fit, its effect will not be discussed any further here.

[13] These kinds of sound changes are often referred to as "'neogrammarian' or 'regular'" (Phillips 2015: 359f.).