Glottalization Variation in Young Vermont Speakers

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1 Introduction

Glottalization of /t/ has been found in an array of British English varieties (Trudgill 1974) and among a few American English varieties (Roberts 2006, Eddington and Taylor 2009, Farrington 2018). This paper expands on previous findings of /t/ glottalization in Vermont English, particularly in young speakers, by providing evidence of phonetic variation of a stigmatized variant.

/t/ glottalization as a variant has typically comprised of glottal stop replacement (full glottal stop replacement with no alveolar contact [ʔ]) and as glottal stop reinforcement (glottal stop replacement with alveolar contact [ʔt]). Roberts 2006 found that although glottal reinforcement is a prevalent feature of American English, word-final intervocalic glottal stop replacement seems to be a distinctly regional feature.

Bellavance and Roberts 2016 examined familial patterns of glottalization in 15 Vermont speakers, looking particularly at how glottalization differed between parents and their children. Although not a focus of the study, the authors noticed instances of aspiration following glottal stop replacement in word-final position, particularly in three fourth grade speakers. As aspiration with glottal stop replacement has not been previously reported in the literature, an investigation of this glottalization production led to the current study. This paper will explore the linguistic and social constraints conditioning the feature with the larger goals of furthering our understanding of the Vermont dialect specifically, and the social and phonetic description of /t/ glottalization more broadly.

This paper determines how this variant behaves across linguistic and social factors, specifically in the ways that it differs from "regular" glottal stop replacement. Given the time and articulatory effort needed to release air after a glottal stop production, we would expect this variant to prefer a pre-pausal environment, perhaps exclusively. Additionally, if this variant is innovative, we would expect it to occur most often in high school speakers.

2 Background

2.1 Constraints and Predictors for General /t/ Glottalization

/t/ is a rich phoneme for variationist studies due to its wide array of allophones, though its glottalized variants have only just begun to receive attention in American varieties (Roberts 2006, Eddington and Taylor 2009, Farrington 2018). In English varieties generally, /t/ lenition usually refers to the weakening of the /t/ phoneme to [ɾ], [ʔ] (debuccalization) or deletion. /t/ lenition does not typically occur when it occupies the onset of the tonic syllable (e.g. *ten*, *retain*) (Harris and Kaye 1990). Glottalization in American English is generally favored utterance-finally and word-finally (Redi and Shattuck-Hufnagel 2001, Roberts 2006, Bellavance and Roberts 2016), though this word position may proportionally contain more /t/ overall (Roberts 2006). Bellavance and Roberts 2016 found a preceding deleted nasal (implying a preceding nasalized vowel) to be the most likely condition for glottalization. Many have found preceding sonorant consonants, and not obstruents, to condition for glottalization (e.g. Pierrehumbert and Frisch 1997, Roberts 2006). Following pause is variably favorable in previous studies (Macaulay 1977, Reid 1978, Roberts 2006), while a following consonant is often found to be favorable for glottal reinforcement, especially when it is a syllabic /n/ (Roberts 2016). A following stressed syllable has been found as a favorable environment for glottalization as well (Eddington and Channer 2010, Pierrehumbert and Talkin 1992).

Social factors such as gender and age have shown mixed results in previous studies. Roberts 2016 and Eddington and Channer 2010 did not find gender to be significant; however, gender has been significant in other glottalization studies (Byrd 1994, Eddington and Taylor 2009, Mees 1987, Milroy, Milroy, and Hartley 1994a, Roberts 2006), with women using higher rates of the glottal

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variant. Additionally, Docherty and Foulkes 1999 found older males to glottalize differently than other social groups in that the oral release occurs just before the glottal articulation, contrary to the expected oral release masked by glottal articulation (thus, the oral release is audible). Roberts 2006 and Eddington and Savage 2012 found age to be a significant predictor for glottalization types as well. In both studies, younger speakers released glottal stops orally (glottal stop replacement), rather than nasally (glottal stop reinforcement).

Glottalization may have discourse functions as well. Docherty et al. 1997 found that although pre-pausal glottalized realizations are largely absent in Tyneside English, they were in fact present for some speakers through sentence tags (e.g. *and that*). Specifically, young working class females had the highest rate of turn-final glottalization, most likely due to their high usage of sentence tags. Additionally, the authors argue for a separate treatment of glottal variants (i.e. replacement, reinforcement), as they were found to pattern differently across social groups (which is supported by others, as mentioned above). Therefore, the authors argue that glottal variants need not be placed in phonological correlation with one another. That is, there may be reasons outside of phonological bounds for a speaker to produce one variant over another. This is not to discount lenition accounts for variation in glottalization. Rather, social accounts may be working in conjunction with lenition accounts to produce variation.

2.2 Vermont /t/ Glottalization

In a study of speakers ranging in age between 3 to 80 years old in the small rural town of Swanton, Vermont, Roberts 2006 found that glottalization was not only operating differently than in other dialects, but may in fact be on the rise. This finding, however, was contrary to the dialectal leveling otherwise occurring in the dialect. Due to increased immigration and emigration within the past few decades, as well as increased tourism, small rural towns in Vermont have experienced an increased diversity in their populations (Roberts 2006, Roberts 2007). As a result, communities have expressed concern over a loss of local speech (Roberts 2006). This sentiment is not unfounded: increased contact between speech communities can have a leveling effect (Kerswill and Williams 2000, Labov 2001), and Vermont exemplifies this leveling effect at least in some vowels (Roberts 2007). Additionally, overt stigmatization and stereotyping has been shown to reduce dialectal features (Hazen and Hamilton 2008). Many Vermonters identify "t-dropping" as a typical feature of the dialect. Given these factors, it would seem to follow that "t-dropping" (/t/ glottalization) would fall out of the rural Vermont dialect. However, glottalization has rapidly become a socially salient and robust feature of the Vermont dialect, especially in younger generations. Roberts 2007 found glottal stop replacement to occur word-medially and word-finally, usually in environments in which glottal stop reinforcement is permitted and flap is prohibited (usually preceded by a vowel and followed by a syllabic /n/, e.g. *mountain*). The most favorable following segment for word-final replacement was a pause. However, a surprising exception arose from the data: word-final glottal stop replacement with a following vowel (across a word boundary) was present, an environment that usually conditions for flap in other American English varieties.[1] Additionally, adolescents were found to produce higher rates of glottalization in word-medial positions (the most stigmatized word position), while older speakers displayed no glottals in this position at all. Therefore, Roberts' 2006 work not only gives the linguistic conditions for Vermont glottalization, but she also suggests that it is undergoing social re-evaluation, and not a decrease in production as we might expect from a stigmatized variant. This could be explained by way of an external influence of glottalization entering the speech community leading to distinctions in prestige level, therefore meriting distinction between glottalization variants (Milroy et al. 1994b). Further, an influx of newcomers may heighten speakers' desire to highlight local features in their speech. Given an explanation of place-identity, young Vermonters may be using higher rates of a salient local feature as the area experiences an influx of newcomers and tourists. In conjunction with, or perhaps regardless of, this reasoning, adolescents could be producing an innovative form, as often observed regardless of geographic region.

In their study of t-glottalization in Utah, Eddington and Channer 2010 used exemplar theory to explain why glottal stop production occurs intervocalically, rather than the expected flap variant. In

[1]Either stressed or unstressed syllables are possible following segments for flap in American English, as long as /t/ is in an intervocalic environment across word boundaries, such as *get on* (Harris and Kaye 1990).

examining the Corpus of Contemporary American English (Davies 2008-), they found word-final /t/ to occur almost as twice as often by a following consonant than by a following vowel. /tC/, in which glottalization is highly probable, may then cause a speaker to store more instances of glottalized /t/ than flap, from the frequency of exemplars alone. Therefore, /tV/ may be produced with a glottal stop, rather than the phonetically-motivated flap that we would expect. Therefore, if Vermont glottalization is indeed on the rise, exemplar theory may assist in understanding its presence in environments that are not easily motivated by lenition accounts.

Aspiration following glottal stop replacement appears in opposition to explanations of lenition (crucially, ease of articulation). Ladefoged and Maddieson 1996 discuss glottal closure continua of both duration and openness. Laryngealization, as defined by Ladefoged and Maddieson 1996, involves the arytenoid cartilages pressed together with anterior vibration in the vocal folds. The authors also note that stops that co-occur with a glottal stop may involve upward movements of the larynx, thus rendering them "weakly ejective" (Ladefoged and Maddieson 1996:78). Further, Ladefoged and Maddieson 1996 place glottal stop closure on the most closed end of the glottal closure spectrum, and define aspiration as having a wider opening between the vocal folds than open voicelessness. Therefore, if we are to consider aspiration following glottal stop replacement, the vocal folds would move from one end of the spectrum to the other in immediate sequence. When we consider coda-final /t/ lenition, ease of articulation is often found to motivate the appearance of new variants. Social factors, however, are inextricably linked to language change and should be considered concurrently. Because aspiration following glottal stop replacement is not easily motivated by a lenition account, a social account will be emphasized alongside a phonetic analysis in the subsequent data.

3 Methods

The spontaneous speech of children and adults born and raised in northern Vermont were recorded during informal interviews for Roberts' 2006 Vermont glottalization study. The current study comprises data from 30 of these speakers (previously unanalyzed): 10 kindergarteners, 10 fourth graders, and 10 high school students.

All tapes were converted to digital files using a Zoom H2 Handy Portable Stereo Recorder. Audacity was then used to listen to the digital files. Tokens with word-medial or word-final /t/ were impressionistically coded (Roberts 2006, Eddington and Channer 2010) as to the variant produced as well as the independent variables. Tokens in which the following segments was /t/, /d/, /θ/, or /ð/ were excluded. In line with Roberts 2006 and Bellavance and Roberts 2016, all instances of ambiguity between glottal stop and glottal reinforcement were coded as glottal reinforcement, as the latter is the more common variant in American English. All data were then tested for significance in a mixed-effects logistic regression model in R. For a visual investigation as well as a reliability check, at least five randomly selected tokens of each variant per speaker were examined using spectrograms in Praat (Boersma and Weenink 2014).

The dependent variable (t) was impressionistically coded for seven possible variants: glottal stop replacement, glottal stop replacement with aspiration, glottal reinforcement, flap, released (realized) /t/, deletion, and creak for each sound position (Roberts 2006).

Due to the separate discussions often given to creaky voice and glottalization, it is relevant to discuss their overlap, at least for the context of the current study. To clarify, creak was considered as laryngealization with a non-pausal following segment. Instances of laryngealization with a following pause were coded as glottal stop replacement or glottal reinforcement. A singular creak pulse and a glottal stop are phonetically identical (Esling and Harris 2005, Ladefoged and Maddieson 1996). Further, Ladefoged 2003 argues that creaky voice is often the phonetic realization of a glottal stop. Ladefoged and Maddieson 1996 argue that true glottal occlusion (what we perceive as replacement) only occurs in gemination, and the glottal replacement we perceive is closer to laryngealization, or stiff phonation. In line with this work, Docherty and Foulkes 1999 found that only 3% of 549 tokens (of Tyneside English) constituted true voiceless glottal occlusion. Most perceived glottal occlusions showed very little disturbance in the vertical striations between two voiced segments. In fact, the difference between laryngealization and glottal stop replacement may be based on perception alone (Schleef 2013).

Aspiration following glottal stop replacement was, at times, difficult to code. Ingressive

aspiration was not included. The egressive aspiration that was included was oral and relatively short in duration. That is, obvious sighing and nasal egressive sounds were not coded as this variant.

The study included linguistic and social variables (Table 1). Although a deleted nasal was coded separately from an oral sonorant, it is important to note that a deleted nasal almost always implies a preceding (nasalized) vowel. Thus, we would expect words with a deleted preceding nasal to behave similarly to those with a preceding oral sonorant. Maintaining the distinction between the two during the analysis is relevant to understanding the lenition process of Vermont glottalization. That is, the phoneme that is either deleted or debuccalized may or may not be linked to similar processes in the surrounding environment.

Linguistic Factors		
	Preceding Segment	obstruent, vowel, /l/, /ɹ/, nasal, deleted nasal
	Following Segment	obstruent (front, middle, back), vowel (front, central, back), liquid, /n/, /m/, /ŋ/, glide, pause
	Grammatical Status	monomorpheme, past tense verb (regular, semi-weak, irregular), negative contraction (one-syllable, two-syllable)
Social Factors		
	School Age	kindergarten, fourth grade, high school
	Binary Gender	male, female

Table 1: Independent variables included.

4 Results

11,736 tokens were collected from all speakers. 240 of these were produced as the aspirated replacement variant. As mentioned in Section 3, five random tokens for each dependent variant were inspected in Praat (an example of aspirated replacement is given in Figure 1). Aspirated glottal stop replacement occurred only in a word-final position, and almost entirely in monomorphemes (99.2%) with a preceding vowel (93.3%; all preceding segments were sonorants) and following pause (95.8%). This differs from the closest related variant, glottal stop replacement, in several ways: replacement can also occur word-medially, with a non-pausal following segment, and in words that are not monomorphemes. Regarding the preceding segment, a few glottal replacement tokens contained a preceding /l/ or nasal, which were not present for aspirated replacement tokens. All other possible preceding segments (deleted nasal, /r/, vowel) were roughly equivalent between the two variants. Aspirated replacement was proportionally used more by fourth graders (74.6%) than other age groups and by females slightly more (56.7%) than males.

Proportions of the glottal variants distributed by age show that aspirated replacement, reinforcement, and replacement have U-shaped trends (Figure 2). Glottal reinforcement, the most common glottal variant in American English (Roberts 2006), shows the highest proportions for each age

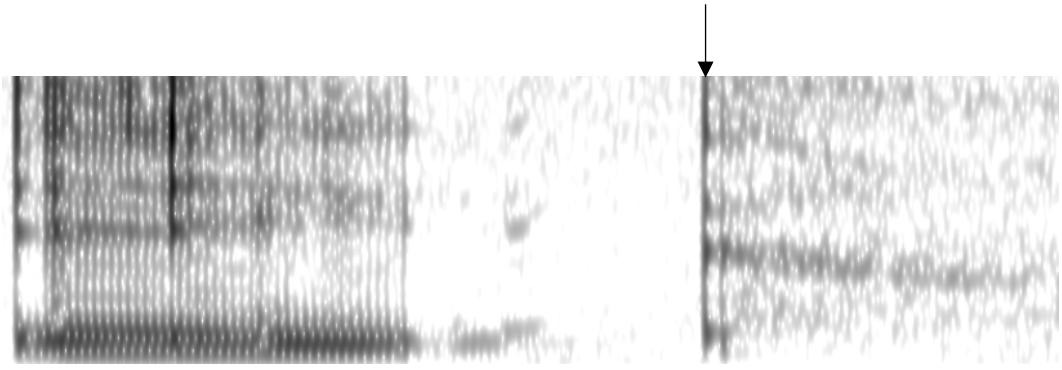

Figure 1: Spectrogram of *eight* [eʔʰ]. Arrow indicates glottal closure (followed by aspiration).

group. This variant is highest in the kindergarten age group, then declines in the fourth grade age group, and again rises for the high school group. In an opposite manner, replacement is lowest in the kindergarten age group, highest in the fourth grade age group, and again lowers at the high school age group. Reinforcement, the more common variant, and replacement, a marked regional feature, may be in lenition- and socially-motivated competition as a speaker ages. Further, aspirated replacement appears to be mirroring replacement production levels. Paired with the least amount of difference between reinforcement and replacement in the fourth grade speakers, the high proportion of aspirated replacement may indicate either an innovative or hyperarticulated glottal variant. Figure 2 also demonstrates a steady increase in creak production as age increases. This may indicate either acquisition of advanced articulatory mechanisms or, more likely, its alternate usage as a voice quality to indicate stance (Lefkowitz and Sicoli 2007, Mendoza-Denton 2011), and therefore acquisition of an advanced sociolinguistic variable. Gender proportions were nearly identical for these combined replacement variants (F=82.6%, M=84.1%).

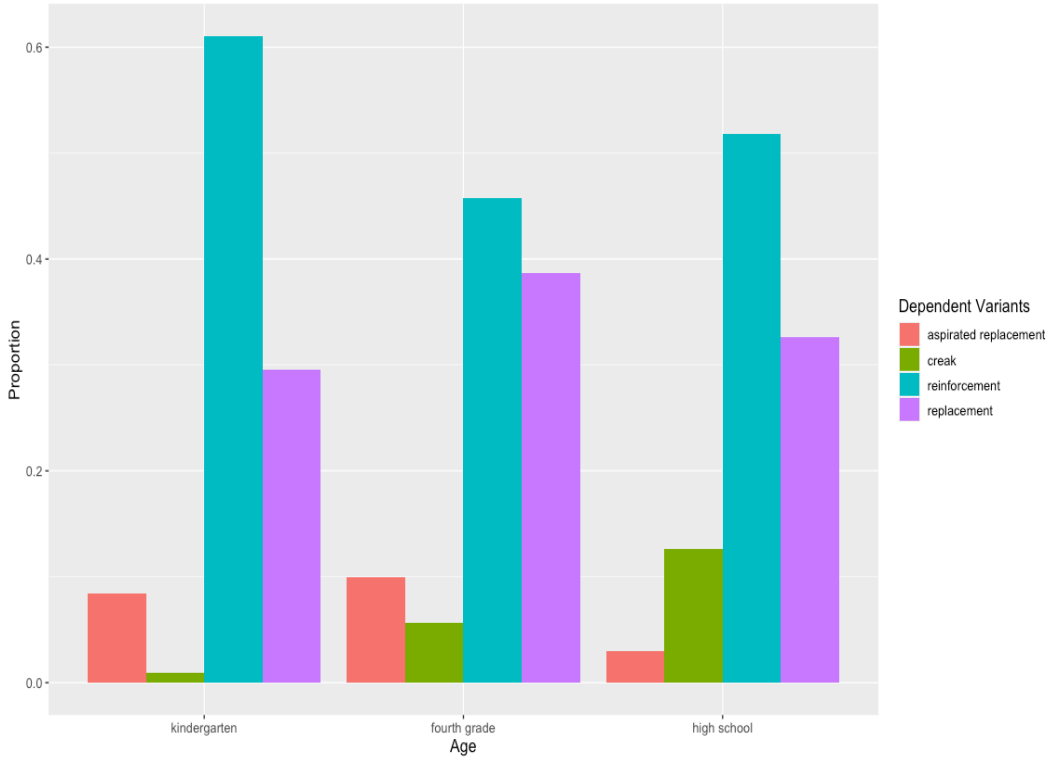

Figure 2: Proportions of glottal variants by age.

Due to the unevenly distributed tokens across the seven response variants, the variants were collapsed into a mixed-effects binomial logistic regression model using the lme4 package (Bates et al. 2015). The model type selection was chosen due to the categorical response variable (logistic regression) and the fixed and random predictors (mixed-effects). Only glottalized variants in the word-final position were included as the dependent variable. Replacement, aspirated replacement, and creak comprise the response variant and reinforcement is the alternative variant. The dependent variants were restricted in order to focus the analysis only on glottalized forms, while also focusing on the alveolar contact (or lack thereof) of the variants. This was motivated by the articulatory assumption that alveolar and non-alveolar contact would have bearing on the preceding and following segment probabilities. Additionally, the model was constructed with the consideration that aspirated glottal replacement is an innovation developing from glottal stop replacement, rather than /t/ more generally. As previously stated, creak can be understood as a series of glottal stops, and was therefore included into the collapsed response variants as well. Further, cross-tabulations revealed aspirated glottal stop replacement to only occur word-finally. Therefore, the analysis was restricted to this word position in order to reflect the variant's full envelope of variation. Forward selection of

the model began with preceding and following segments, as adding linguistic factors before social factors makes theoretically sense, and grammatical status has received less attention in glottalization studies (cf. Roberts 2016). Token and speaker were included as random effects. Preceding and following segment levels were collapsed to reduce model complexity. The model failed to converge with the addition of grammatical status, age, and/or gender. A cross-tabulation of collapsed preceding and following segments revealed an uneven distribution of the data, particularly with few tokens in a preceding deleted nasal and following pause environment, and the largest number of tokens in an intervocalic environment (though no cells were zero). Further, using the bobyqa optimizer with the inclusion of more fixed effects resulted in no convergence issues, but the two models with and without the optimizer were significantly different ($p<0.001$). Therefore, the model reached convergence when the two aforementioned random effects and the two fixed effects of preceding and following segments comprised the model, with no optimizer (Table 2). Both fixed effects reached significance ($p<0.001$).

Predictors	Estimate	S.E.	Pr(>|z|)	*n*	% replacement
preceding segment					
deleted nasal (baseline)				274	89%
nasal	-8.222	0.598	<0.001	369	2%
obstruent	-7.768	1.154	<0.001	63	2%
other sonorant	-2.032	0.314	<0.001	2771	55%
following segment					
nasal (baseline)				316	22%
obstruent	2.341	0.260	<0.001	580	61%
other sonorant	3.699	0.270	<0.001	1157	82%
pause	1.121	0.257	<0.001	1424	28%
intercept	0.676	0.375	0.071		

Table 2: Mixed effects logistic regression model (GLMM) for all glottal variants, including random effects of token (sd = 1.053) and speaker (sd = 0.826). More negative numbers indicate more glottal reinforcement than the corresponding baseline level, while more positive numbers indicate more glottal replacement variants than the corresponding baseline level. AIC = 2888.5.

For ease of interpretation, the probabilities of all levels of the two predictors are plotted in Figure 3, using the effects package (Fox and Weisberg 2019, Fox 2003). Both a preceding and fol-

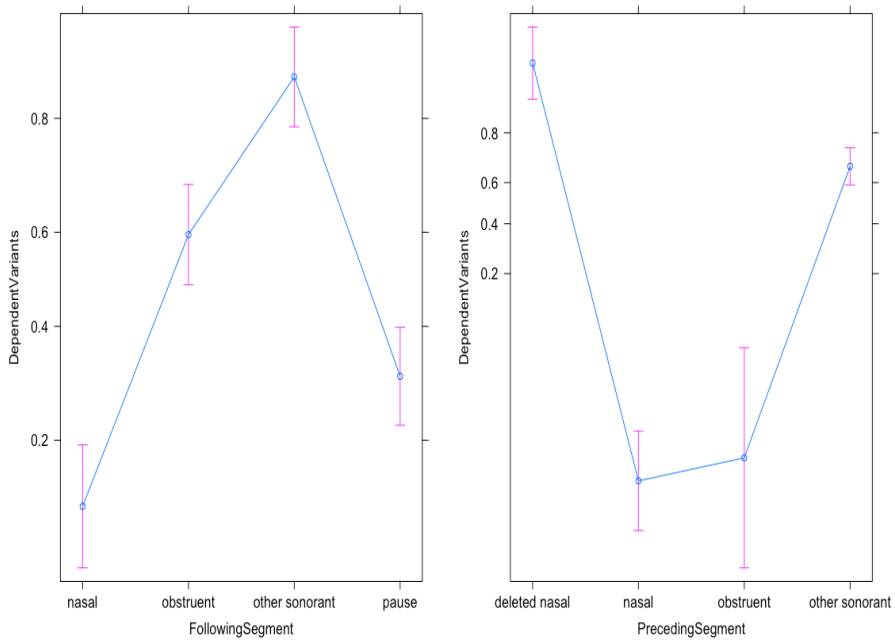

Figure 3: Fixed effects plots, showing probabilities for each level.

lowing nasal do not favor a glottal replacement realization, but rather a reinforced realization, which makes articulatory sense given the alveolar contact of the latter. The high probability for an intervocalic environment, coded as either "other_sonorant" or "deleted_nasal," supports Roberts' 2006 finding that glottal replacement can, in fact, be an allophonic option in Vermont word-finally, rather than the expected flap variant. Further, it is intriguing to note the higher probability for a preceding deleted nasal than that of other sonorants. In order to fully address any effects between an underlying preceding nasal and a glottal realization, the inclusion of word frequency and syllabic stress effects could prove a fruitful avenue to pursue.

5 Discussion

Phonetic motivations for aspiration following glottal stop replacement are not supported by a lenition account. That is, it is articulatorily more difficult to open the glottis after its closure, rather than maintaining closure, especially when it is *not* pre-pausal. Rather, phonetic motivations may be found in young speakers' tendency toward acoustic variability (Lee, Potamianos, and Narayanan 1999, Munson 2004) or hyperarticulation (Pettinato et al. 2016). As further demonstrated by Docherty and Foulkes' 2005 study of pre-aspirated /t/ variants, fine phonetic detail may be acquired by younger speakers, but differently implemented from that of older speakers. Given the similar linguistic conditioning of both aspirated and non-aspirated glottal replacement, speakers who use the aspirated variant could be simply articulating the allophone differently from that of other, older speakers. However, this does not negate possible social factors.

We would expect adolescent speakers to produce higher rates of an innovative variant (Eckert 1998), which was not present in the data. If we accept the above argument for acoustic variability, we would then expect a decreasing usage with increasing age. Because neither of these accounts neatly fit the data, a hyperarticulation account must be explored. We can then ask if children acquire the variation produced by adults, or if the variation they produce is inherent and bound by their individual acquisition processes. Different age groups can acquire variants at different rates, rather than a linear progression toward the adult production of a given social factor (Macaulay 1977). This lends to an argument that children are not linearly imitating adult speech, thus steadily working toward a targeted matched rate of production. Rather, it could be that they *are*, in fact, working toward a targeted adult rate, but at differing rates that are in flux. Therefore, the argument that young speakers are navigating the articulatory productions of such variants would support a hyperarticulation account, though not one of purely phonetic motivations.

It is possible that young speakers receive variable input of glottal replacement, and may therefore be in the process of sorting a range of exemplars. As suggested by Foulkes 2010, production biases may supersede frequency in exemplar storage. While it is difficult to motivate ease of production benefits of aspirated glottal stop versus unaspirated, *perception* biases may be at play if these young speakers are seeking to highlight the variant in their speech. Further, it may stand to question if innovative forms (from adolescent age groups) are more likely to be targets for hyperarticulation in pre-adolescent age groups, thus leading to a higher proportion of a hyperarticulated variant in preadolescent speech. However, this places phonetic variation first, and its socio-indexical meaning second. Due to the stigmatization of glottal stop in Vermont, its socio-indexical meaning cannot be ignored. Therefore, a place-identity linkage is likely the most influential social factor affecting the output. Rather than a reaction to this stigmatization that leads to a reduction in its production, these speakers may (consciously or subconsciously) be producing a hyperarticulated production in order to emphasize a socio-indexical variable (Bucholtz 2001), or more specifically, a strong place-identity linkage (Labov 1963).

It is possible that this hyperarticulation could have multiple meanings. For the high school speakers, it could be stance. Impressionistic evidence for the sociolinguistic usage of the variant in the high school speakers based on listening to the interview content may indicate a shift in the type of usage of the variant between age groups. The variant, when present in the high school data, often occurred during topics of conversation that were more sensitive than the remaining casual conversation (e.g. LGBTQ rights, vegetarianism, foster home experiences). However, no such observations were apparent for fourth grade and kindergarten speakers. This may be due to acquisition of, or change in, stance or style in speech. Further, stance indexed by another allophone, released /t/, has

been found elsewhere (Podesva 2006, Bucholtz 2001, Benor 2004). The lack of impressionistic observation for this operationalization of stance or style in the younger speakers would support an incremental acquisition understanding of sociolinguistic variation (Smith, Durham, and Fortune 2009). However, there still remains a larger proportion of this variant in the fourth grade speakers, which would not indicate a linear acquisition of a stance- or style-related variant.

As emphasized by Eckert 1998, it is necessary to consider age-related variation beyond that of a developmental perspective. Rather, a "mature-use" (157) perspective recognizes that sociolinguistic competence exists at any age, and the variants used are accurately and appropriately used by those speakers. Therefore, it is necessary to consider the aspiration beyond that of a purely articulatory discussion. That is, hyperarticulation (aspiration) of glottal stop replacement must be linked to sociolinguistic competence. Firstly, it may serve as an indicator of stance or style, as suggested above. Secondly, due to its stigmatized status, socio-indexical meaning may accompany its phonetic acquisition and likely serves a place-identity function. Thirdly, it could be the case that young speakers are using this variant for social reasons that are more locally meaningful to their social networks, which may or may not overlap with larger place-identity or stance work.

From what has been discussed in the current study, aspirated glottal replacement is most likely a hyperarticulated production of a stigmatized variant. Kindergartners are likely to have the least amount of exposure to a variety of speakers, as they have largely received input from their caregivers over the course of their lives. Of course, this does not negate exposure to, or production of, sociolinguistic forms, as these are inherently bound to speech. By fourth grade, however, exposure to the community has increased with the continued years of schooling and peer interactions. Additionally, the ability to parse variation can increase with age, such as was found by Nathan et al. 1998. Due to processing (parsing) differences, production should then also differ between age groups (at least of four and seven year-olds, as was included in Nathan et al 1998). Therefore, we would at least expect higher rates of production of socio-indexical forms by fourth grade speakers than would be produced by kindergartners. Additionally, Foulkes et al. 2010 found members of the same community to more accurately identify the gender of children's voices based on the variant used for oral stops (plain or laryngealized), than did listeners from outside of the community. This indicates that not only can individuals *employ* socio-indexical phonetic detail to indicate their own social affiliations, but they can also incorporate it into assessments made of other speakers' social affiliations. This indexical knowledge must, then, be incorporated into community members' speech. Given that children command community-specific variation, that variation must be meaningful for their individual selves.

Contextualizing the current findings across age groups within their likely exposure to and command of sociolinguistic variation, then, would lead to the following conclusion: aspirated glottal stop is not innovative given its lower usage rate among high school speakers, but must carry some socio-indexical meaning given its stigmatized status and higher articulatory focus employed by fourth grade speakers. Further, given its differing rates of aspiration across age groups, we should understand aspirated glottal stop to operate uniquely across age.

6 Summary

This study asked whether or not an articulatory variation of a stigmatized variant patterned differently (linguistically and socially) from that of the "baseline" variant. Although age groups did produce this variant differently, linguistic evidence does not necessarily support an innovative form.

In considering a lenition or social account for glottalization, at least in Vermont, the current study supports a combined motivation. That is, glottalization is a weaker, lenited production of /t/, and therefore a lenition account supports its initial emergence as an allophone. However, the articulatory variation that exists within glottalization that is stratified by age in the current study supports an additional, social explanation. The aspirated variant produced by fourth graders can be contextualized among other glottalization variation findings (Docherty et al. 1997, Eddington and Savage 2012). Hyperarticulation due to children's phonetic variability may largely account for the aspiration, but a discussion of socio-indexical acquisition and production should be included in this account. That is, this hyperarticulation does not operate linearly across age, and the stigmatized status of glottal stop in Vermont merits consideration of its socio-indexical meaning, and therefore, the acquisition of such. This study contributes to work on phonetic variability in children's speech and the acquisition of sociolinguistic information, especially of stigmatized variants.

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