A comparison of turn-of-the-century and turn-of-the-millennium speech in Georgia

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Abstract: The Elsewhere Shift, defined here as the lowering and retraction of the front lax vowels, is a now-widespread phenomenon in North American English. However, few studies document its presence in the South. This study analyzes speech from two corpora of Georgians, one representing contemporary speech and another representing language from a century ago, to demonstrate the presence of the Elsewhere Shift in the South. Generalized additive mixed-effects models fit to formant measurements extracted from these corpora suggest a recession of traditional Southern dialect features (glide-weakening in PRICE, the Southern Vowel Shift) and the adoption of the Elsewhere Shift (the low back merger, retracted front lax vowels), both in relative position in the F1-F2 space as well as formant trajectory shape. In addition to providing the first real-time analysis of English in urban Georgia, this study confirms the Elsewhere Shift's status as a pan–North American dialect feature.

1 Introduction

One of the core topics of investigation in dialectology is that of change in regional varieties of English. Thanks to early large-scale projects conducted decades ago, researchers today are far enough removed from these founding studies (and the invention of portable recording equipment) that they can begin to assess phonetic changes over many decades, whether they be of the same people over multiple points in time (Gahl & Baayen 2019; Harrington, Palethorpe & Watson 2000; Kwon 2018; Rodriguez 2019; Sankoff & Blondeau 2007; Stanley & Renwick 2016) or revisiting the same community some time later (Choi 2005; Hay et al. 2015; Labov, Rosenfelder & Fruehwald 2013). Other large-scale projects have provided invaluable insight into snapshots of entire counties, such as the *Atlas of North American English* (Labov, Ash & Boberg 2006) compared to the Linguistic Atlas Project, or the *Dialect App* (Leemann, Kolly & Britain 2018) compared to the *Survey of English Dialects.*

This study analyzes two corpora of Georgians in the southeastern United States, with speakers separated in time by approximately 100 years, showing that the Elsewhere Shift has supplanted the Southern Vowel Shift in urban Georgia speech. Like what has been found in other real-time studies, nearly every vowel has undergone change in some way: the older Georgians use traditional Southern American English speech patterns while the younger Georgians use patterns that are now widespread across North America. The trajectory of these changes is not simply a reversal of Southern dialect features but rather is in the direction of the Elsewhere Shift. This study offers a unique insight into phonetic change over time in the South, a detailed description of vowels in urban Georgia speech, and further evidence of the pan–North American nature of the Elsewhere Shift.

2 Background

2.1 Two vowel shifts

The varieties of North American English can be broadly classified into three types, based on the ongoing vowel shifts occurring in contemporary speech (Labov 1991). The first vowel shift is the Northern Cities Shift, though it is not of importance in this paper. The most relevant shift in the speech of Georgians is the Southern Vowel Shift (SVS; Labov, Yaeger & Steiner 1972; Thomas 2001; Fridland 2012; Labov, Ash & Boberg 2006; Renwick & Stanley 2020). This shift is argued to have begun with glide-weakening of PRICE so that, in some phonetic contexts, /aɪ/ is realized as [ɑː]. The next stage of the shift is the "swapping" of the nuclei of FACE and DRESS accompanied by some degree of diphthongization. The last stage, a similar swapping of FLEECE and KIT, occurs only in some areas of the South, like Appalachia and Alabama (Labov, Ash & Boberg 2006; Fridland 2012).

The other shift is the Elsewhere Shift,[1] though it not as obviously relevant to the South. Like the SVS, a change in a low vowel accompanies the movement of front vowels. The first stage of this shift is argued to be merger of LOT and THOUGHT (Becker 2019). In the South, since THOUGHT traditionally had a back upglide, this merger results when that glide is lost (Irons 2007). This has

[1] This shift goes by many names, including the *California Vowel Shift*, the *Canadian Vowel Shift*, and most recently the *Low-Back-Merger Shift* (Becker 2019). Because this shift applies to the elsewhere allophones of the front lax vowels, I use the term *Elsewhere Shift* in this study (cf. Stanley 2020: 14–15).

occurred in areas like Alabama (Feagin 2015), Texas and Oklahoma (Bailey, Wikle & Sand 1991; Thomas 2001), West Virginia (Labov, Ash & Boberg 2006), and Kentucky (Irons 2007).[2] This merger is then argued to trigger the retraction and lowering of TRAP, which then, in turn, causes DRESS and KIT to lower and retract, though the specific instantiation of the shift, the relative timing of its component parts, and its phonological implications vary from community to community (see Becker 2019). Though first described in California (Hinton et al. 1987) and Canada (Clarke, Elms & Youssef 1995), this shift is sweeping across the continent. There are a few scattered reports that elements of the Elsewhere Shift are present in areas like Texas (Thomas 2004: 308) and North Carolina (Dodsworth & Kohn 2012), but there is generally a lack of research on the Elsewhere Shift in the South; its status in younger speakers in Georgia and surrounding areas is unknown.

While the Elsewhere Shift spreads like wildfire across the United States, the vitality of the SVS and the Northern Cities Shift appear to be declining. Dodsworth & Kohn (2012) find the SVS retreating in Raleigh due to in-migration from Non-Southerners. Similarly, recent findings in the North (Nesbitt, Wagner & Mason 2019) suggest that the Elsewhere Shift is in fact replacing the Northern Cities Shift. Thomas (2019) suggests that North American English is becoming more homogeneous than ever, at least among white Americans, and that the Elsewhere Shift may be the driving force of this dialect leveling.

2.2 English in Georgia

While some areas of the American South have enjoyed a rich history of sociophonetic studies, there are relatively few studies focused on English in Georgia. It has, of course, been included in regional and national surveys like the *Linguistic Atlas of the Gulf States* (Pederson, McDaniel & Adams 1986) and the *Atlas of North American English* (ANAE; Labov, Ash & Boberg 2006) where it is established that Georgia is firmly within the Southern dialect region. Based on these studies, Georgians merge KIT and DRESS before nasals (the "pin-pen merger") and front GOOSE and GOAT. Outside of the Atlanta metropolitan area, Georgians pronounce PRICE with a weakened glide (in some contexts more than others), "swap" FACE and DRESS as part of the SVS, and pronounce THOUGHT with a back upglide. However, a large number of non-Southerners relocated to metro

[2] However, the low back vowels are not necessarily merging everywhere in the South: Fridland (2015: 562) finds that "there is little evidence that any Memphians are moving toward a fully merged low-back vowel system."

Atlanta in the 1990s and many of features characteristic of the South are missing there. In fact, the speech there is reminiscent of the Midlands. However, the isogloss for nearly every Southern dialect feature listed in the ANAE includes some part of Georgia, and areas like the southeast, the coast, the northern border, and metro Atlanta include features not found elsewhere in the state. Clearly, more analyses of regional, ethnic, and temporal variation in Georgia English are needed.

In an early study of speech in Atlanta, Sledd (1966) provides phonetic transcriptions of vowels in a variety of environments. However, the bulk of the descriptions are for prelateral and prerhotic vowels rather than those elsewhere. Since those preliquid environments are excluded in the current study, it is difficult to compare this study to Sledd's findings.

Based on recent literature though, the Southern features are conditioned by race/ethnicity. While the SVS is found in white Americans and African Americans in the Atlanta area, as evidenced by the position FACE and DRESS (Andres & Votta 2009; Prichard 2010), Korean Americans do not, nor do they exhibit as much back vowel fronting (Kim 2018; 2020). While ethnic variation beyond white Americans and African Americans is understudied in the United States, these studies allow a glimpse into the kind of variation found in Georgia.

Variation in Georgia speech is also conditioned by social class. For example, Dekker (2018) examined glide weakening in PRICE in a rapid anonymous survey in Oconee County grocery stores by eliciting "aisle five" from workers. He found that workers in lower-end stores, defined as those that played country music on the radio, used monophthongal PRICE more than those in higher-end stores, defined as those that sold sushi.[3] This suggests some amount of prestige being associated with non-Southern accents and that the middle class may sound less Southern than working class.

These few studies show that variation exists within Georgia. Nevertheless, regional variation and change across time are unexplored. This paper seeks to address temporal change in urban Georgia speech.

2.3 The current study

This study seeks to answer two questions, each of which fill apparent gaps in the literature. First, is the Elsewhere Shift found in Georgia? While the shift has been documented in many other

[3] In the places he visited, Dekker finds that grocery stores that played country music and grocery stores that sold sushi were mutually exclusive!

parts of the country, there is little research on its presence in the South. As this study will show, the evidence is overwhelmingly in the positive, showing that the Elsewhere Shift can now be found in the southeast. Second, how have vowels, particularly their formant trajectories, changed in urban Georgia speech? There is relatively little work analyzing linguistic change in time in Georgia, none of which have explored vowel formant dynamics. This paper provides evidence for the recession of traditional Southern vowel features, both in relative position in the F1-F2 space and in formant trajectory shape.

3 Methods

3.1 Data

Data for this study came from two sources. First, a collection of older recordings, which I will call the "legacy corpus," ultimately come from the *Linguistic Atlas of the Gulf States* (LAGS; Pederson, McDaniel & Adams 1986), a collection of linguistic atlas interviews conducted across eight southern states in the 1970s and early 1980s with older, primarily rural, native southerners. The *Digital Archive of Southern Speech* (DASS; Kretzschmar et al. 2013) is a 64-speaker subset of LAGS that is balanced for sex, region, and a host of other demographic factors. Despite some of the recordings being 50 years old, DASS has only recently been digitized and transcribed (Olsen et al. 2017), offering a fresh insights into speech from previous generations of Southerners.

Eight Georgians are included in DASS. However, since there were just two African Americans in this subset (a man and a woman), I felt that the data was too sparse to be representative of all African Americans in Georgia and chose to exclude them from this analysis. The ethnic background of the other speakers is unknown other than the label assigned them by the original fieldworkers: "Non-Black." Of those six speakers, five were born between 1887 and 1903 while the last was born in 1956. Again, because I felt that just one speaker was not enough to be representative of an entire generation of Georgians, that youngest male was excluded from analysis. This legacy corpus therefore consists of three women and two men that averaged 73 years of age when they were recorded between 1970 and 1975. Two of them completed some college while three had between eight and ten years of formal education.

Linguistic Atlas–style interviews consisted of long questionnaires aimed at eliciting lexical and grammatical dialect features while encouraging conversation, oral narratives, and other spontaneous speech. The interviews themselves lasted several hours each. The recording quality

reflects the available portable technology of the time, and while phonetic analysis is possible with DASS (Olsen, Olsen & Renwick 2017; Renwick & Olsen 2017; Renwick & Stanley 2020; Stanley et al. manuscript), it is admittedly far noisier than data collected with modern equipment.

The second corpus of data comes from undergraduates recruited from the University of Georgia in 2017. Of the 33 people recorded, the 21 who reported being raised in Georgia were selected for inclusion in this project. However, like the legacy speakers, African Americans were undersampled, and the one person who self-identified as Black was excluded on the grounds of data sparsity. Language change in ethnic minorities in Georgia, to build upon Andres & Votta's (2009) study, will be left for future work. The remaining 20 speakers were born between 1994 and 1997, over a century after the oldest of the legacy speakers.

This corpus is, admittedly, very different from DASS. These 20 speakers, balanced for sex, were all approximately the same age when recorded. They were recorded in a sound-attenuated booth reading the same list of 300 sentences, all of which were selected from COCA (Davies 2008), yielding approximately 30 minutes of audio per speaker. The self-identified race/ethnicity of these younger speakers was predominantly white, though there were three Asians, one Latino, and one person with mixed race/ethnicity. For consistency with the original "Non-Black" label in DASS, these minority groups are included in this analysis.

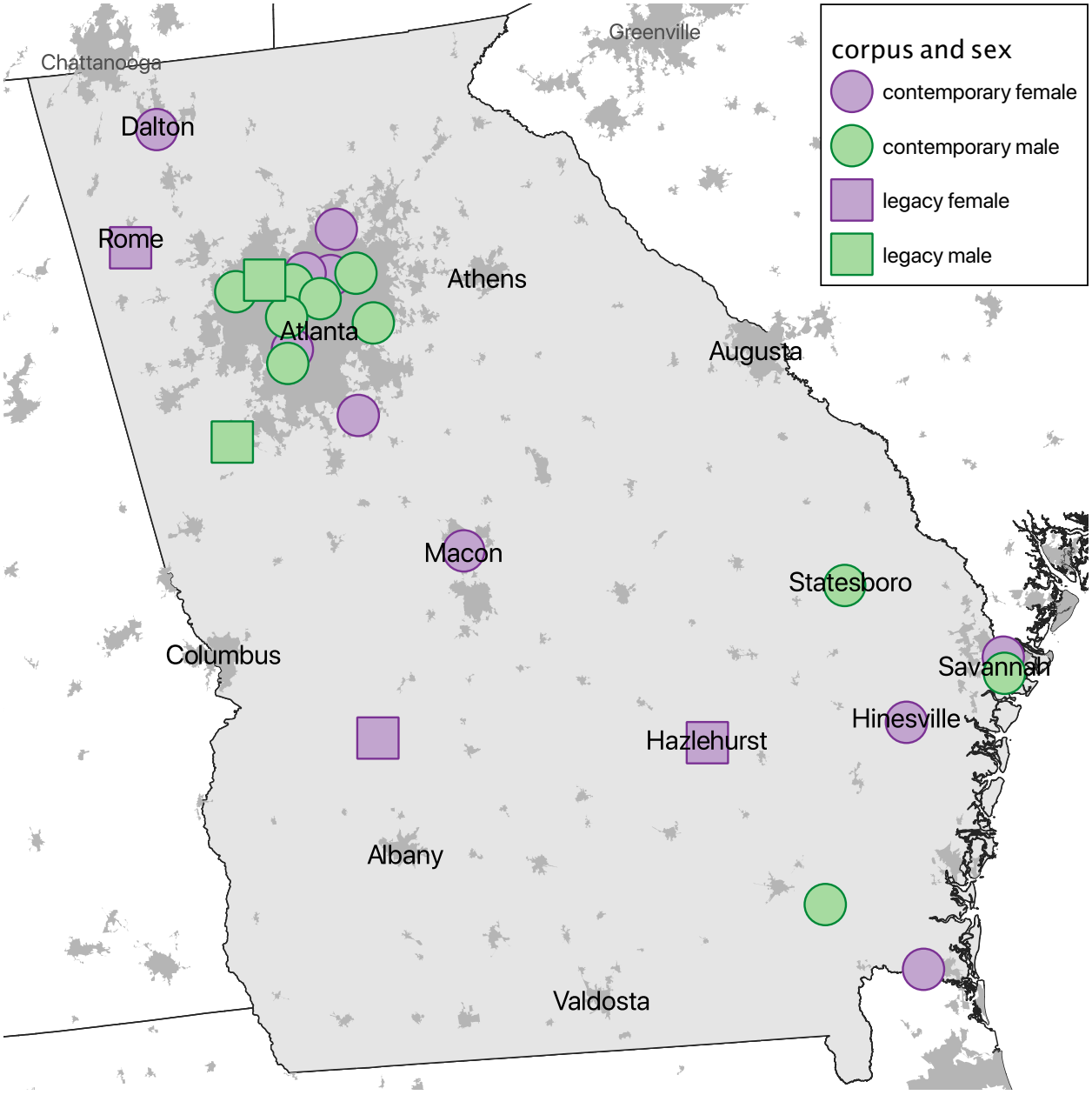

Figure 1: Approximate geographic locations for the 25 speakers in this study. Color represents sex and shape represents corpus. Gray areas represent metropolitan regions.

While the regional background of the participants is different between the two corpora, they reflect shifts in population that have taken place over the last century in Georgia. As seen in Figure 1, just one of the legacy speakers comes from the Atlanta metropolitan area while the other four are spread throughout the state. Because LAGS sought to demonstrate variability across the South, its speakers are not necessarily a random sample meant to be representative of all of Georgia;

instead, speakers were chosen to represent a wide range of backgrounds, as evidenced in these five legacy speakers. In contrast to the primarily rural DASS speakers, 12 of the contemporary speakers come from Atlanta or its suburbs. In some ways, this is a cause for concern since there is a mismatch between the proportion between urban and rural speakers. However, this difference reflects somewhat the changing demographics of Georgia. Atlanta has grown considerably in the last century, and a much larger proportion of Georgians do in fact live in the Atlanta metropolitan area. So, while change in regional variation in Georgia cannot be identified with these two corpora, these speakers do a better job at capturing the differences between older, white, rural Georgia speech to younger, white, urban Georgia speech at two snapshots in time.

To put it differently, this is not a typical trend study. Ideally, two groups that are separated in time, but are otherwise as alike as is feasible, are compared so that time is the only variable. Instead, this study analyzes two groups near the extremes of the vowel shifts analyzed here, with the older, rural, legacy speakers predicted to have the most conservative SVS and the younger, urban, contemporary speakers predicted to have the most innovative Elsewhere Shift. A more prototypical trend study of English in Georgia may find smaller differences than those presented here, even if the samples are born 100 years apart, but because the two corpora in the current study reflect not just a difference in birth years but also age and urbanity/rurality, the linguistic differences will be magnified. Consequently, it will be difficult to disentangle the time variable from other factors like age, locality, amount of education, and speaking style present in these two corpora. All this is to say that the differences presented in this paper should be interpreted as a combination of these factors rather than simply as change in time.

3.2 Processing

Though the two corpora were originally recorded using very different methods, the way they were processed was much more similar. As described in Olsen et al. (2017), the legacy recordings were transcribed manually by trained student workers. Meanwhile, since the quality of the contemporary speakers' recordings allowed for it, those files were automatically transcribed using the DARLA web interface (Reddy & Stanford 2015). Admittedly, automatic speech recognition is still a developing technology and DARLA's system readily admits that there will be errors; however, it does a very good job of at least detecting the correct vowel if the word itself is wrong. Since the focus of this analysis is on shifts in vowels and less so on individual word-specific characteristics,

this method seemed adequate at this time and a more accurate analysis will be reserved for future work.

Once the transcriptions were complete, the processing pipeline was the same for both corpora. The transcriptions and accompanying audio were subject to forced-alignment using the Montreal Forced Aligner (McAuliffe et al. 2017) and formant measurements at 20%, 35%, 50%, 65%, and 80% into the vowels' durations were extracted from stressed vowels using FAVE (Rosenfelder et al. 2014). For the legacy corpus, these steps were done using in-house installations of the software while the contemporary corpus was processed with this software using DARLA.

At this point, potentially noisy data was excluded from analysis and the two corpora were brought closer together to make them comparable. Only stressed vowels occurring before obstruents were retained for analysis to avoid the phonological effects of following nasals and liquids on vowels.[4] For each vowel for each speaker, the furthest 5% of tokens, as measured by the Mahalanobis (1936) distance in the F1-F2 space, were excluded to remove potentially bad data due to measurement errors.[5] The data was then normalized using the method described in the *Atlas of North American English* (Labov, Ash & Boberg 2006) and then transformed into Barks (Zwicker 1961) using the Traunmüller (1990) formula.

The resulting dataset included formant measurements from 59,682 vowels: 35,357 from DASS and 24,325 from the contemporary speakers. The number of tokens per vowel per corpus is presented in Table 1:

Table 1: Number of vowel tokens per vowel per corpus. While all vowels are visualized in this paper, those that are not analyzed in depth are in gray.

[4] I acknowledge that because DARLA's word-level transcriptions are not completely reliable (even in lab quality audio like the contemporary corpus) the information about the following segments is likewise not accurate. A preliminary check at the transcriptions revealed that the words are indeed not always correct, but at least the following segments were slightly more accurate. I am taking a risk by only keeping what appear to be preobstruent tokens in this study since that filter is based on information that is not always correct, meaning there is inevitable noise introduced into the analysis. Future analysis of this data will have to rely on accurate transcriptions to get a better picture of this data.

[5] Data from all timepoints were pooled together when determining outliers.

	Corpus		
Vowel	*Legacy*	*Contemporary*	**Total**
FLEECE	1,632	2,405	4,037
KIT	6,613	2,176	8,789
FACE	1,792	2,483	4,275
DRESS	2,967	4,063	7,030
TRAP	5,866	3,304	9,170
LOT	3,105	1,395	4,500
THOUGHT	868	924	1,792
STRUT	5,249	1,338	6,587
GOAT	1,051	1,571	2,622
FOOT	1,816	693	2,509
GOOSE	1,088	1,012	2,100
PRICE	2,062	1,972	4,034
MOUTH	1,248	989	2,237
Total analyzed	16,660	14,141	30,801
Total	35,357	24,325	59,682

3.3 Analysis

Vowels in Southern American English generally change over their duration in meaningful ways more so than in other American English dialects (Koops 2010; 2014; Jacewicz & Fox 2013; Holt & Ellis 2018; Farrington, Kendall & Fridland 2018; Renwick & Stanley 2020; Stanley et al. manuscript). Extracting just one pair of F1-F2 measurements is like taking a single snapshot of a moving object and would miss out on the formant movement that is inherent in these vowels (cf. Morrison & Assmann 2013). So, to adequately analyze the formant dynamics of these Southern vowels and to properly assess the change in their movement over time, I model the data using generalized additive mixed-effects models (GAMMs; Wood 2017). Unlike linear models, GAMMs can account for the non-linear relationship between a dependent variable and predictor variables. In this case, a vowel's formant frequency as a function of time may not necessarily be linear, so a model that allows for the flexibility to capture that curve is required. For more information on GAMMs in linguistics, see Sóskuthy (2017).

After pooling together data from all speakers and both formants, separate GAMMs were fit to each vowel with identical specifications. The dependent variable was the Bark-transformed, normalized formant frequencies, meaning that the models fit a single underlying formant trajectory to each vowel. That underlying curve is hardly interpretable, though, since it lies somewhere between F1 and F2, so a three-way interaction term was included in the model as the main dependent variable. This interaction term incorporates formant (F1, F2), speaker sex (female, male), and corpus (legacy, contemporary) and allows the model to adjust that underlying curve independently for each of the eight combinations of those factors. This interaction term was incorporated as a parametric effect and as a "smooth," allowing for each combination's formant curve to reposition and reshape itself freely in the F1-F2 space to fit that subset of data. Furthermore, the interaction between that term and log-transformed duration was incorporated into the model to account for vowel duration in the modeling.

In addition to these effects, speaker was added to the model as a random effect with by-formant adjustments. Specifically, speaker was incorporated as a random smooth, which allows each speaker's predicted curve to freely vary in position and shape. The speaker-level random effect accounts for some of the idiosyncratic behavior in individuals that exist but are not of interest to this study. Consequently, any effects in the model relating to sex or corpus are interpreted to be above and beyond these speaker-level idiosyncrasies.

Normally, word would also be included in the random effects structure. However, as an anonymous reviewer points out, because the automatic transcriptions from DARLA do not guarantee accurate transcriptions at the word-level, any modeling that depended on the individual words from the contemporary corpus would be inaccurate.[6] Therefore, word was not incorporated into the model structure at all.

Though this study only analyzes preobstruent tokens, meaning many of the allophones of the vowels included in this study have been filtered out, some language internal variation exists with the PRICE vowel. A major contributing factor in the realization of PRICE is the voicing of the following segment. While glide-weakening before voiced segments is more widespread in the South, glide-weakening before voiceless segments is socially conditioned and more geographically

[6] Originally, a model was run with word as a random slope and intercept, interacting with formant. A comparison of the visuals produced with that model and the current model showed very little difference in the output.

restricted (Labov, Ash & Boberg 2006, inter alia). Nevertheless, the PRICE phoneme was modeled without regard to its allophones for two reasons. First, as mentioned previously, the information about the following segment in the contemporary corpus is somewhat unreliable because of the automatic transcriptions, and separating the allophones based on this information may produce inaccurate results. Despite this shortcoming, an attempt was made to include allophone in the model for PRICE, but because there were only two men in the legacy corpus, the model failed to fit a curve due to a combination of data sparsity and too much variance. So, the second reason PRICE's allophones were not analyzed was because it was impossible to fit a model with the current specifications.

Because the statistical summary of a GAMM is difficult to interpret compared to that of linear models, the primary tool for analyzing the output this model was through visualization of predicted formant frequencies. For more examples of fitting GAMMs to vowel trajectories, see Warburton (2018), Gahl and Baayen (2019), Sóskuthy et al (2018), Stanley (2020), & Renwick and Stanley (2020).

4 Results

Figure 2 shows predicted formant trajectories for all vowels for men and women from both corpora. One of the most obvious differences between the legacy and contemporary speakers is the lack of formant movement and the overall compression in F1. Though duration was incorporated into the model, these differences are likely a reflection of speaking style. Recall that the legacy speakers were recorded in natural conversion, the speech rate of which is typically faster than would be expected from the contemporary speakers who were reading in an unnatural environment. Shorter vowel duration often leads to more centralized vowels and less formant movement. Subsequent plots will continue to separate the corpora, but the two facets will center the visualization on the trajectories they display to make the two more comparable.

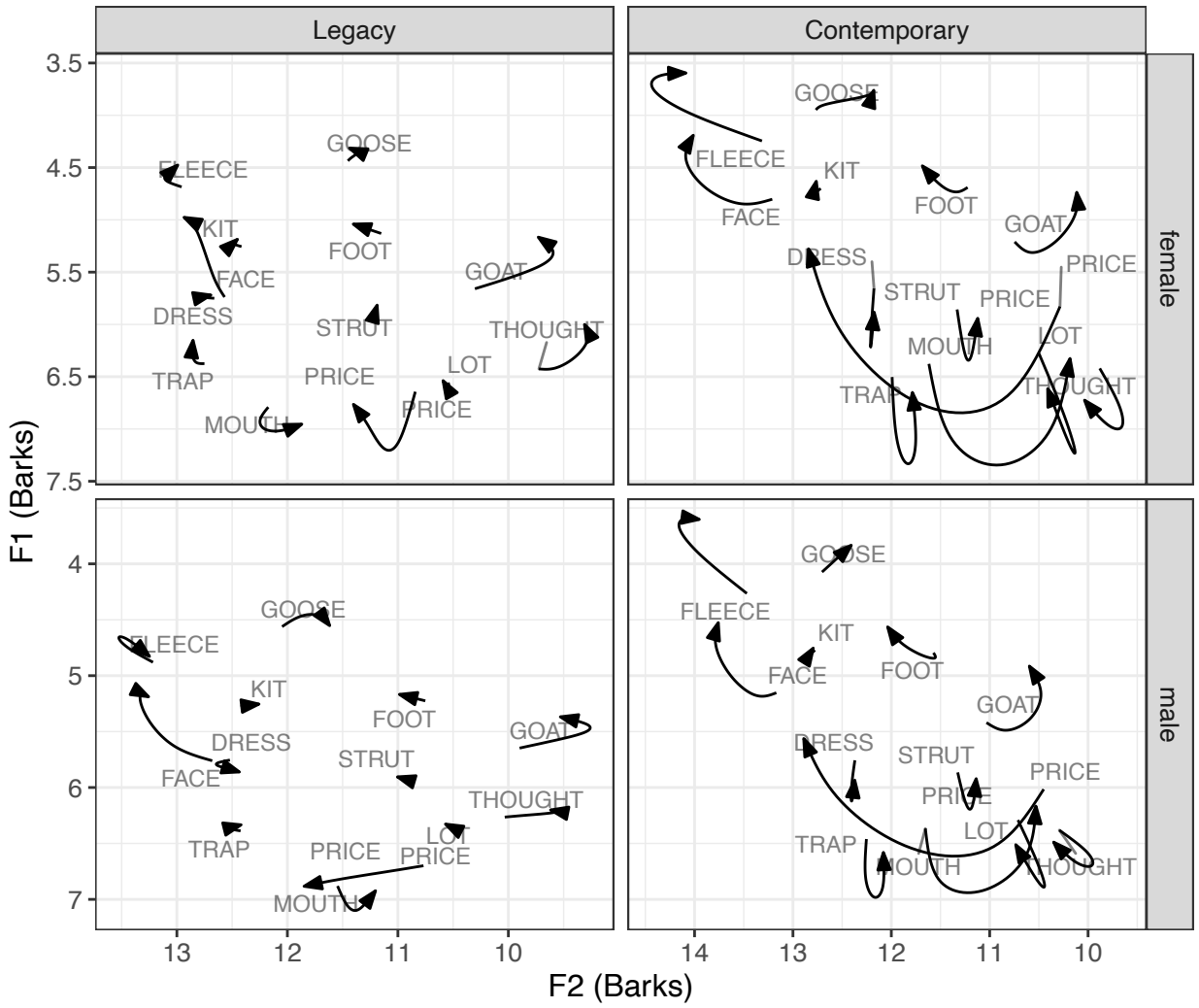

Figure 2: Predicted formant measurements by sex and corpus. Vowel labels are placed near the vowels' onsets while arrows indicate their offset.

While all vowels were incorporated into the model and are included in the figure, this paper will only discuss a subset of them in detail. In this section, I describe the results found for glide-weakening in PRICE, the SVS, the low back merger, and the Elsewhere Shift.

4.1 Glide-weakening in PRICE

The model for PRICE suggests that a great deal of glide-weakening has been lost in Georgia. In other words, PRICE is far more diphthongal than it once was, though this is unsurprising given that PRICE was diphthongal in Atlanta in the ANAE. Figure 3 illustrates these vowel trajectories in the context of the vowel space. The data strongly suggests that there has been a change in real time

over the past century. Nevertheless, other factors such as speaking style and urban/rural distinction may account for some of these differences as well.

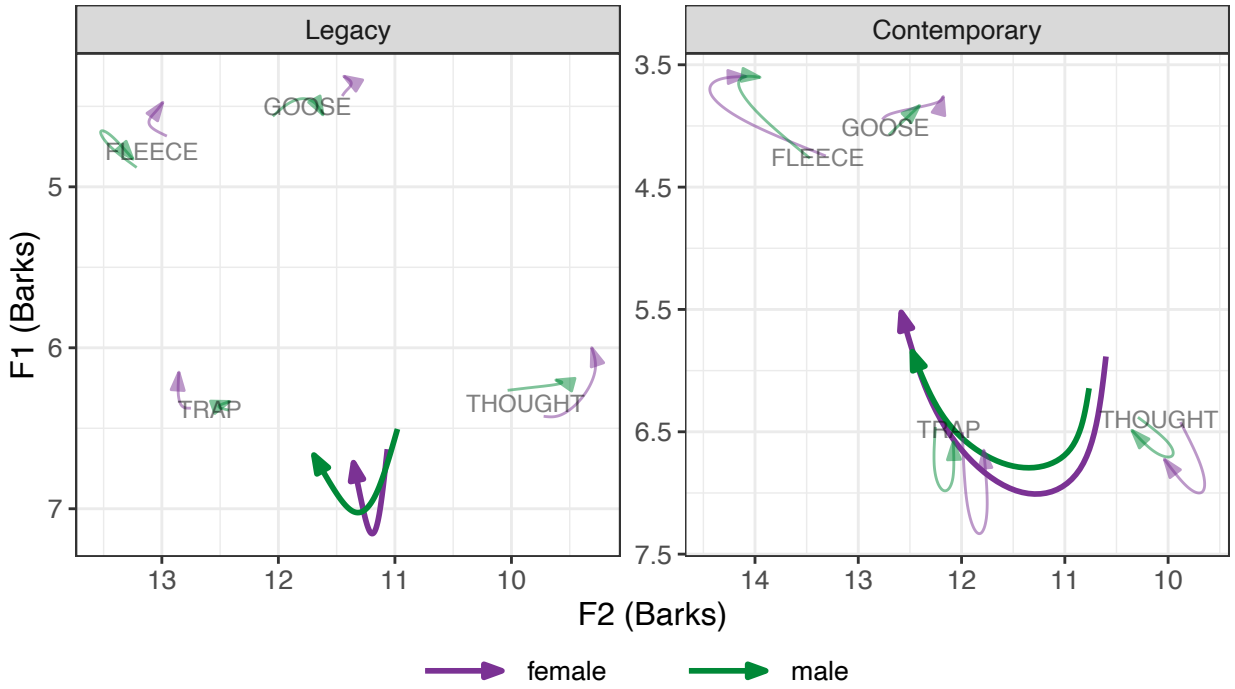

Figure 3: PRICE, by corpus and sex. Grayed trajectories indicate vowels at the periphery of the vowel space for context. Arrows indicate vowel offsets.

Though there are just two points in time being compared, based on trajectory length, there is some indication that this loss of glide-weakening is a change in progress in urban Georgia speech. The length for these trajectories was calculated by sampling the predicted curves at 51 time points, calculating the Euclidean Distance between adjacent pairs in Barks,[7] and finding the sum of those 50 line segments.[8] The legacy speakers' trajectory lengths were 1.03 for the men and 1.26 for the women while among the contemporary speakers, the men's was 2.55 and the women's was 3.57. The difference within the legacy speakers was relatively small while the contemporary women's trajectory length was 40% longer than their male counterparts. Under the assumption of a female-led linguistic change (Labov 2001), it is hypothesized that the loss of glide-weakening in PRICE

[7] Euclidean Distance is calculated in Barks rather than Hz so that both F1 and F2 have approximately equal weight in the calculation.

[8] This is the same technique described in Fox & Jacewicz (2009) and Farrington et al. (2018), except I am summing the length of 50 segments instead of four.

will continue to progress in urban Georgia speech. On the other hand, among many other characteristics, Southern vowels index maleness (Preston 2018 inter alia), so it may be that these contemporary men were adopting speech forms that index characteristics that reinforce their own gender expression.

4.2 The Southern Vowel Shift

The relative position of FACE and DRESS among these speakers is illustrated in Figure 4. Since swapping of FLEECE and KIT is not expected among these Georgians,[9] even among the legacy speakers, they are not displayed here since their results were largely unsurprising. However, the mid vowels in the SVS are subject to a high degree of variation and social perception (Kendall & Fridland 2012; Renwick & Stanley 2020), so FACE is the focus in this section. DRESS will be revisited in §4.4.

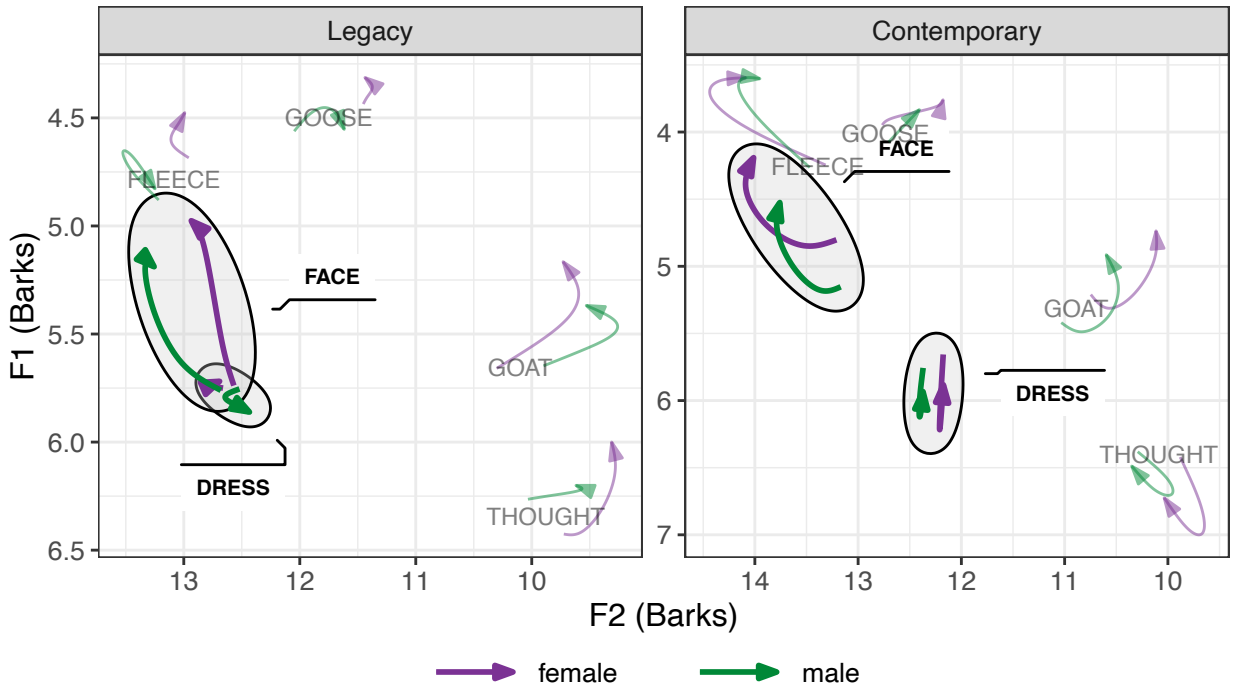

Figure 4: The positions of FACE and DRESS, by corpus and sex.

[9] None of the speakers were from the southeast corner of the state where the ANAE finds swapping of FLEECE and KIT.

No group appears to have prototypically Southern realizations of both vowels. The legacy speakers' FACE is quite diphthongal, beginning relatively low and very close to the onset of DRESS. At first glance, the women's FACE appears to be more retracted than the men's, though a comparison with FACE and FLEECE's relative F2 position suggests these differences between the sexes are more likely the result of the normalization procedure failing to fully account for inter-speaker differences (see Johnson 2020). DRESS is rather monophthongal, not showing any of the 'breaking' or triphthongization found in other Southern varieties (Feagin 1987).

Meanwhile, the younger speakers' vowels are quite divergent from traditional Southern mid front vowels. FACE is relatively high in the vowel space and is less diphthongal, in line with mainstream North American English (Olive, Greenwood & Coleman 1993). The position of face is still higher and fronter, in line with what is expected of younger Atlantans (Labov, Ash & Boberg 2006). The younger men's FACE is quite a bit lower than their female peers, approximately midway between contemporary women's and the legacy speakers' FACE. This may indicate another change in progress and suggests that this raising from traditional Southern FACE to a more contemporary raised FACE is still ongoing. Alternatively, like the gender differences in PRICE, the differences between younger men and women may be another manifestation of speakers embracing or avoiding what these shifted vowels index (Kendall & Fridland 2012; Preston 2018). Or, it is a relic of the normalization procedure. Perhaps the data reflects a combination of these three factors.

4.3 The low back vowels

Another finding from the models was the relative position of the low back vowels. The low back merger is not expected to be found among the legacy speakers since it was not widespread in Southern American English at that time. It is therefore unsurprising to find a distinction between LOT and THOUGHT among the older generation in this study (Figure 5). LOT is firmly back and THOUGHT exhibits its characteristic upglide, a feature of traditional rural white Southern speech (Thomas 2004).

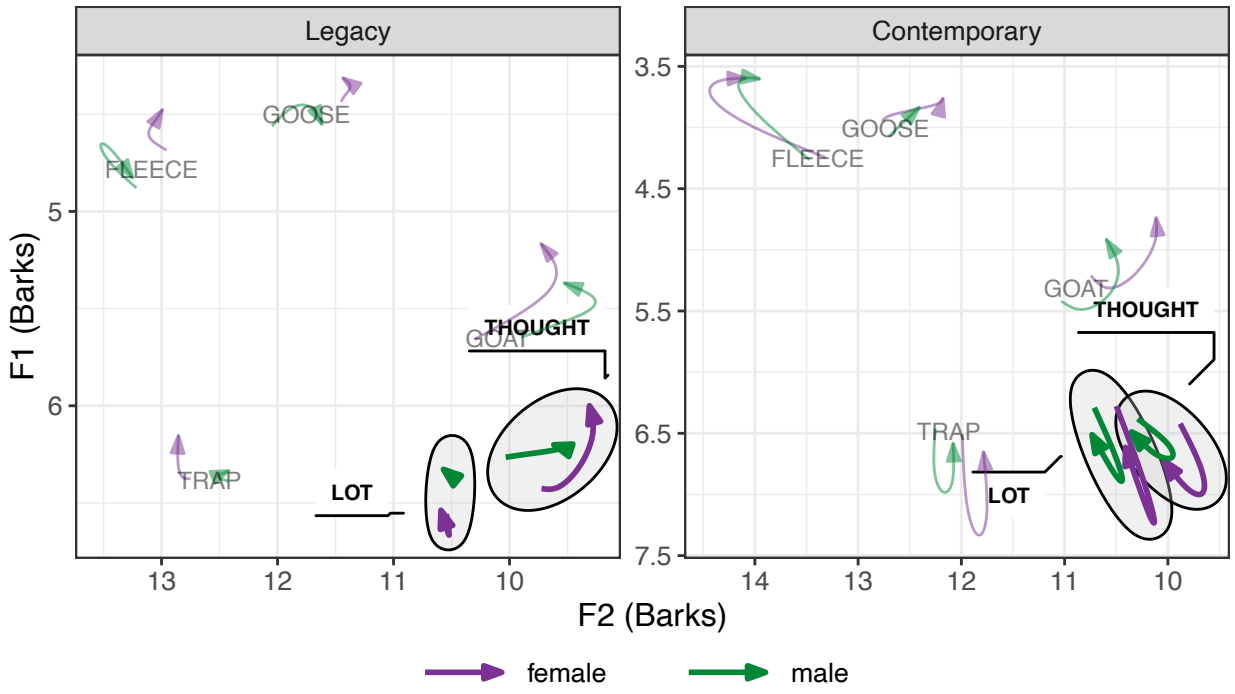

Figure 5: The position of the low back vowels, by corpus and sex.

The contemporary speakers, on the other hand, have clearly shifted and altered the trajectories of both vowels. LOT is backer and raised slightly while THOUGHT is lowered so that the two overlap considerably in the vowel space, somewhere between their historic distributions. Meanwhile, LOT changed from being a very monophthongal vowel (approximately 0.19 Barks for the older speakers) to considerably more diphthongal (1.46 Barks in the younger speakers). Furthermore, while THOUGHT became more diphthongal as well, it most notably altered its trajectory shape: the offglide in legacy speakers was in the direction of /u/ while for the contemporary speakers it is in the direction of /ə/. In other words, it changes from having upsilon-VISC to schwa-VISC (Nearey 2013). While some areas of the South retain the distinction between LOT and THOUGHT (Fridland 2015), these Georgians pattern more closely with Feagin's (2015) Alabama-based observations that as the back upglide in THOUGHT is reduced, the contrast between the two vowels is lost.

The trend towards convergence in both the vowel space, trajectory length, and trajectory shape suggest a merger between the two vowels. At this point, it is difficult to assess whether the two are indeed merged because additional information such as voice quality, duration, and speaker intuition, which have been shown to keep the vowels distinct in other communities (Di Paolo 1992; Brickhouse 2019; Hall-Lew 2013), is not available. Nevertheless, the changes are in the direction

of the shift, putting younger Millennial-aged Georgians in line with most other regions of North America.

4.4 The Elsewhere Shift

The final change in progress is the adoption of the Elsewhere Shift (Figure 6). Parts of this shift have been alluded to already in previous plots, such as the backed position of TRAP and DRESS among the younger speakers, but in this section the front lax vowels are analyzed directly.

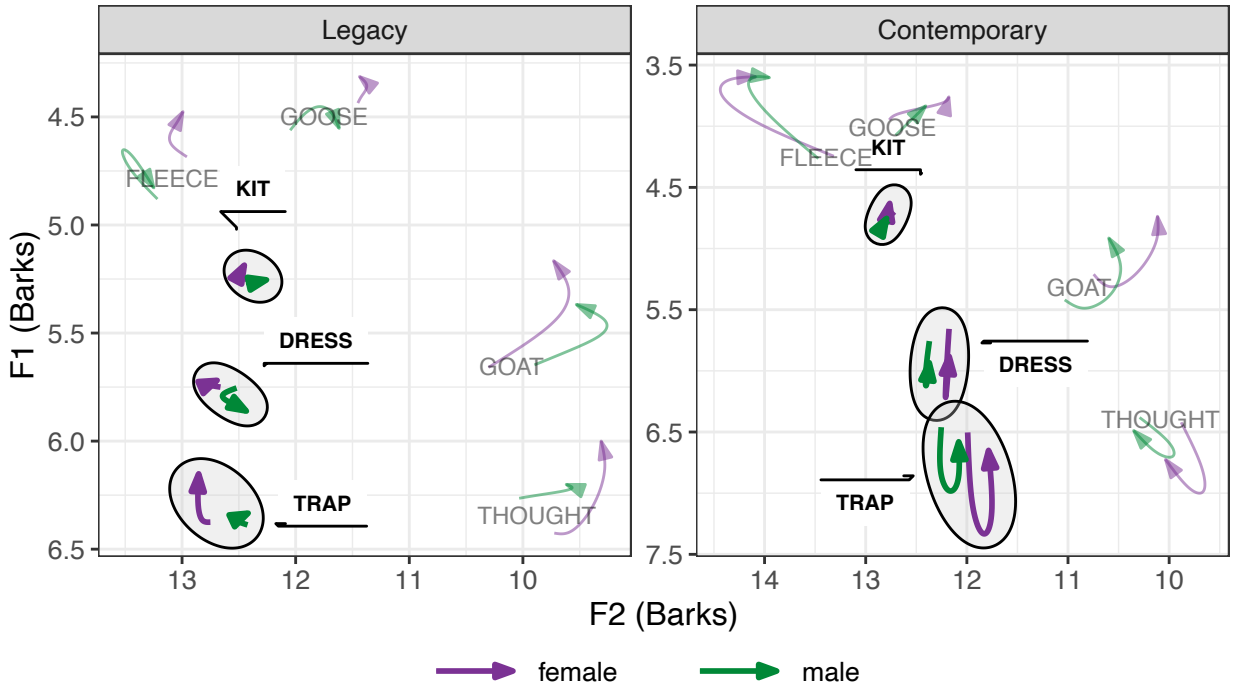

Figure 6: The front lax vowels, by corpus and sex.

Between the two groups, there is a clear shift in the direction of the Elsewhere Shift. The legacy speakers' vowels, particularly TRAP, are in their canonical front position. There is little indication of retraction or lowering among any of the three vowels. However, the younger speakers' vowels pattern very much like what is described other regions of North America (Becker 2019). TRAP is backed considerably to central position and is lower than THOUGHT; phonetically TRAP is the new low, central vowel in the younger speakers' vowel space. Meanwhile, DRESS is centralized and is even further back than GOOSE is, and may be slightly lowered. Like in other

varieties, KIT has shifted the least, though it is still much more centralized relative to FLEECE than what is found in the legacy speakers.

We also see a change in progress. Among the younger speakers, the women's vowels are more advanced in their centralization, indicating a female-led change in progress. Curiously, the legacy speakers' vowels are also separated by sex, with the men having the more centralized realizations, especially relative to FLEECE. These realizations may reflect shifts in traditional Southern pronunciation rather than early signs of the Elsewhere Shift, but without data from the years between these two corpora, it is difficult to account for these differences.

In addition to their relative positions, the trajectories of these front lax vowels have shifted to match those found in other communities as well. The bulk of research on the Elsewhere Shift has focused on single-point measurements and the vowels' relative positions only; however, Stanley (2020) provides a detailed account of the formant trajectories for these three vowels based on a community in Washington. Even though these contemporary Georgians grew up some 2,500 miles from Stanley's (2020) participants, their trajectories look quite similar. In particular, TRAP shows the same U-shaped trajectory, and though DRESS is more Bounce-shaped than the Washingtonians' V-shape,[10] the similarities outweigh the differences.

4.5 A comparison of two speakers

The changes described above are abstracted somewhat since they are based on predicted measurements from models fit to pooled data across multiple speakers. This section gives more concrete evidence of these shifts by providing an analysis of the vowels produced by two speakers. Speaker 105, who represents the legacy speakers, was born in 1903 and lived in Marietta; to contrast him, 'Josh' was born in 1995 and grew up in the adjacent city of Kennesaw, just northeast of Marietta. Since both are male and grew up within a few miles of each other, the differences found in their speech would be more attributable to the 92 years separating their birth than to sex or region.

Speaker 105 and Josh's vowel spaces are displayed in Figure 7. These were calculated by taking the mean F1 and F2 measurements, per time point, per vowel, per speaker. The lines are more jagged than in previous plots because they are more directly based on raw data rather than the smoothed lines produced by the model output.

[10] See Stanley (2020: 84–87) for a description of these trajectory shapes.

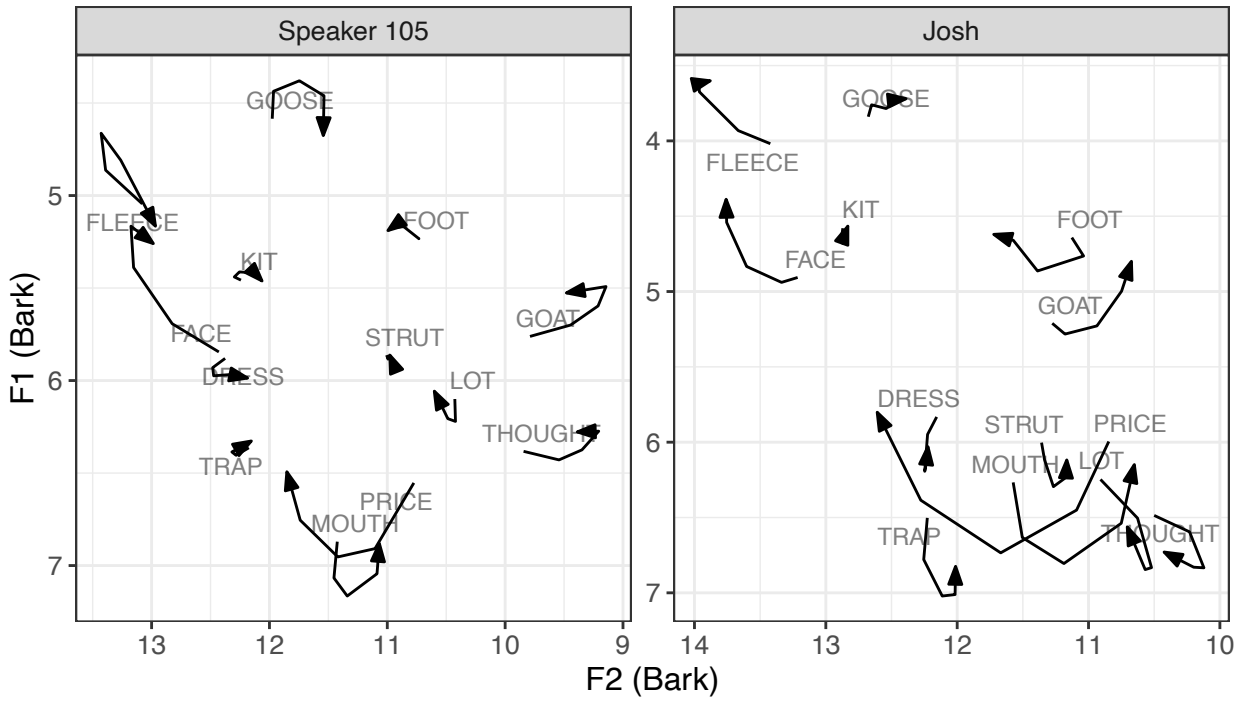

Figure 7: Average vowel trajectories for Speaker 105 and Josh.

The figure demonstrates all the changes discussed in the previous sections, with some speaker-specific differences. Speaker 105 has a relatively monophthongal PRICE vowel, though it is slightly more dynamic than the model predicts. Meanwhile, Josh's PRICE vowel is significantly more diphthongal, and more or less matches what is shown in Figure 3. Both speakers' FACE vowels are similar to the model predictions. Looking at the low back vowels, we see separation between Speaker 105's vowels: THOUGHT has the back-gliding offset as the model predicts, and LOT is relatively high. Meanwhile Josh's low vowels are quite close and have very similar trajectory shapes. Finally, looking at the front lax vowels, Speaker 105's TRAP and DRESS vowels are relatively front, in approximately the same F2 range as KIT. However, Josh's TRAP and DRESS vowels are quite low and retracted, with an F2 value about half a Bark lower than KIT and even lower back than GOOSE. TRAP is also his lowest vowel, dipping below the diphthongs or the canonical low back vowels. It is noted that KIT does not appear to be shifted in Josh's speech.

Because both men deviated somewhat from the model predictions, some of the differences described in this study may be attributable to geographic differences between speakers (particularly the urban/rural divide), sex differences, or other factors. However, the differences between

Speaker 105 and Josh's speech demonstrate that the much of the vowel shifting presented in this paper is a result of changes in time.

5 Discussion

5.1 Summary of findings

This study compares two corpora of Georgians, separated in time by a century, and examines vowels known to be involved in shifts in Southern American English. The previous section showed that there was a shift away from traditional Southern vowel realizations, such as glide-weakening in PRICE and the SVS, and a trend toward mainstream American English, including the low back merger and the lowering and retraction of the front lax vowels. Many of these changes were to vowel formant trajectories rather than to vowel nuclei alone. These findings support the ANAE and Prichard's (2010) conclusion that traditional Southern features are being lost in Atlanta.

The Elsewhere Shift has been described in nearly all areas of North America. In addition to the thorough investigations of shift in California (Eckert 2008; Janoff 2018) and Canada (Labov, Ash & Boberg 2006), the Elsewhere Shift has been found in other areas of the West (Fridland et al. 2016; Fridland et al. 2017), the Midlands (Strelluf 2018; Bigham 2010; Durian 2012), the North (Nesbitt, Wagner & Mason 2019), and the Northeast (Stanford et al. 2019). To my knowledge, the spread of the Elsewhere Shift at the expense of traditional Southern features has not yet been described in the South, let alone Georgia. This study therefore confirms the presence of the Elsewhere Shift in urban Georgia speech.

5.2 How did the Elsewhere Shift develop in Georgia?

One possible explanation for why the Elsewhere Shift is found in these contemporary speakers is that it spread to Georgia (chiefly Atlanta) through geographic diffusion. Trudgill (1974) proposes a "gravity model" of linguistic diffusion where change spreads from urban center to urban center, with moderately-sized cities adopting later, and rural areas last. As one of the largest cities in the United States, Atlanta would attract innovative linguistics variants. As additional evidence for this gravity model, the Elsewhere Shift has not taken complete control over Georgia: anecdotally I have heard robust Southern Vowel Shifted speech in rural speakers, even young people, in

Georgia. In the future we may find that the primary regional variation in North America English is an urban-rural divide rather than reflecting historic settlement patterns.

However, rather than proposing a language-external explanation of the Elsewhere Shift, it may be that it is an internal-development. Kendall and Fridland (2017) suggest that it is merely the retraction of LOT, rather than the low back merger itself, that acts as the trigger for TRAP retraction. The low vowels have been described as a pivot point in North American varieties of English (Labov 1991; Labov, Ash & Boberg 2006; Labov 2019), offering key insight into the primary dialectal differences. Furthermore, rather than suggesting the movement of DRESS and KIT as a canonical pull chain (Labov 1994), the shifting vowels are argued to be tethered in some way, since in nearly every community where this shift has been investigated they all move in tandem rather than one at a time (Becker 2019 inter alia). These recent findings, together with the now-numerous reports of the Elsewhere Shift developing simultaneously in geographically distant communities, suggest a language-internal development, perhaps reinforced by sociolinguistic perception and identity, rather than a traditional wave or gravity model. The Elsewhere Shift may have developed independently, simultaneously, and robustly in Georgia just as it has in other regions.

A third possibility accounts for sociolinguistic evaluations of Southern and non-Southern realizations of these vowels. A full-scale analysis of census records and in-migration data is out of the scope of this study, but it is sufficient to say that Atlanta has grown significantly in recent decades. These migrants need not come from places like California or Canada (where the Elsewhere Shift has been firmly established for several decades) for this shift to take over; rather the fact that many of these incoming residents to urban Georgia were not from the South may have been enough for younger speakers to shift from Southern features. This parallels what happen in Raleigh, North Carolina: Dodsworth and Kohn (2012) report that younger people who come from middle-class, white-collar backgrounds are shifting away from Southern dialect features. There, many non-Southern migrants have moved in since the 1960s, particularly to the middle-class suburbs, and younger people there do not even identify as Southern. Similarly, in Lansing, Michigan, younger speakers are adopting the Elsewhere Shift. There, Nesbitt et al (2019) report that while aspects of the Northern Cities Shift is not subject to much overt commentary, attitudinal data suggests that they are associated with negative qualities. Meanwhile, aspects of the Elsewhere Shift were evaluated positively. The change from the traditional regional Northern Cities Shift to the supra-regional Elsewhere Shift is being led by upwardly-mobile middle-class speakers.

The motivation behind the adoption of the Elsewhere Shift in Georgia may be similar to what happened in Raleigh and Lansing. Like Raleigh, Atlanta's huge influx of non-southern migrants in the 1990s means children are exposed to Southern speech less often. And like Lansing, when children are faced with the negative values associated with the regional vowel patterns (such as "poorly educated" and "ignorant"; Preston 2018) and the generally positive associations with Elsewhere Shifted vowels found in other parts of the country (such as "professionalism" and "educated"; D'Onofrio 2016), the innovative forms get used more often. While I do not have extensive sociodemographic information about the contemporary speakers in this sample, the fact that they were all recruited from the University of Georgia suggests some indication of being upwardly mobile and middle-class, just as the speakers in Raleigh and Lansing were. Therefore, it may be the case that these younger Georgians are not only shifting their vowels *away* from the SVS, but I argue that they are also shifting their vowels *towards* the Elsewhere Shift.

An anonymous reviewer points out that, even though the GOOSE vowel is not analyzed in depth in this study, it may shed some light on how these contemporary speakers align themselves with regard to the South. Back vowel fronting is widespread across North American English, including the South (Labov, Ash & Boberg 2006). Nevertheless, Koops (2010) describes two ways that a fronted GOOSE is realized. A Southern GOOSE is front and monophthongal, meaning both the onset and the offset are fronted. Meanwhile, a non-Southern GOOSE is fronted only in the nucleus, while the glide remains relatively further back, resulting in some formant movement. As explained in depth in Stanley et al (manuscript), and as can be seen in Figure 2, the contemporary speakers have a more monophthongal GOOSE, with the entire vowel's trajectory being fronted, suggesting a realization like Koops' Southern GOOSE. However, the contemporary speakers have a more diphthongal realization, more in line with Koops' non-Southern GOOSE. This shift from one type of fronted GOOSE to the other is further evidence that the contemporary Georgians in this sample are rejecting Southern speech patterns are adopting the more supra-regional patterns of North American English.

With the limited data analyzed in this paper, any further claims about the development of the Elsewhere Shift in Georgia remain speculative. Additional acoustic, social network, and sociolinguistic evaluative data from the intervening decades between these two corpora, from more regions within the state, and from ethnic minorities is required to fully understand the process of language change in Georgia English.

6 Conclusion

This paper has analyzed vowel formant trajectories from two different groups of speakers in Georgia. The older generation's speech can be described as traditional Southern American English while the younger generation cannot. Instead, the younger generation adopts the widespread Elsewhere Shift. This study contributes to our understanding of the Elsewhere Shift and its spread throughout North American English. It also sheds additional light on dialect leveling and the recession of Southern American English.

Finally, this study has provided insight into language change in real time in Georgia. The dearth of research based in Georgia has yielded very little insight into change across time. Prichard (2010) analyzes some change in apparent time, though the sample size was very small. Andres & Votta (2009) expand the range and sample size to provide a more detailed account of change in apparent time in African and white Americans. This study augments the findings from these previous studies by analyzing change in real time, that is, comparing older recordings to newer recordings rather than relying exclusively on the apparent time hypothesis. With the availability of DASS, future work in Georgia will uncover additional variation in change and help contribute to the growing body of research on change in regional varieties of North American English.

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