DYNAMICS OF PHONOLOGICAL VARIATION IN TEXAS ENGLISH

by

Caroline Jean Story

HONORS THESIS

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Thesis Supervisor:

Augustine Agwuele

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To the state I call home.

ACKNOWLEDGEMENTS

Nearly 700 miles of Texas roads introduced me to the many faces and voices of the Texas populace. This study, the first of my academic career to bring me out of bounds and into fieldwork, encompassed two cities of two distinctive regions wherein I met with locals, Mason and Dallas. Although I have previous familiarity with Dallas, being the largest city in proximity to my hometown, I never had the pleasure of visiting Mason, nor had I been aware of its existence until the approval of my research topic. Here, I was cordially welcomed, offered a tour of the town and its history by Mason's longstanding inhabitants, and engaged in exchanges with people heartened in pride by generations of residency. Dallas showed me the significant generational contrasts I had speculated about, unveiling senior city folk in touch with the classic patterns of Dallas environs, and the new urban generation personifying diversity and possibility. From these considerations, I am further substantiated in my proposition that the individuals recorded as participants in this study are valid representatives of the remarkability of the many accents of Texas.

The extensive knowledge, contributions, and guidance of my professor and supervisor, Dr. Augustine Agwuele, require my deepest gratitude. I am indebted to Dr. Agwuele for not only accepting responsibility for overseeing this preeminent segment of my academic career, but for inspiring my pursual of linguistics as a formal course of study. I'd like to further thank Dr. Ron Haas and Dr. Heather Galloway of Texas State University's Honors College for contributions to the commencement of this project that cannot be understated.

I would be guilty of intentional error not to extend tribute to those who played a decisive role in supporting this endeavor throughout the year of its completion and beyond. My mom and dad, tirelessly fostering my spirit from home throughout the milestones of this project. My sister, from whom I derive profound inspiration towards my academic accomplishments. Christian, the embodiment of open arms, ears, and heart. And my family, friends, peers, and academic mentors who continue to support my aspirations and ambitions beyond the margins of my thesis.

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ABSTRACT

This acoustic phonetic study examines the stable and deviant phonological features of contemporary Texas accents. The range of Southern American English (SAE) speech patterns are observed in apparent time to identify possible cross-generational and cross-regional dynamics and the diffusion of potential variants among specific Texas populations. The frames of contrast identified are from a total of 8 representative participants – divided by age and urban or rural residence. In this study, a set of 8 vowels were placed in lexical sets with identical environments for sentence readings and an elicited-word game. The participants' samples of citation speech styles were compiled through recorded interviews for subsequent acoustic measurement. Through comparative analyses using spectrographic displays, I find distinctive contrasts in vowel qualities among the younger generations in contrast to their older regional counterparts. Additionally, the analysis demonstrates a de-localizing shift from SAE through vowel shifts propagated by the younger population. The variabilities in population patterns are further subject to t-testing to determine their statistical significance. This method of evaluating hypothesized language change through synchronic variation expands on a related body of work and provides the foundation for future diachronic research on sound shifts in American English.

Keywords: Accent, Acoustic Phonetics, Sociolinguistics, Southern American English

I. INTRODUCTION

In the following chapters, I will condense the methodology, findings, and implications of nearly a year's worth of phonetic research to examine in detail one of the most transient properties of language – speech sounds. All intensive inquiry into this topic aims to identify the potential segments and approximate direction of phonological change among the many accents of English in Texas.

To understand the dynamics of Texas accents in apparent time, recorded interviews were conducted among 4 representative groups to yield acoustic properties of 8 phonemes relevant to accent distinction. The purpose of this study is to address questions relating to 2 social factors – age and location – in linguistic variation and change, and to do so through phonetic analysis. Are there differences between urban and rural population speech patterns? Are Texas accents stable or shifting through time across contemporary generations? Are there differences in the relative phonological features of General American and Texas accents? What are the implications of this research for the future of Texas accent study and dialectology as a whole? Data samples collected in this study will be examined and interpreted through their synchronic variability, but not in absence of diachronic context.

1.1 The synchronic perspective

> To understand and generalize on linguistic change, we must see it as part of the wider process of cultural change.
>
> (Hoijer 1948: 337)

Historically, the synchronic approach to linguistic description has functioned under the assumption that the samples of interest are shared features among the speaker's linguistic community and independent of personal idiosyncrasies (Duranti 1997). The intent of approaching samples collected for this study from a synchronic perspective is not to negate the relevancy of individual differences in speech patterns. Indeed, these differences are significant and cannot be held to be an absolute model of a linguistic community. However, language, in principle, is a cultural practice constantly undergoing change from the collective attitudes and ideologies of its speakers. It would therefore be impossible to draw conclusions on a speech community without acknowledging such conclusions as products of an amalgamation of individual speech patterns.

When a sample of a speech community is contextualized and aligned with related records, a continuum of language change forms that illustrates the influences, patterns, and shifts that position an accent in its most recent social context. An individual token of language, such as Texas English, in an auditory database represents a unique position in time and space through its relative phonetic qualities. As accents change at a continuous rate, phonetic data such as this lacks infallibility moments after it is recorded. It is therefore essential to the field that updated editions of regional accents be continuously recorded and analyzed to ensure present data remains as relevant as possible.

1.2 Central terms

This section serves a dual purpose to provide both operational definitions and specific details regarding the methodology used to obtain the quantitative data for analysis. The goal of phonetics is to describe speech and its many patterns of pronunciation, and in

acoustic phonetics, this is done by studying speech sounds through their physical properties. These sounds are analyzed through *spectrogram displays*, which are visible representations of articulated speech as a function of time, frequency, and intensity. The type of utterance relevant to the data collection methods and analyses of this study is referred to as citation speech. *Citation* is a semi-conscious pattern of speech characteristic of careful articulation. Among the sections in the recorded interview (see *3.2.1 Sample participant interview form*), this style is elicited through a fill-in-the-blank word game and lexical set sentence readings. The simple vowels observed in this study are *monophthongs*, such as /ɛ/ in *head*. When vowels are transcribed, they are written using the *International Phonetic Alphabet (IPA)*, or symbols representing the individual sounds of spoken language. Each of these concepts are essential to interpreting the chapters to follow and the role of acoustic phonetic analysis in the description of dialectical patterns.

II. THEORY

> Every diachronic change passes through a stage of synchronic variation.
>
> (Elsig, Meisel, & Rinke 2013: 21)

The persistence of a phonological variant in a population requires a level of participation beyond the individual. From Hans Lindquist's sociolinguistic article, *Language Change*, the concept of "change in apparent time" is introduced to explain the direction of language change through the speech patterns present among the older and younger populations of a given area (2009). This dimensional approach allows for the inference of diachronic change based on synchronic-level variants. Despite sociolinguistic factors that limit the pertinence of the apparent time construct, historical linguists recognize the validity and relevancy of its integration in comparative data analysis (Michael 2014: 23).

2.1 The diachronic perspective

One of the assumptions associated with the apparent time construct is the general direction of change. As part of the sociological factors that drive variant diffusion, the change in progress is assumed to be moving through intergenerational transmission, in the direction of the younger generation. As Berkeley linguist Lev Michael describes the phases of sound change in a linguistic community, the first step of differential variant propagation is defined as transmission, by which adolescents adopt the variants present in the repertoires of the adults – or linguistic role models – in their speech community (2014: 16). Although the onset of phonological or dialectical variants is divided among internal and external influences, the relative source of progressive change is generally observed to be of a consistent set of social categories relating to class status and gender.

This hypothesis, known as *the curvilinear principle*, identifies those within the centrally located groups of the socioeconomic hierarchy as the innovators of sound change (Labov 2001: 31-32). In subsequent sections, this theoretical foundation will be applied to interpret patterns observed among the relative vowel qualities of the populations in this study. To briefly implement the diachronic framework of such samples, it is essential to first address the relevant historical and geographic influences on Texas' contemporary speech patterns.

2.1.1 Historical occupations

> What distinguishes a Texas accent the most is the confluence of its influences.
>
> (Bailey 2003)

The variety of English in Texas, here referred to as Southern American English (SAE), took precedence through the same process many of its contemporary features achieve prevalence: the politicization of language. At the end of the Texas Revolution in 1836, English began to replace Spanish as the dominant language in use across the territory, later ignited through a south-bound influx of English-speaking migrants (Tillery 2007: 115). In the following decades into the late 19th century, what scholars termed the "prototypical features of SAE" began to appear and spread across the new state, subsequently replacing older forms (Tillery & Bailey 2003: 159). Despite a new Anglo-Texan sociocultural identity adopted by English speakers, by the mid-1940s, German and Czech were still widely in use from generations of European immigration and settlement leading back to Mexican rule (Arnn 2012: 9). The 1970s saw an urbanizing Texas, unremittingly flooded with in-migration. Here is where the significant urban-rural split

began to form, evident in contemporary forms of Texas English, such as those under consideration in this study (Tillery 2007: 115-116). The resultant regional dialects and speech patterns from centuries of resettlement and conquest exist as products of these unique linguistic communities.

2.1.2 Inland versus Lowland Texas dialects

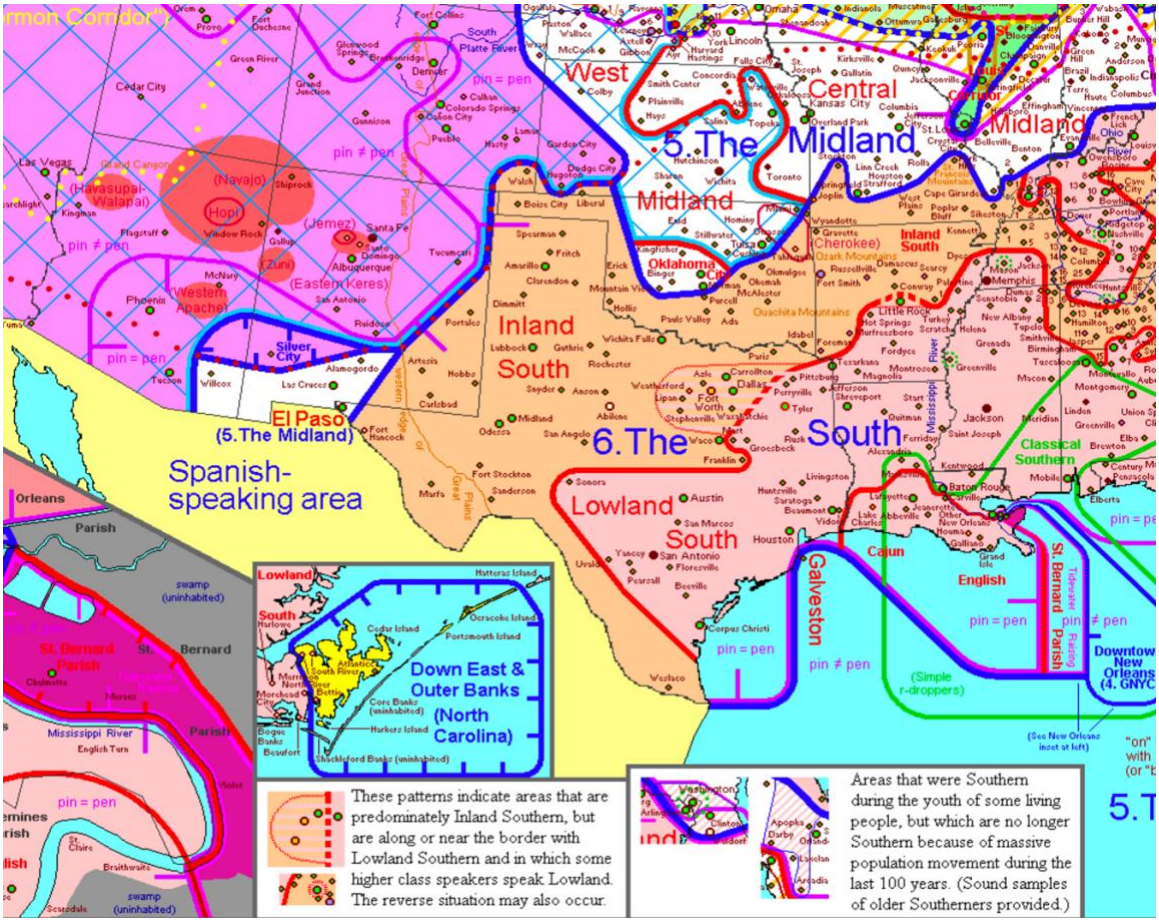
The phonological features of Texas have commonly led to a bisected regional division of the state, reaching from the Northeast to the Southwest. East Texas experienced the joint influence of early Anglo settlers with the SAE features typical of Mississippi, Louisiana, and Alabama while the Inland Southern features of Tennessee and Kentucky clustered in West Texas. With the combined contributions of the German and Czech immigrant populations and Spanish-speaking communities, external dialectical interference and internal variant diffusion became the key features in the development of contemporary SAE (Colloff 2003). The resultant subregions have been most cited “Texas South” and “The South” from chapter 18 of the landmark American English phonology project, *The Atlas of North American English* (see *Figure 2.1 North American Dialectical Regions from The Atlas of North American English*), but for the sake of minimizing the regional scope to the state of Texas, the Northwest and Southeast areas will be referred to as Inland and Lowland, respectively, as introduced by linguist Rick Aschmann (2018).

Figure 2.1 North American Dialectical Regions from The Atlas of North American English (Labov et al. 2006: 148)

Distinction between Inland and Lowland south rely on the most popular phonological aspect of the prototypical southern accent, known as long monophthong /a/. The Inland segment pronunciation of /aɪ/, as in /faɪv/, is not articulated through the diphthong (2 vowel qualities) shift, but rather experiences a full smoothing of the vowel to /a/, as in /mæs/. Lowland segments differentiate through partial monophthongization of /aɪ/, wherein the diphthong remains before voiceless consonants. However, previous studies have found the existence of Lowland phonological features concentrated in the Inland Dallas/Fort Worth area, resulting in an overlap between the features of the two geographic areas (Aschmann 2018, Labov et al. 2006: 254). This alternative subregion,

indicated in Figure 2.2, is further characterized by its Lowland speakers belonging to a middle to high socioeconomic class (Aschmann 2018). Although there are divergent assessments of this model, its features are supported by similar observations of the social and dialectical divisions of Texas and will be considered through their relevance to the present study (Labov et al. 2006: 250).

Figure 2.2 Map of North American English Dialects, Based on Pronunciation Patterns: The South (Aschmann 2018)



2.1.3 Texas English varieties

Among the forms of spoken English in Texas, 3 prominent sociocultural categories have emerged due to settlement patterns, class-based divisions, and a multiplicity of ethnic identities. These varieties include Anglo, Tejano, and African American Vernacular English (AAVE). Due to historical occupancy patterns and access to speech communities, Spanish maintains a ubiquitous existence across Texas as the second most spoken language in the state (U.S. Census Bureau 2021). In this context, Tejano English thrives through competing influences of the Spanish language on local English dialects in Texas. However, sociolinguistic studies have demonstrated that the subsequent generation of native Spanish-speaking immigrants to English-speaking communities "adopt the local vernacular with great regularity." This pattern of change in the SAE context can be utilized to minimize the discussion of Spanish phonological interference when drawing samples from second-generation immigrants and Anglo English speakers of the same population. In contrast, "studies of AAVE have shown a remarkable geographic uniformity in those grammatical and phonological features that are distinctive," suggesting that where there are differences in the vowel qualities of an Anglo population of English speakers, the AAVE population of the same locale may be demonstrating standardization of the same vowel systems (Labov et al. 2006: 24, 27). Noting the distinctions among these varieties becomes most crucial when participant demographics are addressed with the intention of demonstrating the validity of subject samples. Additionally, these dialects, existing in all localized forms of Texas speech in this study, must be comparable to other largely recognizable forms of American English.

In a wider scope of speech styles in English, phoneticians refer to a supposed "non-accent" form of American English known as *General American* to note deviations in regional dialects from a standardized form of speech. General American is commonly associated in its distribution of vowel qualities with an American Midwest dialect of English but remains independent from categorization in regional classifications of American English accents (Ladefoged & Johnson 2015: 102). Accompanied by other sociolinguistic factors that shape population speech patterns, geographically localizing a pronunciation pattern contributes to the maintenance of a collective identity. Samples of General American will serve in proceeding chapters to characterize the Texas accents introduced in this study as either approaching a national norm or maintaining distinctive SAE vowel features.

2.2 Propositions

In introducing the populations of interest in this study (urban, rural, older, younger), this study will examine hypothesized variant propagation through bivariate contrast. In testing inter-generational samples, I expect to find a consistent shift in relative vowel qualities in the direction of the younger generation, in accordance with the apparent time construct. In an examination of urban and rural samples, I expect a level of acoustic variance that approaches a de-localizing shift among the younger population, despite perceptual invariance between subjects. Although the urban and younger populations are hypothesized to be deviating from older, rural speech patterns, I nonetheless expect to find prototypical features of SAE among all populations sampled, maintaining distinctive Texas accent features in contrastive context with General American. All recorded stable

and dynamic phonological features will be observed as transitory moments along the continuum of linguistic changes going on in Texas English.

III. METHODS

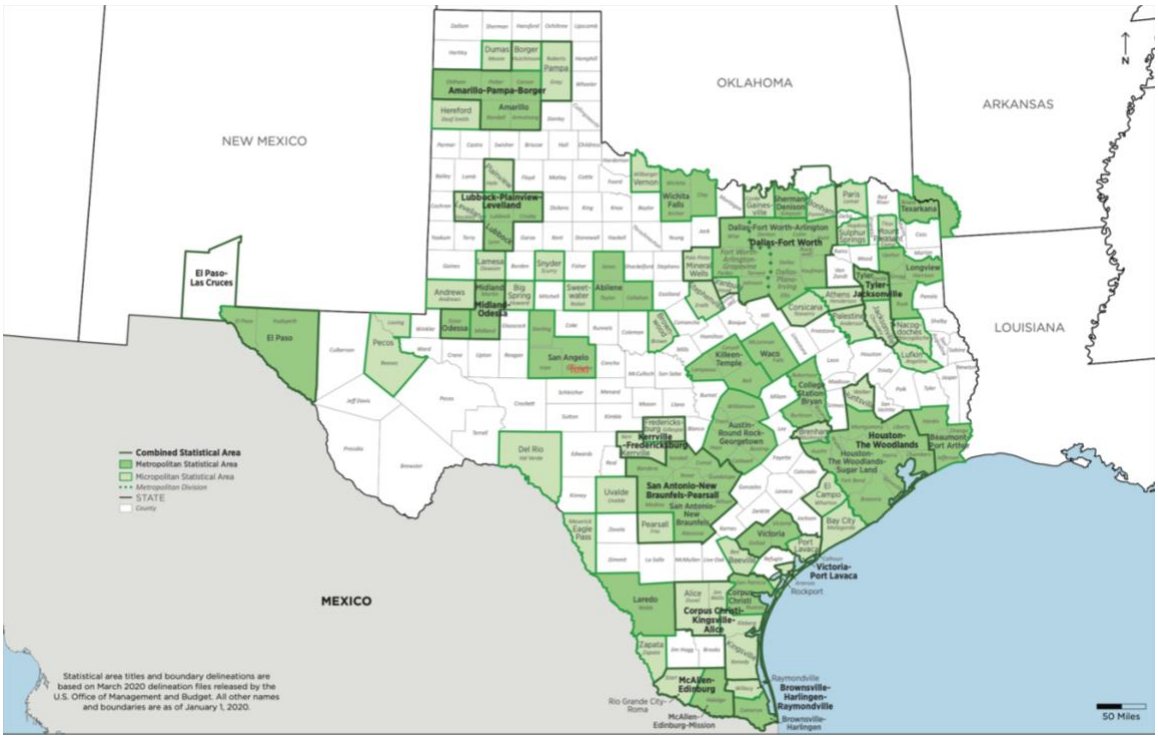
3.1 Sample

Some of the approaches that scholars have used to collect data include telephone interviews and collection of pre-existent data from dialect corpora. Although these methods prove most effective for large-scale surveys, several common issues arise from them, such as an increase in the margin for sampling error and potentially obtaining low quality recordings. In *The Atlas of North American English,* Labov et al. (2006) encountered sampling issues across several stages of fieldwork and analyses by use of the telephone method, including significantly low interview acceptance rates – 9% in Texas – (26), a reduced maximum range of 3,000 Hz in attainable frequency values (36), and more difficulties establishing rapport characteristic of the sociolinguistic interview than comparable to an in-person interview method (25). Under the conditions of a reduced sample size in a project design like that of this study, the in-person interview proves to be an effective design of choice for the necessary selection of speakers and data collection.

To meet the objectives of this study, subjects were recruited across the social categories of sex (male versus female), age (older versus younger) and location (urban versus rural). The process of sample city selection chiefly rests on accurate data regarding population size, regional locality, and relative density for classification in the urban-rural divide. According to data drawn from the United States Census Bureau, the metropolitan city encompasses a population in number of 50,000 or greater while rural county classifications typically number no more than 10,000 (2020). Cross-referenced with the bisectional division of Inland and Lowland Texas, the city of Dallas, with a population of

1,343,573, and the town of Mason, with a population of 2,265, were selected to serve respectively as urban and rural sample extraction points (2020).

Figure 3.1 Texas Metropolitan and Micropolitan Statistical Areas (United States Census Bureau 2020)



Using a preset list of selection criteria, 8 individuals were randomly selected: 4 drawn from the rural town of Mason and 4 from the urban city of Dallas. The criteria for selecting each participant were stated as follows prior to the interviewing process: under 25 (younger) or over 40 (older) years of age, born and raised in selected location with minimal outer-region exposure (preferably under 6 months), native speaker of English, and willing to provide demographic background information including residency history, occupation, education, and national ancestry. The purpose of noting occupation and

education as relevant social factors relates to prior empirical observations of sound change and the role social stratification serves in linguistic variant diffusion. According to Labov et al., “centrally located social groups – lower middle and upper working-class speakers” initiate the phonological changes in use by the population “which operates below the level of consciousness” (2006: 23). Those referred to in this study were initially identified to belong to this lower middle to upper working economic background, determined by occupation and average annual income relative to the U.S. Bureau of Labor Statistics Consumer Price Index (Horowitz et al. 2020). In addition to meeting the 5 conditions, participants were guaranteed anonymity per IRB requirements, agreeing that all information obtained in the recorded interview was to be anonymously reported and at no point would identifiable information such as a name or photo be requested. As a result, the participants have been assigned standardized labels that categorize by locality (denoted as R for rural or U for urban), age, and sex. For example, the notation R66M represents rural, age 66, and male). In each location, there were 2 female and 2 male subjects sampled. To account for intergenerational differences, 1 male and 1 female from each region are above the age of 40 and the adjacent male and female subjects are the age of 25 or below. The Mason subjects are hereafter referred to as such: R66M, R67F, R25M, and R24F, and the Dallas subjects as U68M, U79F, U20M, and U20F.

3.2 Experimental design

Using 8 monophthongs (/i/, /ɛ/, /æ/, /ɪ/, /ʊ/, /ɑ/, /u/, /ɔ/) as medial sounds, all within a predetermined environment /h_d/, a simple lexical set design was implemented to collect tokens of the primary units of perceptive variance in accents: vowels. Phonetic

differences that could arise from variations in coarticulation are controlled by use of the same environment for each of the eight vowels (Labov et al. 2006: 4).

Subjects participated in a 5-component interview comprised of acceptance of permission to record, an invitation to conversational rapport, an elicited word game, sentence readings, and brief demographic questionnaires. (See *3.2.1 Sample participant interview form* for the complete interview process including its sequential sections.) The solicitation of conversational rapport served to establish a relationship between the interviewer and the interviewee, minimizing the confounding effects of formal speech conditions. The subsequent word game was developed to elicit the production of a fixed set of words using simplistic prompts, such as *What part of your body does a hat sit on?* and, *Complete the title: Little Red Riding _,* followed by a request to repeat the utterance for a second repetition. Should the subject respond with an incorrect word to the prompt, the associated prompts were posed until the desired phrase was obtained. Significant caution was performed as to not produce the intended word prior to the subject's articulation to avoid supplying an alternate pronunciation. After conducting the word game, the participant was instructed to read from a page listing 8 phrases, each featuring 1 of the 8 words from the lexical set. The subject was requested to repeat this step as well for a total of 2 repetitions per phrase. In a trial experiment conducted several months before the interviews discussed here, collection of phonological data rested solely on recordings of lexical set sample sentence readings. This method of citation speech sampling proves effective in guaranteeing collection of the desired tokens and accurate phonetic transcription. The goal of requiring 4 repetitions ensured an adequate representation of the subject's naturally occurring speech pattern.

3.2.1 Sample participant interview form

Hi, my name is Caroline Story. I'm from Texas State University in San Marcos, Texas. As part of the anthropology department, I'm doing research on differences between people from rural and urban parts of Texas, so I'm looking for people who grew up in one place to help by telling me a little about your area and showing me how people say things.

Did you grow up in _?

1. Request permission to record
2. Begin with invitation to conversational rapport, asking questions about hometown
    - *Tell me about your hometown. What is there to do downtown? What kind of stuff did you do when you were growing up? Did you learn any other languages while growing up? (Do you speak any of them now?)*
3. Word game – When a participant says the elicited word, *Could you repeat that?*
    - *What is the opposite of she?* (HE)
    - *What part of your body does a hat sit on?* (HEAD)
    - *What is the past tense of have?* (HAD)
    - *What's the past tense of the verb "hide"?* (HID)
    - *Complete the name: Little Red Riding _.* (HOOD)
    - *What is the name of a fish that starts with a C? / How would you pronounce C-O-D? –* (Question format changes relative to region)

    Now replace that C with an H. (HOD)
    - *What question word does an owl say?* (WHO)

- *What does a cowboy say after Ye-?* (HAW)

4. Lexical set sentence readings – two repetitions
    - [i] I say heed again.
    - [ɛ] I say head again.
    - [æ] I say had again.
    - [ɪ] I say hid again.
    - [ʊ] I say hood again.
    - [ɑ] I say hod again.
    - [u] I say who'd again.
    - [ɔ] I say hawed again.
5. Demographic questionnaire
    - *What year were you born?*
    - *Where did you go to high school?* (If applicable)
    - *Did you complete any education beyond high school?*
    - *Do you know where your parents were raised? (If so, where?)*
    - *What were their occupations?*
    - *What is your occupation?* (If applicable)
    - *What is your national heritage?*
6. Any questions?

While conducting interviews, a format adjustment was made for 1 of the prompts in the third component of the experiment to suit unanticipated inter-regional contrasts regarding word association. Regarding the elicitation of the word /hɔd/, the initial

phrasing of the question only prompted response of the correct word among the urban subjects. *What is the name of a fish that starts with a C? Now replace C with H,* in urging /cɔd/ then /hɔd/, proved to be an ineffective structure when presented to both rural populations given the disproportionate access to freshwater cod distributors in Central Texas, comparable to North or East Texas. Instead, the common association was consistently "catfish." In preserving validity of interview methods, the format adjustment sustained consistent use across the appropriate subjects relative to their representative populations, having no disorderly effect on the number of tokens retrieved or quality of recording required for acoustic analysis.

3.3 Acoustic measurements

All participant interviews were recorded in person using a MacBook Pro laptop with built-in microphone. The recordings were done using the University of Amsterdam's speech software *Praat*, version 6.1.38 (Boersma & Weenink 1992). They were sampled at a frequency of 44100 Hz for both male and female participants. The spectrogram settings consistent across all subject analyses extended the range of visible wide bands to 5000 Hz. *Praat* was used for all recording, playback, spectrographic display, and formant measurement purposes.

Each speaker produced 4 repetitions of every 1 of the 8 vowels sampled. Overall, this yielded 256 tokens (8 speakers * 8 vowels * 4 repetitions = 256) across 8 subjects. By identifying the locus of each word from the lexical set, I extracted frequency values (in Hz) of the first (F1) and second (F2) formants from the center of each vowel token, using *Praat*'s programmed formant listing feature and hand-checked for accuracy. In

Figure 3.2, the point at which the frequency value was selected lies at the convergence of the horizontal and vertical red dotted lines. The resultant value of F2 for this first token of /æ/ from R66M is located at the left of the spectrogram as 1935 Hz. The F1 and F2 values collected in this manner were noted, apart from 3 manual formant measurements when the *Praat* formant tracker did not produce reliable frequency values.

Figure 3.2 Formant Measurement Tracker R66M "had" F2 Sample 1

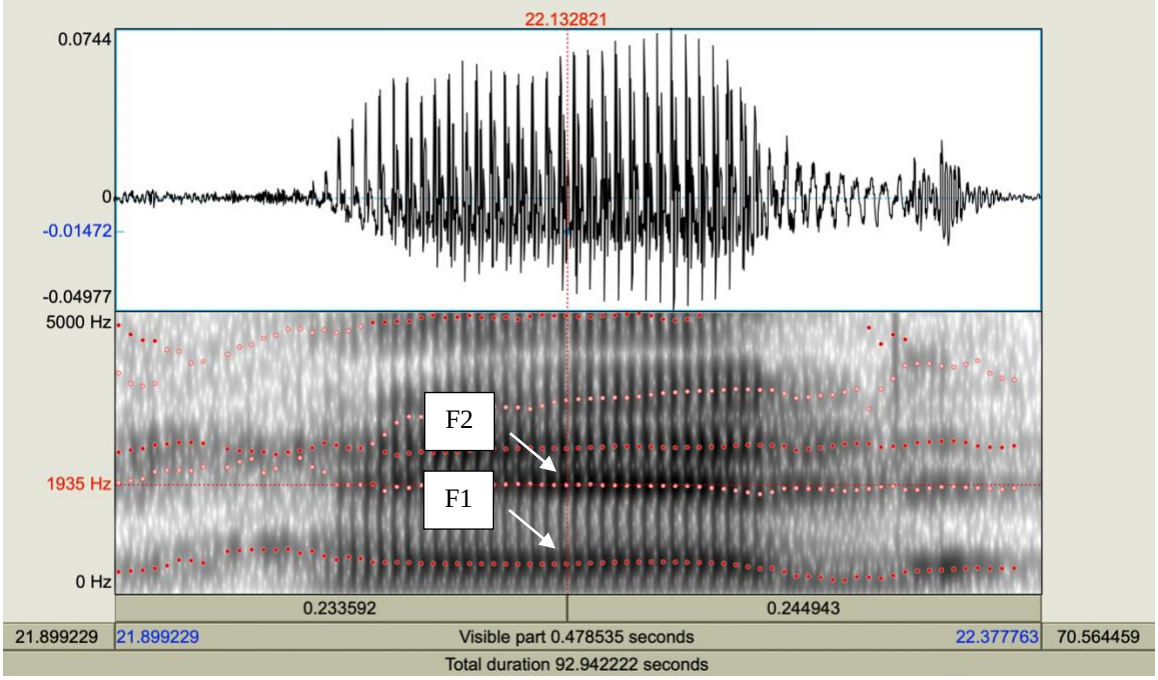
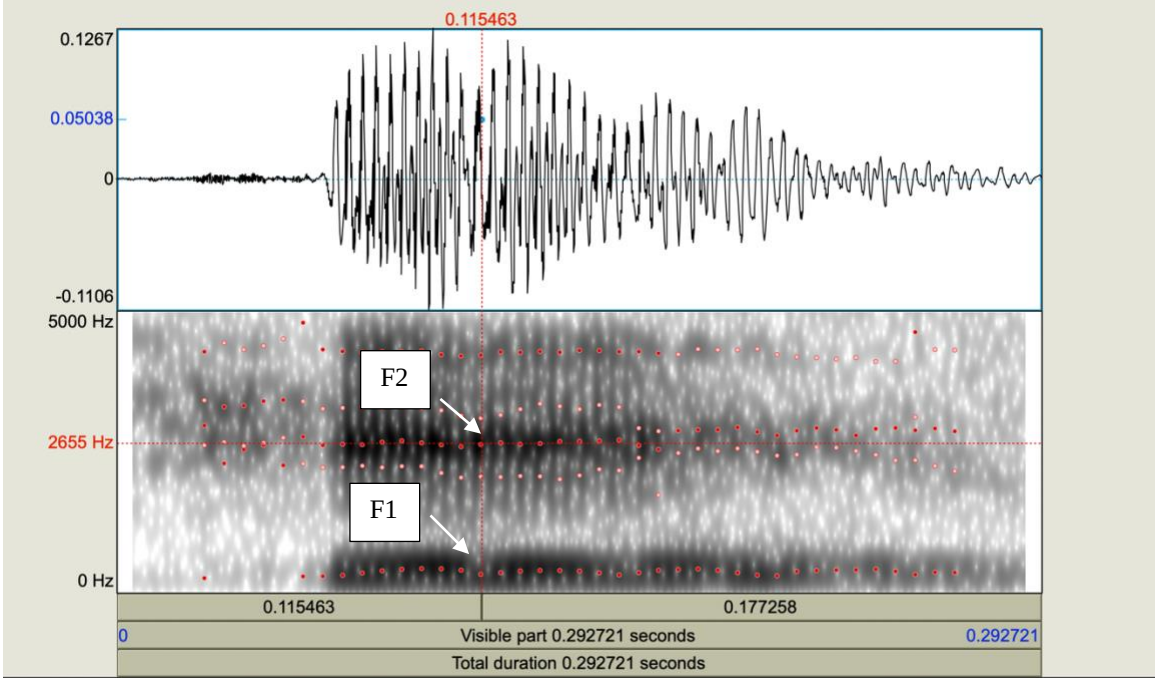


Figure 3.3 Manual Formant Measurement U20F "heed" F2 Sample 1



This process of spectrographic analysis results in a set of quantitative data necessary for the construction of scatterplots. Each plot demonstrates the scale of shared and deviant relative vowel qualities as compared by population. In the following chapter, the resultant plots will be analyzed in detail to interpret correlative and contrastive relationships between population pairings.

IV. RESULTS

This section focuses on the contrast of urban, rural, older, and younger population samples to observe if there are any differences between speakers based on residency or age. In graphing acoustic space, according to acoustic theory, there is a formal relationship between vowel quality and the shape of the vocal tract as a function of formant. The first formant (F1) is inversely related to tongue height, meaning the higher the tongue and jaw placement, the lower the resonant frequency produced. Furthermore, the more front the tongue is placed, the higher the F2 resonant frequency. These relationships maintain relevance in the analysis of all proceeding figure plots.

4.1 Rural versus Urban

In testing the foremost hypothesis regarding urban and rural residency, measurements were obtained for the following monophthongs: /i/, /ɛ/, /æ/, /ɪ/, /ʊ/, /ɑ/, /u/, and /ɔ/. F1 and F2 measurements were pooled and averaged for subjects as a function of residence. Each averaged data point represents the pooled raw data of 4 participants' samples for each location. Each vowel plotted accounts for 32 individual tokens, 16 per population. Figure 4.1 compares rural subjects to urban subjects through their respective F1 (y-axis) and F2 (x-axis) values.

Figure 4.1 Rural versus Urban F1 x F2 Scatterplot

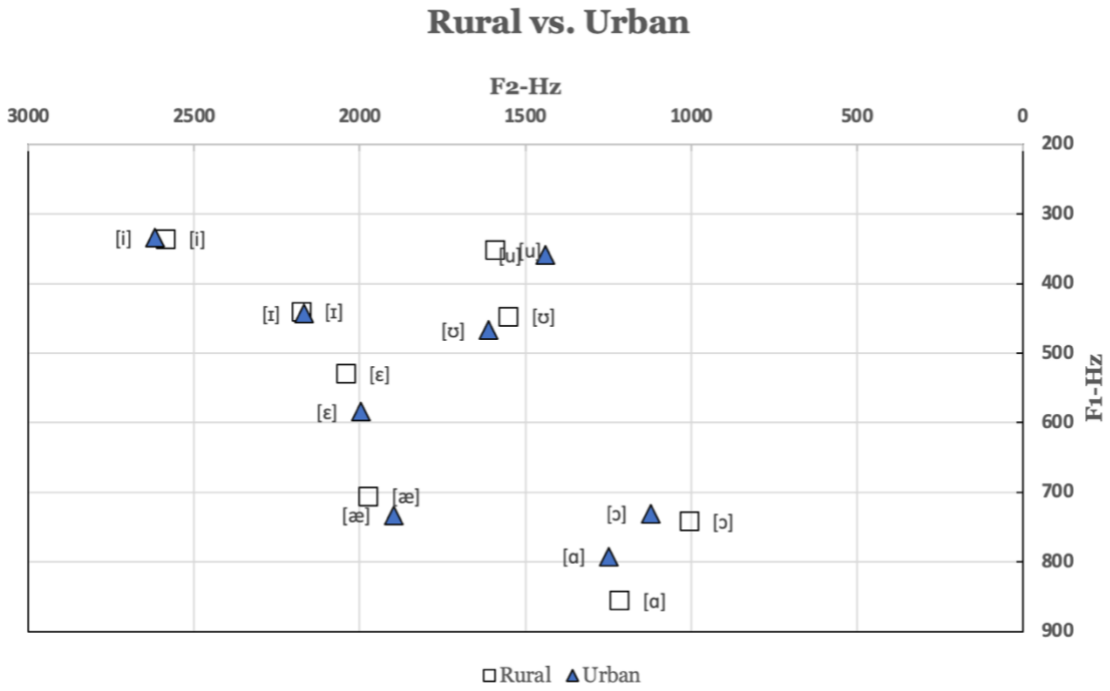
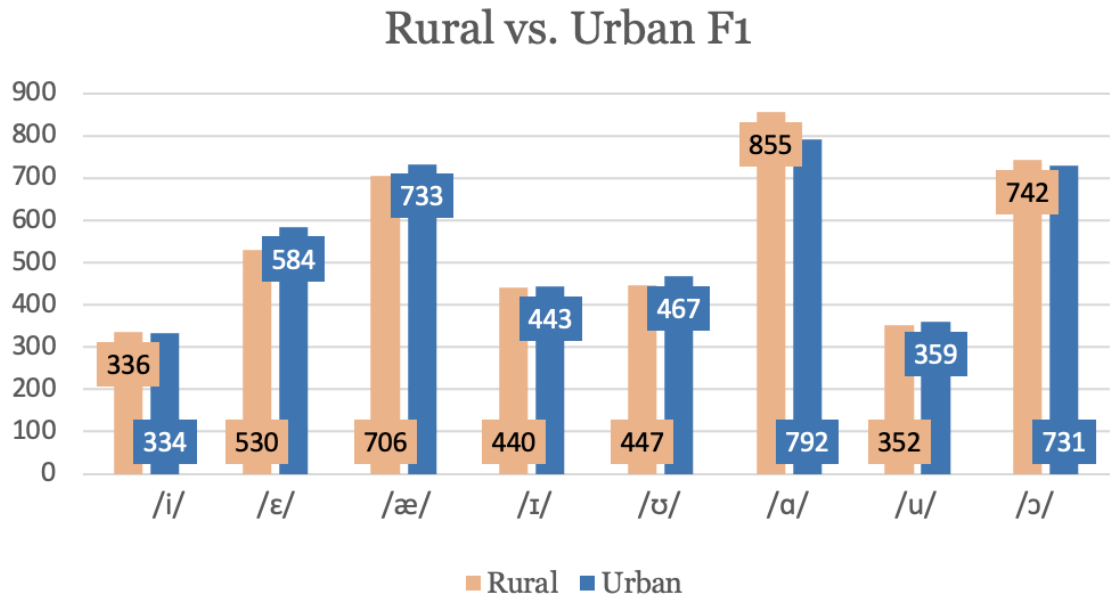


Figure 4.1 demonstrates areas of distinctive acoustic space for rural versus urban subjects, apart from overlapping vowels /i/ and /ɪ/. A closer observation appears to indicate a possible approaching overlap of the low-back vowels in the cot-caught merger (/ɑ/ and /ɔ/) from the urban population and a raised front /ɛ/ approaching a pin-pen merger from the rural population. To compare the independent vowels between rural and urban subjects, 2 bar graphs were obtained. For this, each vowel was averaged across speakers as a function of residence. All rural subjects were collapsed together without distinction for age or sex. The same was done for the urban subjects. The resultant vowel averages were plotted in Figure 4.2 for F1 and Figure 4.3 for F2.

Figure 4.2 Rural versus Urban F1 Bar Graph



In Figure 4.2, the urban population's F1 values are consistently higher than F1 for the rural population. The exceptions to this pattern are the high-front /i/ and the cot-caught vowels, /ɑ/ and /ɔ/. These deviations display the urban population's lowering of the tongue body in articulation of most simple vowels, especially front vowels.

Figure 4.3 Rural versus Urban F2 Bar Graph

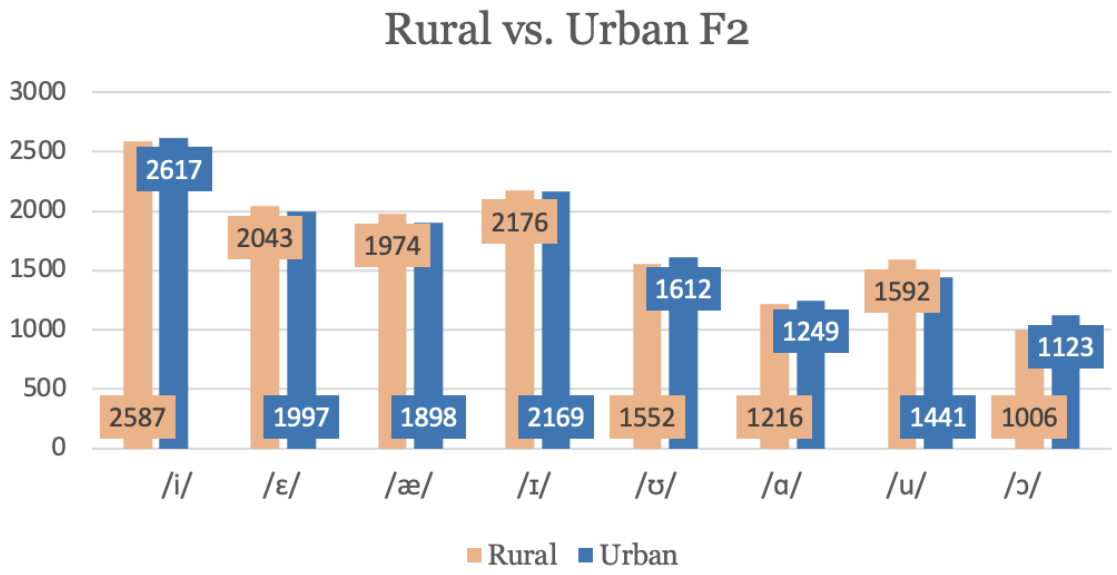


Figure 4.3 demonstrates an even split of highest and lowest F2 values between the urban and rural populations, with the rural F2 values consistently higher among front vowels and the urban F2 values consistently higher among back vowels. Through these articulations, the urban population is demonstrating a constriction of acoustic space through positioning front vowels further back and back vowels further front.

4.1.1 Statistics

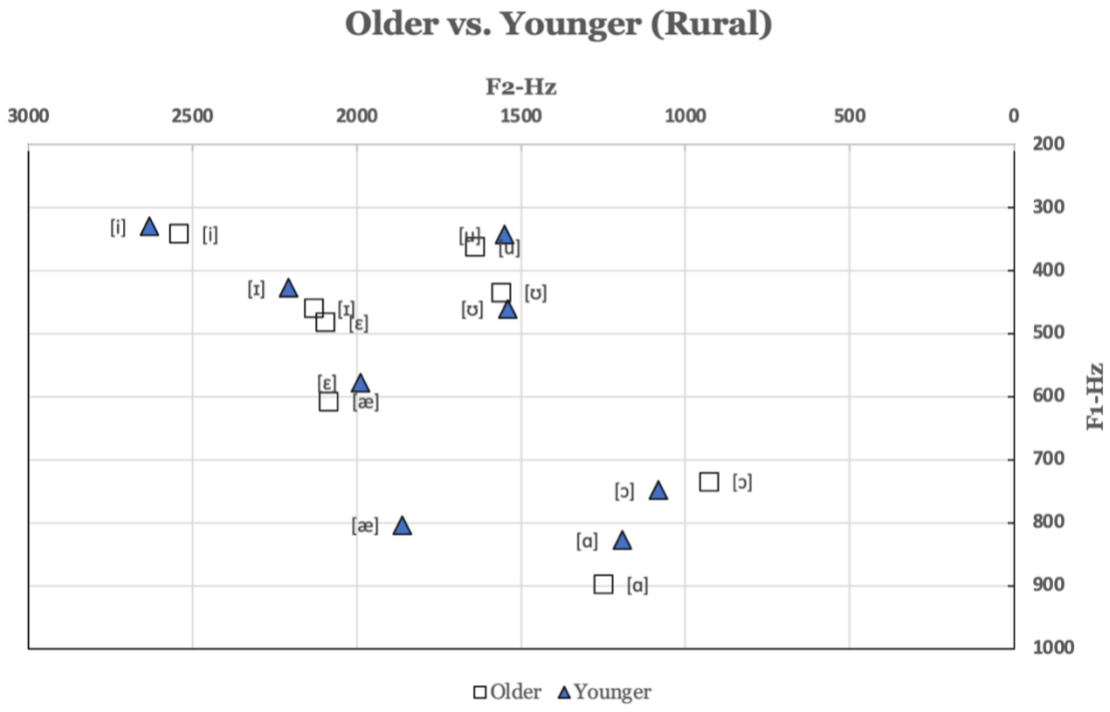
To determine the urban and rural results' significance, without distinction for age, 2 two-sample t-tests were conducted, each assuming equal variances. The null hypothesis states that the true difference between urban and rural population means is 0. In the alternate hypothesis, the true difference is different than 0. As standard in t-tests, $\alpha = 0.05$ and results are statistically significant if the probability coefficient is less than 0.05. Between

the rural and urban means, the p value equals approximately 0.829 for F1 and 0.924 for F2 and we fail to reject the null hypothesis.

4.2 Older versus Younger

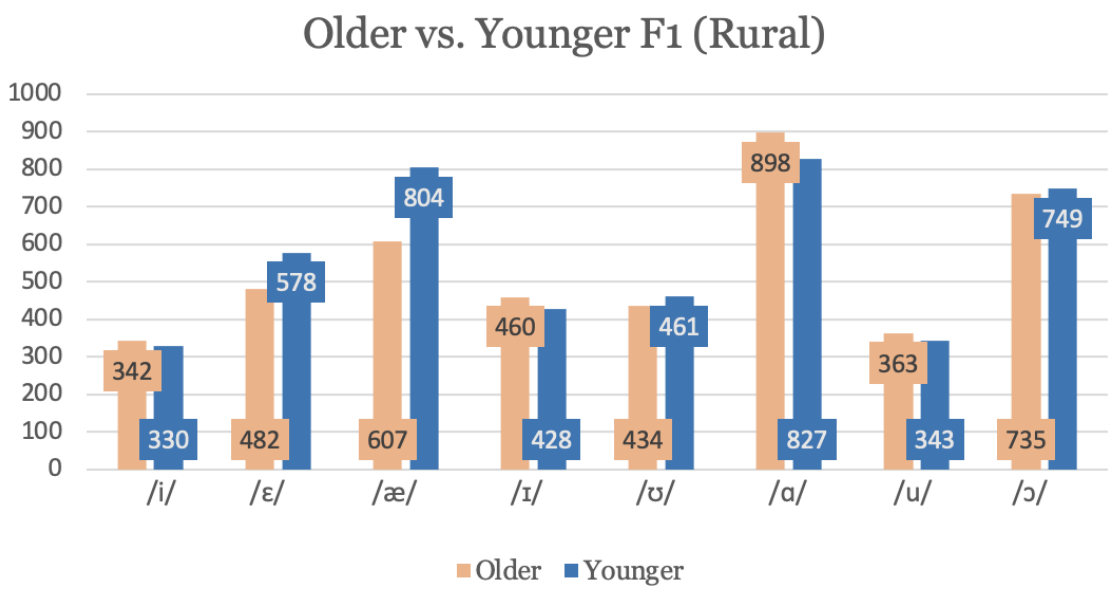
In testing the relationship between generational speech patterns, F1 and F2 measurements for the 8 sampled monophthongs (/i/, /ɛ/, /æ/, /ɪ/, /ʊ/, /ɑ/, /u/, /ɔ/) were pooled and averaged as a function of age and residency, without distinction for sex. Each plotted vowel is a mean sum of 2 subjects' tokens. Each subject provided 4 tokens of each vowel for a total of 8 tokens represented per data point. Figure 4.4 compares the older and younger rural subjects' vowel qualities through their respective F1 and F2 values.

Figure 4.4 Rural Older versus Younger F1 x F2 Scatterplot



The above scatterplot illustrates distinctive patterning for each population's vowel samples. The younger speakers' acoustic space does not overlap with the acoustic space of their older counterparts. This space is most significant in the front vowels /æ/ and /ɛ/ and the back vowels /ɔ/ and /ɑ/. These vowel pair distinctions mirror the SAE (pin-pen), and non-SAE (cot-caught) accent features present in the rural-urban contrast. This demonstrates that there is a generational difference in the speech pattern. In Figures 4.5 and 4.6, the individual vowel qualities are contrasted as a function of age within the rural population.

Figure 4.5 Rural Older versus Younger F1 Bar Graph



The F1 values shown in Figure 4.5 illustrate an equal divide of front and back vowel high-low placement between the older and younger rural populations. The younger sample demonstrates a significant lowering in tongue position of the low-front /æ/ vowel

at a variance of +197 Hz. The younger sample's /ɛ/ tokens fall close behind in degree of lowering at +96 Hz from their older counterparts.

Figure 4.6 Rural Older versus Younger F2 Bar Graph

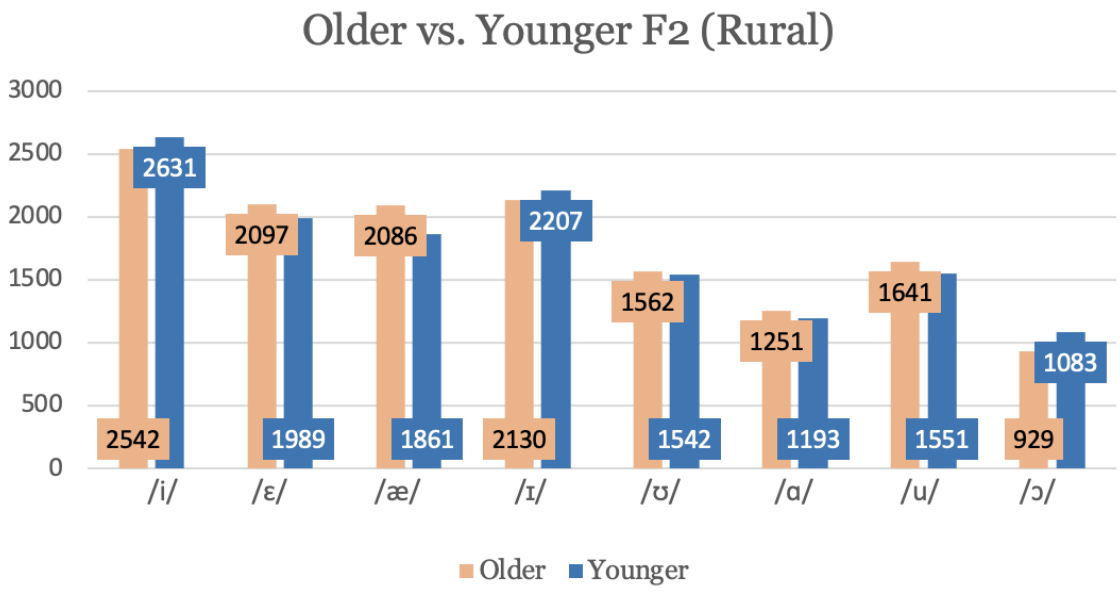
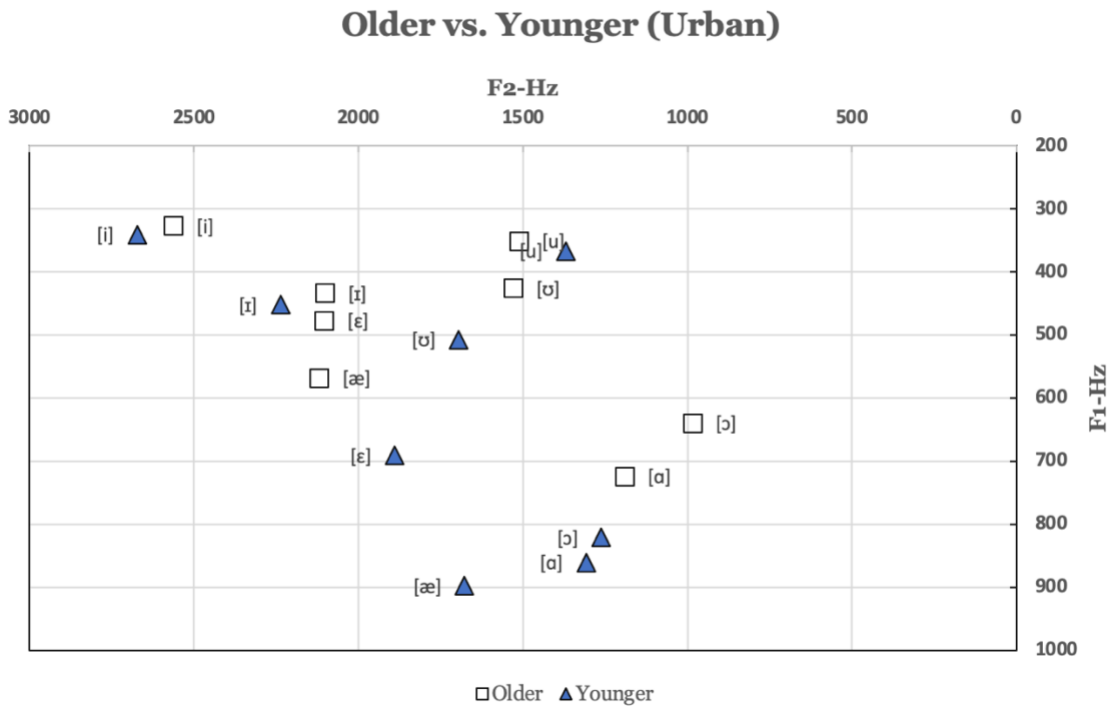


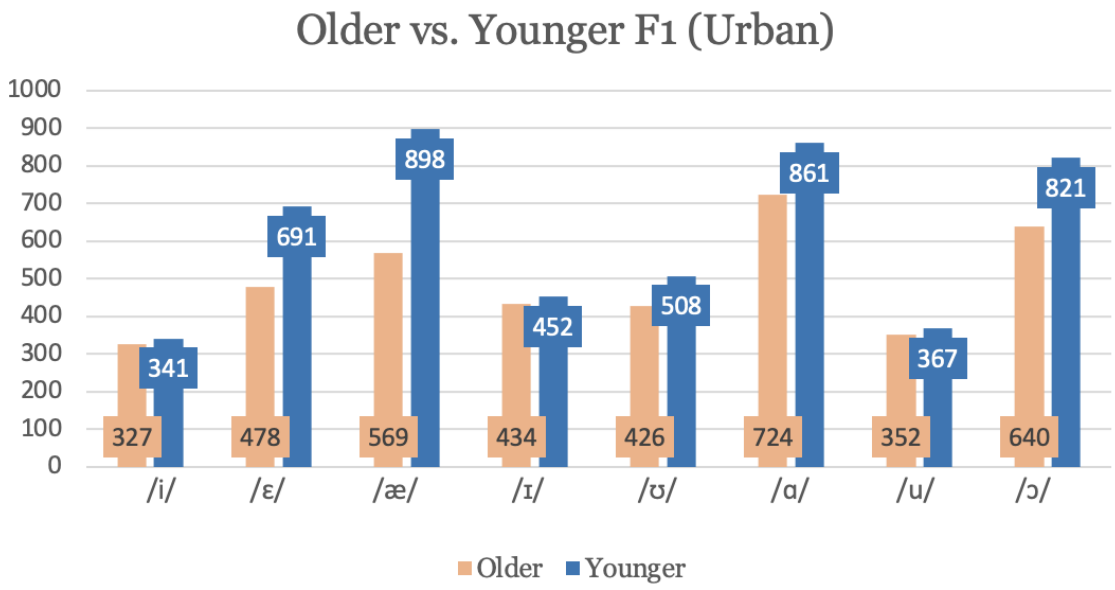
Figure 4.6 shows a similar relationship of a nearly even pattern in front vowels of front-back positioning in older and younger vowel qualities. The older population's F2 values are consistently higher among back vowels (/ʊ/, /ɑ/, /u/). The younger population is thus positioning most back vowels further backward.

Figure 4.7 Urban Older versus Younger F1 x F2 Scatterplot



The acoustic space between older and younger urban samples demonstrates no overlapping of vowel qualities. The high-front vowels of the younger population are further fronted while the low-front vowels are constricted back. The back vowels are also farther to the front for the younger population, except for the high-back, unrounded /u/. Finally, all front and back vowels are produced with a lower tongue placement among the younger population. This relationship demonstrates generational differences in the urban speech patterns. The degree of significance is further demonstrated in the following bar graphs.

Figure 4.8 Urban Older versus Younger F1 Bar Graph



The F1 values in Figure 4.8 are consistently higher among the younger urban samples. This deviance of the younger generation is most distinguishable in the front vowels /æ/ (+329 Hz) and /ɛ/ (+213 Hz), and the back vowels indicative of the cot-caught merger. The younger population produces all simple vowels with a broader acoustic space through a consistently lower tongue position.

Figure 4.9 Urban Older versus Younger F2 Bar Graph

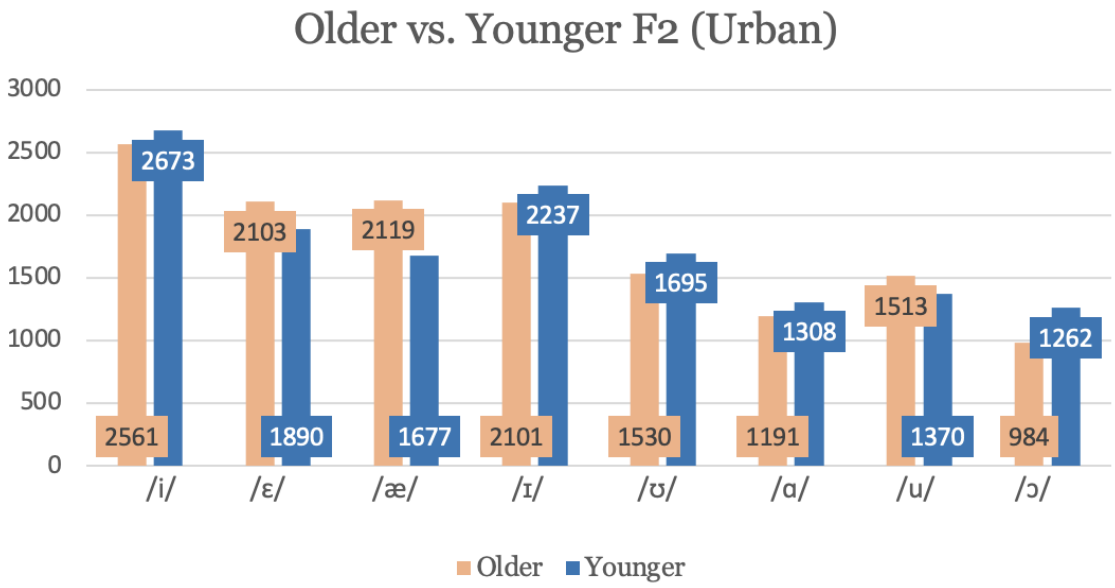


Figure 4.9's F2 values show a corresponding pattern of higher frequencies from the younger sample. The /æ/, /ɛ/, and /u/ vowels are exceptions to this relationship. The younger population produces all remaining sampled vowels through a further forward tongue position.

4.2.1 Statistics

An additional 2 two-sample t-tests were conducted in contrasting the older and younger population means without distinguishing residency. The parameters were the same as the rural-urban t-tests: each assuming equal variances, $\alpha = 0.05$, and results are statistically significant if the probability coefficient is less than 0.05. The same null hypothesis states that the true difference between population means is 0. The alternate hypothesis states that the true difference is different than 0. Between the older and younger means, we reject the null hypothesis as the p value equals approximately 0.024 for F1 and 0.924 for

F2. In rejecting the null for the older versus younger test, we can assume variance between the populations as being not due to chance.

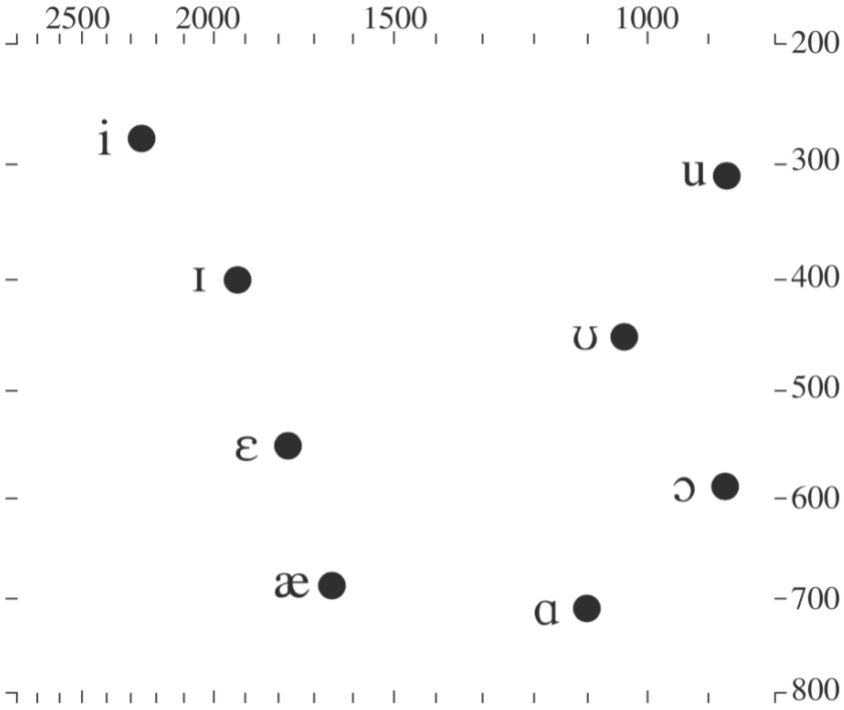
4.3 Summary and region-generation hypotheses

Two principal research questions were explored in this study: Are there differences between urban and rural population speech patterns? Are Texas accents stable or shifting through time across contemporary generations? In section 4.1, I tested the sampled data as a function of rural-urban residency. Although the difference in means between the two populations resulted in statistical insignificance, mixed patterns of distinction emerged including constriction of front-back acoustic space and lowering of the tongue position among the urban population. Section 4.2 was comprised of tests in which the older and younger generations were set against each other. The resultant t-tests showed statistical significance between generational speech patterns as well as distinctive acoustic spacing with no overlapping vowel qualities. The younger urban population consistently positioned the tongue lower while this feature is only present in half of the younger rural vowel samples. The F2 values in Figures 4.6 and 4.9 show some rural variation in front-backness, but a higher degree of variation present between the urban generations. While there is conclusive evidence of shifting from the older to younger generation in both regions sampled, the younger urban population is demonstrating broader variance from their regional seniors than the younger rural population.

4.4 General American

The presented contrastive plots in this section respond to the question of the presence of a population of Texas English speakers demonstrating a de-localizing pattern of speech. The following formant chart, derived from Ladefoged and Johnson (2015: 207) shows the F1 and F2 values of a generalized American speech pattern. Using this as a measure, I compared my older and younger population data to it to understand how Texas speech patterns relate to a generalized speech pattern in American English.

Figure 4.10 Formant Chart of Eight American English Vowels F1 x F2 (Ladefoged & Johnson 2015: 207)

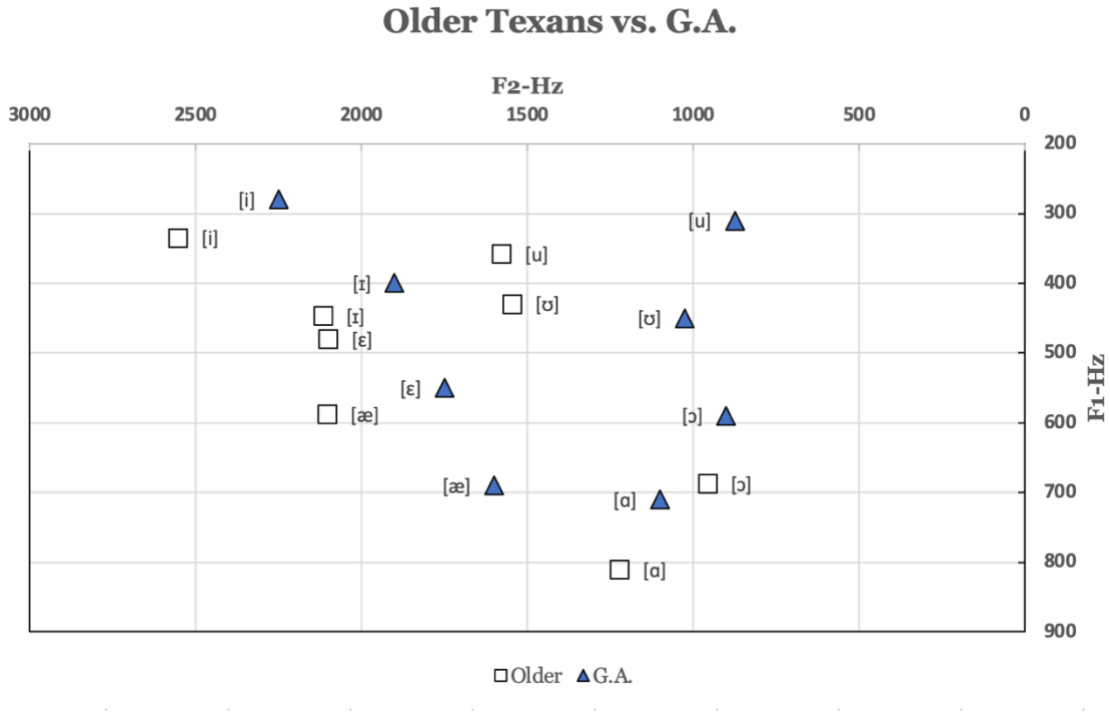


4.4.1 Older

In Figure 4.11, I paired the formant measurements for older Texans with the F1 and F2 values taken from Ladefoged for comparison. For this plot, the data from the urban and

rural older populations, both male and female, were pooled to represent an overall older generation of Texas English speakers. The 2 sample sets occupy distinct acoustic space. The older Texan sample demonstrates lower and further fronted front and back vowels relative to General American, apart from two higher front vowels, /i/ and /ɪ/, and one higher back vowel /ʊ/.

Figure 4.11 Older Texans versus General American F1 x F2 Scatterplot

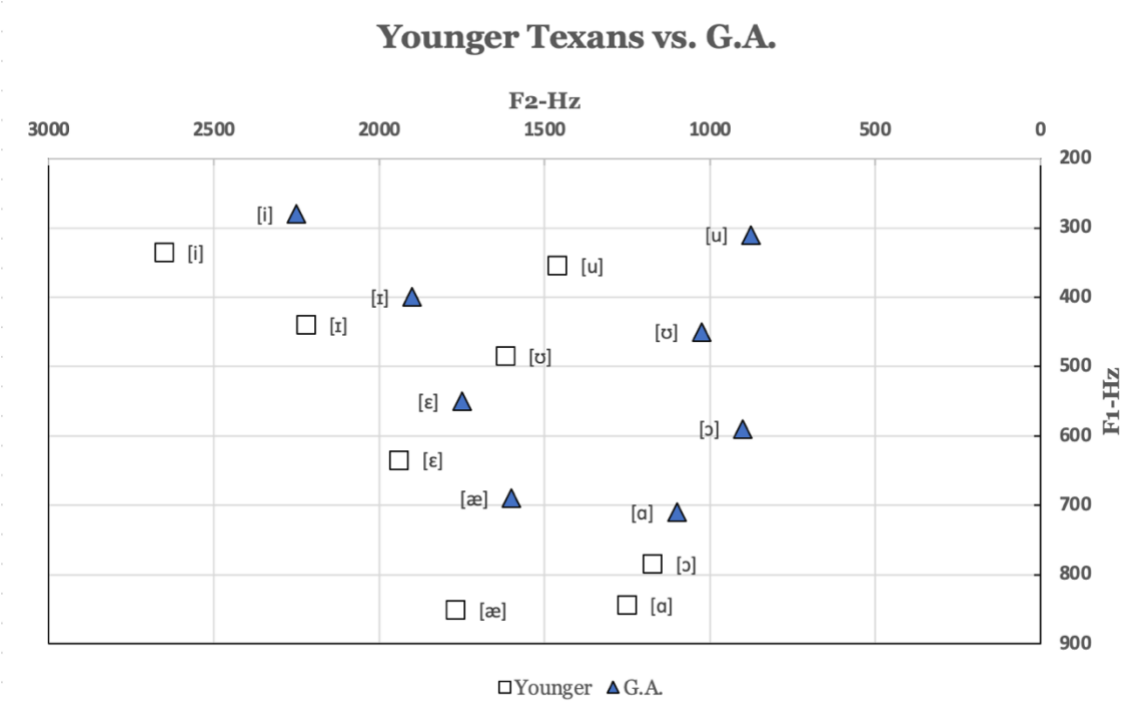


4.4.2 Younger

The F1 and F2 Ladefoged values were paired against the pooled sample of younger Texans in Figure 4.12. This sample also does not distinguish for residency or sex to demonstrate average sums for all younger representative subjects. There is distinctive acoustic space between the 2 populations with all vowels produced at higher F2 and F1

frequencies. These contrastive samples in Figures 4.11 and 4.12 demonstrate a distinctive speech pattern present among both the older and younger generations of Texans.

Figure 4.12 Younger Texans versus General American F1 x F2 Scatterplot



4.5 Summary and de-localization hypothesis

In exploring the relationship between Texas speech and General American through their relative vowel qualities, I tested my averaged sampled data, with distinction for age, against the F1 and F2 values of Ladefoged. A conclusive pattern of lower and further front vowel articulations emerged among both generations of Texans. This acoustic space is broader in contrasting General American with younger speakers of Texas English than older speakers. The older population demonstrated three exceptions to the low-front Texas vowel shift: /i/, /ɪ/, and /ʊ/. Overall, each representative population in this study

produces characteristics SAE phonological features at varying degrees of deviance from General American, but the speech pattern of the younger population of Texans shows more consistent deviation in vowel quality from SAE.

V. DISCUSSION AND CONCLUSION

> Language is one of the ways that we negotiate identity; as long as there is a need for unique and different identities, there will be requisite for linguistic change and diversity.
>
> (Bailey 1991: 133)

5.1 Observations to findings

Observations of the English-speaking Urban-Inland and Rural-Lowland populations of Texas reveal patterns of dynamic phonological features, both those articulated in prior synchronic studies of Texas English and those newly propagated with the decisions of the younger population. In testing the cross-generational and cross-regional hypotheses, the existence of variant phonological features between the older and younger populations supports the proposition that innovation in sound change is being driven by variants transmitted by the younger generation of Texans. The SAE features – goose-fronting (/u/) and pin-pen merging (/ɪ/-/ɛ/) – were concentrated in the older subjects' speech patterns while the non-SAE feature – cot-caught merging (/ɑ/-/ɔ/) – was present in all younger subjects. These generational contrasts are present through relative vowel qualities from both regional populations but are stressed to a greater extent among young Texans in the urban environment. This greater variance is illustrated by the urban younger generation's consistent lowering and fronting of the tongue and jaw across 8 monophthong vowels. The conclusive statistical significance supports the probability of these variants propagating due to non-random chance. Furthermore, the findings drawn from the bivariate contrasts with a sample of General American demonstrate that generational phonological differences vary in proximity to approaching a non-local style of Texas

accents. Overall, the younger generation of Texans is shifting away from phonological characteristics typical of the SAE speech pattern.

5.2 Participant demographics: "Tell 'em you met the one-thumb cowboy"

Among the prior mentioned subject selection requirements in this study, a crucial component was the extent of residency in 1 of the 2 regional categories to further interpret the demographic details of each participant. Evidently, all 4 rural representatives noted their place of birth as Mason, Texas, and all 4 urban representatives as Dallas, Texas. Each of the Mason subjects attributed their residency histories within Mason to extend at least 2 generations (R24) and as far as 6 generations (R66M). As commonly the case among natives to urban Texas areas, only 1 Dallas subject reported having a parent from the same location (U20F). When questioned regarding national identity beyond American-born ancestors, 1/2 of all participants identified as having Anglo ancestry, evenly divided between urban (U68M, U79F) and rural (R24F, R66M) residency. Additionally, 3/8 of subjects identified as having German ancestry, all of which belong to the rural category. As for racial and ethnic identity, 2/8 of subjects identified themselves as Hispanic (U20M, U20F), while the remainder of subjects were classified as White, Non-Hispanic. In accordance with the prevalence of the Spanish language across Texas, 1/2 of subjects claimed to speak both English and Spanish, also evenly divided between urban (U20M, U20F) and rural (R66M, R25M). The English as a first language status of all 8 participants substantiated their eligibility to represent their respective Texas accents without a confounding level of Spanish phonology influence. Finally, each subject stated their parents' occupations, highest education level, and most critically, personal

occupation to establish an even set in socioeconomic status in accordance with the curvilinear principle: R66M rancher, R67F teacher, R25M cowboy, R24F vineyard manager, U68M cyber security specialist, U79F retired secretary, U20M barista, and U20F YMCA representative.

5.3 Suggestions for future research

In naming several considerations given the controlled scope of this survey, the course of selecting subjects for sampling, organizing populations for analysis, and interpreting spectrograms gave rise to three limitations. These derived primarily from constraints regarding the period through which this study took place. In selecting 8 subjects to represent 4 distinctive Texas speech patterns, the qualitative conclusions on regional and generational accents must be observed at the degree of their imposed margins. Additionally, the equal distribution of male and female subjects recorded in this study relates to the fundamental differences in vocal tract length, which directly correlates to frequency in pitch produced by the subject. Although this difference in absolute frequency value has been cited with prior observations of sex-based variant diffusion (Freeman 2014; Kendall & Fridland 2015; Michael 2014), "the formant frequencies will remain the same as long as there are no changes in the shape of the vocal tract" (Ladefoged & Johnson 2015: 200-201). Lastly, in outlining the theoretical and sociolinguistic factors that influence change, the concept of identity could be further analyzed with participant demographics as a confounding factor in variant propagation and use among populations. In utilizing qualitative sociological methods, I composed a

sample form of potential questions to implement this experimental method, intrigued by the relationship individual identity holds with speech pattern development.

5.3.1 Sample survey form

1. How likely would you be to recommend living in Texas to someone?

Not at all - Somewhat - Quite a bit - A great deal

2. How would you rate the standard of living in Texas?

Poor - Fair - Good – Excellent

3. I feel a strong connection to my identity as a Texan.

Disagree - Somewhat disagree - Somewhat agree – Agree

4. My accent is distinguishable from those in other regions of Texas.

Disagree - Somewhat disagree - Somewhat agree - Agree

5. My accent is distinguishable from those of other states in the U.S.

Disagree - Somewhat disagree - Somewhat agree – Agree

In recording, contextualizing, and interpreting forms of languages at intermittent points in time, the progression of phonological change can be better understood for related historical linguistic descriptions and sociolinguistic methods. According to the apparent time hypothesis, these points on the timeline of Texas English mark significant patterns in the language's development and can be used to compare diachronic change in future forms of English in Texas. The data presented in this study in the shared context of related data can be used to draw a continuum of change in the language through time.

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APPENDIX

Table 1

F1 and F2 Values of /i/ Tokens of All Subjects

Participants	Vowel	Word	F1	F2
R66M-1	[i]	heed	282	2545
R66M-2			322	2491
R66M-3			328	2517
R66M-4			316	2348
R25M-1	[i]	heed	310	2469
R25M-2			339	2506
R25M-3			333	2513
R25M-4			346	2337
R67F-1	[i]	heed	385	2576
R67F-2			367	2565
R67F-3			366	2560
R67F-4			340	2557
R24F-1	[i]	heed	363	2736
R24F-2			328	2811
R24F-3			306	2751
R24F-4			321	2870
U68M-1	[i]	heed	280	2245

U68M-2			247	2276
U68M-3			313	2115
U68M-4			291	2176
U20M-1	[i]	heed	344	2688
U20M-2			429	2654
U20M-3			362	2445
U20M-4			374	2490
U79F-1	[i]	heed	396	2908
U79F-2			385	2816
U79F-3			317	2946
U79F-4			424	2908
U20F-1	[i]	heed	364	2651
U20F-2			227	2699
U20F-3			487	2497
U20F-4			403	2654

Table 2

F1 and F2 Values of /ɛ/ Tokens of All Subjects

Participants	Vowel	Word	F1	F2
R66M-1	[ɛ]	head	434	2080
R66M-2			450	2018
R66M-3			436	1931

R66M-4			435	1953
R25M-1	[ε]	head	580	1843
R25M-2			516	1982
R25M-3			539	2053
R25M-4			410	1780
R67F-1	[ε]	head	591	2159
R67F-2			486	2132
R67F-3			495	2259
R67F-4			530	2088
R24F-1	[ε]	head	643	1935
R24F-2			592	2020
R24F-3			596	2098
R24F-4			577	1934
U68M-1	[ε]	head	461	1948
U68M-2			460	1780
U68M-3			457	1733
U68M-4			486	1821
U20M-1	[ε]	head	713	1857
U20M-2			738	1795
U20M-3			801	1808
U20M-4			700	1929
U79F-1	[ε]	head	517	2252
U79F-2			472	2433

U79F-3			589	2136
U79F-4			451	2321
U20F-1	[ɛ]	head	725	1847
U20F-2			589	2062
U20F-3			726	1842
U20F-4			701	1942

Table 3

F1 and F2 Values of /æ/ Tokens of All Subjects

Participants	Vowel	Word	F1	F2
R66M-1	[æ]	had	547	1936
R66M-2			547	1972
R66M-3			530	1919
R66M-4			611	1848
R25M-1	[æ]	had	759	1848
R25M-2			650	1821
R25M-3			687	1854
R25M-4			774	1852
R67F-1	[æ]	had	722	2182
R67F-2			636	2221
R67F-3			661	2286
R67F-4			577	2203

R24F-1	[æ]	had	901	1851
R24F-2			900	1836
R24F-3			926	1957
R24F-4			946	1867
U68M-1	[æ]	had	597	1956
U68M-2			471	1925
U68M-3			439	1934
U68M-4			448	1857
U20M-1	[æ]	had	785	1685
U20M-2			869	1652
U20M-3			936	1666
U20M-4			915	1674
U79F-1	[æ]	had	628	2337
U79F-2			578	2258
U79F-3			731	2067
U79F-4			754	2304
U20F-1	[æ]	had	945	1655
U20F-2			991	1716
U20F-3			953	1722
U20F-4			941	1723

Table 4

F1 and F2 Values of /ɪ/ Tokens of All Subjects

Participants	Vowel	Word	F1	F2
R66M-1	[ɪ]	hid	358	2216
R66M-2			491	1913
R25M-1	[ɪ]	hid	420	2104
R25M-2			432	2083
R25M-3			418	2093
R25M-4			429	1954
R67F-1	[ɪ]	hid	473	2099
R67F-2			476	2149
R67F-3			531	2057
R67F-4			479	2127
R24F-1	[ɪ]	hid	421	2423
R24F-2			451	2221
R24F-3			424	2319
R24F-4			473	2137
U68M-1	[ɪ]	hid	433	1835
U68M-2			428	1809
U68M-3			409	1936
U68M-4			425	1852
U20M-1	[ɪ]	hid	521	2122

U20M-2			528	2215
U20M-3			456	2208
U20M-4			563	2073
U79F-1	[ɪ]	hid	467	2423
U79F-2			408	2338
U79F-3			407	2417
U79F-4			391	2429
U20F-1	[ɪ]	hid	369	2201
U20F-2			391	2411
U20F-3			494	2126
U20F-4			461	2173

Table 5

F1 and F2 Values of /ʊ/ Tokens of All Subjects

Participants	Vowel	Word	F1	F2
R66M-1	[ʊ]	hood	379	1576
R66M-2			408	1453
R66M-3			438	1578
R66M-4			492	1430
R25M-1	[ʊ]	hood	429	1469
R25M-2			430	1528
R25M-3			407	1561

R25M-4			429	1352
R67F-1	[ʊ]	hood	437	1625
R67F-2			462	1557
R67F-3			482	1581
R67F-4			460	1633
R24F-1	[ʊ]	hood	507	1525
R24F-2			501	1588
R24F-3			489	1580
R24F-4			492	1597
U68M-1	[ʊ]	hood	408	1597
U68M-2			381	1415
U68M-3			449	1457
U68M-4			387	1432
U20M-1	[ʊ]	hood	525	1602
U20M-2			563	1595
U20M-3			662	1547
U20M-4			677	1731
U79F-1	[ʊ]	hood	467	1538
U79F-2			448	1569
U79F-3			442	1511
U79F-4			473	1677
U20F-1	[ʊ]	hood	459	1821
U20F-2			483	1760

U20F-3			657	1704
U20F-4			534	1722

Table 6

F1 and F2 Values of /a/ Tokens of All Subjects

Participants	Vowel	Word	F1	F2
R66M-1	[ɑ]	hod	845	1141
R66M-2			755	1289
R25M-1	[ɑ]	hod	945	1064
R25M-2			884	1032
R25M-3			798	1084
R25M-4			707	1062
R67F-1	[ɑ]	hod	940	1250
R67F-2			837	1217
R67F-3			968	1394
R67F-4			1029	1190
R24F-1	[ɑ]	hod	794	1207
R24F-2			755	1399
R24F-3			788	1371
R24F-4			921	1165
U68M-1	[ɑ]	hod	677	1164
U68M-2			601	1118

U68M-3			754	1152
U68M-4			581	1057
U20M-1	[ɑ]	hod	848	1349
U20M-2			815	1163
U20M-3			876	1433
U20M-4			900	1483
U79F-1	[ɑ]	hod	802	1264
U79F-2			817	1218
U79F-3			886	1409
U79F-4			703	1275
U20F-1	[ɑ]	hod	916	1364
U20F-2			863	1355
U20F-3			908	1272
U20F-4			989	1573

Table 7

F1 and F2 Values of /u/ Tokens of All Subjects

Participants	Vowel	Word	F1	F2
R66M-1	[u]	who'd	337	1349
R66M-2			344	1470
R66M-3			364	1533
R66M-4			351	1340

R25M-1	[u]	who'd	308	1518
R25M-2			331	1623
R25M-3			306	1587
R25M-4			410	1258
R67F-1	[u]	who'd	328	1943
R67F-2			440	1911
R67F-3			345	1860
R67F-4			363	2003
R24F-1	[u]	who'd	351	1257
R24F-2			383	1659
R24F-3			380	1664
R24F-4			372	1405
U68M-1	[u]	who'd	360	1610
U68M-2			369	1751
U68M-3			239	1592
U68M-4			288	1587
U20M-1	[u]	who'd	358	1320
U20M-2			355	1299
U20M-3			377	1394
U20M-4			355	1562
U79F-1	[u]	who'd	333	1321
U79F-2			344	1368
U79F-3			262	1219

U79F-4			281	1339
U20F-1	[u]	who'd	389	1382
U20F-2			366	1479
U20F-3			492	1572
U20F-4			469	1435

Table 8

F1 and F2 Values of /ɔ/ Tokens of All Subjects

Participants	Vowel	Word	F1	F2
R66M-1	[ɔ]	hawed	780	896
R66M-2			713	987
R66M-3			817	833
R66M-4			786	1110
R25M-1	[ɔ]	hawed	678	933
R25M-2			816	963
R25M-3			661	1006
R25M-4			696	1014
R67F-1	[ɔ]	hawed	761	1086
R67F-2			663	855
R67F-3			675	914
R67F-4			1079	1390
R24F-1	[ɔ]	hawed	839	1355

R24F-2			738	1119
R24F-3			759	1119
R24F-4			822	1011
U68M-1	[ɔ]	hawed	613	974
U68M-2			586	996
U68M-3			657	998
U68M-4			631	968
U20M-1	[ɔ]	hawed	767	1214
U20M-2			808	1191
U20M-3			735	1085
U20M-4			829	1324
U79F-1	[ɔ]	hawed	679	979
U79F-2			682	988
U79F-3			859	1207
U79F-4			756	1010
U20F-1	[ɔ]	hawed	865	1198
U20F-2			845	1443
U20F-3			975	1319
U20F-4			935	1338

Table 9

F1 and F2 Values of General American

G.A.	Vowel	F1	F2
	[i]	280	2250
	[ɛ]	550	1750
	[æ]	690	1600
	[ɪ]	400	1900
	[ʊ]	450	1025
	[ɑ]	710	1100
	[u]	310	875
	[ɔ]	590	900