

ROOTEDNESS AND PRE-LATERAL MERGERS
IN OKLAHOMA

By

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IN OKLAHOMA

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Abstract: Oklahoma is in a dialectal transition zone, on the periphery of the South and Midland and blending into the West. Accordingly, it has a mix of linguistic and phonetic features. This study asked how phonetic features relate to community connection. Key terms include pre-lateral mergers: the merging of two (or more) vowel sounds when produced before the consonant /l/, and rootedness: a sense of place or belonging to one's community. Participants of this study included 52 native Oklahoman English-speakers that had previously submitted recordings to be used in a study of pre-lateral mergers in Oklahoma. Results of the previous study were mixed in terms of vowel merger patterns, which led to the question of what social or demographic factors influence pre-lateral mergers in Oklahomans. This study used a follow-up survey of rootedness to identify a correlation between pre-lateral merger patterns and an individual's rootedness. Results of this study showed participants from large cities to be less rooted than those from medium or small sized cities, and participants of the older age groups (40+) to be more rooted than younger participants. There were also correlations between vowel indexes, pre-lateral merging of /ʌ/ and /ʊ/ (identified from previous study), and rootedness scores among demographic groups; females had a positive correlation between rootedness and both vowel index scores, and males had a positive correlation for one index and a negative correlation for one index. Size of city in which a participant lived also produced trends, with people from small cities having a negative correlation between rootedness and merger patterns. Implications were also drawn in regard to age groups, as participants aged 40-59 had unique results in comparison to the other age groups. Future studies should attempt to clarify factors of rootedness and compare it to other phonetic factors.

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CHAPTER I

INTRODUCTION

Being located on a dialectal transition zone gives social groups more options in expressing group membership through their accents. Past studies of regional accents have shown that Oklahomans have speech features of both the South and the Midland regions (Bakos, 2013). Dialectal features including the Midland *lot-thought* merger, Southern *pin-pen* merger, and some *price* monophthongization have all been previously identified (Bakos, 2013). Mergers help differentiate regional dialects of English, and they signify change over generations. In a merger, sounds that used to be pronounced as different are pronounced similarly. For example, a common merger to the Southern dialect is the convergence of the vowels in words like “pin” and “pen” (Weirich, 2013), and the Midland dialect has a clear merging of the vowels in words like “caught” and “cot” (Labov, Ash, & Boberg, 2006).

Pre-lateral mergers are vowels before the consonant /l/ being pronounced similarly. Past work has shown there to be some tense-lax vowel collapse before /l/ in various dialects of English. Specific to the South, past work showed front vowels lax before /l/ (i.e., “feel” being produced as “fill,” “fail” being produced as “fell”: Labov et. al, 2006). With back vowels, there is less information on patterns of pre-lateral merging according to region. Some work showed lax vowels merging to tense vowels (i.e., “pull” being produced as “pole” or “pool”) (Labov et. al, 2006).

Research preceding the current study consists of 97 participant recordings of a word list and passages (Freeman & Landers, 2021). This study hypothesized that Oklahomans would produce a variety of Southern and Midland pre-lateral vowel mergers. Predictions included that tense front vowels /i, e/ would merge to their lax counterparts /ɪ, ɛ/ when produced before /l/ (i.e., *feel-fill*, *sale-sell*), and that back rounded vowels /ʊ, o, u/ may converge (i.e., *pull-pole-pool*). Results of this study yielded interesting and unpredicted results. Working-age Oklahomans (ages 18-59) showed no pre-lateral mergers of front vowels in this wordlist-reading task (no *feel-fill* or *sale-sell*), but GULF* (/ʌl/) was shifted toward GOLD (/oʊ/) (*dull-dole*), and WOOL (/uʊ/) tended to merge with GOLD among urban speakers (*bull-bowl*) but with SPOOL (/uʊ/) among rural speakers (*full-fool*). Based on these results, the question as to social differentiation arose. The current study aims to investigate which demographic and social factors affect pre-lateral mergers in native Oklahomans.

The current study aims to identify factors which lead to various patterns of pre-lateral mergers in the Oklahoma dialect. The analyzed patterns include those related to rootedness. This study is based on Reed's past work on rootedness in East Tennessee in Appalachia (Reed, 2016). Reed looked at the links between various phonetic features and social and demographic features which he termed "rootedness." Rootedness is determined by examining an individual's sense of connection to his or her community; for example, if a person travels away from her hometown frequently, how willing she would be to relocate, how often she participates in community events, and more. A person's communal ties are hypothesized to have a relationship to their phonetic features as seen in pre-lateral vowel merger patterns. The question remains as to the relevance of rootedness in speakers who are native to Oklahoma. The current study's objective is to identify ties between rootedness and pre-lateral vowel mergers.

**GULF will represent the class of words with the phonetic combination /ʌl/. Other words in all capitals (i.e., GOLD, WOOL, etc.) are words without a minimal pair that will be used to define the vowel before /l/ in that word.*

CHAPTER II

REVIEW OF LITERATURE

i. Mergers

Mergers are one process involved in how languages change over time. In vowel mergers, two vowels collapse and become indistinguishable. There are some patterns of how vowels merge over time, and there are often trends in merger patterns across different groups. In the *Atlas of North American English*, Labov, Ash, and Boberg (2006) catalogued various mergers; they defined mergers in general as a change that results in a fewer number of oppositions and phonemic categories than originally existed. Two common mergers are the *cot-caught* merger and the *pin-pen* merger. *Cot-caught* is seen in the Midland dialect and occurs when /ɑ/ and /ɔ/ are produced identically. *Pin-pen* occurs in the Southern dialect region, and speakers of this dialect often merge the vowels /ɪ/ and /ɛ/ before nasal consonants /n/ and /m/.

ii. Pre-lateral Mergers

Mergers before /l/ are likely to be a collapse of tense-lax distinction. For example, Labov and colleagues found /ul/-/ʊl/ (*pool-pull*) merging in western Pennsylvania. The Atlas of North American English also catalogues the merging of /il/ and /ɪl/ (*peel-pill*) in various regions of the US (Labov et al., 2006). Both examples show a tense vowel merging to its lax counterpart. There is also evidence of pre-lateral mergers occurring in the opposite direction: a lax vowel to its tense counterpart. Labov et al. (2006) saw this in the *full-fool* merger in regions of the Southern dialect.

Pre-lateral mergers are common across North America and in English because /l/ contains strong coarticulatory effects when in a coda (syllable final) position (Labov et al., 2006), and previous work has begun to find patterns in specific dialectal regions. In the Southern dialect region, Labov et al. (2006) found front vowels merge to the lax vowel (*feel-fill*). They also found some evidence of *fail-fell* merging, but there was no clear region that defined this merger behavior. For the back vowels, there is less information on patterns or regions in the literature. It is possible that the back vowels merge to the tense vowel (*pull-pole, dull-dole*). Although there is no clear trend in where or how these vowels converge, *pull-pole, pull-pool, pull & pole-pool* were all possible in the Pittsburgh area (Arnold, 2015; Labov et al., 2006).

iii. Oklahoma Dialects and Perceptions

Oklahoma, being in a dialectal transition zone between the South, Midland, and West, contains characteristics of each neighboring dialect region, and more specifically, vowel mergers.

The Survey of Oklahoma Dialects (SOD) provides an initial foundation to the characteristics of Oklahoman English. Bailey, et al. (1994) tracked linguistic patterns of spatial diffusion in the survey. They classified the respondents as being born before or after 1946. The youngest participants of this study were born around 1962, and the oldest participants of the current study were born around 1960. The current study contains 7 participants 60 years or older; therefore, some data is comparable. The authors' most robust merger pattern documented was that of /ɑ/ and /ɔ/ in all age groups (*cot-caught*). They also found evidence of the *pin-pen* merger.

The *pin-pen* merger, common to the Southern dialect, is inconsistently seen in Oklahoman English. Weirich (2013) acknowledged the interaction of monophthongal merging of the vowels as well as triphthong productions of these vowels. Bakos's (2013) research suggested that almost all respondents produced the *pin-pen* merger in Oklahoma. In contrast, Dokhtzeynal's 2020 study of young adult second-generation Persian-Oklahomans showed some speakers' vowels to

be unmerged across tasks. Since the *pin-pen* merger of the Southern dialect and the *cot-caught* merger of the Midland dialect converge in some type of pattern on Oklahoman speech, this leads to further complications of the Oklahoman dialect.

Bailey, Wikle, Tillery, and Sand (1994) investigated the effects of World War II in Texas and Oklahoma in terms of linguistic consequences. Authors discussed the catastrophic language change that occurred after this event, and they found that speakers laxed /i, e, u/ before /l/. For example, participants laxed the vowel /i/ in words such as “field,” laxed the vowel /e/ in “bale, sale,” and laxed the vowel /u/ in “pool” and other similar words. Results of this study weren’t definitive to say the influx of Texans to Oklahoma created a rapid transition to the laxing of front vowels before /l/. However, authors discussed how in the successive generations after WWII, there was a complex convergence of phonetic (and linguistic) features. While there were some patterns of language innovations, they also found the preservation of some traditional features, which could be due to speakers’ nativity to the region. Specific to Texas, nativity and connection to the land was important to a person’s dialect. This factor relates to the current study’s key term: rootedness. Speakers of the current study were analyzed according to their vowel merger patterns and rootedness. Even more specific to the current study, Bakos (2013) found Oklahomans lax front vowels (/i, e/) before /l/. He cited it as a more recent change in the region and a characteristic of Southern speech. This shift of tense vowels to lax front vowels before /l/ (*feel-fill*) is likely to be influenced by age and rurality. Speakers of this study were younger and therefore contribute to the speculation of language change in this region based on generation. Specifically, pre-lateral mergers have become more common among younger age groups.

In contrast, recent work has found Oklahomans of all ages have displayed a lack of front vowel mergers before /l/ in a word list task (Freeman & Landers, 2020), despite this being a characteristic of the Southern dialect that would be expected of speakers of the region. Back vowel mergers are complex among native speakers of OK English. Merging of lax WOOL /o/

toward nearby tense back vowels /u/ or /o/ is present in Oklahomans, but there is a suggestion of an urban-rural split. Urban speakers shifted WOOL to overlap GOLD /ol/, or to points between /o/ and /u/, but they did not raise WOOL as high as SPOOL /ul/. In contrast, rural participants shifted WOOL to various points between GOLD and SPOOL. The urban speakers may be following a trend of prestige in their production of back vowels. Aside from this suggested tendency, the factors signaling differences in speaker production of vowels before /l/ was unclear. Authors suggested further research into participants' sense of belonging and attachment to their city or town. This past study by Freeman and Landers provided the basis for the current study.

Aside from the common demographic factors (age, gender, socioeconomic status, city size), another possible explanation for merger patterns considers a person's sense of place and attachment to location. The participants from Dokhtzeynal's (2020) study were asked to describe which region to which they were most oriented; did they want to stay in Oklahoma, or did they want to move to places like California? Speakers who wanted to stay in OK displayed the *pin-pen* merger. However, those that wished to live in CA did not merge these vowels (Dokhtzeynal, 2020). This orientation to place can be interpreted as a sense of place and belonging, and it relates to rootedness as seen in this study.

iv. Rootedness, Rootedness Metric

Reed (2016) defined rootedness as a place-based identity. How speakers discuss place, what a place means to them, and why a place is important reflects a person's sense of place, identity, and attachment to a location. Past studies have shown rootedness to be a factor contributing to production of key phonetic features (Reed, 2016). Among speakers of Appalachian English in Tennessee, speakers with greater rootedness use specific phonemic structures more than other speakers that are less rooted. This greater attachment to place, rootedness, can be observed by asking key questions. Reed's rootedness metric survey was administered via ethnographic

interviews. It asked questions that target a person's identity towards the local area. Each participant was asked to describe how they feel about that local area, their affinity towards the local community, the strength of their local connections, and more.

CHAPTER III

METHODOLOGY

i. Survey Recruitment and Administration

In a previous study, recordings of a 69-item word list and various passages were collected from 113 participants (Freeman & Landers, 2020). In the initial collections, participants completed a standard demographic survey, providing information about age, gender, and size of the city in which they grew up. The same participants were invited via email to complete the survey. In the recruitment email, the individuals were asked to provide more information as a follow-up to their previous participation in the study. The survey was created and distributed using Qualtrics online survey system. All participants gave informed consent and were given a \$10 Amazon gift card for their time taking the 30-minute survey. All protocols were approved by the Oklahoma State University Institutional Review Board.

ii. Survey Development

The survey was delivered online rather than in person for a variety of reasons: Covid, re-contact with speakers living across the state, and ease of finding participants for online survey vs. in-person interview. The survey was modeled after Reed's past work among speakers of Appalachian English. Some questions remained the same, such as "How often do you visit nearby towns?". Many questions were expanded upon to gain more context and insight through the online survey. For example, the current survey expanded on the travel question by asking, "How often do you travel out of the city, state, or country?". The survey was built in the Qualtrics

online program. The Qualtrics program automatically scored most questions based on scoring rules set by the author. After constructing the survey, it was necessary to split the questions into two broad groups for scoring purposes. Some questions were identified as having to do with where the participant grew up, and some were identified as having to do with where the participant lives now. Participants who live in the same place where they grew up received one set of questions. Participants who live somewhere different than where they grew up received two set of identical questions, but the questions specified if they were asking about where you live now or where you grew up. (i.e., Where you are from, are people proud of the community? Where you live now, are people proud of the community?). See Appendix A and B for the full questionnaire and scoring rubric.

iii. Participant Characteristics and Demographics

Fifty-two participants completed the online rootedness survey of 51 questions. Table 3.1 shows the distribution of participants by age group, gender, and city size. All participants self-reported their age, gender, and city where they live now and where they grew up. They were also asked to identify if the city was large, medium, or small. In the Oklahoma Vowels study (Freeman & Landers, 2020), participants' identification of city size was double checked by the researchers. If the city had a population less than 15,000, it was considered small. If the participant was from one of the two main metropolitan areas in OK (Oklahoma City and Tulsa and their suburbs), they were considered to be from a large city. Participants from cities larger than 15,000 that were not in a metropolitan area were considered to be from medium sized cities. All the participants of the current study continued to be identified based on the city size identified from the OK Vowels study.

Table 3.1 Participants in each demographic group

Age range	Large		Medium		Small		TOTALS		By age
	Male	Female	Male	Female	Male	Female	Male	Female	
18-24 (1)	3	6	3	1	1	4	7	11	18
25-40 (2)	1	3	1	3	3	4	5	10	15
40-59 (3)	1	3		2	1	5	2	10	12
60+ (4)	1	1		2	1	2	2	5	7
	19		12		21		16	36	52

iv. Rootedness Metric

The survey responses were quantified using an adapted version of Reed’s scoring system for the rootedness metric (see Appendix A). In this system, each question has various point options based on a participant’s responses. High scores on the metric indicate a high level of rootedness. Scoring rules were inputted into Qualtrics, and each participant’s score was generated automatically. Once participant rootedness scores were calculated, they were compared to the speaker’s vowel plot. Rootedness scores were compared to GULF index and WOOL index scores (described below).

v. Factor Analysis

First, objective scores were applied to all question responses within the rootedness category. Questions (and scores) were divided into two categories based on about what it was asking: where you grew up and where you live now (see Appendix B). Each participant had an overall rootedness score and two category scores. Next, histograms were made for total rootedness scores for each demographic group to see the distribution of scores. The data seemed to be somewhat normally distributed, and no unreasonable outliers were identified (Figure 3.3).

The next step was to make correlations with total rootedness scores and Wool Index (WI) and Gulf Index (GI) for each demographic group. In order to get a better idea of which questions were unimportant to consider, *XL stat* was used to perform factor analysis on all questions included in the rootedness score (*XL stat*, 2007). From this, two questions were identified that did not have at least 0.3 factor loading and were removed from remaining analysis. Based on the question patterns identified by the factor analysis, common themes among questions were outlined to label and explain the factors. From this information, four factors were identified: 1, 2, 3, and 4, and scores were created for each factor for each participant.

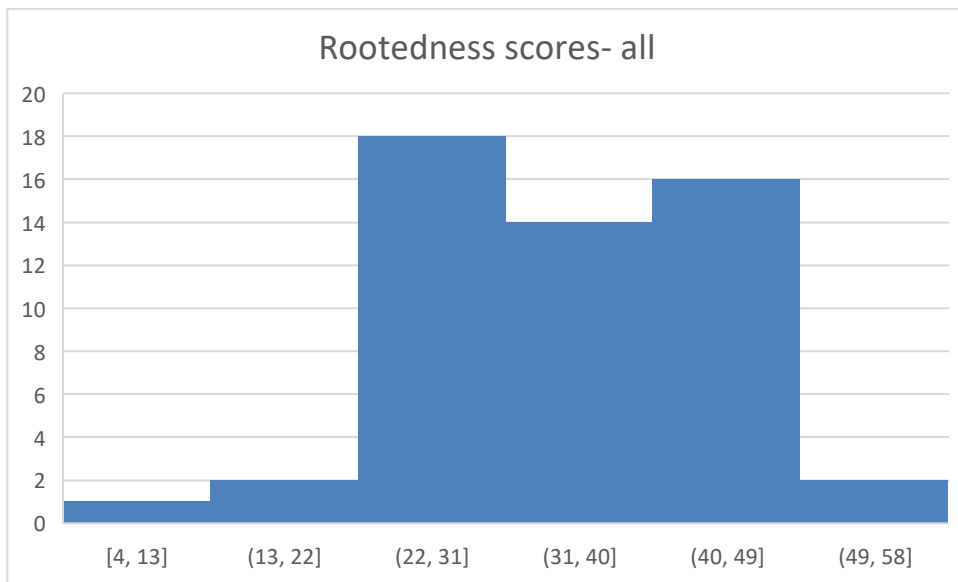
Although the factors could not be defined precisely, some common themes emerged based on which questions weighed on each factor. Factor 1 contained multiple questions about family, church, land in their family, and where their family lives. This factor relates to a person's "homeplace". Factor 2 contained mostly questions about type of vehicle owned and ideas about owning a pickup truck. There were also two questions about moving away from where one lives now. This factor relates to a person's ideas about stereotypes or being a "good Okie". Factor 3 contained multiple questions about high school and three questions about church (fewer church questions than F1). This factor can somewhat be defined as a person's involvement in the community or means of socializing. Factor 4 was less clear in terms of concepts and patterns of questions. There were some questions about outward ideas of rurality, such as moving away, traveling, and where to move and/or travel. This factor can be defined as a person's affinity to places outside of that in which they grew up. The factors remain numbered instead of given titles due to the lack of clarity in assigning concepts or topics.

Table 3.2 The factor pattern scores calculated by XL Stat for each question (two removed questions marked through)

Question#	F1	F2	F3	F4
85	-0.276	-0.075	-0.043	0.421
101	0.354	0.052	0.234	0.412
11	0.146	0.122	0.202	0.305
22	-0.113	0.363	0.369	-0.473
29	-0.261	-0.185	0.567	-0.276
82	-0.089	0.144	0.497	-0.198
12	0.14	0.08	-0.32	-0.252
37	0.171	-0.362	-0.424	-0.361
38	0.39	0.297	-0.545	0.177
94	0.174	-0.175	-0.436	-0.27
33	0.088	-0.268	0.352	-0.262
16	0.09	0.04	0.545	-0.214
88	-0.174	0.574	0.132	-0.225
87	0.063	0.769	-0.25	-0.175
103	0.102	0.334	0.256	-0.207
14	0.379	0.4	0.326	0.04
84	0.42	0.54	-0.092	-0.271
10	0.12	0.446	-0.174	0.094
86	0.122	0.744	-0.262	-0.208
24	0.301	-0.154	0.174	-0.274
93	0.347	0.106	0.122	-0.238
89	0.351	-0.153	-0.019	-0.312
95	0.366	0.158	-0.071	0.095
28	0.438	-0.375	0.187	-0.267

30	0.443	0.098	-0.071	0.255
25	0.446	-0.093	0.093	-0.03
27	0.469	-0.249	0.12	-0.165
26	0.48	-0.133	-0.064	-0.352
81	0.614	-0.178	-0.142	-0.131
34	0.71	-0.208	-0.192	0.015
83	0.71	-0.208	-0.192	0.015
100	0.712	0.071	0.373	0.369
99	0.712	0.071	0.373	0.369
13	-0.062	-0.109	-0.143	-0.291
90	-0.252	-0.293	-0.229	-0.097

Figure 3.1: Rootedness scores for all participants



vi. Vowel Indexes

Based on results from the Oklahoma Vowels study (Freeman & Landers, 2021), each speaker was assigned a vowel index for the production of GULF and for WOOL. These indexes were calculated based on the location of a speaker's GULF/WOOL in comparison to phonetic anchors on their own F1 x F2 vowel plot. Figure 3.4 shows a vowel plot of all speaker vowel productions from Freeman & Landers (2020). This plot shows FOOT (non-pre-lateral /ʊ/) to be at the same height as GOAT (/o/); therefore, any location of WOOL higher than GOLD is considered raised. If a speaker's WOOL was directly centered between SPOOL and GOLD on the vowel plot, their index was 0. If it moved toward SPOOL, it was closer to 1, and if it moved toward GOLD, it was closer to -1. When calculating the GULF index, the phonetic anchors to which to compare were STRUT (non-pre-lateral /ʌ/) and GOLD. If GULF was produced closer to STRUT, the index moved toward 0. If GULF was closer to GOLD, the index score was closer to 1. Figures 3.2 and 3.3 give an example WOOL and GULF index. Figure 3.2 has the pre-lateral vowel (GULF) symbolized by the blue star. The red square is one of the phonetic anchors, GOLD, and the blue triangle is STRUT. The green circle shows the midpoint (index=0.5) between the square (GOLD) and triangle (STRUT). GULF is about two-thirds of the distance between STRUT and GOLD with a GULF index of 0.66. Figure 3.3 has the pre-lateral vowel (WOOL) symbolized by the purple star. The red square is one of the phonetic anchors, GOLD, and the black triangle is SPOOL. The green circle shows the midpoint (index=0) between the square (GOLD) and triangle (SPOOL). WOOL is almost a third of the distance between the midpoint and GOLD with a WOOL index of 0.29.

Example of GULF index (left, figure 3.2) and WOOL index (right, figure 3.3)

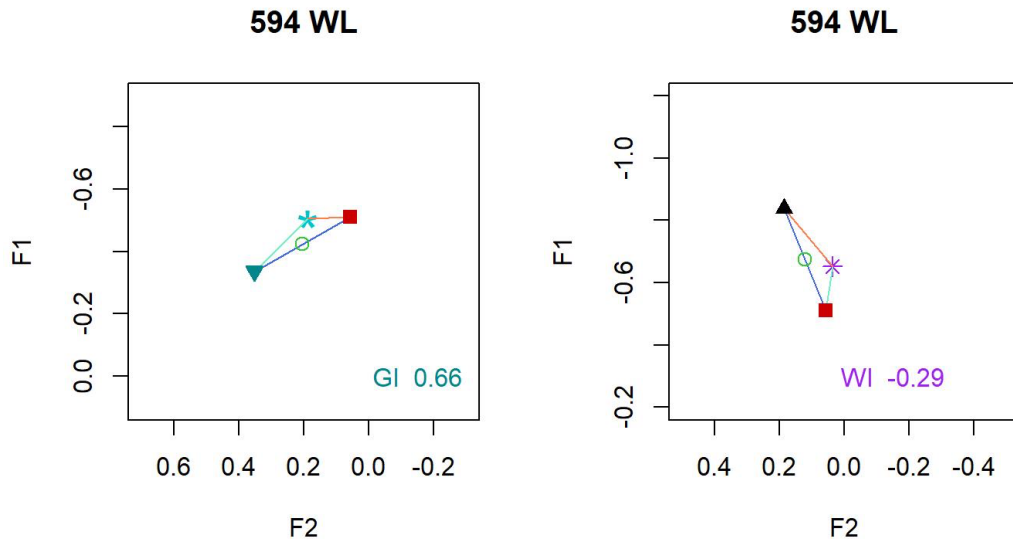
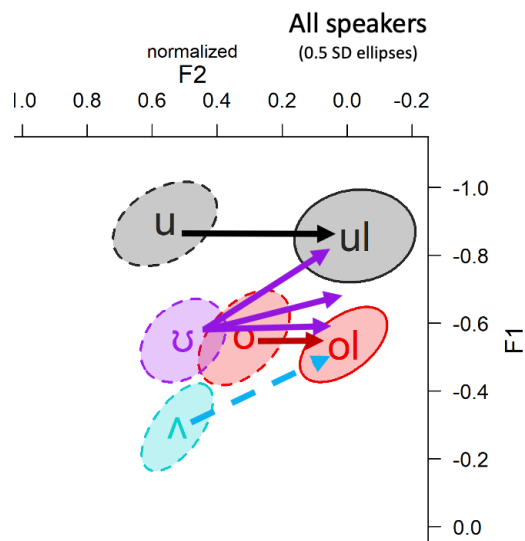


Figure 3.4 A plot of all speaker vowel productions from Freeman & Landers (2020) (reprinted with permission)



CHAPTER IV

FINDINGS

i. Descriptive statistics

Analysis began with the calculation of descriptive statistics. Mean rootedness scores, mean index scores, and individual mean factor scores were calculated for each demographic group (gender, age group, city size in all possible combinations). For factor scores, the minimum and maximum scores and number of questions included were noted for more context. Next, the standard deviation for rootedness, indexes, and factor scores were calculated for each demographic group (Table 4.1).

After calculating, mean scores for GULF index, WOOL index, overall rootedness scores, and each factor score were compared. The mean rootedness score for the entire sample was 35.8 (range: 4 to 54). The mean WOOL index was -0.37 (range: -2.36 to 1.03). GULF index mean was 0.65 (range: 0.29 to 1.26). The mean for factor 1 was 12.35 (range: 0 to 26). The mean for factor 2 was 6 (range: 1 to 13). Factor 3 had a mean of 4.23 (range 0 to 9). The mean of factor 4 was 5.52 (range: 1 to 10).

The WOOL index showed a very common pattern; there was a consistent difference in WOOL raising based on gender, as seen in Table 4.1. There was a pattern of lower scores of WOOL raising (no evidence of pre-lateral merger behaviors), and female participants showed greater degrees of this pattern than male participants. This did not occur in the GULF index.

Other

patterns were observed based on age differences. Participants over the age of 40 had a higher WOOL index, indicating more raising. Participants under the age of 40 (age 18-24, 25-39) produced WOOL toward GOLD, with less raising (i.e., they say *pull* more like *pole* than older speakers do), as seen in Table 4.1. The GULF index mean scores were consistent across all groups except males from small towns, which was lower than the other groups (0.45). This indicates that small town males had less GULF raising.

Mean rootedness scores showed participants from large cities to be overall less rooted. Older participants (40+) were more rooted than the younger age groups. This is expected based on Reed’s (2016) past work in Eastern Tennessee, as older people are expected to have had more time to become rooted in the community and likely do not consider leaving the place in which they have settled.

When observing factor scores for each demographic group, people from large cities had lower scores across all factors, which is consistent with their overall lower rootedness scores (Table 4.1). There were semi-consistent trends across age groups for factor scores. Participants over the age of 40 had higher mean scores on factors one and two, but there was no clear trend for factors three and four.

Table 4.1: Means and standard deviations for rootedness and vowel indexes for select demographic groups. Differences between groups large enough to note are bolded and standard deviations are in parentheses.

Group	<i>n</i>	Mean rootedness scores	Mean GULF index scores	Mean WOOL index scores
Large city size	19	29 (9.1)	0.63 (0.14)	-0.42 (0.43)
Medium city size	12	39 (7.86)	0.67 (0.19)	-0.45 (0.67)
Small city size	21	39 (8.59)	0.66 (0.22)	-0.29 (0.61)
Age group 1 (18-24)	18	33 (8.68)	0.65 (0.14)	-0.52 (0.67)
Age group 2 (25-39)	15	33 (10.42)	0.6 (0.18)	-0.39 (0.49)
Age group 3 (40-59)	12	39 (6.14)	0.67 (0.24)	-0.23 (0.54)
Age group 4 (60+)	7	43 (9.27)	0.71 (0.24)	-0.25 (0.48)

Males	16	35.5 (7.95)	0.58 (0.14)	-0.24 (0.52)
Females	36	37.5 (10.08)	0.7 (0.21)	-0.4 (0.6)

Small city size, male	6	39 (7.9)	0.45 (0.09)	-0.2 (0.49)
Small city size, female	15	40 (8.81)	0.74 (0.21)	-0.33 (0.64)
Medium city size, male	4	35 (5.12)	0.61 (0.1)	-0.23 (0.43)
Medium city size, female	8	41 (6.18)	0.71 (0.24)	-0.56 (0.79)
Large city size, male	6	29 (5.96)	0.66 (0.13)	-0.35 (0.59)
Large city size, female	13	30 (10.1)	0.61 (0.15)	-0.45 (0.34)
Age group 1, male	7	33 (8.89)	0.66 (0.12)	-0.38 (0.56)
Age group 1, female	11	33 (8.55)	0.64 (0.15)	-0.6 (0.71)
Age group 2, male	5	31 (5)	0.5 (0.08)	-0.13 (0.57)
Age group 2, female	10	34 (12.17)	0.66 (0.19)	-0.5 (0.36)
Age group 3, male	2	40	0.46	-0.16
Age group 3, female	10	39 (6.71)	0.71 (0.23)	-0.24 (0.57)
Age group 4, male	2	38	0.71	-0.27
Age group 4, female	5	44 (8.5)	0.78 (0.23)	-0.24 (0.56)

Table 4.2: Means and standard deviations factor scores for select demographic groups.

Group	Mean F1	Mean F2	Mean F3	Mean F4
Large city size	10 (3.42)	5 (2.96)	3 (1.99)	5 (1.93)
Medium city size	13 (5.02)	6 (3.38)	4 (1.85)	6 (1.71)
Small city size	15 (5.54)	7 (3.57)	5 (2.13)	6 (2.1)
Age group 1 (18-24)	11 (4.67)	5 (3.45)	3 (1.86)	6 (1.73)
Age group 2 (25-39)	10 (4.6)	5 (3.13)	5 (2.34)	6 (2.5)
Age group 3 (40-59)	13 (3.82)	8 (2.63)	5 (1.85)	5 (2.21)
Age group 4 (60+)	18 (6.46)	6 (3.64)	5 (1.98)	5 (0.93)
Males	13.5 (4.99)	6 (3.38)	4 (1.71)	5 (1.52)
Females	13 (5.53)	6 (3.52)	5 (2.31)	6 (2.14)

Small city, male	16 (5.62)	6 (3.21)	4 (1.8)	5 (1.63)
Small city, female	14 (5.45)	7 (3.64)	5 (2.18)	6 (2.17)
Medium city, male	8 (2.59)	8 (2.74)	3 (1.3)	5 (1.48)
Medium city, female	15 (5.69)	6 (3.28)	5 (1.8)	6 (1.76)
Large city, male	10 (2.11)	4 (3.02)	4 (1.71)	5 (1.37)
Large city, female	9 (3.86)	5 (2.92)	3 (2.09)	5 (2.13)
Age 1, male	10 (3.84)	7 (4)	3 (1.29)	6 (1.67)
Age 1, female	12 (4.85)	4 (2.4)	4 (2.06)	6 (1.76)
Age 2, male	11 (2.76)	4 (1.17)	5 (1.67)	5 (1.17)
Age 2, female	10 (5.32)	5 (3.71)	5 (2.62)	6 (2.88)
Age 3, male (n=2)	15	9	4	4
Age 3, female	12 (4.03)	8 (2.81)	5 (1.96)	6 (2.24)

Age 4, male ($n=2$)	18	4	5	4
Age 4, female	18 (5.85)	7 (3.73)	6 (2.22)	6 (0.76)

i. Correlations

Pearson correlations were used to compare each factor score and WOOL or GULF index for each demographic group. This included age, gender, and city size. Correlations greater than positive or negative 0.2 were considered meaningful and highlighted for further investigation. Correlations across multiple demographic groups were also calculated; for example, the WOOL and GULF index compared to each factor score for all participants that were young females. This process continued for every possible combination of the demographic factors.

Figure 4.1: Rootedness scores versus GULF index scores for all participants

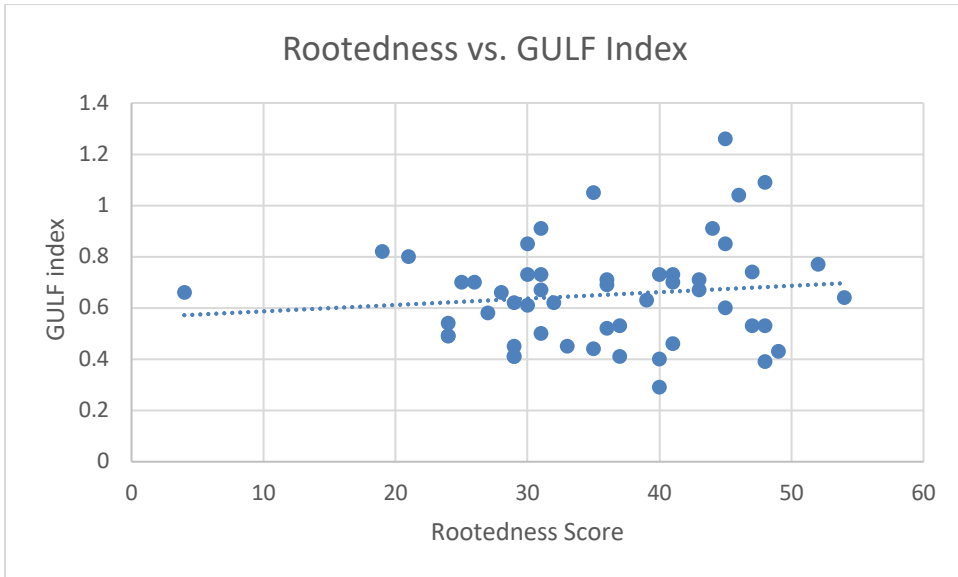
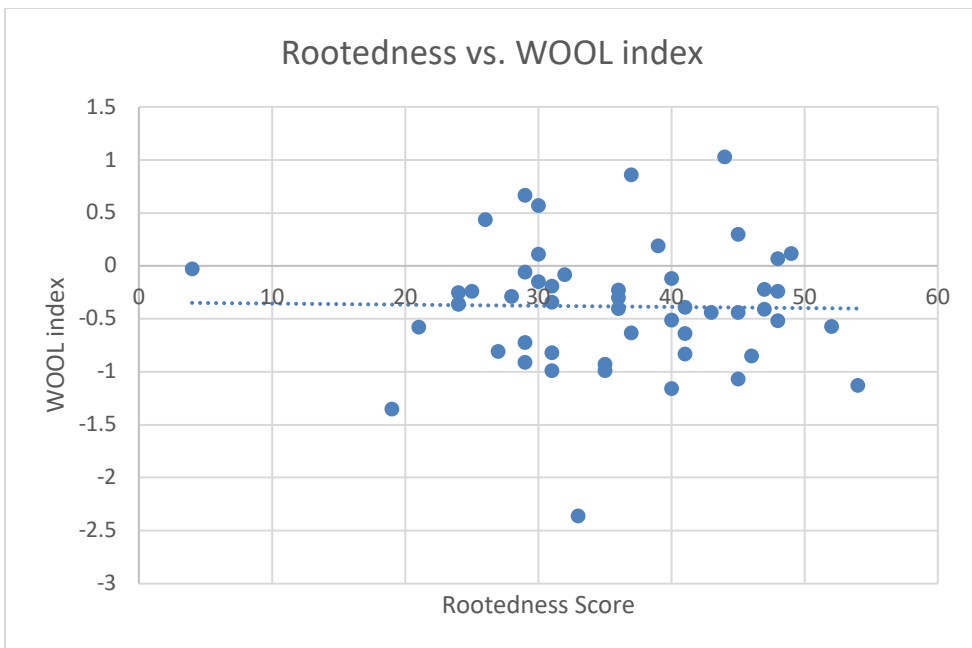


Figure 4.2: Rootedness scores versus WOOL index scores for all participants



Figures 4.1 and 4.2 and Table 4.3 show the correlation between rootedness scores and vowel indexes. As seen on Figure 4.1, rootedness has a slight positive correlation with GULF

index, and there are multiple outliers in the data. Figure 4.2 shows a negligible negative correlation between rootedness and WOOL index with multiple outliers.

Table 4.3 Correlations for all participants

All participants (<i>n</i> =52)		
Score	WOOL index	GULF index
Rootedness	-0.01	0.12
Factor 1	-0.05	0.08
Factor 2	0.15	0.21
Factor 3	0.06	0.13
Factor 4	-0.15	0

Table 4.4 shows Pearson’s correlations by gender, and there is a strong negative correlation between rootedness scores and the GULF index (-0.5) for males but not females (0.24). The GULF index had slight positive correlations (0.2 to 0.3) to factors 1, 2, and 3 and with the overall rootedness scores of all females. This indicates a weak relationship between rootedness and raising, but it provides some evidence for greater raising of GULF accompanying greater rootedness. Male participants had a strong negative correlation between the GULF index and overall rootedness score. Their GULF index was also negatively correlated with factors 1 and 2. This negative correlation indicates good evidence of less raising accompanying more rootedness.

The WOOL index had limited correlation to the rootedness and factor scores of female participants, but it correlated positively with overall rootedness and factor 2 among males (Table 4.4). This provides some evidence for greater raising of WOOL accompanying greater rootedness.

Table 4.4: Correlations based on gender

Female (<i>n</i> =36)		
Score	WOOL index	GULF index
Rootedness	-0.06	0.24
Factor 1	-0.07	0.23
Factor 2	0.11	0.29
Factor 3	0.1	0.26
Factor 4	-0.13	-0.06
Male (<i>n</i> =16)		
Score	WOOL index	GULF index
Rootedness	0.24	-0.5
Factor 1	0.09	-0.57
Factor 2	0.27	-0.03
Factor 3	0	-0.64
Factor 4	-0.13	-0.1

According to city size correlations, people from large and medium cities do not have a consistent connection between overall rootedness and the indexes (Table 4.5). The GULF index scores for large city participants had a moderate negative correlation with factors 3 and 4. This could indicate less raising for more rooted people. The WOOL index had a slight correlation with factor 2 in participants from large cities. Overall, the people from large cities have less GULF and WOOL raising. In medium city participants, the overall rootedness scores had a moderate positive correlation to the GULF index. They had a positive correlation between factors 1, 2, and 3 and GULF but a negative correlation between GULF and factor 4. WOOL index correlated positively with factors 2 and 3, and it correlated negatively with factor 4. Participants from small towns had an opposite correlation on factor 4 than participants from medium cities. There was a moderate positive correlation between GULF index and factor 4, indicating more raising is associated with being more rooted. There was also a negative correlation between WOOL index and overall rootedness and factor 3.

Table 4.5: Correlations based on city size

Small city size (<i>n</i> =21)		
Score	WOOL index	GULF index
Rootedness	-0.28	0.09
Factor 1	-0.15	-0.11
Factor 2	-0.15	0.16
Factor 3	-0.27	0.1
Factor 4	-0.05	0.36
Medium city size (<i>n</i> =12)		
Score	WOOL index	GULF index
Rootedness	0.17	0.49
Factor 1	-0.02	0.32
Factor 2	0.53	0.55
Factor 3	0.43	0.61
Factor 4	-0.85	-0.51
Large city size (<i>n</i> =19)		
Score	WOOL index	GULF index
Rootedness	0.13	-0.18
Factor 1	-0.03	0.1
Factor 2	0.24	-0.06
Factor 3	0.14	-0.31
Factor 4	0.2	-0.36

Age group correlations provided more results of rootedness versus vowel raising. The youngest age group, 18-24 years, had a positive correlation between factor 2 and the WOOL index score, but a negative correlation between factor 4 and WOOL. There was also a negative correlation between factor 4 and GULF index scores. This could indicate less raising associated with higher rootedness scores on factor 4. There were no significant correlations between overall rootedness scores and index scores. The second age group, 25-39 years, was unremarkable for correlations except for a moderate negative correlation between WOOL index scores and factor 4. There were limited correlations between GULF index and rootedness/factor scores. The third age group, 40-59 years, had positive correlations between overall rootedness scores and both indexes. Their WOOL index scores correlated positively with factors 1 and 4, and their GULF index scores correlated positively with factors 2 and 4. The eldest age group, 60+ years, had a stronger

negative correlation between their WOOL index scores and overall rootedness scores. Their WOOL scores correlated negatively with factors 1 and 2, which indicates less WOOL raising is associated with being more rooted. Their GULF index scores correlated negatively with factor 1 and positively with factors 2 and 3. The correlations for this age group are mixed and makes predications difficult.

Table 4.6: Correlations based on age

Age group 1 (<i>n</i> =18)		
Score	WOOL index	GULF index
Rootedness	-0.03	-0.11
Factor 1	-0.16	0.04
Factor 2	0.3	-0.08
Factor 3	0.03	-0.11
Factor 4	-0.3	-0.41
Age group 2 (<i>n</i> =15)		
Score	WOOL index	GULF index
Rootedness	-0.18	0.07
Factor 1	-0.16	0.05
Factor 2	0.08	0.04
Factor 3	-0.08	0.16
Factor 4	-0.49	0.03
Age group 3 (<i>n</i> =12)		
Score	WOOL index	GULF index
Rootedness	0.38	0.29
Factor 1	0.41	0.17
Factor 2	-0.05	0.31
Factor 3	0.02	-0.04
Factor 4	0.49	0.31
Age group 4 (<i>n</i> =7)		
Score	WOOL index	GULF index
Rootedness	-0.56	0.07
Factor 1	-0.53	-0.24
Factor 2	-0.3	0.49
Factor 3	0.03	0.64
Factor 4	-0.16	0.03

To summarize so far, correlations between the vowel indexes and rootedness scores showed there to be less raising of GULF for more rooted people of some groups. Male

participants had a strong negative correlation between rootedness scores and the GULF index, and participants from large cities had a moderate negative correlation between the GULF index and factors 3 and 4. People from medium-sized cities had a moderate positive correlation between rootedness and the GULF index; therefore, higher rootedness scores indicate greater degrees of GULF raising. Participants from the third age group, 40-59 years, had a strong positive correlation between rootedness and both vowel indexes, which tells us that higher rootedness signaled more raising of both GULF and WOOL. In contrast, participants of the oldest age group (60+) had a strong negative correlation between rootedness and the WOOL index.

When broken down into groups by gender and city size, we see similar results to the overall gender groups. Males from large cities have a positive correlation between WOOL index and rootedness, and a negative correlation between rootedness and GULF index. Males from small cities also have a negative correlation between rootedness and GULF index. Females, however, tend to have a positive correlation between rootedness and GULF index (Table 4.4), which is true for females from large and medium cities (Table 4.7).

Table 4.7: Correlations based on gender and city size

Female, large city size (<i>n</i> =13)		
Score	WOOL index	GULF index
Factor 1	-0.22	0.22
Factor 2	-0.08	0
Factor 3	0.22	-0.19
Factor 4	0.33	-0.33
Male, large city size (<i>n</i> =6)		
Score	WOOL index	GULF index
Factor 1	0.36	-0.47
Factor 2	0.69	-0.17
Factor 3	0.03	-0.75
Factor 4	0.06	-0.43
Female, medium city size (<i>n</i> =8)		
Score	WOOL index	GULF index
Factor 1	0.21	0.28
Factor 2	0.6	0.81

Factor 3	0.78	0.79
Factor 4	-0.9	-0.71
Male, medium city size (<i>n=4</i>)		
Score	WOOL index	GULF index
Factor 1	0.11	-0.1
Factor 2	0.09	0.52
Factor 3	-0.18	-0.61
Factor 4	-0.69	-0.39
Female, small city size (<i>n=15</i>)		
Score	WOOL index	GULF index
Factor 1	-0.19	0.02
Factor 2	-0.15	0.07
Factor 3	-0.31	0.05
Factor 4	-0.01	0.23
Male, small city size (<i>n=6</i>)		
Score	WOOL index	GULF index
Factor 1	-0.09	-0.45
Factor 2	-0.11	0.15
Factor 3	-0.01	-0.6
Factor 4	-0.07	0.54

Further evaluation of groups divided by age and gender reveal an interesting note. Age group 3 had a positive correlation between rootedness and WOOL index, but age group 4 had a negative correlation (Table 4.6). This is consistent with results in Table 4.8 because all female age groups had a negative correlation between WOOL index and rootedness except for females from the third age group, which had a positive correlation. The male group had negative correlations between rootedness, factor 1, factor 3, and GULF index (Table 4.4). Males from the youngest age group had negative correlations between all scores and the GULF index (Table 4.8). When looking at the males of age group 2, there was a negative correlation between all scores and GULF index, except for factor 2 which had a positive correlation (Table 4.8).

Table 4.8: Correlations based on age and gender

Age group 1, female (<i>n=11</i>)		
Score	WOOL index	GULF index
Factor 1	-0.2	0.22

Factor 2	0.18	0.19
Factor 3	0.1	-0.03
Factor 4	-0.49	-0.28
Age group 2, female (n=10)		
Score	WOOL index	GULF index
Factor 1	-0.48	0.16
Factor 2	0	-0.08
Factor 3	-0.08	0.33
Factor 4	-0.55	-0.02
Age group 3, female (n=10)		
Score	WOOL index	GULF index
Factor 1	0.48	0.35
Factor 2	-0.11	0.38
Factor 3	0.09	-0.02
Factor 4	0.55	0.17
Age group 4, female (n=5)		
Score	WOOL index	GULF index
Factor 1	-0.69	-0.08
Factor 2	-0.36	0.4
Factor 3	0.02	0.7
Factor 4	-0.25	-0.49
Age group 1, male (n=7)		
Score	WOOL index	GULF index
Factor 1	0.07	-0.35
Factor 2	0.39	-0.5
Factor 3	0	-0.35
Factor 4	0.08	-0.71
Age group 2, male (n=5)		
Score	WOOL index	GULF index
Factor 1	0.19	-0.52
Factor 2	0.74	0.75
Factor 3	-0.26	-0.59
Factor 4	-0.43	-0.96

Participants were also divided into groups based on size of the city in which they live and age group (Table 4.9). Interestingly, participants from large cities in age group 2 and small cities in age group 1 had very similar correlations between rootedness and vowel indexes. This is surprising because the overall large city size did not have any substantial correlations between rootedness and vowel indexes, and the small city size group had a negative correlation between rootedness and WOOL index (Table 4.5). This could show that participants in the younger age

groups (18-39) have similar merger patterns based on rootedness regardless of their city size. Age group 4 also has similar correlations between rootedness and WOOL index (medium city size, age group 4) and between rootedness and both vowel indexes (small city size, age group 4) (Table 4.9). Age group 3 is the only group with different results when broken down into city size/age groups. People from large cities and small towns in age group 3 have positive correlations between rootedness and both vowel indexes (large city size, age group 3) and between rootedness and WOOL index (small city size, age group 3) (Table 4.9).

Table 4.9: Correlations based on city size and age

Large city size, age group 1 (<i>n</i> =9)		
Score	WOOL index	GULF index
Factor 1	-0.11	0.72
Factor 2	0.49	0.07
Factor 3	0.39	-0.32
Factor 4	0.34	-0.15
Medium city size, age group 1 (<i>n</i> =4)		
Score	WOOL index	GULF index
Factor 1	-0.58	-0.42
Factor 2	0.99	0.82
Factor 3	-0.05	-0.6
Factor 4	-0.94	-0.8
Small city size, age group 1 (<i>n</i> =5)		
Score	WOOL index	GULF index
Factor 1	-0.63	-0.33
Factor 2	-0.38	-0.36
Factor 3	-0.63	0.46
Factor 4	-0.55	-0.16
Large city size, age group 2 (<i>n</i> =4)		
Score	WOOL index	GULF index
Factor 1	-0.62	-0.31
Factor 2	-0.47	-0.01
Factor 3	-0.23	-0.02
Factor 4	-0.66	-0.38
Small city size, age group 2 (<i>n</i> =7)		
Score	WOOL index	GULF index
Factor 1	-0.03	0.12
Factor 2	0.12	-0.02
Factor 3	-0.22	0.14

Factor 4	-0.37	0.26
Large city size, age group 3 (<i>n</i> =4)		
Score	WOOL index	GULF index
Factor 1	0.94	-0.46
Factor 2	0.02	0.9
Factor 3	-0.1	-0.84
Factor 4	0.53	-0.74
Small city size, age group 3 (<i>n</i> =6)		
Score	WOOL index	GULF index
Factor 1	0.36	0.1
Factor 2	0	0.51
Factor 3	0.02	0.07
Factor 4	0.52	0.7
Medium city size, age group 4 (<i>n</i> =2)		
Score	WOOL index	GULF index
Factor 1	-0.92	-0.1
Factor 2	0.27	0.67
Factor 3	0.92	0.99
Factor 4	-0.8	-0.45
Small city size, age group 4 (<i>n</i> =3)		
Score	WOOL index	GULF index
Factor 1	-0.68	-0.87
Factor 2	-0.76	0.46
Factor 3	-0.88	0.26
Factor 4	-0.03	0.97

One-way and two-way demographic factor correlations (i.e., gender and age, age and city size, etc.) were useful to identify specific groups with notable connections between demographics and survey scores. The participants were also broken down into groups crossed with all three demographic factors: city size, age, and gender. Some groups did not have a large enough sample size (see *n*, Table 4.1), and therefore, data for those groups are not included on Table 4.10.

Consistent with previous results, all females from large cities had a negative correlation between rootedness and WOOL index, except for age group 3, which had a positive correlation (Table 4.10). The oldest age group subgroups continued to have a negative correlation between rootedness and both vowel indexes (medium city size, age group 4, female). Table 4.3 shows males to have a positive correlation between rootedness and WOOL index and a negative

correlation between rootedness and GULF index. This was consistent with medium city size, age group 1, male which had a negative correlation between rootedness and GULF index and with small city size, age group 2, male that had a positive correlation between rootedness and WOOL index and a negative correlation between rootedness and GULF index (Table 4.10).

Table 4.10: Correlations based on city size, age, and gender

Large city size, age group 1, female (<i>n</i> =6)		
Score	WOOL index	GULF index
Factor 1	-0.43	0.91
Factor 2	0.17	0.31
Factor 3	0.55	-0.37
Factor 4	0.43	-0.09
Large city size, age group 2, female (<i>n</i> =3)		
Score	WOOL index	GULF index
Factor 1	-0.55	-0.1
Factor 2	-0.55	-0.1
Factor 3	-0.06	0.4
Factor 4	-0.6	-0.15
Large city size, age group 3, female (<i>n</i> =3)		
Score	WOOL index	GULF index
Factor 1	0.9	-0.85
Factor 2	-0.15	0.9
Factor 3	0.76	-0.96
Factor 4	0.98	-0.7
Large city size, age group 1, male (<i>n</i> =3)		
Score	WOOL index	GULF index
Factor 1	0.15	-0.52
Factor 2	0.69	-0.16
Factor 3	0.08	-0.77
Factor 4	0.21	-0.48
Medium city size, age group 4, female (<i>n</i> =3)		
Score	WOOL index	GULF index
Factor 1	-0.92	-1
Factor 2	0.27	0.67
Factor 3	0.92	1
Factor 4	-0.8	-0.45
Medium city size, age group 1, male (<i>n</i> =3)		
Score	WOOL index	GULF index
Factor 1	0.04	-0.1
Factor 2	1	0.99
Factor 3	-0.96	-0.99

Factor 4	-0.69	-0.79
Small city size, age group 1, female (<i>n</i>=4)		
Score	WOOL index	GULF index
Factor 1	-0.63	-0.35
Factor 2	-0.49	-0.12
Factor 3	-0.92	0.28
Factor 4	-0.61	0.06
Small city size, age group 2, female (<i>n</i>=4)		
Score	WOOL index	GULF index
Factor 1	-0.44	0.2
Factor 2	0.42	-0.3
Factor 3	-0.03	0.1
Factor 4	-0.22	-0.03
Small city size, age group 3, female (<i>n</i>=5)		
Score	WOOL index	GULF index
Factor 1	0.42	0.33
Factor 2	-0.14	0.5
Factor 3	0.04	0.19
Factor 4	0.49	0.62
Small city size, age group 2, male (<i>n</i>=3)		
Score	WOOL index	GULF index
Factor 1	0.27	-0.55
Factor 2	0.7	1
Factor 3	-0.13	-0.84
Factor 4	-0.25	-0.9

CHAPTER V

DISCUSSION

i. Findings

Participants from large cities were less rooted than people from medium and small cities. It is possible that urban speakers are less rooted because there are fewer opportunities for involvement and/or attachment to the community or multiple communities to which they have an opportunity to be attached. Participants from the two older age groups (40+) were more rooted than the younger age groups (18-39). This matches the expected results, because it is assumed that if people are older, they have had more time to establish a sense of community and belonging to their surrounding area, and they are less likely to want to move away in their current stage of life (Reed, 2016). When looking at the factor scores, participants from larger cities had lower scores across all factors, and older participants (40+) had higher scores on factors 1 and 2. This is consistent with the findings in the overall rootedness scores and supports the previous two statements.

Pearson's correlations between the vowel indexes and rootedness scores showed there to be less raising of GULF for more rooted males and participants from large cities, but more rooted people from medium-sized cities had greater degrees of GULF raising. Participants from the 3rd age group, 40-59 years displayed a higher degree of rootedness which signaled more raising of both GULF and WOOL.

The correlations between scores and indexes specific to age group 3 (40-59) were worth noting, as they consistently varied from the other age groups. When broken down into city size/age groups, age group 3 (40-59) is the only group with different correlations (Table 4.9). Additionally, all females from large cities had a negative correlation between rootedness and WOOL index, except for age group 3, which had a positive correlation (Table 4.10). In groups divided by age and gender, males and females of age group 3 had a positive correlation between rootedness and WOOL index, but females of age group 4 had a negative correlation (Table 4.6). These correlation results indicate that something unique occurred within group 3, the participants aged 40-59, that consistently did not occur in the other age groups.

i. Implications

Based on these findings, it is suspected that older participants are more rooted to their communities (Table 4.1), which provides information on the effect of age on rootedness. Additionally, people from large cities were less rooted, laying a basis for patterns in pre-lateral vowel production in correlation with rootedness. There is also a difference in production of WOOL based on age group and gender (Table 4.1). This information provides a basis for speculating on gender differences among young people. It seems young females are trending to greater negative WOOL index scores (producing WOOL towards GOLD) (Figure 3.5). This could be an early sign of language change signaled by young females in Oklahoma.

In Bailey and colleagues' (1994) study of linguistic diffusion, Oklahomans demonstrated laxing of /u/ in words like *pool* (i.e., producing “pool” as “pull”). The youngest speakers in his study are of similar age to the oldest speakers in the current study. Analysis from the Oklahoma Vowels study (Freeman & Landers, 2020) showed an opposite trend than what Bailey found. Oklahomans are now trending to tense the vowel in *pull* (i.e., producing “pull” as “pole”). This is a large change in trend in only a couple of generations. Furthermore, predictions in the Atlas of

North American English (Labov et al., 2006) were for back pre-lateral mergers to trend towards tensing, which fits the current data but is the opposite of what Bailey et al. (1996) found. Results from the current study allow for predictions of a trend similar to what Labov et al. predicted.

Based on the results of this study, we can make a prediction about directions of future change. First, it is expected that as people enter the older two age groups, 40+, they are likely to be more rooted to their community than in their younger years. This rootedness may influence phonetic features based on a speaker's location (i.e., if a person becomes rooted in a Southern region, they will pick up features of the Southern dialect.) Specific to features of the Oklahoma dialect, it is possible that more rooted Oklahomans will produce some variation of raising the vowel in GULF. Since people from large cities are trending to producing less raising of GULF with more rootedness, we can speculate that future change will mimic this; there will be a negative correlation between GULF raising and rootedness.

ii. Limitations and Future Research

Given that this study was conducted as an online survey, there were limitations to what and how the participants could express in reply to the presented questions. Informal interviews may provide more insight into the thoughts and ideas of participants related to their rootedness. A common limitation in both the current study and in the pre-lateral mergers study was a lack of males and participants in the eldest age group. A greater sample size with a wider variety of demographic factors would provide stronger evidence for the results of this study. A limitation of the pre-lateral mergers study was the formality of participants reading a word list. Further analysis of the reading passages in this study would provide more accurate data points with which to compare rootedness.

Future studies should aim to increase the number and variety of participants. Also, more research is needed to determine clear factors for rootedness (i.e., the four previously mentioned

factors with more details). Furthermore, future studies could examine rootedness in relation to other phonetic factors such as AY monophthongization, one of the most salient features of Southern dialects.

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APPENDICES

Appendix A. Rootedness Survey by factors

	Question
Q#	Factor #1
Q25	How many generations of your family have lived in the county (or your city and general area) where you are from?
Q26	How often do you interact with nearby family? (family living in OK or within 2 hours of where you live) Examples: gathering for holidays, sharing meals, attending events, family vacations, etc.
Q27	Do you (or your parents, if applicable) own land near the area where you grew up? If so, describe the purpose for this land (examples: you/they live there, farm on the land, etc.)
Q28	Have multiple generations of your family lived in the same house/on the same land? If so, how many generations?
Q93	Do you feel like owning land is a sign of success in Oklahoma?
Q30	Are you currently involved in your community's school? (sports, PTA, booster clubs, etc.)
Q99	Do you follow any local high school sports in your area?
Q100	Which sports do you do any of the following for: watch in person, watch online, listen to on the radio (select all that apply)
Q34	Are you currently involved in church events? (small groups, mission trips, etc.)
Q83	Is the church in which you are currently involved:
Q95	Where you live now, how important for socializing is belonging to a church?
Q89	Please indicate on the following scale to what degree you would say your identity is tied to your family:

Factor #2

- Q10** Are there any circumstances in which you might see yourself moving away from the city in which you currently reside?
- Q14** How often would you want to visit your current residence if you moved away?
- Q103** Do you typically attend these event(s)?
- Q84** Do you like to listen to country music?
- Q86** Do you own a pickup truck?
- Q87** For what purposes do you use your pickup truck? (select all that apply)
- Q88** Do you own other vehicles?
- Q82** Please indicate on the following scale to what degree you would say your identity is tied to your Greek organization:

Factor #3

- Q12** If yes, would you like to live in Oklahoma City (OKC) or Tulsa?
- Q29** In high school, were you involved in clubs, sports, etc. at your school?
- Q33** In high school, were you involved in church events? (youth group, mission trips, etc.)
- Q94** Where you grew up, how important for socializing is belonging to a church?
- Q38** Please indicate on the following scale to what degree you would say your identity is tied to where the community where you now live:
- Q81** Please indicate on the following scale to what degree you would say your identity is tied to your church:

Factor #4

- Q13** If yes, would you like to live in Oklahoma City (OKC) or Tulsa?
- Q11** Are there any circumstances in which you might see yourself finding permanent residence away from the city in which you grew up? (aside from education purposes, i.e., moving away for college)
- Q22** How often do you travel outside of the United States for recreational/personal purposes?
- Q24** How many family members do you have residing in the county (or your city and general area) where you are from?
- Q101** Do you participate in any of the following activities that may accompany local high school sports? (select all that apply)
- Q85** Do you like to listen to other types of music besides country?

Q37 Please indicate on the following scale to what degree you would say your identity is tied to where you grew up:

Q90 Is there anything else to which you which you would say your identity is closely tied?

Appendix B. Survey questions with answer choices and corresponding scores

Question	Block	Score1	Score2	Score3	Score4	Score5
Where you are from, are people proud of the community?	Grew up	Def yes-3	Prob yes-2	Maybe -1	Prob not-0	Def not-(-1)
Are there any circumstances in which you might see yourself moving away from the city in which you currently reside?	Live now	Yes- 0	No- 2	Maybe - 1		
If yes, would you like to live in Oklahoma City (OKC) or Tulsa?	Live now	Yes- 0	No- 2	Maybe - 1		
Are there any circumstances in which you might see yourself finding permanent residence away from the city in which you grew up? (aside from education purposes, i.e., moving away for college)	Grew up	Yes-0	No-2	Maybe -1		
If yes, would you like to live in Oklahoma City (OKC) or Tulsa?	Grew up	Yes-0	No-2	Maybe -1		
How often would you want to visit your current residence if you moved away?	Live now	Very freq-3	Somew hat freq-2	Rarely-1	Almost nev/nev-0	
How often would you want to visit the area where you grew up if you moved away?	Grew up	Very freq-2	Somew hat freq-1	Rarely-0	Almost nev/nev-(-1)	
How often do you visit larger cities like OKC or Tulsa?	Live now	Very freq-0	Somew hat freq-1	Rarely-2	Almost nev/nev-3	
How often do you travel outside of Oklahoma for recreational/personal purposes?	Live now	Very freq-0	Somew hat freq-1	Rarely-2	Almost nev/nev-3	Never-4

How often do you travel outside of the United States for recreational/personal purposes?	Live now	Very freq-0	Somewhat freq-1	Rarely-2	Almost nev/nev-3	Never-4
How many family members do you have residing in the county (or your city and general area) where you are from?	Grew up	1 to 5-1	6 to 12-2	13 to 20-3	20+-4	None-0
How many generations of your family have lived in the county (or your city and general area) where you are from?	Grew up	1 (only my gen)-0	2 ppl-1	3 to 4-2	5+-3	
How often do you interact with nearby family? (family living in OK or within 2 hours of where you live)Examples: gathering for holidays, sharing meals, attending events, family vacations, etc.	Live now	Less than 3x/yr-0	3-7x-1	1x/mo-2	2-4x/mo-3	Several x/wk-4
Do you (or your parents, if applicable) own land near the area where you grew up? If so, describe the purpose for this land (examples: you/they live there, farm on the land, etc.)	Grew up	Yes-2	No-0	Not right now-1		
Have multiple generations of your family lived in the same house/on the same land? If so, how many generations?	Live now	Yes-2	No-0			
Do you feel like owning land is a sign of success in Oklahoma?	Live now	Def yes-4	For most ppl-3	For some-2	Not for most-1	Def not-0
Do you typically attend these event(s)?	Live now	Yes, always-3	Yes, some-2	Not really-1	No-0	
In high school, were you involved in clubs, sports, etc. at your school?	Grew up	Yes-1	No-0			
Are you currently involved in your community's school? (sports, PTA, booster clubs, etc.)	Live now	Yes-2	No-0			
Do you follow any local high school sports in your area?	Live now	Yes-2	No-0			

Which sports do you do any of the following for: watch in person, watch online, listen to on the radio (select all that apply)	Live now	Any answer-1				
Do you participate in any of the following activities that may accompany local high school sports? (select all that apply)	Live now	Any answer-1				
In high school, were you involved in church events? (youth group, mission trips, etc.)	Grew up	Yes-1	No-0			
Are you currently involved in church events? (small groups, mission trips, etc.)	Live now	Yes-1	No-0			
Is the church in which you are currently involved:	Live now	The exact same...-3	The same denomination...2	A different denom...-1	Other-1	
Where you grew up, how important for socializing is belonging to a church?	Grew up	Very important...-2	Useful but not necessary...-1	Not important at all...-0		
Where you live now, how important for socializing is belonging to a church?	Live now	Very important...-2	Useful but not necessary...-1	Not important at all...-0		
Do you like to listen to country music?	Live now	Yes, frequently-3	Yes, sometimes-2	Not really-1	Never-0	
Do you like to listen to other types of music besides country?	Live now	Yes(-1)	No-0			
Do you own a pickup truck?	Live now	Yes-2	No-0	Not right now-1		
For what purposes do you use your pickup truck? (select all that apply)	Live now	Any answer-1				
Do you own other vehicles?	Live now	Yes-0	No-1			

Do you feel like owning a pickup truck is a sign of success in Oklahoma?	Live now	Def yes-4	For most ppl-3	For some-2	Not for most-1	Def not-0
Please indicate on the following scale to what degree you would say your identity is tied to where the community where you now live:	Live now	1-not at all-0	2-somewhat tied-2	3-closely tied-4		
Please indicate on the following scale to what degree you would say your identity is tied to where you grew up:	Grew up	1-not at all-0	2-somewhat tied-2	3-closely tied-4		
Please indicate on the following scale to what degree you would say your identity is tied to your family:	Live now	1-not at all-0	2-somewhat tied-1	3-closely tied-2	N/A-0	
Please indicate on the following scale to what degree you would say your identity is tied to your church:	Live now	1-not at all-0	2-somewhat tied-1	3-closely tied-2	N/A-0	
Please indicate on the following scale to what degree you would say your identity is tied to your Greek organization:	Live now	1-not at all-0	2-somewhat tied-1	3-closely tied-2		
Is there anything else to which you would say your identity is closely tied?	Live now	Yes-1	No-0			

Appendix C. Word list for OK Vowels study

<u>List 1</u>	<u>List 2</u>	<u>List 3</u>	<u>List 4</u>	<u>List 5</u>
deed	goal	stole	soot	bagel
goat	fought	fed	hill	height
nice	Bain	how'd	sawed	skull
feel	sod	pale	fade	aid
side	deal	hid	heard	beg
cold	ice	say	bang	soy
like		fat	foot	high
	pole			
sale	hut	side	head	Dan
food	fail	fill	sad	time
gulf	sigh	stool	hell	sell
night	hull	owed	bin	eye
Dell	feet	bye	egg	ban
heed		still	sane	stale
	spool	cite	leg	nine
mill	awed			
void	pelt	dull	pull	Sid
so	vote	peel	thanks	school
pool		hide	pill	fa (as in "fa la la")
fit	suds	full	length	hail
bowl	fold	odd	vow	who'd
	heal	fight	sang	
eyes	fudge	hood	din	
sin	sir			sag
meal	fool	fell	vague	fir
hide	Dane	send	land	cool
south		flag	Ben	Hoyt
had		den	sand	seed
sue		plague	angry	
		said	bull	
		bag	strength	

Appendix D. Words selected from word list for pre-lateral analysis

bowl	dull*	fill	goal
bull**	fail	fold	gulf*
deal	feel	fool	meal
Dell	fell	full**	mill
sale	still	cool	hill
sell	stole	hail	pale
spool	stool	heal	peel
stale	cold	hell	pelt
pill	pool	school	hull*
pole	pull**	skull*	

*- used to calculate GULF index

** -used to calculate WOOL index

Appendix E. IRB approval letter



Oklahoma State University Institutional Review Board

Application Number: AS-18-65
Proposal Title: Speech and Voice Perception

Principal Investigator: Valerie Freeman
Co-Investigator(s):
Faculty Adviser:
Project Coordinator:
Research Assistant(s):

Status Recommended by Reviewer(s): Approved

Study Review Level: Exempt
Modification Approval Date: 01/26/2021

The modification of the IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46. The original expiration date of the protocol has not changed.

Modifications Approved:

Modifications Approved: Add Molly Landers as a research assistant, 450 participants and a survey measure to assess rootedness, or ties to one's local community, as a possible predictor of language usage

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved.
2. Submit a status report to the IRB when requested
3. Promptly report to the IRB any harm experienced by a participant that is both unanticipated and related per IRB policy.
4. Maintain accurate and complete study records for evaluation by the OSU IRB and, if applicable, inspection by regulatory agencies and/or the study sponsor.
5. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Sincerely,

Oklahoma State University IRB
223 Scott Hall, Stillwater, OK 74078
Website: <https://irb.okstate.edu/>
Ph: 405-744-3377 | Fax: 405-744-4335 | irb@okstate.edu

VITA

Molly Landers

Candidate for the Degree of

Master of Science

Thesis: ROOTEDNESS AND PRE-LATERAL MERGERS IN OKLAHOMA

Major Field: Communication Sciences and Disorders

Biographical:

Education:

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Experience:

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Student Clinical Intern St. Anthony's SSM Hospital, Oklahoma City, OK	2022
Student Intern Highland Park Elementary, Stillwater, OK	2021
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