A SOCIOPHONETIC STUDY OF (AI) IN UTAH ENGLISH

by

Robert D. Sykes

A thesis submitted to the faculty of
The University of Utah
in partial fulfillment of the requirements for the degree of

Master of Arts

Department of Linguistics

The University of Utah

August 2010

The University of Utah Graduate School

STATEMENT OF THESIS APPROVAL

The thesis of **Robert D Sykes**

has been approved by the following supervisory committee members:

Marianna Di Paolo	, Chair	**4/16/2010**
Lyle Campbell	, Member	**4/16/2010**
Patricia Hanna	, Member	**4/16/2010**

and by [illegible], Chair of

the Department of **Linguistics**

and by Charles A. Wight, Dean of The Graduate School.

ABSTRACT

This thesis is a variationist study of a reputed "Third Dialect" of American English — the variety of English spoken in the Salt Lake Valley. Wendy Morkel's dialectological study revealed that the Southern monophthongal (ai) is present in Utah. Morkel's study follows the study of Di Paolo and Faber predicting the Southern Rotation in Utah. This thesis is a sociophonetic assessment of these claims. Sociolinguistic interviews of seven young adults in Utah were analyzed acoustically. Results of the acoustic analysis indicated that glide-weakening in (ai) is present in Utah English and is conditioned by the voicing of the following consonant, consistent with Southern patterns. Glides tend to be weaker before voiced obstruents, nasals, and in open syllables. However, this thesis found that the front-upgliding word classes are inconsistent with Southern patterns. The analysis also revealed that gender plays an important role, with men weakening glides significantly more than women. This thesis frames the results of the analysis within sociolinguistic theory and will show how the evidence presented can inform sociolinguistic research both linguistically and socially.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

I would like to thank the members of my advisory committee, Marianna Di Paolo, Lyle Campbell, and Patricia Hanna, for their comments and helpful revisions on this thesis. I would especially like to thank Marianna Di Paolo for working very closely with me to refine the ideas presented in this thesis. Without her consistent support and advice, I would not have been able to produce such a well-informed paper. I would also like to thank other faculty members of the University of Utah Department of Linguistics for support and consultation on this project and in other aspects of my study: Aniko Csirmaz, Ed Rubin, and Rachel Hayes-Harb — thank you. I would also like to acknowledge the comments and support of Katherine Matsumoto-Gray, Zebulon Pischnotte, Debbie Wager, and Thiago Chacon. I'd like to acknowledge my family for continuing to support me in my unprofitable ventures. Finally, I would like to acknowledge the kindness and warmth of the speakers who participated in this study; without them none of this would be possible.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This study critically investigates the phonological status of this so-called Third Dialect area of American English and to assess the claim that Utah is actually aligned with the Southern linguistic area. This study also adds to the dialectological study of Morkel (2003), which found that (ai)-monophthongization is present in Utah, seeks to frame its findings within current variationist theory. This study addresses core theoretical constructs within variationist theory, particularly peripherality and the lower exit principle in attempt to assess Utah's participation or lack of participation in the Southern Vowel Shift and its alignment with the greater South Midland linguistic area or whether it is a "Third Dialect" of English (cf. Labov 1991; Di Paolo & Faber 1990; Labov, Ash, & Boberg 2006 (henceforth referred to as ANAE)) by investigating the status of (ai) in the English of Utah speakers. Additionally, this study will identify the key social correlates with the use of (ai) variants through a community of practice framework. The study is primarily interested in the communities of practice of the Mormon community along the Wasatch Front, one of the most powerful and socially salient communities in the area.

The study is organized into the following chapters: this chapter will provide a review of the relevant sociolinguistic literature concerned with The West, the Southern Vowel Shift and glide weakening in general. Chapter 2 will review the literature pertaining to social networks, communities of practice, and their application and relevance to society in Utah. Chapter 3 will outline the methods, and subjects of the study. Chapter 4 will outline the analyses, and results of the study. Chapter 5 will conclude with directions for further research.

1.1.1 Peripherality, the Southern Shift, and the "Third Dialect"

Labov (1991) and ANAE describe three dialects of American English: The North (characterized by the Northern Cities Vowel Shift), the South and South Midland (Characterized by the Southern Vowel Shift), and the "Third Dialect," which includes the American West. Labov (1991) and ANAE have some difficulty defining the "Third Dialect" region and the West in particular. Labov (1991: 30) defines the Third Dialect by a relatively stable, "original /æ/ [that] remains in place, at least in part. Raising and tensing are confined to the most favored, phonetically defined environments," specifically before nasals and velars. Additionally, "*short open o* [ɔ] and *long open o* [ɑ] are merged in a single low back phoneme," and as a dialect where, "neither the Northern Cities Shift or the Southern Shift appear to operate noticeably..."(1991: 33).

The West is particularly tricky to define. In addition to the lack of glide deletion in (ai), ANAE (p. 137) provides a rather complex definition of The West

- Differential fronting of /u/ and /o/: the F2 of /u/ after coronals is more than 500 Hz greater than the F2 of /o/.
- Complete or nearly complete low back merger: /ɑ/ and /ɔ/ are identical either in production or perception.
- No Canadian Raising of /ai/ before voiceless segments. The difference between the F1 of /ai/ before voiced and voiceless segments is not more than 50 Hz.

However, even this complex definition yields relatively low statistical homogeneity and relatively low statistical consistency of and homogeneity compared to other dialect areas.

Labov, Yeager, and Steiner (1972) (henceforth referred to as LYS) demonstrated that there is a major realignment of the vowel space of white Americans in the American South characterized by an "active rotation" of the front upgliding vowels. This rotation refers to an exchange in phonological space of the tense and lax front vowels characterized by the word classes *FLEECE*, *KIT*, *FACE* , and *DRESS*. The tense vowels in *FLEECE* and *FACE* become nonperipheral, lower, then centralize. The lax vowels in *KIT* and *DRESS* become peripheral, fronted, and raised. A precipitating change is the monophthongization or backing and raising of the low upgliding diphthong (ai) as in *SIDE* (Figure 1.1, Labov 1994 (henceforth referred to as PLC).

Labov, Ash, and Boberg (2006) define the Southern Shift crucially in relation

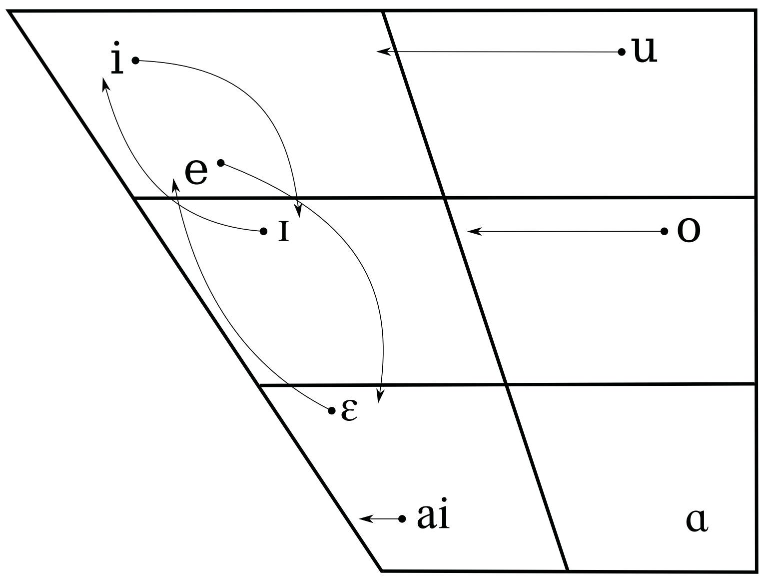


Figure 1.1: The Southern Vowel Shift.

to the monophthongization of (ai). Additionally, Labov's work indicates that monophthongization in (ai) is the catalyst for the other changes in the front vowels (i.e., Stage 1 of the Southern Shift).

LYS, Labov (1991), and PLC propose a series of principles motivating vowel shifts. The key concept involved is peripherality. The vowel space is composed of two tracks, a peripheral track and a nonperipheral track. Peripheral vowels naturally have more extreme formant values and are situated more toward the margins of phonetic space. Peripheral vowels also tend to be more tense, more breathy, and develop salient offglides (Thomas 2000).

The six principles of vowel shifting proposed by LYS, Labov (1991), and PLC that pertain to peripherality are as follows (emphasis added):

I In chain shifts, tense nuclei rise along the peripheral track.

II In chain shifts, lax nuclei fall along the nonperipheral track.

III In chain shifts, back vowels move to the front.

IV In chain shifts, low, nonperipheral vowels become peripheral (the lower-exit principle).

V In chain shifts, high peripheral vowels become nonperipheral before peripheral glides (the upper exit principle).

VI *Peripherality is defined relative to the vowel system as a whole.*

These principles clearly dictate the order of the changes in the Southern Shift. Under Principle IV, the low, nonperipheral upgliding vowel (ai) must leave the nonperipheral track and become peripheral where it loses its glide. The newly peripheral, monophthongal (ai) redefines the front periphery of the vowel space, where *FLEECE* and *FACE*, now nonperipheral, fall and centralize according to Principle II, and *KIT* and *DRESS*, now peripheral, raise into the positions previously occupied by *FLEECE* and *FACE* under Principle I.

A question that arises here and the argument that I will attempt to make is one of sequencing. The principles of vowel shifting put forth in PLC, LYS, and the Three Dialects of English make a prediction about the sequencing in the changes of the subsystems that make up the Southern Shift. First, (ai) must monophthongize (and front somewhat) and leave the subsystem of front-upgliding vowels, creating a "void" in the lower portion of the vowel space, providing a motivation for the centralization and lowering of *FACE* behind *DRESS* and all other subsequent shifts.

1.1.2 Fitting Utah Into the Three Dialects

Some previous work have taken a skeptical view of Utah as a Third Dialect by demonstrating a number of grammatical and phonological variables common in the South have been documented in Utah. A prototypical South Midland feature occurring in Utah, the low-back vowel (*COT-CAUGHT*) reversal was, documented by Di Paolo (1992). Di Paolo (1989) also demonstrated that the Southern double modal feature was present in Utah in the late 1980s.

Bowie (2005) and Bowie, Morkel, and Lund (2001), and Morkel (2003) investigated Utah English from its early beginnings. From recordings of LDS general conference recordings in 1940s and 1950s by male church leaders born in the 1890s in Utah, they concluded that several southern features were present in Utah early on. These studies show that pre-lateral laxing, (aw)-monophthongization and even (ai)-monopthongization were present in the speech of these men.

Bowie analyzed several recordings of "somewhat formal semiextemporaneous" addresses by LDS Church leaders to a congregation of believers. The men Bowie studied were all born along the Wasatch Front near Salt Lake City around the time Utah English was in its infancy (between 1870 and 1900) and were recorded primarily during the 40s, 50s, and 60s. Bowie's analysis was primarily concerned with the *FEEL* ~ *FILL*, *CARD* ~ *CORD*, and *POLE* ~ *POOL* mergers, /aw/ and /ai/ monophthongization, and word-final /u/ and /o/ fronting.[1] Bowie's findings

[1] While Bowie measures these variables, he does not present them as findings in his analysis

presented evidence[2] that /u/ and /o/ fronting was present in the speech of his subjects. The finding of /o/ fronting is interesting because, as mentioned above, /o/ fronting is not considered a Western feature. Bowie also found evidence for an early merger of the *PEEL* and *PILL* word classes. Additionally, Bowie's findings confirm the finding of Stanley Cook's dissertation (1969) that investigated the Southern feature of (aw) fronting in Salt Lake City. Cook found that (aw)-fronting was present in Utah in 1969, and argued that it was probably present at least 40 years previous to his study, placing the presence of that feature at the genesis of this dialect. The realization of the variables studied by Bowie and Cook are demonstrably Southern, presenting evidence that Utah had Southern linguistic features from the beginning.

The most recent study of Utah English (Morkel 2003) found through auditory analysis of the same data set used by Bowie that (ai)-monophthongization was present among early speakers of Utah English and is present among younger Utahns today. Morkel's study revealed a number of interesting facts about (ai) monophthongization in Utah. First, gender appears to have little effect on the incidence of monophthongization. Second, when comparing the incidence of monophthongization in early Utah English to the speakers in her sample, she finds that monophthongization declined for some time and only recently began to make a resurgence among younger speakers. Morkel found that the incidence of monophthongization

[2]Bowie argues that the data presented in his study could possibly be an instance of age-grading rather than the beginnings of a change. See Bowie 2005 for a complete discussion.

is more common in the Salt Lake Valley, followed by southern Utah, Utah Valley, and Cache Valley, which she attributes to urban areas, "(adopting) sound changes more rapidly" (Morkel 2003: 41).

While Morkel's study is revealing, it has a number of shortcomings. First, Morkel fails to frame her argument into a broader discussion of sociolinguistic theory. A discussion of (ai) monophthongization in Utah means little without tying it to a larger theory of linguistic change and framing it within the other changes in the vowel system in Utah. Second, Morkel's analysis depends heavily on the monophthongization of the word *I* and it is variants (*I'm, I'd*). *I* is commonly in unstressed positions in most varieties of English and thus is highly likely to monophthongize as a function of phonetic reduction. By depending heavily on this variable, her study fails to capture the possibility for more nuanced phonetic change in (ai) in other environments.

Di Paolo and Faber (1990), Di Paolo (1989), and Faber and Di Paolo (1995) investigated the tense-lax (*PEEL-PILL*) contrast in Utah English, which had been described as an "apparent merger" in LYS. Di Paolo and Faber argue that although *PEEL* and *PILL* word classes may have approximated each other in two-formant space, a contrast is retained by means of some other phonetic feature, in this instance, phonation. In short, the sounds may appear to merge superficially, but do not actually merge. Di Paolo and Faber conclude (emphasis added):

> In contrast to the loss of distinctions in F1[-]F2, VQI [voice quality] contrasts remain about as common a feature in the teenage population

> as they are in the adult group. However, the reversals or near reversals in VQI [voice quality], self-categorization, and in F1 for the front vowels ... and in F2 for the high back vowels, suggest that *the eventual outcome of this apparent merger will be a reversal and not a merger.* (1990: 198)

The reversal predicted by Di Paolo and Faber is a phenomenon they say aligns Utah linguistically more with the South and South Midland (and less so with "the Third Dialect"). However, Di Paolo and Faber did not assess if there was a change in the (ai) diphthong. The question of the Utah's participation in the Southern Vowel Shift then rests on the status of (ai) in Utah English.

Di Paolo and Faber's work aligns neatly with the findings of Erik Thomas (2000a). When the nuclei of *FLEECE* and *KIT* are analyzed acoustically in American dialects that are confirmed to be taking part in the Southern Vowel Shift, we would expect their nuclei to change in peripherality – *FLEECE* centralizing, and *KIT* fronting – before they change in height. However, analyses have shown that this is not the case. Thomas (2000: 9) shows that rotation in these word classes occurs linearly, simultaneously changing in height and peripherality. Thomas's analysis shows that peripherality is actually an effect of change rather than its motivating factor. The results of Di Paolo and Faber's study reveal that the laxing of /i/ before /l/ that results in the merger may not be motivated by peripherality. In contrast, the word classes *PEEL* and *PILL* shift linearly, shifting simultaneously in height and peripherality, then converge in two-format space. Thomas argues that peripherality is a black box and provides only a descriptive account of the end stage of a vowel shift.

This fact raises several important theoretical questions concerning the framework of vowel shifts as outlined in LYS. As previously discussed, Labov has argued that (ai) monophthongization or raising is pivotal in the Southern Shift as its movement redefines the front periphery of the vowel space (under Principle VI), acting as the catalyst for the change in the front upgliding vowel subsystem.

1.1.3 Summary

In summary, previous research has shown that The West is a relatively heterogenous linguistic area that is difficult to define. Previous research has found various southern features in Utah English and that these southern features may have been present at the early beginnings of this dialect, and may be related to Utah's migration history.[3]

The most important findings are those of Di Paolo and Faber (1990), which predicted a reversal of *PEEL* and *PILL*, rather than a merger as described by LYS, and Morkel (2003), which found that (ai)-monophthongization was present early in Utah English and is making a resurgence today. Di Paolo and Faber did not assess (ai) in their study of the tense-lax merger. Morkel did not assess peripherality as a causal factor in vowel shifting or any of the other sound changes that happen in concert with (ai)-monophthongization. This study will fill the gap between these two findings.

[3]Even if Utah's migration history plays little or no role, the evidence presented by Cook, Bowie, Bowie, Morkel, and Lund, and Morkel show that Utah English was a very southern-like linguistic system from its beginnings.

1.2 Glide Weakening

This study investigates the weakening of the glide of (ai) rather than outright monophthongization, following Fridland (2003), assuming phonetic gradualism. Fridland (2003) argues that in Memphis, glide weakening is far more common than full monophthongization of (ai), which is relatively uncommon - a trend that remains consistent across social groups in her study.

Glide weakening involves the shortening or centralization of the glide in (ai) diphthongs to produce [ae], [aːæ∼aːa], and perhaps eventually glide deletion resulting in [aː] (Thomas 2001). Geographically, it is most common in the southern United States and some southern-influenced areas (Evans 1935; Edgerton 1935; Johnson 1928; Greet 1931; ANAE). In most varieties of American English, the spectral properties of glides following (ai) are conditioned by the voicing of the following consonant (Thomas 2000; Thomas 2001).

Thomas (2000b) demonstrated that white speakers from central Ohio and Hispanic speakers from Laredo, Texas both produce spectral offsets of (ai) that are lower and more central before /d/ than before /t/, though the Ohio speakers appeared to produce a greater distinction. An additional finding from Thomas related to the steady states of the diphthong. Earlier research (Lehiste & Peterson 1961; Gay 1968) concluded that (ai) diphthongs in American English consist of one steady state in the beginning of the vowel and a shorter steady state at the end. Thomas found that among the Ohio speakers the picture was more complicated.

Often, the Ohio speakers produced two steady states, but if only one steady state was present, it was at the beginning of the diphthong before /d/ and at the end before /t/. The Laredo speakers, on the other hand, consistently showed two clearly defined steady states more in line with the pattern of Spanish diphthongs. This finding further confirmed that while a host of articulatory constraints determined by phonological context can affect the spectral properties of (ai), the spectra are themselves subject to variation along the social dimension. Thomas argues that the difference between the two speaker groups shows that the spectral offsets are themselves subject to sociolinguistic variation and are not merely artifacts of articulatory processes.

Oxley (2009) conducted a study of (ai) in Deer Park, Texas. Oxley's analysis confirms some of Thomas's predictions. She finds that in Deer Park, (ai) is more likely to be monophthongized before voiced segments than in open syllables and before voiceless segments. Her acoustic analysis shows that the offsets of (ai) before voiced obstruents, nasals, and open syllables tend to be lower and more central than those before voiceless obstruents.

1.3 Conclusion

This thesis will provide a sociophonetic account of glide weakening in Utah. I will test the prediction that (ai) monophthongization must occur before the rotation in the front vowels occurs, as would be expected in the Southern Vowel Shift.

CHAPTER 2

VARIATION IN ITS SOCIAL CONTEXT

2.1 Utah's History

This section is a brief discussion of the sociohistorical motivations for questioning the distinction of the West as linguistically distinct from the South. The aforementioned works that found southern linguistic features in Utah English suppose that the explanation for these southern linguistic features commonly appearing in Utah lay in Utah's demographic history. While the earliest group of Mormon converts were from New England, the youngest new members of the Church likely had contact with South Midland speech. Converts to the Church of Jesus Christ of Latter-day Saints moved to Missouri as early as 1831. The Saints, as members of the Church of Jesus Christ of Latter-day Saints call themselves, left Missouri for Nauvoo, Illinois in 1839 where they remained until they left for Iowa in 1846 and then for Salt Lake City in 1847. Children born during this migration would have spent a substantial part of their linguistically formative years in a South Midland dialect area.[1]

---

[1]Lyle Campbell (p.c.) mentioned that Independence may have been much more Northern, if these dialect areas existed at all at this point. However, Frazer (1978) has made a strong argument that South Midland features were widespread outside of St. Louis in the early half of the 19th century.

Additionally, throughout the latter half of the 19th century there was a substantial continued migration to Utah. Two of the earliest LDS missions were to southern England and the American South. Mormon converts from the south of England (claimed by Feagin 1986 to be the origin of the Southern Shift) began to migrate to Utah to live with their fellow believers. Starting in 1876, a mission to the Southern United States was established, and according to Mission records, 779 new Mormons were baptized by 1883, most of whom moved to Utah.

2.2 Mormon "Social Practice"

The findings of the previous research cited above suggest that English in Utah may bear some relation to Southern varieties of English. Of particular importance are the findings of Di Paolo and Faber and Morkel. Di Paolo and Faber's prediction of the Southern Rotation occurring in Utah is a strong example of such a feature that would align Utah English with Southern varieties. Morkel's finding of the previous occurrence and resurgence of (ai)-monophthongization in Utah, if true, is equally compelling. This study will assess each of these claims, and if possible, unite the two to more fully assess the claims that Utah is participated in the Southern Vowel Shift.

Sociolinguists do not study language variation and change without situating it within its social context. We seek to acquire naturalistic language data in a naturalistic setting. There is a substantial body of literature concerning the correlation between linguistic variables and social variables stretching back to Labov's landmark Martha's Vineyard study (1962).

This study approaches the social variables in the framework of social networks (Milroy & Milroy 1985; Milroy 1987) and communities of practice (Eckert & McConnell-Ginet 1992; Eckert 2000). The motivation for this is Milroy's finding that a speaker's degree of integration into a social network often correlates with a speaker's likelihood to use innovative linguistic norms.

Traditional social network analysis has been employed in communities where network ties are relatively strong. Close-knit social networks are likely to reinforce linguistic norms, and we could therefore assume that loose-knit social networks are more susceptible to change. Milroy and Milroy argue this very point, proposing that linguistic innovators are often socially positioned to contract many weak ties, resistors to change tend to be situated in stronger social networks, where normative pressures inhibit change.

The social geographer David W. Meinig (1965) wrote of Mormondom forming a "cultural area" throughout the Intermountain West. Thus, Mormon identity can be considered an ethnic identity. Full membership within the Mormon community in Utah requires a great deal of commitment. Along the Wasatch Front, the Mormon community is one shaped by both descent and consent, while initially between 1880 and 1960, the Mormon community grew more by natural increase than by convert baptism, except for one decade (Shipps 1994).[2]

---

[2]There is some question as to whether the same social features of the Mormon cultural area are present in Mormon communities outside of the Intermountain West. In Utah, LDS church

2.3 The Community

The primary goal of a singles ward is to provide members a chance to meet single Mormons of the opposite sex and to eventually get married. While many of the lessons are similar to those of other wards, there is a special emphasis on lessons that prepare members for future marriage and family life. As mentioned in the previous section, activities outside of regular church meetings are similarly designed to encourage members of the opposite sex to interact with one another in a Mormon-friendly environment.

The ward the speakers analyzed in this study are members of is a compelling arena for a social-network and community of practice analysis. Young single adults wards are known in and about Utah as having a distinct culture from other wards in the area. These cultural differences arise in part due to the unique demographics of the ward when compared to other wards. First, members of the ward fall into a specific age cohort of 18 through 30, and since many of these are college students, there is a high turnover in membership. All members are unmarried.

Singles wards are also different from other wards in that they overlap other wards geographically, often covering the geographical jurisdiction of several wards or stakes (a collection of wards in Mormon polity), and as a result are demographically heterogenous. Membership of the singles ward is composed of residents from several different neighborhoods throughout Salt Lake City. It is a doctrinal requirement

---

membership still grows primarily by natural increase, while convert baptisms are the primary source of growth outside of it. See Shipps (1994) for a full discussion.

that the bishop or leader of a ward be married. As such, the bishop is often called out of another ward to serve in this capacity.

One subject commented on the interaction between men and women specifically in the interview when asked about the relationships between men and women in the ward, claiming that there is a larger number of couples within it even when compared to other singles wards:

> S. Stebbing: SANDY and I were recounting, there are tons of couples, like intra-ward couples right now, and I think that's something I've never seen before, and BYU[3] or at other wards here. Tons, never. There are like, there have to be like, 15 intra-ward ward couples, like in our ward. We counted 10, and there are all these people we don't know who are totally dating.
>
> ...(40)
>
> Like, our little visiting teacher[4] just left, and she's dating this dude in our ward, who's like, he's so shy. Like he, like, he asks girls out on Facebook because he's so shy. He asked her out on Facebook, but, like, and he like has like asked other girls in the ward to like, set him up with people because he's so shy, but he's totally marrying our visiting teacher, and they are like, a perfect match. Like, we were commenting that they like, kind of, no-, not like look like each other, but they have like the same countenance, like they're both like really calm, and like you can tell they're really nice, but they're like really shy so they don't say much, and it's like, that is perfect. You found each other. (STEBBING.1, 23:52; May 21, 2009)

The network structure of the singles ward is compelling. Together, church meetings and ward activities constitute a substantial time commitment. In many mainline denominations, one hour per week for a church service is considered

[3]Brigham Young University in Provo, Utah is an LDS church-owned university. In the Salt Lake Valley, it is highly stereotyped as a place where students go to marry rather than earn a degree.

[4]A visiting teacher is a woman assigned to provide counsel, advice, and support to other women in the ward.

sufficient; however, in an LDS context, particularly within the context of a singles ward, the time commitment is far greater. Each Sunday, there is a three-hour block of meetings consisting of 'sacrament meeting' (roughly analogous to a Eucharist service), Sunday school, and a gender-segregated block of two meetings. In addition to these meetings, members of the ward with an important 'calling,' or a layperson religious responsibility, are expected to arrive two hours prior to the beginning of church meetings for an additional organizing committee meeting. These members are also expected to remain after church for an additional hour afterward for a similar meeting. Beyond church meetings, there is usually an activity each Monday night called Family Home Evening (FHE) which lasts anywhere from one to three hours and is designed to enforce a sense of camaraderie within the ward. There is also a meeting each Sunday night called "ward prayer," where members meet and pray together. This adds to a weekly time commitment of up to nine hours each week, and this time commitment makes up the entirety of many members' social interaction. Ward members fraternize, date, and often eventually marry within the ward. As a result of this substantial time commitment, the social networks of singles wards are particularly strong.

The Church of Jesus Christ of Latter-day Saints espouses a doctrine of their membership becoming a "peculiar people," and as such, has stringent guidelines for full integration into the community. Mormons whose membership comes by virtue of birth are expected to a conform to a very high standard and reach certain age-graded milestones from a very early age (Shipps 1994: Table 4.1). Mormon boys and girls are instilled from a very young age the importance of Mormon gender roles. Gender segregated religious instruction begins as early as four years old and continues throughout a member's lifetime. At the age of 12, Mormon boys are initiated into the church's lay priesthood. At 18, boys are initiated into a higher level of priesthood in preparation for a two-year religious mission that is expected of them. Girls are initiated into the women's organization, the 'Relief Society.' It is clear then that gender and gender roles are an especially salient feature of the Mormon community.

For these reasons, this community is a reasonable one to apply the concept Penelope Eckert employs of the *community of practice* to locate where language variation and social meaning interact. Eckert and McConnel-Ginet (1992: 186) define a community of practice as 'an aggregate of people who, united by a common enterprise, develop and share ways of doing things, ways of talking, beliefs, and values. Eckert and Wegner (2005) define *practice*, the analytical hub of the community of practice framework, as, 'a way of doing things, as grounded in and shared by a community.' While this study may not be able to fully assess this variable as one endemic to this community of practice, the results presented below will elucidate a relationship between social meaning and variation.

This study investigates glide weakening of (ai) phonetically through the social network of a young single adults' ward,[5] referred to as a "single's ward" of the Church of Jesus Christ of Latter-day Saints (hereafter referred to as LDS or Mormon). The motivation for choosing a singles ward over another congregation or any other institution is two-fold: first, I intend to investigate how closely tied this feature of the Southern Vowel Shift can be tied to Mormon migration history and Mormon identity and if so, to see if it can address its relatively slow onset. The second is reason is the strength of network ties within a singles ward, providing a laboratory to test claims about network strength and language change.

2.4 Conclusion

I predict that the primary social correlate favoring glide-weakened (ai) tokens will be gender, style, and network strength. Gender seems to be a likely correlate given the salience of gender within the ward and the broader LDS culture. If style is a significant correlate of glide-weakening, it would indicate that this variable is, at some level, socially salient and possibly stigmatized if glides are stronger in more formal styles than less formal ones. Given the findings that strong networks tend to inhibit language variation and change, speakers who are more strongly situated within the ward network can be predicted to have weaker (ai) offglides.

[5] A ward is a local congregation of Mormons.

CHAPTER 3

METHODOLOGY

3.1 Subjects

Seven subjects were recruited from a University young single adults ward of the Church of Jesus Christ of Latter Day Saints (Table 3.1). These subjects were recruited through a snowball sampling method with S. Stebbing as my initial contact. The speaker in the first row was my initial contact and introduced me to the other subjects.[1] Pseudonyms were assigned to the subjects.

It should be noted that despite the mixed demographics of the ward, which includes members from all parts of Utah, this subject pool is heavily biased in favor of communities from the east side of Salt Lake City, which is predominately middle and upper-middle class. Only one of these subjects attended a high school on the west side of Salt Lake City.

3.2 Tasks

The subjects were asked to complete three tasks. The first task was an interview that lasted approximately 60 minutes. The interview portion of the recording was intended to elicit a more spontaneous, casual style of speech. Discussion topics

[1]As an interviewer, I am in a unique position to elicit natural data from these speakers as I am relatively "in group" as a member, albeit a non-practicing member, of the Church of Jesus Christ of Latter-day saints and the Mormon community.

Table 3.1: List of subjects

Speaker	Age	Gender	Home neighborhood/Current neighborhood
S. Stebbing	26	Female	Capitol Hill/Downtown
P. Churchland	21	Female	Emigration/East Central
N. Cartwright	25	Female	Hollady/East Central
B. Russell*	25	Male	Ivy/Ivy
L. Wittgenstein*	25	Male	Ivy/Ivy
G. Ryle	26	Male	Ivy/Sugarhouse
J. Searle	25	Male	Ivy/University

*L. Wittgentstein and B. Russell are childhood friends.

during the interview included speaker demographics, perceptions of church culture, and the strength of interpersonal relationships with ward members and people not affiliated with the ward.

The second task was the reading of a word list and took place immediately following the individual interview. The word list consisted of 100 tokens selected to elicit vowel classes of particular interest to studies of Utah English, specifically *COT* ∼ *CAUGHT*, *PEEL* ∼ *PILL*, *PIN* ∼ *PEN*, *GOOSE*, *GOAT*, *POOL*, and (ai) tokens preceding voiced segments /aiV/, voiceless segments /ai0/, nasals /aiN/, and in free syllables /aiF/. The subjects were asked to read the word list twice: once slowly, once quickly. One subject, G. Ryle, did not complete the word list task, on account of his dyslexia.

The third task was a group interview and was designed to elicit views on gender relations. Each gender cohort was interviewed separately. The group interviews each lasted approximately one hour. The discussion was open ended, however two questions were asked in each interview. The first question was about the romantic relationships that the subjects were involved in. The second question was about an NPR news story that reported that women are increasingly more educated and earn more than their husbands. For purpose of the analysis, both interviews were treated as one task[2]. The interview was performed using two recorders with two microphones attached to each recorder in order to capture the speech of all speakers. In total, seven hours and 13 minutes of individual interview data were recorded. One hour and 54 minutes of group interview data were recorded.

The interviews and word lists were recorded on a Marantz PMD-660 solid-state digital recorder using an Audio Technica Pro 70 lavaliere condensor microphone. The recordings were transcribed prior to analysis. The recording was encoded 16 bits at 48 kHz and transferred to a Macintosh computer and saved as a .WAV file. Audio files were resampled at 11.25 kHz before analysis in Praat (Boersma & Weenik 2010). The number of tokens measured and other descriptive statistics can be found in Appendix A.

3.3 Acoustic Analysis

A Praat script was used to record values for the first formant, second formant, third formant, and duration in each stressed vowel. Measurements were taken at 20%, 50%, and 80% points within the vowel. Measurements were taken at these

[2]The dyadic interviews and the group interviews are treated as one task in order to isolate only two levels of style in the analysis — interview and word list — as the statistical treatment of this variable already investigates an interaction between gender and style. This treatment allows to control for possible confounds that could arise if these interviews were treated separately.

points rather than the precise beginning and end of the vowel to avoid measurement of formant transitions as a result of the preceding and following consonants. LPC analysis settings were modified for each vowel so that there was only one reading per formant at each point of measurement. Figure 3.1 shows a diphthongal (ai) token of *nice* produced by the speaker with the points of measurement indicated. Figure 3.2 shows a glide-weakened (though not completely monophthongal) token of the the word *side* with points of measurement indicated. All measured values were normalized using NORM Normalization Suite 1.0 (Thomas and Kendall 2009). While normalizing the data make the results less comparable to previous studies which did not use normalization, it allows for more accurate comparisons across gender groups.

Following Oxley (2009), to represent spectral change in the (ai) tokens, ΔF1 and ΔF2 values were calculated using the following formulas:

ΔF1 = ((Final F1 @ 80%) - (Initial F1 @ 20%))/Duration (ms)

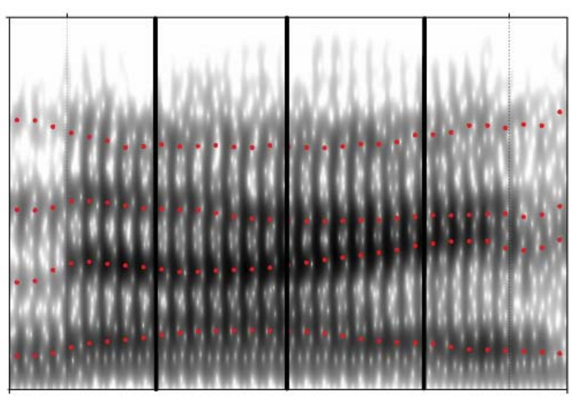


Figure 3.1: Diphthongal *nice*.

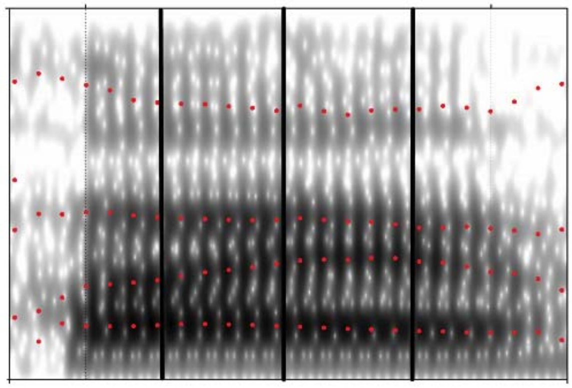


Figure 3.2: Glide-weakened *side*.

ΔF2 = ((Final F2 @ 80%) - (Initial F2 @ 20%))/Duration (ms)

ΔF_n measurements allow us to capture inherent spectral change over time rather than the raw distance between the onset of the diphthong and the offset or the distance between F1 and F2. This method allows us to more directly assess glide weakening. An upgliding vowel like (ai) will decrease in F1 over time as it changes in height. It will also increase in F2 over time as in becomes more fronted. Lower ΔF1 values indicate greater spectral change over time. Higher ΔF1 values indicate less spectral change over time. These values are reported as negatives as the offset of upgliding vowels are higher and thus have a lower F1 than their respective onsets. Higher ΔF2 indicate more spectral change in the F2 dimension over time. Lower ΔF2 values indicate less spectral change in this dimension over time. These values are reported as positives as the offsets of front-upgliding vowels have higher F2 values than their respective onsets.

3.3.1 Note Concerning Measurement

One issue remains to be discussed. Figure 3.3 and 3.4 show the complete typical vowel envelope for an (ai) token before a voiced consonant and a voiceless consonant respectively as seen in my data. In Figure 3.3, we can see that when (ai) precedes a voiced consonant, there is a very long steady state past the midpoint of the vowel. In Figure 3.4, we see that there are two short steady states at the beginning and end of the vowel and a long and steep transition through the midpoint.

The long steady state at the beginning of (ai) before voiced consonants are cause for skepticism about the validity and accuracy of the measurement system of ΔF1 and ΔF2 employed in this study. As stated earlier in this chapter, ΔF_n measures are measures of inherent spectral change over time. However, these measurements only take into account the onset and offset of the vowel and ignore everything in between the two. The diphthong before a voiced consonant below shows a long, essentially monophthongal, steady state in the F1 dimension that cannot be captured by a

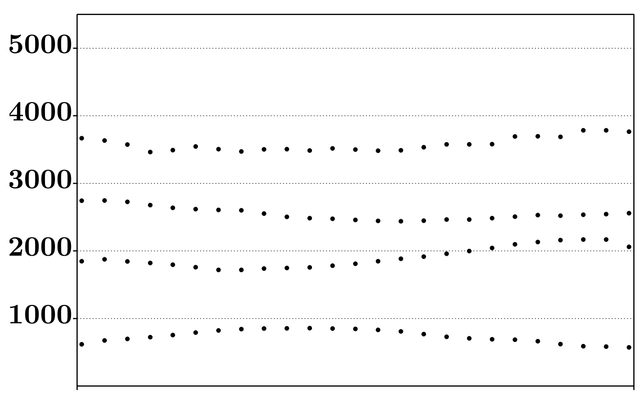


Figure 3.3: LPC formant track of (ai) before a voiceless obstruent.

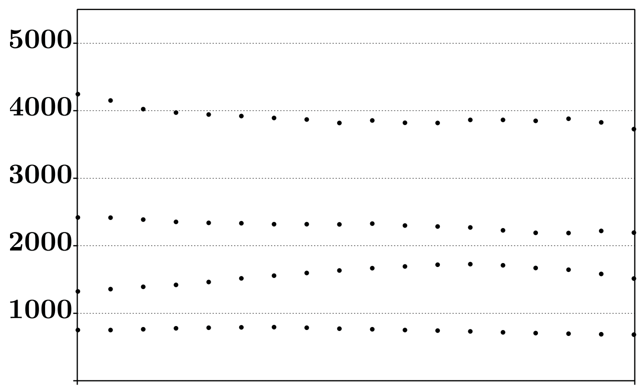


Figure 3.4: LPC formant track of (ai) before a voiced obstruent.

measurement designed to measure inherent spectral change.

3.4 Statistical Analysis

Multiple regression was employed to assess the statistical significance of the relationship between the independent and dependent variables. The ΔF_n values were taken as the dependent variables. The independent variables were phonological context, gender, style (as operationalized by task), and network strength (as operationalized by activity level with the ward). The phonological context level contains four levels: (ai) before voiced obstruents /aiV/, (ai) before voiceless obstruents /ai0/, (ai) before apical[3] nasal segments /aiN/, and (ai) in open syllables /aiF/. Gender takes two levels: male and female. Style takes two levels: interview and word list. Network strength takes seven levels, and is assigned according to

[3]While this is beyond the scope of this study, excluding velar nasals has a number of benefits. First, Utah English is often described as having a nasal system, where /æ/ raises to /e/ before velar nasals. If we see a similar raising of /æ/ before apical nasals, it would indicate the beginning of a drag chain.

additive model in Table 3.2, with individual speaker's network scores found in Table 3.3.

All statistical analyses were carried out in the R Language and Environment for Statistical Computing 2.10.0 64-bit. Statistical models were nested in order to assess the relative importance and predictive power of each variable and statistical model.

Table 3.2: Network score model

Question	**Response**
How often do you attend *this* ward?	Always (2), usually (1), rarely (0).
How often do you attend Family Home Evening?	Always (2), usually (1), never (0).
How often do you attend Ward Prayer?	Always (2), usually (1), never (0).
Do you hold a calling?	Do you hold a calling? Yes (1), no (0).

Table 3.3: Network score model

Speaker	**Score**
S. Stebbing	5
P. Churchland	4
N. Cartwright	7
B. Russell	6
L. Wittgenstein	6
G. Ryle	3
J. Searle	3

CHAPTER 4

RESULTS

4.1 Qualitative Assessment of Vowel Space

This section will provide an initial qualitative assessment of the speakers' vowel spaces from the interview style to frame them within the context of the findings of ANAE. The vowel spaces for individual speakers are included in Appendices B and C. Figure 4.1 displays the normalized vowel space of the interview-style broken down by gender. The positions of *GOOSE* and *GOAT* and the mean onsets of all (ai) variants for most speakers appears in this plot to agree with ANAE's description of southern, not western vowels. For men, the mean onset of *COT* and *CAUGHT* are roughly equivalent in the F1 dimension. For women, the mean onsets of *COT* and *CAUGHT* appear to be reversed in the F1 and F2 dimensions. These results do not appear to agree with the ANAE description, though are in line with the findings of Di Paolo (1992).

For the high-front and mid-front vowel classes, the mean onsets of women's *PEEL* is only slightly less peripheral than *FLEECE* and does not appear to encroach on the territory of *KIT* and *PILL* whatsoever. *PILL* is still roughly equivalent in height with *KIT*. For most of the men, *PEEL* is clearly more lax, and is encroaching on the territory of *PILL* and *KIT*. In neither case is there any indication of a clear

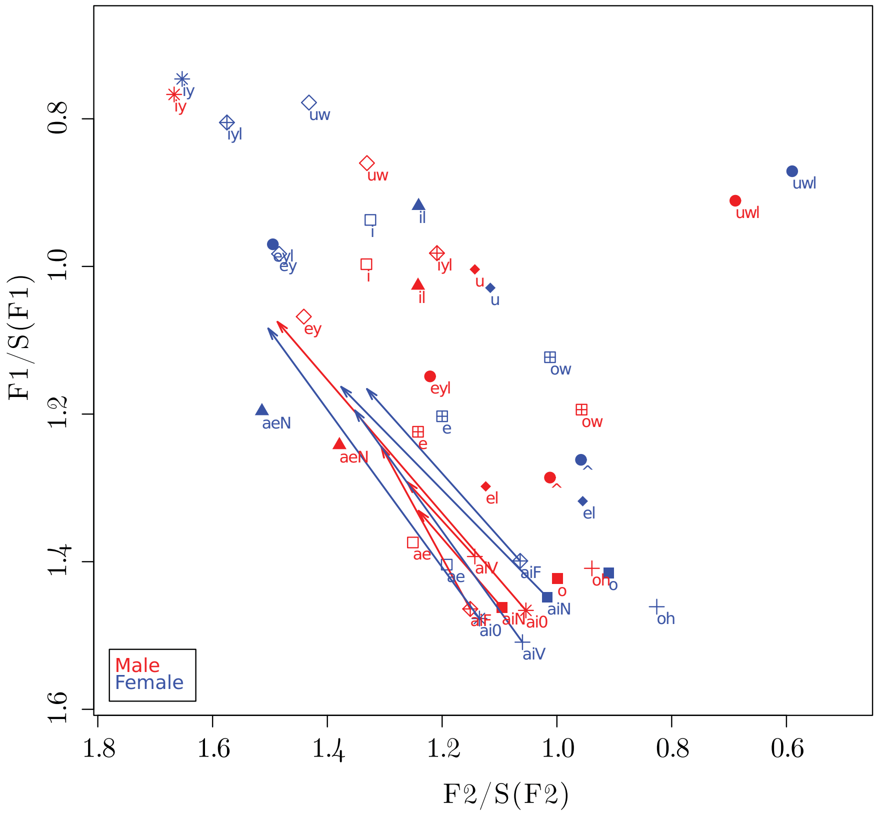


Figure 4.1: Normalized interview-style vowel space for men and women.

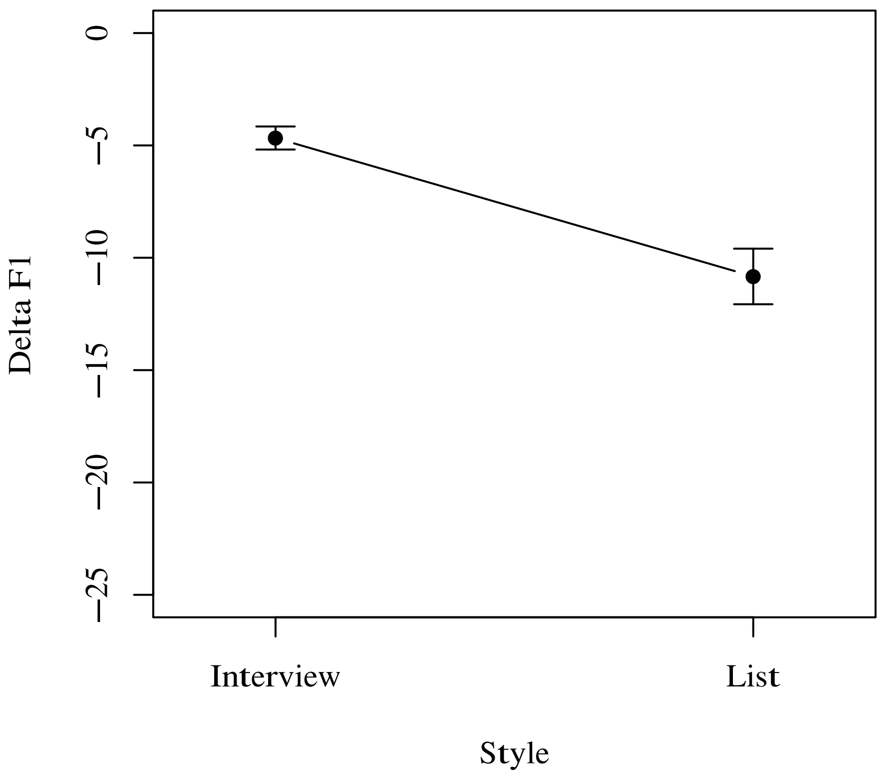
reversal in these word classes. For women, the mean onset of *SALE* is equivalent in height and peripherality with *FACE*. For men, the mean onsets of *SALE* is clearly lower and nonperipheral and is encroaching on the territory of *DRESS*. Surprisingly, for both gender groups *SELL* is even more centralized than described by ANAE.

4.2 Statistical Results

For both gender groups and across all phonological environments, (ai) variants from the interview style contained significantly weaker glides in the F1 dimension, $p < 0.000$. Style as a sole predictor of ΔF1 accounts for 22.01% of the variance in the F1 data set. In the F2 dimension, there is significantly less spectral change in the interview style than in the word-list style, $p < 0.000$. Style as a sole predictor ΔF2 accounts for 17.08% of the variance in the F2 data set. Style results are shown in Figures 4.2 and 4.3.

On average, there is greater spectral change in the F1 dimension for the /ai0/ word class with a mean of -9.24 Hz/ms than word classes /aiF/, /aiN/, and /aiV/ at -5.85 Hz/ms, -5.37 Hz/ms, and -5.86 Hz/ms respectively. These classes all have significantly weaker offglides than /ai0/, $p< 0.000$, though are not statisitically different from one another. Phonological environment as a sole predictor of ΔF1 accounts for 5.39% of the variance in the F1 dataset. In the F2 dimension /ai0/ again shows the greatest degree of spectral change at 24.10 Hz/ms, $p < 0.000$. /aiF/, /aiN/, and /aiV/ are statistically different from /ai0/ at 13.98 Hz/ms, 16.64 Hz/ms, and 14.50 Hz/ms respectively but not statistically different from each other. Phonological environment as the sole predictor of ΔF2 accounts for 8.98% of the variance in the F2 dataset. Results for phonological environment are plotted in Figures 4.4 and 4.5.

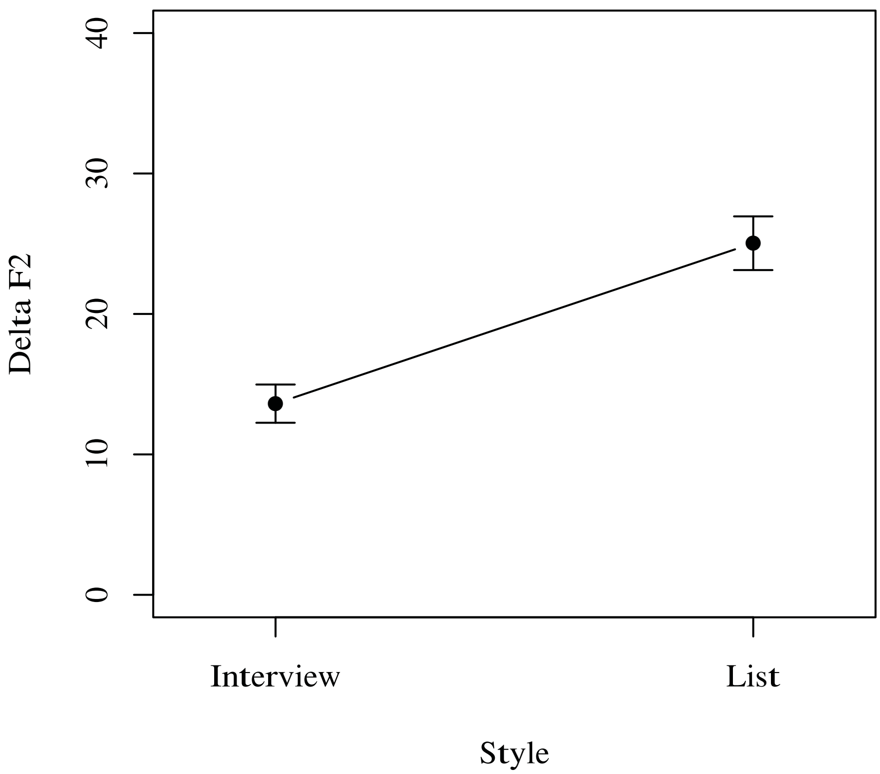
Across all phonological environments, men's (ai)s have weaker offglides than women's in the F1 dimension, $p < 0.000$. Modeling gender alone as a predictor of ΔF1 accounts for 8.611% of the variance in the F1 data set. In the F2 dimension, men also have weaker offglides in all contexts, $p < 0.000$. Modeling gender alone as a predictor of ΔF2 accounts for 7.359% of the variance in the F2 data set. Gender



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-4.6705	0.3108	-15.03	0.0000
List/Interview	-6.1611	0.5704	-10.80	0.0000

$F(1{,}409) = 116.1 \quad R^2 = 0.2201 \quad p < 0.000$

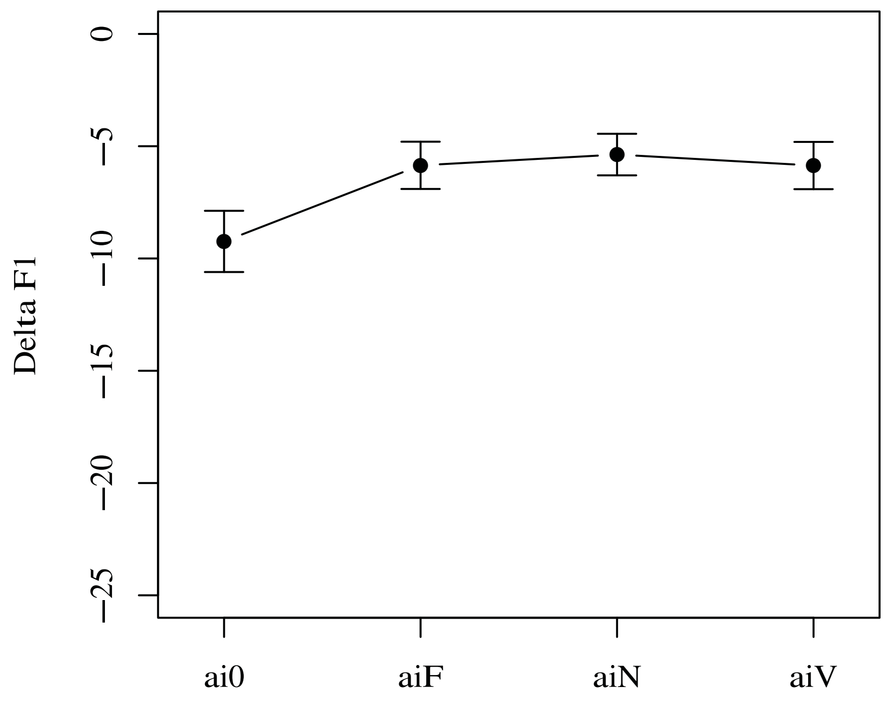
Figure 4.2: $\Delta F1$ regression model for style



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	13.6124	0.6733	20.22	0.0000
List/Interview	11.4230	1.2358	9.24	0.0000

$F(1{,}409) = 85.43 \quad R^2 = 0.1708 \quad p < 0.000$

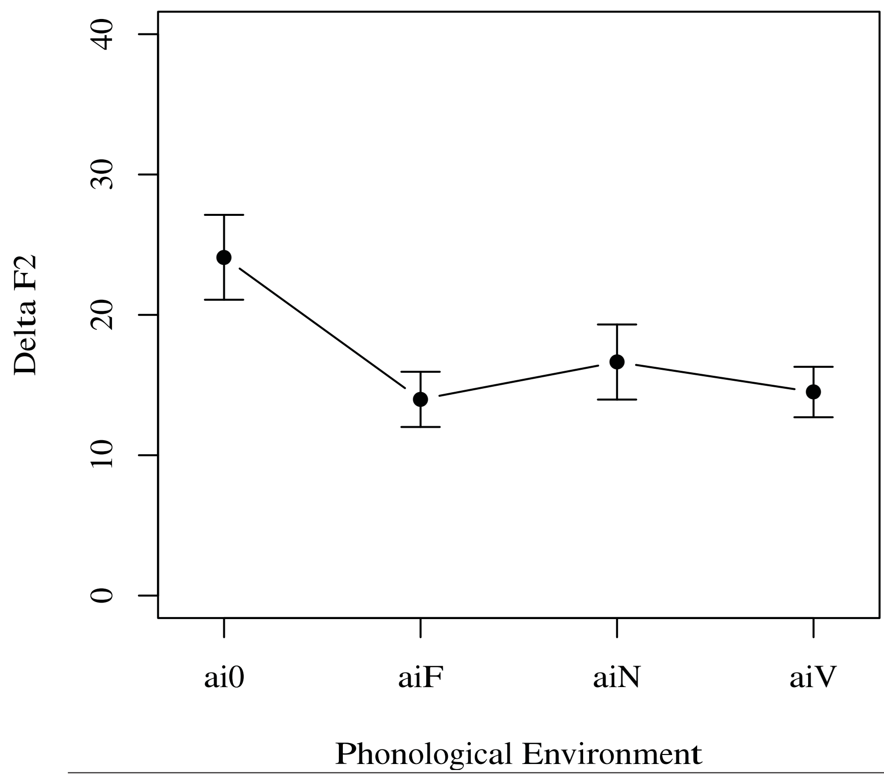
Figure 4.3: $\Delta F2$ regression model for style



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-9.2399	0.6099	-15.15	0.0000
aiF/ai0	3.3878	0.9009	3.76	0.0002
aiN/ai0	3.8673	0.8625	4.48	0.0000
aiV/ai0	3.3788	0.7712	4.38	0.0000

$F(3,407) = 14.49$ $R^2 = 0.07359$ $p < 0.000$

Figure 4.4: ΔF1 regression model for phonological environment



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	24.1025	1.2571	19.17	0.0000
aiF/ai0	-10.1228	1.8568	-5.45	0.0000
aiN/ai0	-7.4626	1.7778	-4.20	0.0000
aiV/ai0	-9.6003	1.5895	-6.04	0.0000

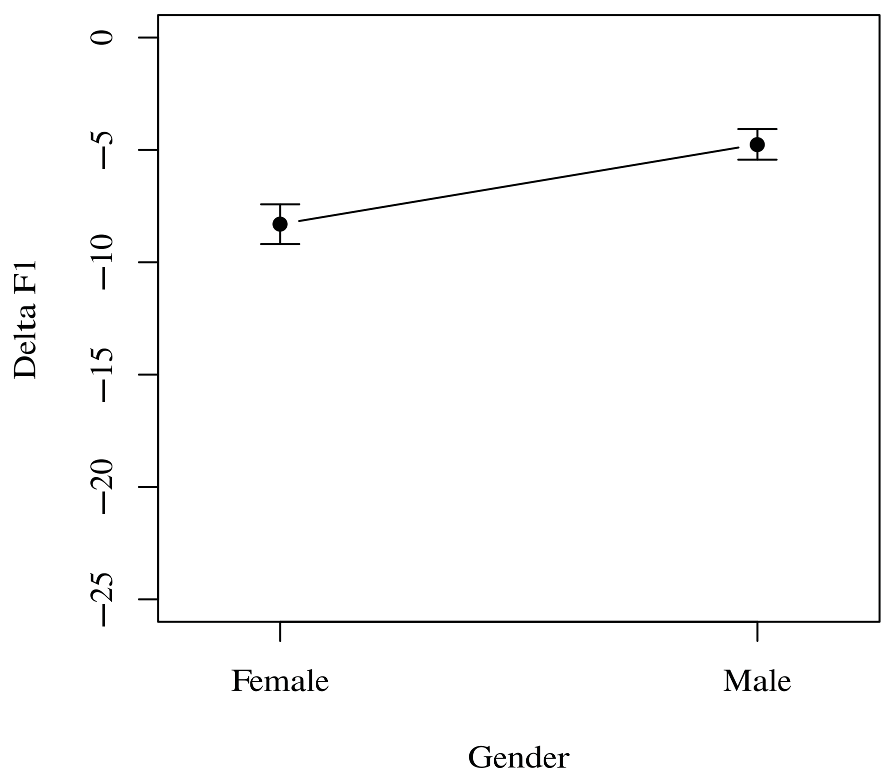
$F(3,407) = 14.49 \quad R^2 = 0.0898 \quad p < 0.000$

Figure 4.5: ΔF2 regression model for phonological environment.

results are shown in Figures 4.6 and 4.7.

Speakers with higher network strength scores tend to produce slightly stronger glides in the F1 dimension, $p < 0.5$. This finding is predicted if we assume speakers with stronger network ties are less likely to adopt incoming changes and that glide weakening is a change from outside the network. However, network as a sole predictor of ΔF1 only accounts for 1.2% of the variance in the F1 data set. In the F2 dimension, there is no significant correlation between spectral change and network strength. The weakness of this predictor could be a result of a scale that is far too detailed for the small sample studied here. Future work will address this. Network strength results for ΔF1are shown in Figure 4.8, each dot corresponding to one production of (ai).

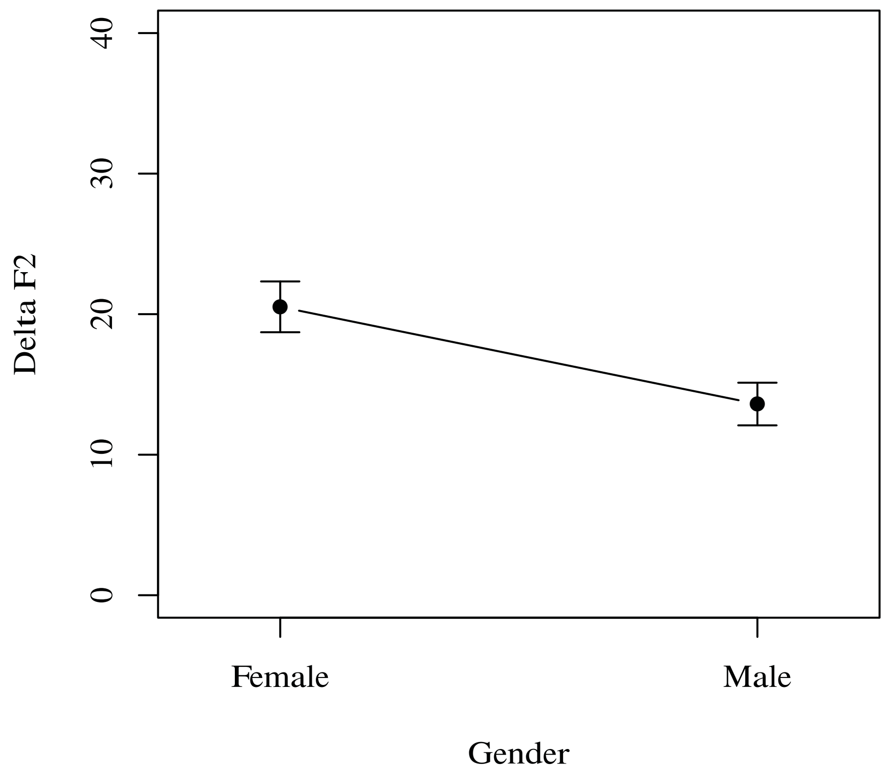
Modeling phonological environment and style together produces the following results: in the F1 dimension there weaker offglides in all phonological environments under the interview style than under the word list style, $p < 0.000$. Modeling phonological environment and style together as a predictor of ΔF1 accounts for 28.42% of the variance in the F1 data set. In the F2 dimension there are weaker offglides in all phonological environments under the interview style than under the word list style, $p < 0.000$. Modeling phonological environment and style together as a predictor of ΔF2 accounts for 27.61% of the variance in the F2 data set. The results of modeling phonological environment and style together are plotted in Figure 4.9 and 4.10.



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-8.3056	0.4024	-20.64	0.0000
Female/Male	3.5519	0.5642	6.30	0.0000

$F(1{,}409) = 39.63 \quad R^2 = 0.08611 \quad p < 0.000$

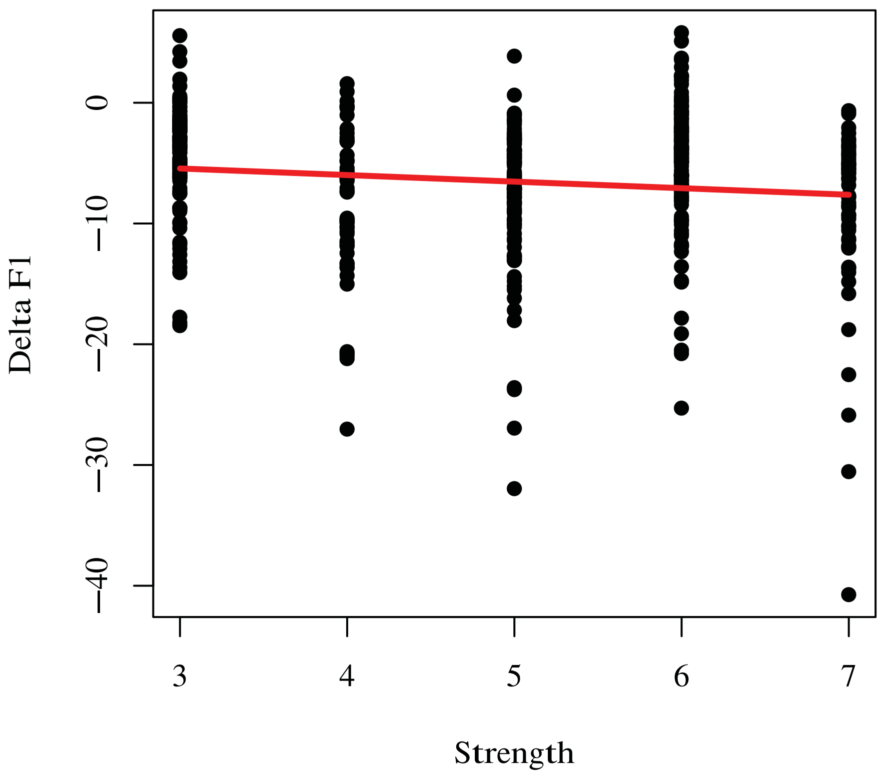
Figure 4.6: ΔF1 regression model by gender.



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	20.5202	0.8513	24.11	0.0000
Female/Male	-6.9163	1.1937	-5.79	0.0000

$F(1{,}409) = 33.57 \quad R^2 = 0.07359 \quad p < 0.000$

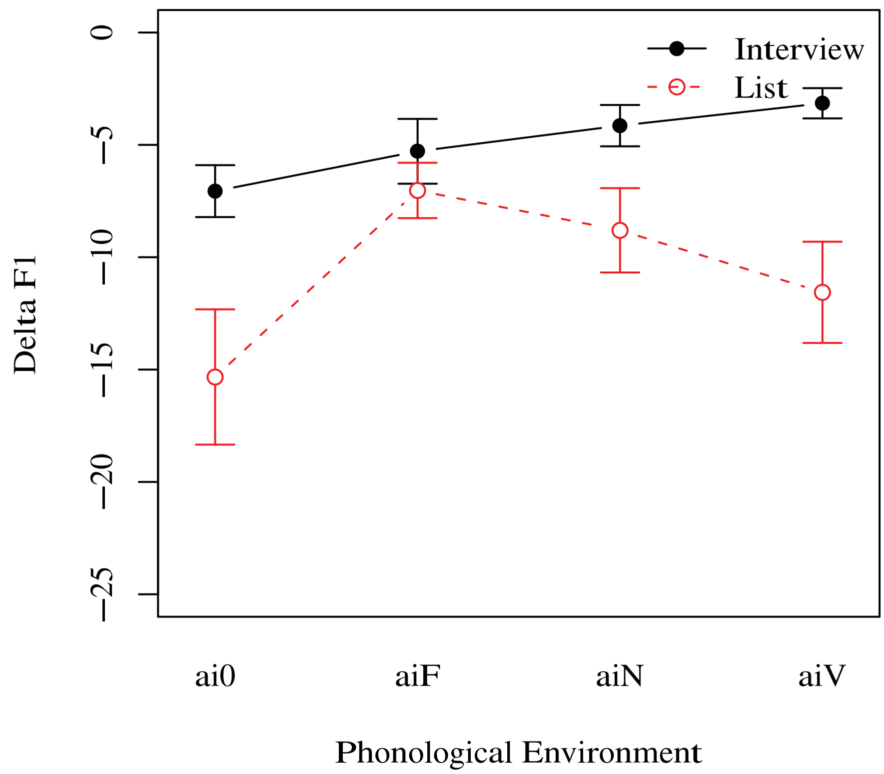
Figure 4.7: $\Delta F2$ regression model for gender



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-3.8124	1.1047	-3.45	0.0006
Strength	-0.5440	0.2157	-2.52	0.0120

$F(1{,}409) = 85.43 \quad R^2 = 0.01532 \quad p < 0.01203$

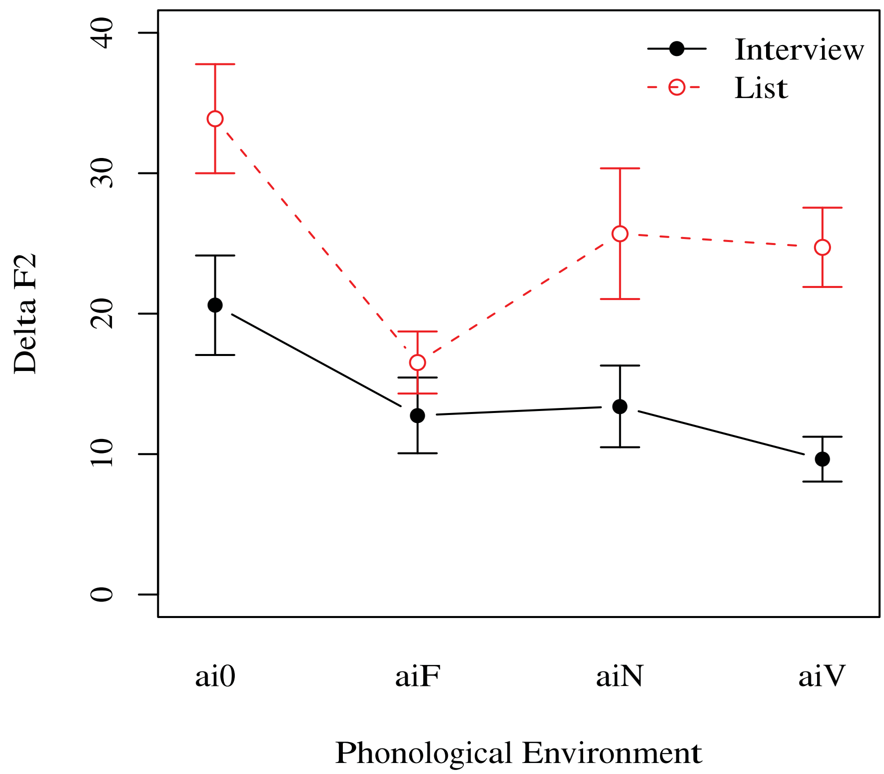
Figure 4.8: ΔF1 regression model for network strength.



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-7.5813	0.5498	-13.79	0.0000
aiF/ai0	3.7711	0.7843	4.81	0.0000
aiN/ai0	3.8673	0.7503	5.15	0.0000
aiV/ai0	3.7476	0.6716	5.58	0.0000
List/Interview	-6.2891	0.5476	-11.49	0.0000

$F(4{,}406) = 41.7 \quad R^2 = 0.2842 \quad p < 0.000$

Figure 4.9: ΔF1 regression model for phonological environment and style.

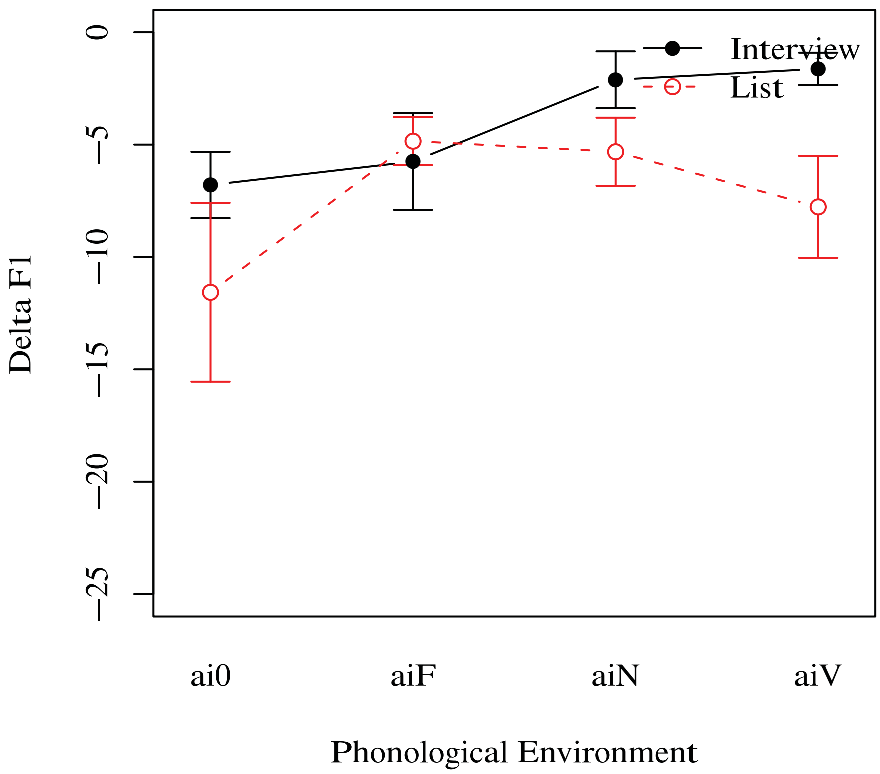


	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	20.9646	1.1619	18.04	0.0000
aiF/ai0	-10.8478	1.6575	-6.54	0.0000
aiN/ai0	-7.4626	1.5855	-4.71	0.0000
aiV/ai0	-10.2979	1.4191	-7.26	0.0000
List/Interview	11.8978	1.1571	10.28	0.0000
	$F(4{,}406) = 40.1$	$R^2 = 0.2761$	$p < 0.000$	

Figure 4.10: ΔF2 interaction between phonological environment and style.

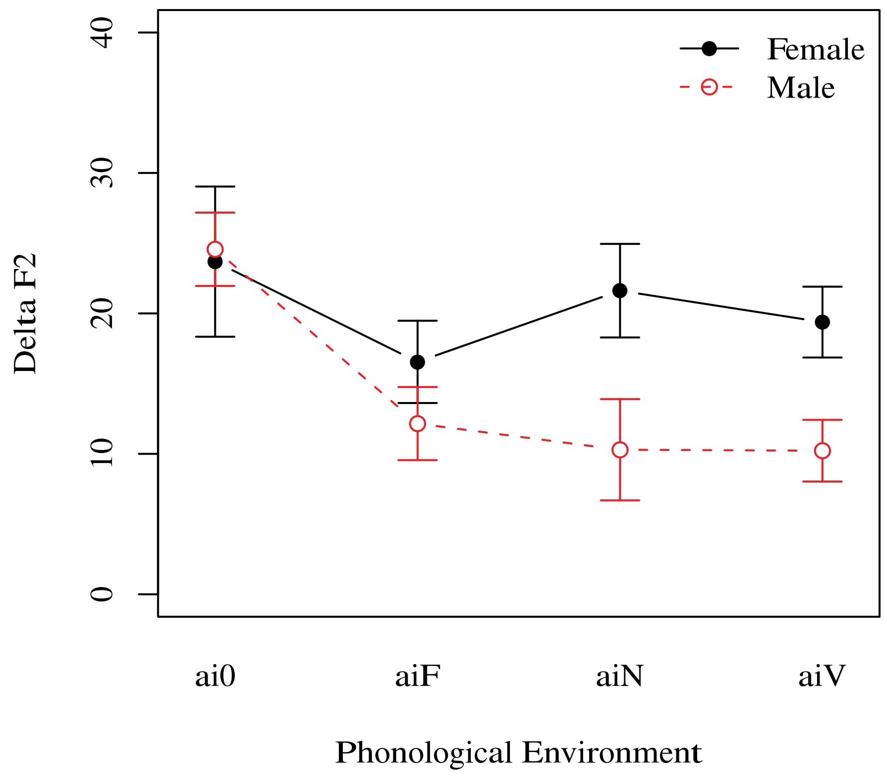
Modeling phonological environment and gender together produces the following results: in the F1 dimension, there is no significant difference in spectral change between men and women for /ai0/ and /aiF/. Men produce significantly weaker offglides in /aiN/, $p < 0.01$, and /aiV/, $p < 0.05$, than women do. Modeling gender and phonological environment together as predictors of ΔF1 accounts for 15.31% of the variance in the F1 data set. In the F2 dimension, there is no significant difference in spectral change between /ai0/ and /aiF/ for men and women. Men produce significantly stronger offlides than women for both /aiN/, $p < 0.01$, and /aiV/, $p < 0.001$. Modeling gender and phonological environment together as predictors of ΔF2 accounts for 18.18% of the variance in the F2 data set. Results for phonological environment and gender are plotted in Figures 4.11 and 4.12.

Modeling phonological environment, gender, and style together produces the following results. In the F1 dimension, women produce significantly stronger offglides in every phonological environment in the word-list style than in the interview style, $p < 0.000$. Men produce stronger offglides in the interview style in every environment except /aiF/, $p < 0.000$. Surprisingly, /aiF/ in the interview style is statistically significantly stronger than /aiF/ in the word list style, $p < 0.01$, though the difference is small. Modeling gender, phonological environment, and style together as predictors of ΔF1 accounts for 35.83% of the variance in the F1 data set. There is no significant difference in offglide strength in /aiN/ between styles. Men produce significantly stronger glides in every context, $p < 0.000$.



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-10.8988	0.6378	-17.09	0.0000
aiF/ai0	2.9950	0.8622	3.47	0.0006
aiN/ai0	3.9830	0.8236	4.84	0.0000
aiV/ai0	3.1669	0.7369	4.30	0.0000
Female	3.5106	0.5509	6.37	0.0000
	$F(7{,}403) = 11.59$	$R^2 = 0.1531$	$p < 0.000$	

Figure 4.11: ΔF1 regression model for environment and gender.



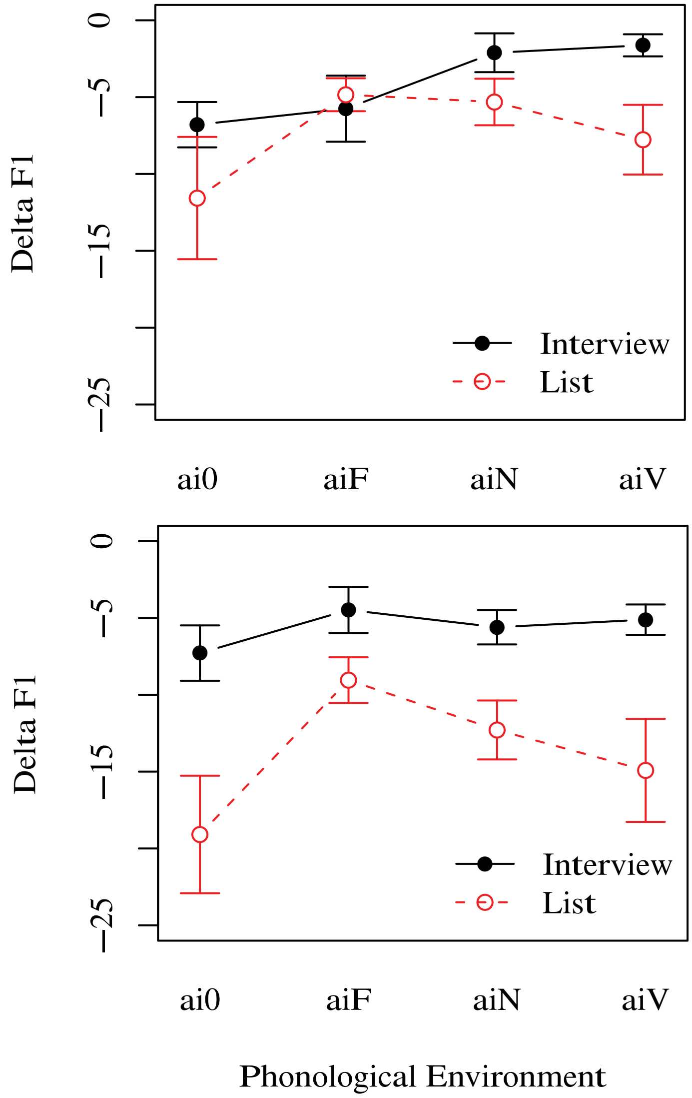
	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	27.1827	1.3269	20.49	0.0000
aiF/ai0	-9.3934	1.7938	-5.24	0.0000
aiN/ai0	-7.6775	1.7135	-4.48	0.0000
aiV/ai0	-9.2068	1.5331	-6.01	0.0000
Female/Male	-6.5187	1.1462	-5.69	0.0000
	$F(7{,}403)$	$R^2 = 0.1818$	$p < 0.000$	

Figure 4.12: ΔF2 regression model for phonological environment and gender.

Modeling phonological environment, gender, and style together as predictors of ΔF2 accounts for 33.35% of the variance in the F2 data set. This model has the greatest predictive power. The results for this model are plotted in Figures 4.13 and 4.14. In all of the models above, /aiV/, /aiN/ and /aiF/ do not behave significantly different from one another. For the remainder of this analysis, these vowel classes are treated as equally glide-weakened.

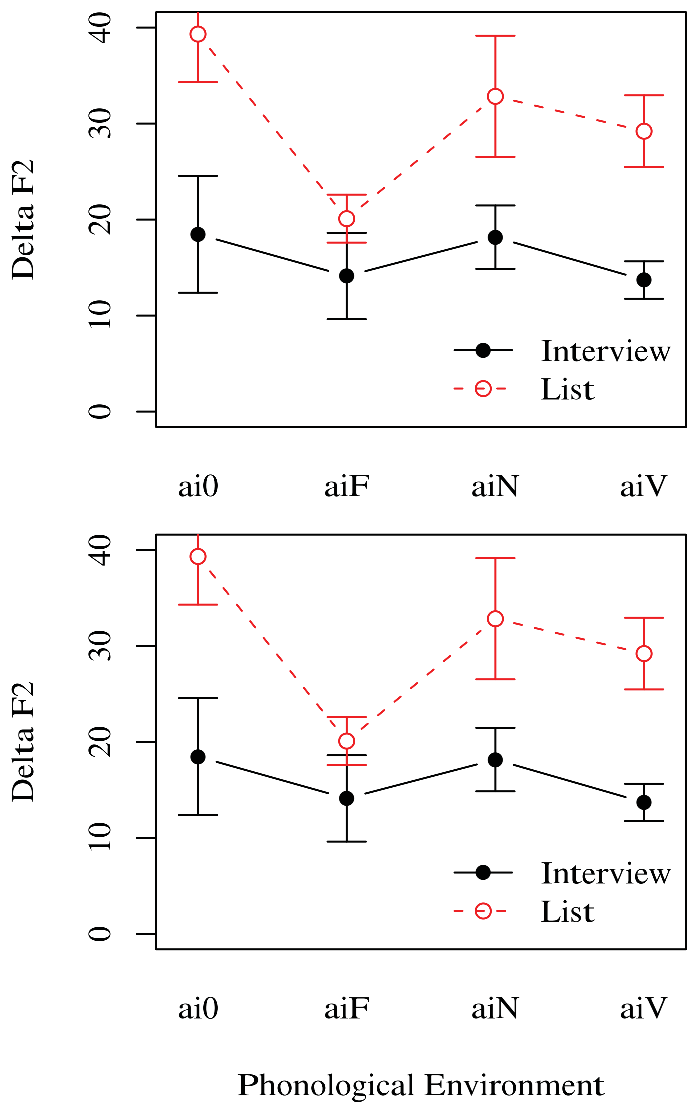
4.2.1 Peripherality

Statistically assessing peripherality as defined by Labov is a difficult task, as there is no accepted practice and Labov defines peripherality relative to anchor vowels. Thus in order to assess peripherality of the nucleus of the glide-weakened (ai) onset and assess whether peripherality is a causal factor in vowel shifting, two measurements were taken. The first measurement, following Purnell (2010), is the distribution of the residuals of the onsets of glide-weakened (ai) in the interview data. More peripheral vowels will have a negative (or right) skew, as more observations fall on the left side of the distribution. Less peripheral vowels will have a positive (or left) skew as more observations fall on the right side of the distribution. Figure 4.15 includes a scatterplot of the residuals of the men's and women's glide-weakened onsets and a histogram of the distribution. Having found no significant difference between the distributions of men's and women's (ai) onsets in either height or backness, the residual distributions were combined. The histogram in Figure 4.15 show a slight positive skew of 0.16. This result indicates



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-9.1735	0.5692	-16.12	0.0000
aiF/ai0	3.3943	0.7446	4.56	0.0000
aiN/ai0	3.9758	0.7105	5.60	0.0000
aiV/ai0	3.5407	0.6365	5.56	0.0000
Male/Female	3.2920	0.4757	6.92	0.0000
List/Interview	-6.1499	0.5188	-11.85	0.0000
	$F(5{,}405) = 46.79$	$R^2 = 0.3583$	$p < 0.000$	

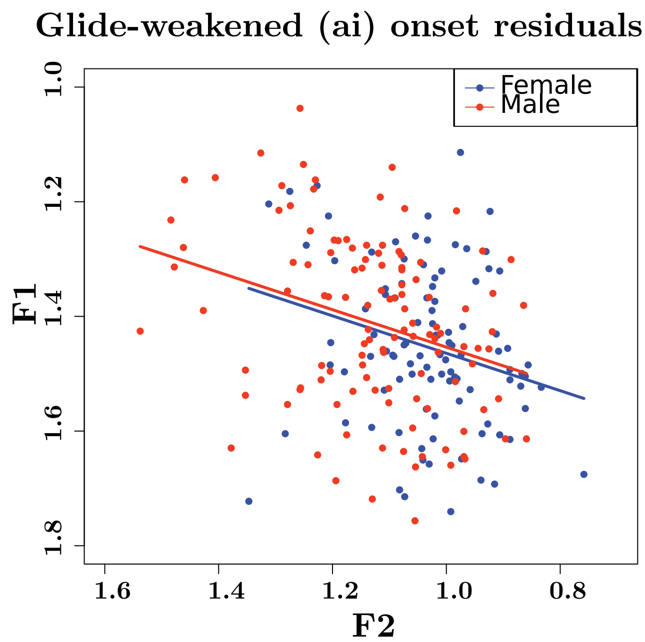
Figure 4.13: ΔF1 regression model for men (top) and women(bottom) for phonological environment and style.



	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	23.9174	1.2190	19.62	0.0000
aiF/ai0	-10.1490	1.5948	-6.36	0.0000
aiN/ai0	-7.6638	1.5218	-5.04	0.0000
aiV/ai0	-9.9142	1.3633	-7.27	0.0000
Male/Female	-6.1050	1.0187	-5.99	0.0000
List/Interview	11.6397	1.1112	10.48	0.0000

$F(5,405) = 42.02$ $R^2 = 0.3335$ $p < 0.000$

Figure 4.14: ΔF2 regression model for men (top) and women (bottom) for phonological environment and style.



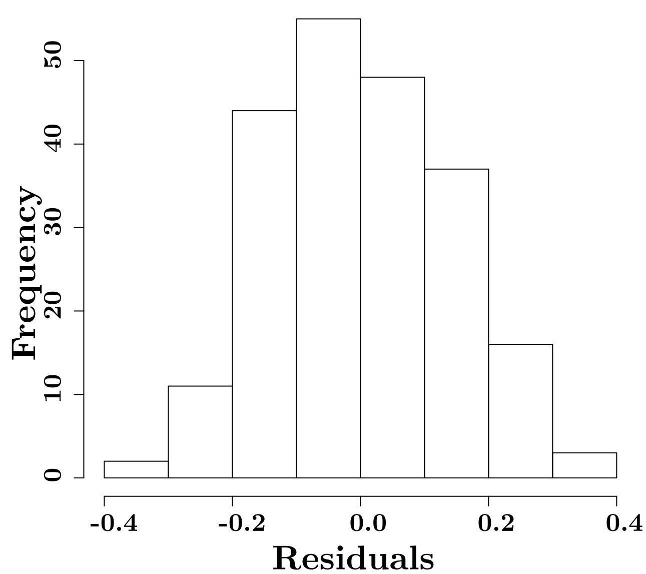


Figure 4.15: Plots of men's and women's glide-weakened (ai) onset residuals. Positive skew of 0.16 indicates nonperipherality

that, on average, the onsets of glide-weakened (ai) are nonperipheral.

The second measurement is a measurement of the Euclidean distance between the midpoint of low-peripheral *TRAP* and the onsets of glide-weakened (ai) in the interview data. I compare onsets to midpoints because the prediction is that the onset of (ai) becomes more peripheral as its glide weakens. I compare this onset to the midpoint of *TRAP*, which is claimed in ANAE to define the front periphery of the vowel space. Figure 4.16 shows a scatterplot of the midpoints of *TRAP* and the onsets of glide-weakened (ai). The means onset of glide-weakened (ai) is significantly lower than the mean midpoint of *TRAP*, $p < 0.001$. The mean onset of glide-weakened (ai) is also significantly more back than the mean midpoint of *TRAP*, $p < 0.000$. The mean Euclidean distance between the onset of (ai) and midpoint of *TRAP* is 0.127 normalized units, or approximately 20 Hz, again indicating a nonperipheral onset of glide-weakened (ai).

Figures 4.17 and 4.18 shows a scatterplot of the normalized mean onsets of the *FLEECE*, *KIT*, *PEEL*, and *PILL* vowels for men and women and respectively. These scatterplots show that men have substantial overlap in the *PEEL* and *PILL* word classes. Five *PEEL* tokens appear to reach F2 values behind the a majority *PILL* tokens, though the majority of *PILL* tokens seem to be scattered throughout the *PEEL* tokens. Statistically, there is no significant difference in either F1 or F2 between *KIT*, *PILL*, and *PEEL*, though all of these vowel classes are significantly lower than *FLEECE*, $p < 0.001$. For men, there is substantial individual variation

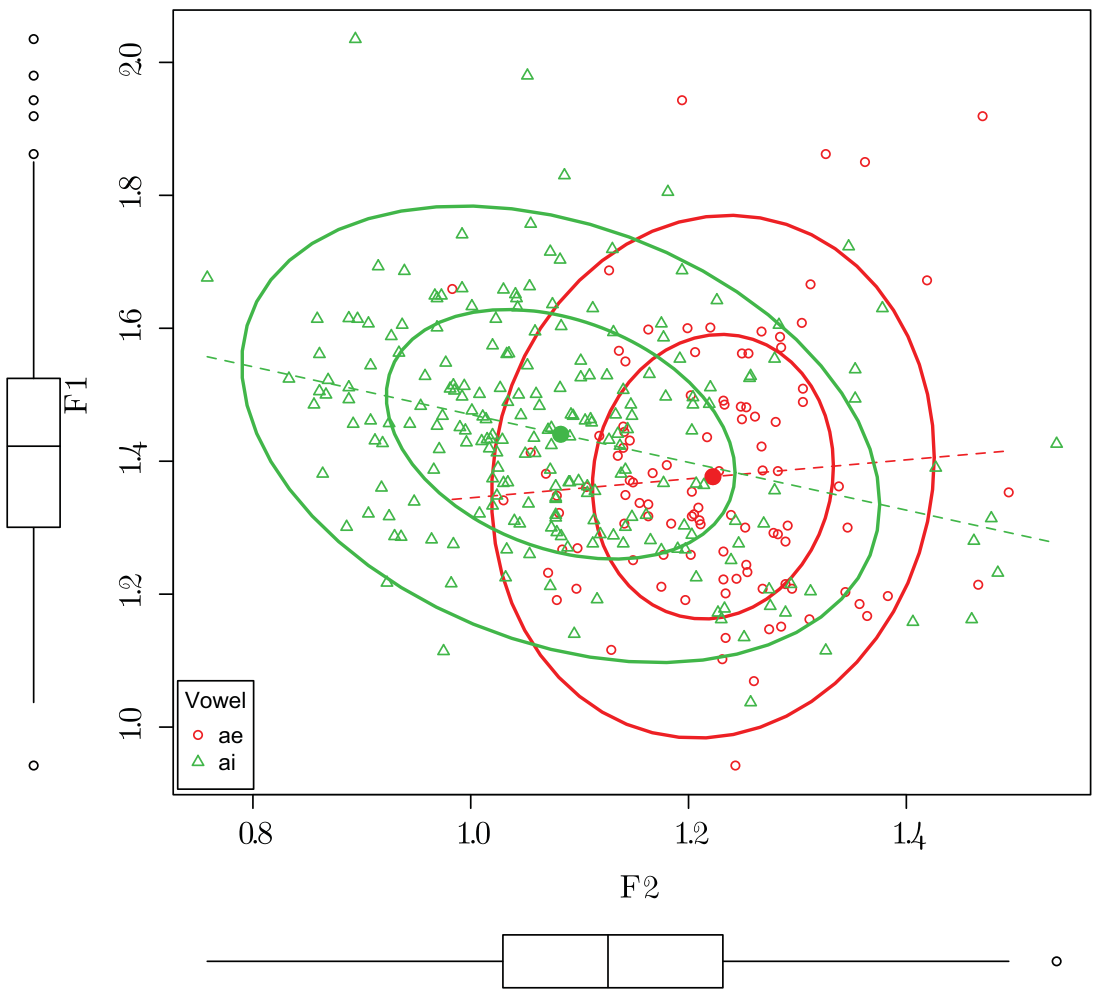


Figure 4.16: Distribution of glide-weakened (ai) onsets and low-front *TRAP* midpoints.

in average production of these word classes. See Appendices B and C for individual vowel spaces for each speaker.

Women show considerably less overlap in these word classes. Three *PILL* tokens appear to be encroaching on the distribution *PEEL*, however, these word classes appear to remain largely distinct. Statistically, *PEEL* is not significantly different than *FLEECE* and *KIT* is not significantly different than *PILL*, though both are significantly lower and more back than *FLEECE* and *PEEL*, $p < 0.01$.

One *SALE* token encroaches on the distribution of *SELL*, however, these classes otherwise appear to remain entirely distinct. The scatterplot for women show these classes as remaining entirely distinct in both height and peripherality. For both gender groups, *SELL* is significantly lower and more back than *DRESS*, $p < 0.000$. Scatterplots for men's and women's *FACE*, *DRESS*, *SALE*, and *SELL* word classes are shown in Figures 4.19 and 4.20.

4.3 Summary of Results

The results presented above are very revealing. The statistical results for ΔF1 and ΔF2 for phonological environment indicate that (ai) offglides are weaker before voiced obstruents and nasals and in free environments than before voiceless obstruents. This supports the findings of Thomas (2001) that (ai) is more monophthongal before voiced consonants than before voiced consonants and adds that (ai) is also more monophthongal before nasals and in free and open syllables.

The ΔF1 and ΔF2 results for gender show that in the Salt Lake Valley, men

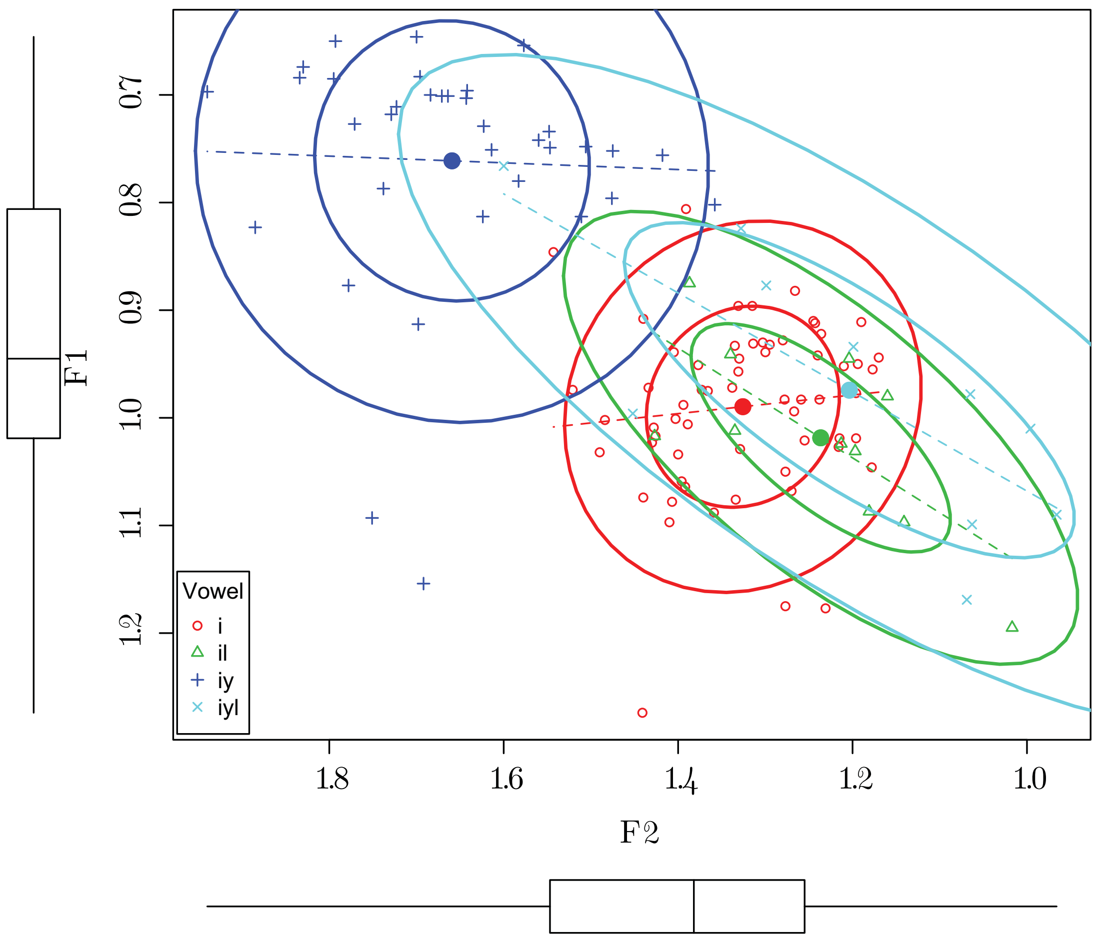


Figure 4.17: Men's normalized midpoints for *FLEECE*, *KIT*, *PEEL*, and *PILL*.

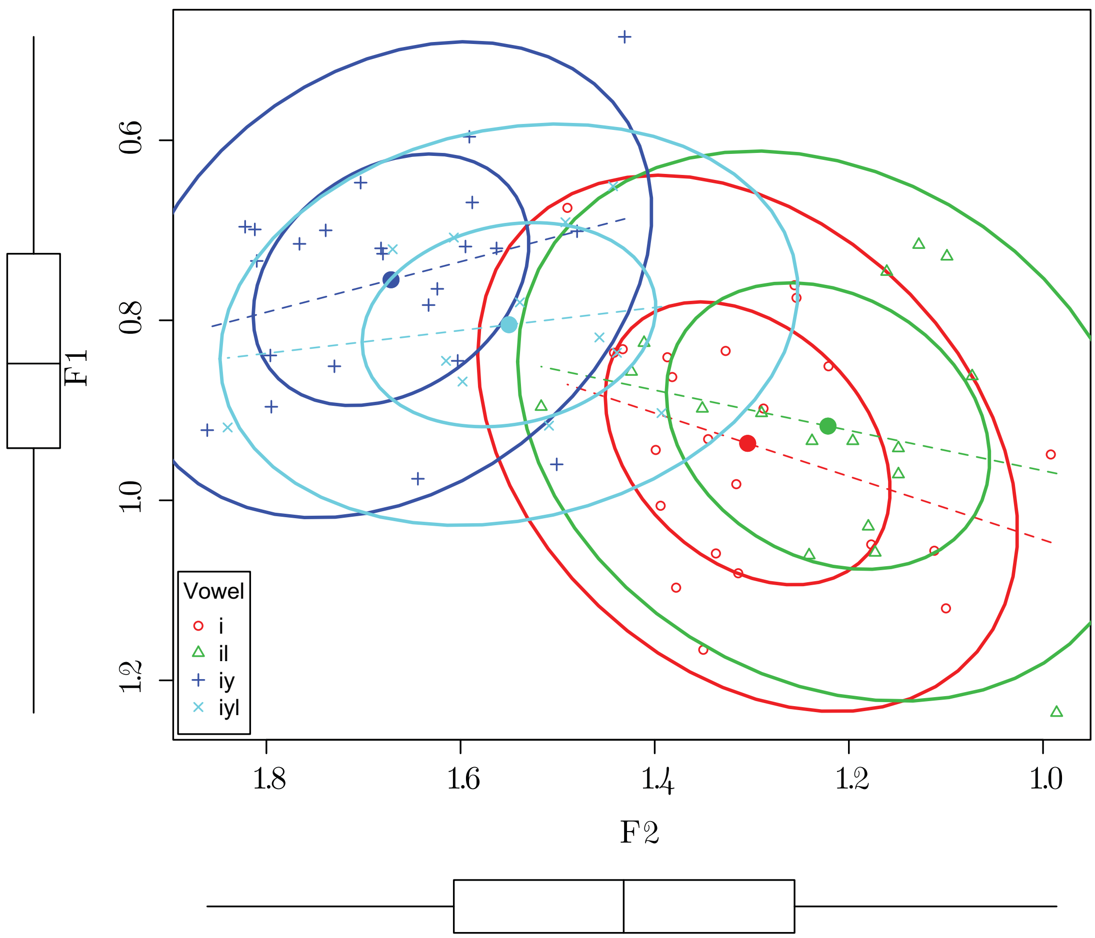


Figure 4.18: Women's normalized midpoints for *FLEECE*, *KIT*, *PEEL*, and *PILL*.

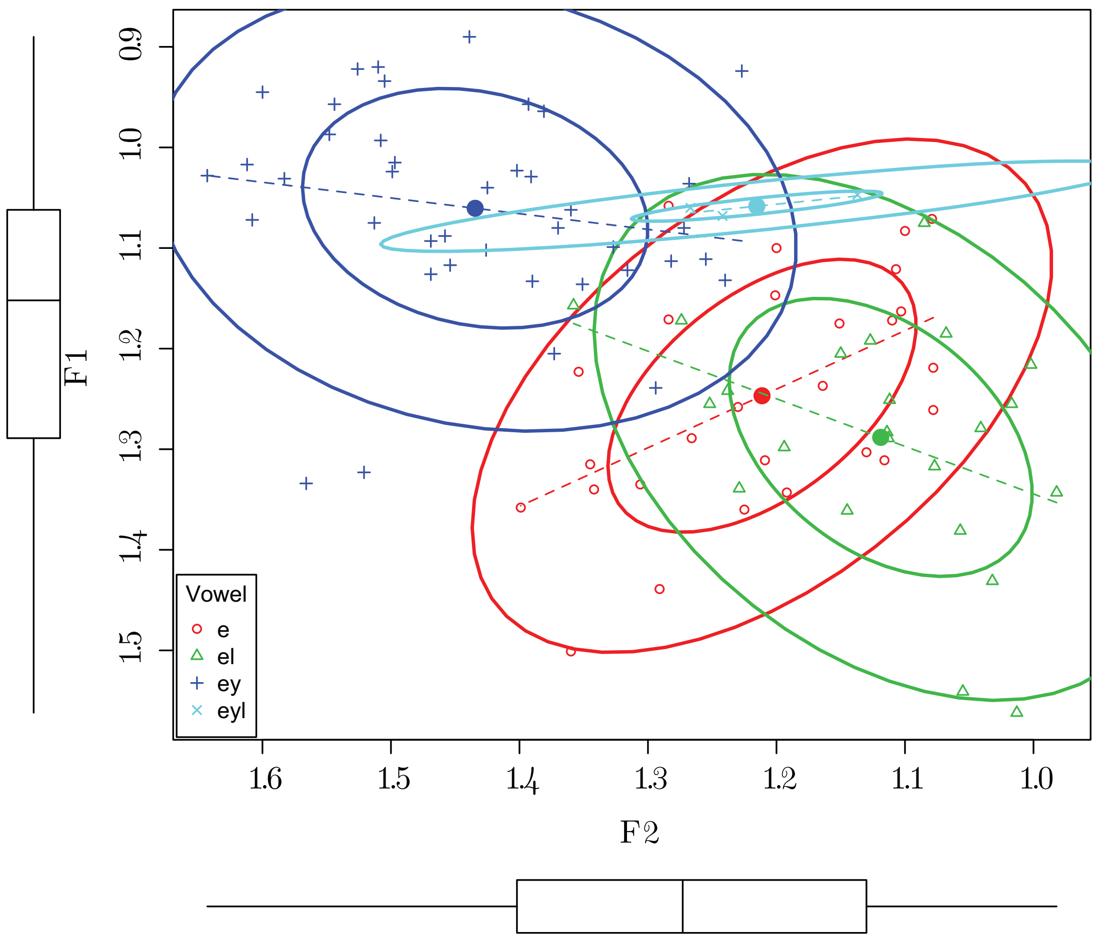


Figure 4.19: Men's normalized midpoints for *FACE*, *DRESS*, *SALE*, and *SELL*.

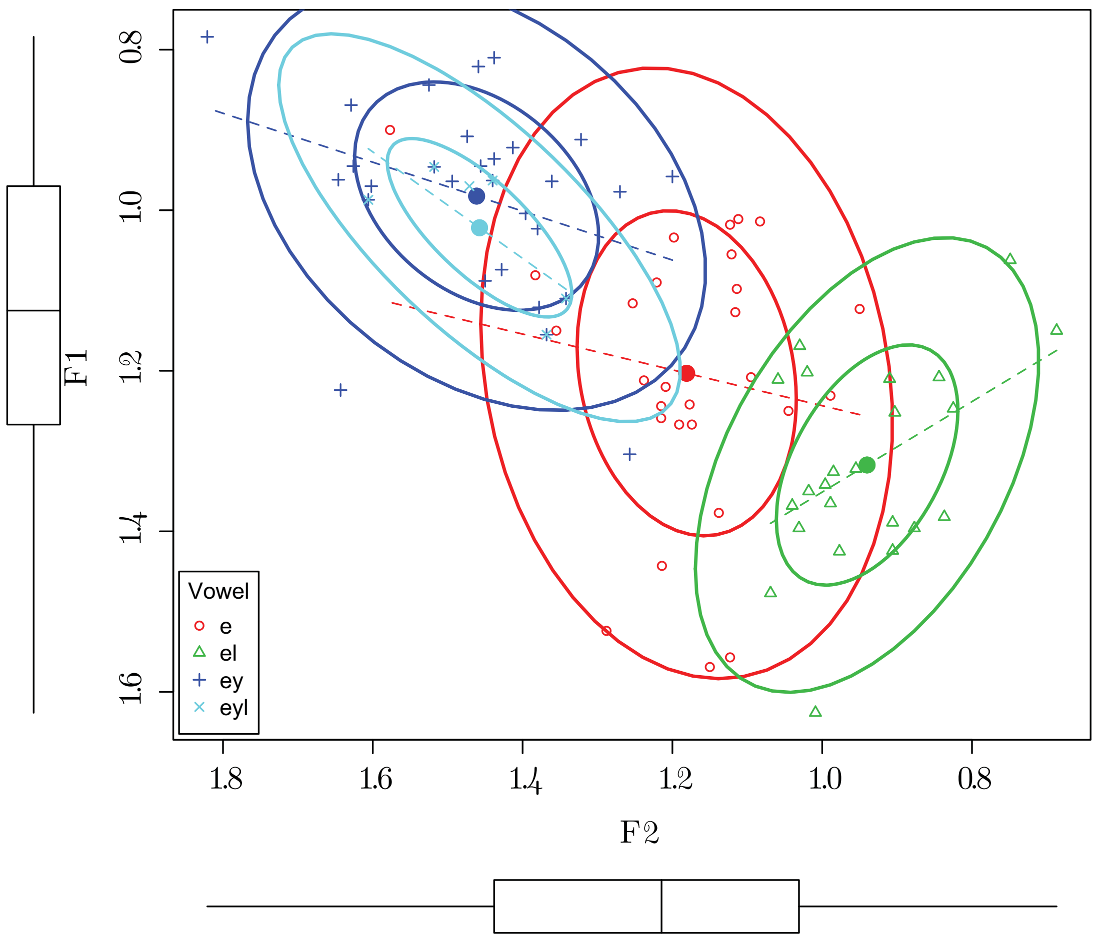


Figure 4.20: Women's normalized midpoints for *FACE*, *DRESS*, *SALE*, and *SELL*.

are more likely to produce glide-weakened (ai) tokens than women are.

The ΔF1 and ΔF2 results for style show that (ai) offlgides are consistently weaker in the interview style than in the word-list style for all phonological environments. The strong predictive power of style on offglide production relative to other predictors may provide some evidence of some level of social and stylistic awareness of this variable.

The ΔF1 and ΔF2 results for network strength indicate that glide-weakened (ai) is more common in subjects with a lower network-strength score. However, despite being a statistically significant finding, it's minute predictive power and its lack of interaction with any other predictors casts doubt on its meaningfulness.

The ΔF1 and ΔF2 results for modeling phonological environment and gender together show that men are more likely to display glide-weakened (ai) than women before voiced obstruents and nasals only. This finding strengthens the additional finding that men tend to produce more monophthongal (ai) tokens. Additionally, taking into account the interaction between these predictors dramatically improved the predictive power of the statistical model.

CHAPTER 5

DISUSSION

Perhaps the most interesting finding is the result of modeling phonological environment, style, and gender together. Recall that Figures 4.13 and 4.14 above show the men's and women's ΔF1 and ΔF2 results for the interview style and the word-list style. For ΔF1, there is substantial overlap in the production of /ai0/ and /aiF/ for men, with fully distinct productions of /aiN/ and /aiV/. Women display a very different distribution, with distinct distributions for all phonological environments. The ΔF2 results shows that men again have substantially overlapping distributions in /ai0/ and /aiF/, but fully distinct distributions in /aiN/ and /aiV/. Women show overlapping distributions in /aiF/, though fully distinct distributions in all other phonological environments. Modeling phonological environment, gender, and style together produces the most predictively powerful model. The strong predictive power of style in these data and its interaction with gender may possibly indicate an important social meaning. The strong predictive power of the interaction between style and gender would seem to suggest that glide weakening is an incoming change in Utah English.

In addition to the empirical results presented above, two important theoretical claims were made. The first claim was that peripherality may not be the motivating factor in vowel shifting as claimed by LYS and PLC. The statistical results of the glide-weakened (ai) onsets show that these word classes are nonperipheral, though still clearly weakened. The distributions of the front upgliding vowels show that men show evidence for the beginnings of a reversal in the *PEEL* and *PILL* word classes in nonperipheral vowel space while women keep these classes entirely distinct. The distributions for the *SALE* and *SELL* word classes show that both gender groups are retaining these word classes as distinct but that both these classes are more central than their original positions. Where individual tokens of these classes do show evidence of reversal, peripherality appears to play little, if any role, and in fact both classes appear to remain entirely nonperipheral, even for speakers whose front-upgliding word classes have approximated or passed each other in two formant space. The nonperipheral position of glide-weakened (ai) onsets and the position of the front upgliding word classes cast serious doubt upon peripherality as a causal factor in these changes.

The second claim that was made was that the Salt Lake Valley can be demonstrated to be linguistically aligned with the South and South Midland linguistic area. Although these results clearly show that glide-weakening is present in Utah, contradicting the claims of ANAE. The vowel spaces presented in 4.1 also show that the low-back and high back vowels of these speakers are demonstrably Southern — with the midpoints of the high back vowels clearly fronted and the midpoints and glides seemingly reversed for the low-back vowels — and do not fit with the descriptions of ANAE, and present strong evidence for Utah being a more Southern-like linguistic area when taken into consideration with previous findings of Southern linguistic features in Utah English. However, the positions of the front upgliding vowels do not fit the Southern pattern. These results are unexpected if Utah is a Southern dialect. These results are possibly explained by the fact that currently in the Salt Lake Valley these word classes are highly stereotyped. These findings also add another complication to the already complicated definition of The West as a linguistic area. Additionally, these findings directly contradict the claims of Labov (1991) and ANAE that the West is a relatively stable linguistic area beyond the presence of fronting of high back vowels.

5.1 Directions for Future Research

The findings presented in this thesis provide fertile ground for future research into glide weakening in Utah and the West as a whole. As stated in the previous section, while these data present evidence for glide weakening or deletion in The West, they do not necessarily directly reflect an incoming or a previous change. In order to assess this, future research will need to investigate English in the Salt Lake Valley with a larger and more diverse sample size that includes subjects of different ages and perhaps different religious affiliations.

The finding of this thesis that glide weakening is present in Utah is also a call for additional research to be conducted in other Western cities in order to more critically assess the claims made by ANAE and to provide a more adequate definition of The West as a linguistic area.

APPENDIX A

DESCRIPTIVE STATISTICS

Table A.1: Descriptive Statistics

				ai0	Female	Interview			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	36	-7.29	5.32	-7.05	-27.05	3.86	30.91	-1.23	3.38
ΔF2	36	18.47	18	18.67	-65.37	60.82	126.19	-2.36	11.07

				aiF	Female	Interview			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	19	-4.48	3.11	-3.9	-10.28	-0.33	9.96	-0.3	-1.13
ΔF2	19	14.12	9.33	15.85	-4.44	31.1	35.54	-0.21	-0.85

				aiN	Female	Interview			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	39	-5.6	3.45	-4.54	-13.03	0.13	13.15	-0.62	-0.52
ΔF2	39	18.17	10.2	16.31	-1.05	47.35	48.4	0.5	0.31

				aiV	Female	Interview			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	45	-5.11	3.28	-4.98	-15.18	1.59	16.77	-0.66	1.36
ΔF2	45	13.7	6.48	12.99	2.96	33.27	30.32	0.65	0.34

				ai0	Male	Interview			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	31	-6.79	4.02	-6.25	-19.1	0.55	19.65	-0.65	0.88
ΔF2	31	23.07	8.62	26.4	0.28	35.35	35.07	-1.05	0.52

				aiF	Male	Interview			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	33	-5.75	6.06	-4.32	-20.46	3.71	24.17	-0.53	-0.39
ΔF2	33	11.97	9.94	10.14	-8.66	35.01	43.67	0.31	-0.27

				aiN	Male	Interview			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	28	-2.11	3.26	-2.07	-10.09	5.58	15.66	-0.12	0.66
ΔF2	28	6.75	11.06	6.84	-18.47	34.94	53.41	0.19	0.6

				aiV	Male	Interview			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	58	-1.63	2.73	-1.82	-7.52	5.79	13.31	0.29	0.37
ΔF2	58	6.49	7.99	6.65	-14.02	26.42	40.43	0.01	0.06

				ai0	Female	List			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	12	-19.09	6.02	-20.69	-26.95	-7.39	19.56	0.58	-0.97
ΔF2	12	39.33	7.9	39.5	23.77	54.27	30.5	-0.09	-0.46

				aiF	Female	List			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	13	-9.05	2.46	-9.13	-12.44	-4.35	8.09	0.25	-1.24
ΔF2	13	20.1	4.13	19.07	13.03	27.69	14.66	0.15	-1.08

				aiN	Female	List			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	12	-12.29	3.02	-13.15	-17.17	-6.37	10.8	0.28	-0.97
ΔF2	12	32.84	9.94	29.19	23.94	55.88	31.94	1.01	-0.23

				aiV	Female	List			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	26	-14.92	8.3	-12.26	-40.73	-5.46	35.27	-1.63	1.97
ΔF2	26	29.21	9.25	27.56	16.89	50.65	33.75	0.69	-0.42

				ai0	Male	List			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	12	-11.57	6.26	-12.21	-25.28	-2.85	22.43	-0.49	-0.41
ΔF2	12	28.43	7.05	28.11	18.03	41.18	23.14	0.12	-1.28

				aiF	Male	List			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	12	-4.85	1.69	-4.47	-7.21	-2.32	4.89	-0.12	-1.6
ΔF2	12	12.65	3.52	13.77	4.86	17.52	12.66	-0.74	-0.44

				aiN	Male	List			

	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	12	-5.32	2.38	-5.3	-9.86	-0.33	9.53	0.13	-0.09
ΔF2	12	18.55	6.63	18.09	9.67	33.51	23.84	0.69	-0.31

				aiV	Male	List			
	n	mean	sd	median	min	max	range	skew	kurtosis
ΔF1	23	-7.77	5.24	-6.02	-20.78	-3.11	17.68	-1.24	0.2
ΔF2	23	19.65	7.93	17.32	8.71	34.23	25.52	0.66	-0.85

APPENDIX B

NORMALIZED VOWEL SPACES FOR INDIVIDUAL SPEAKERS — INTERVIEW

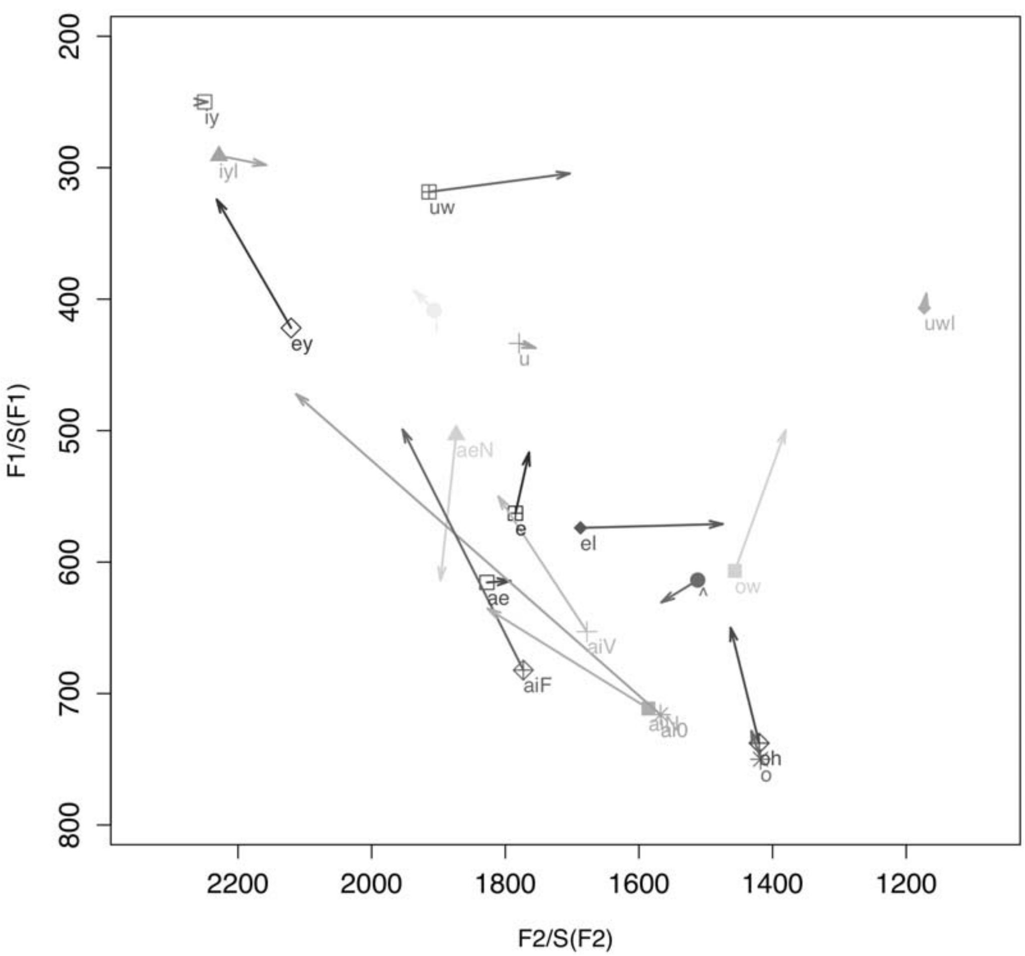


Figure B.1: G. Ryle.

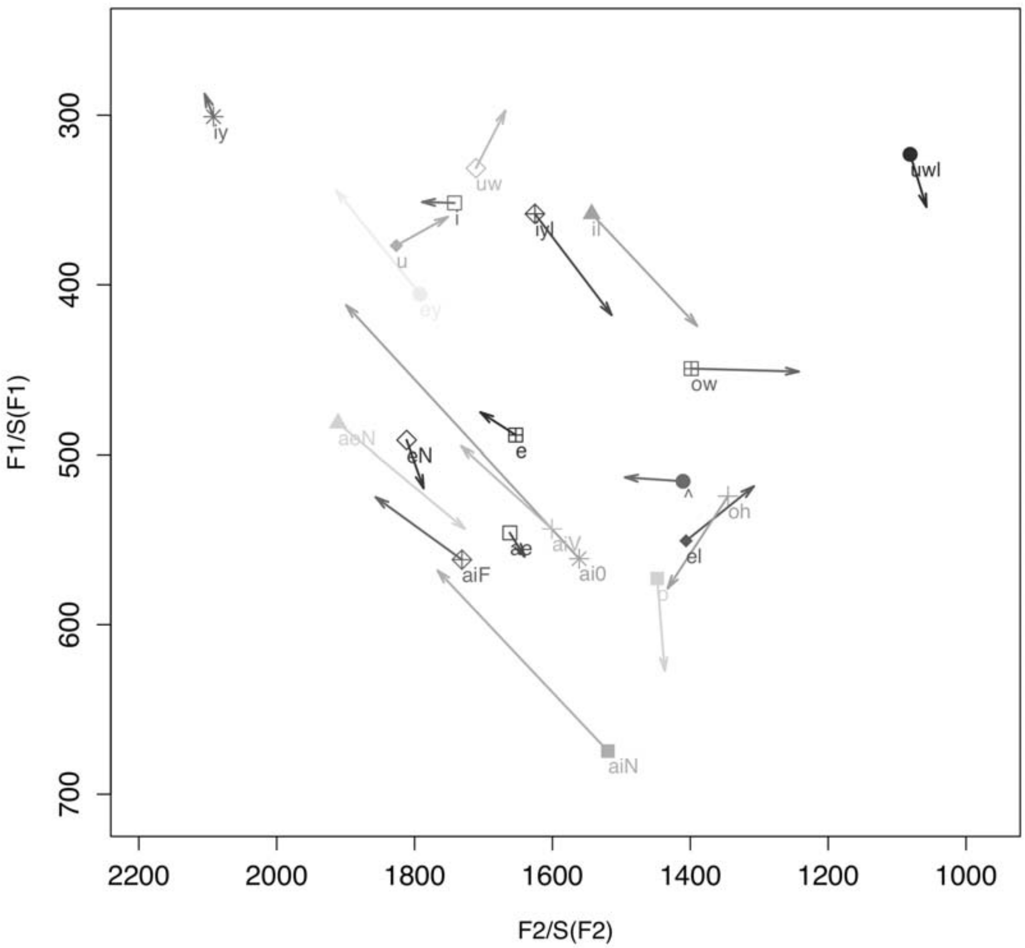


Figure B.2: J. Searle.

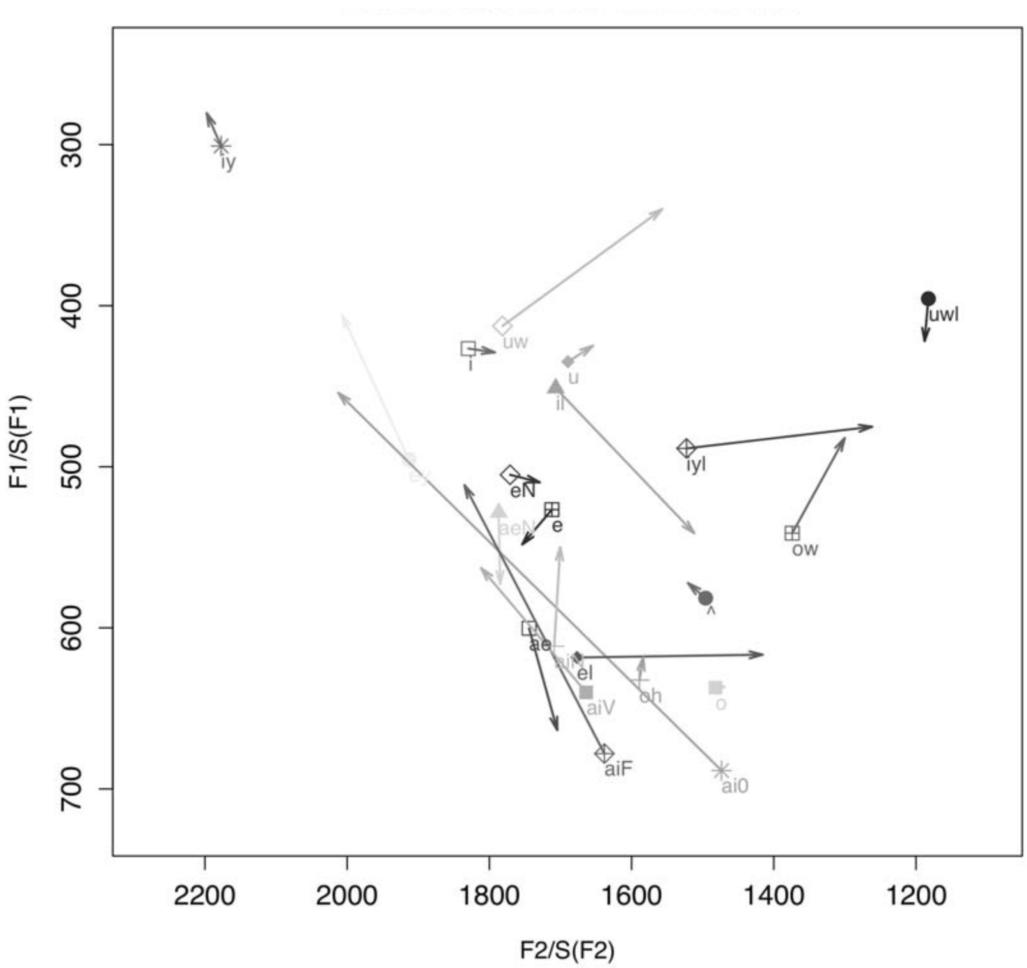


Figure B.3: L. Wittgenstein.

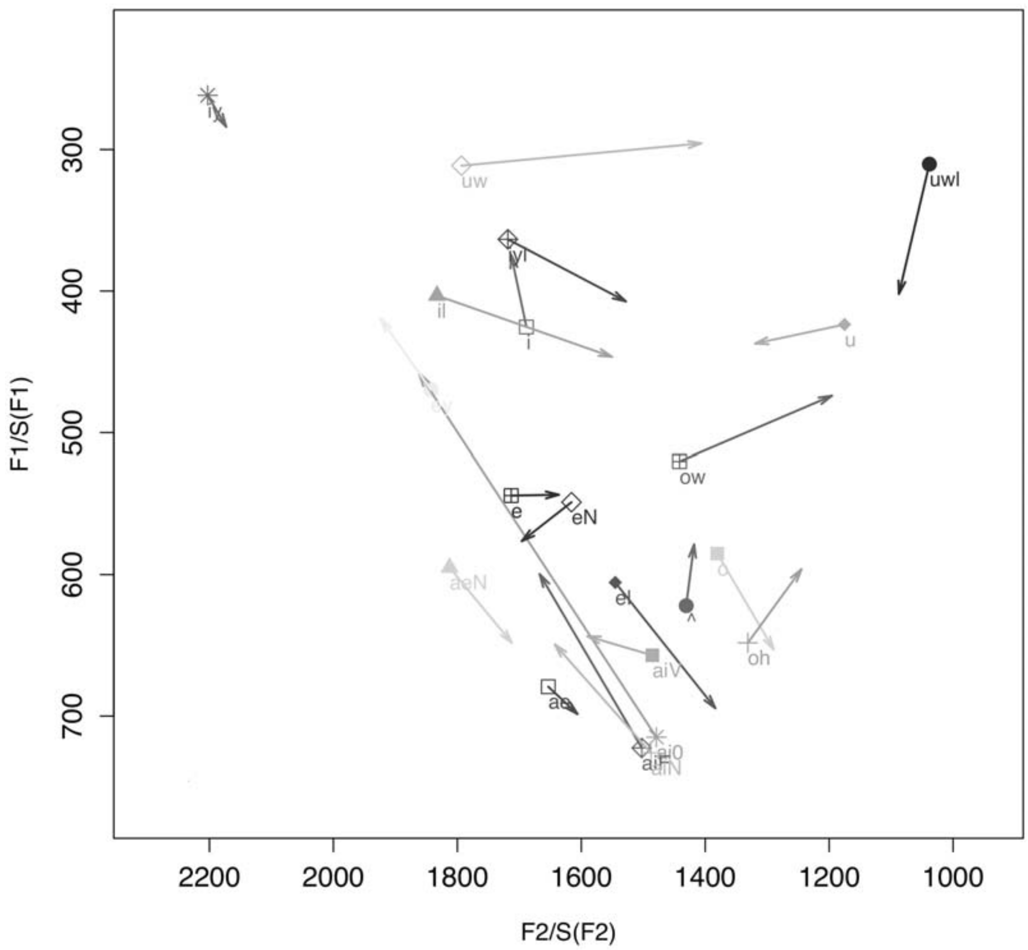


Figure B.4: B. Russell.

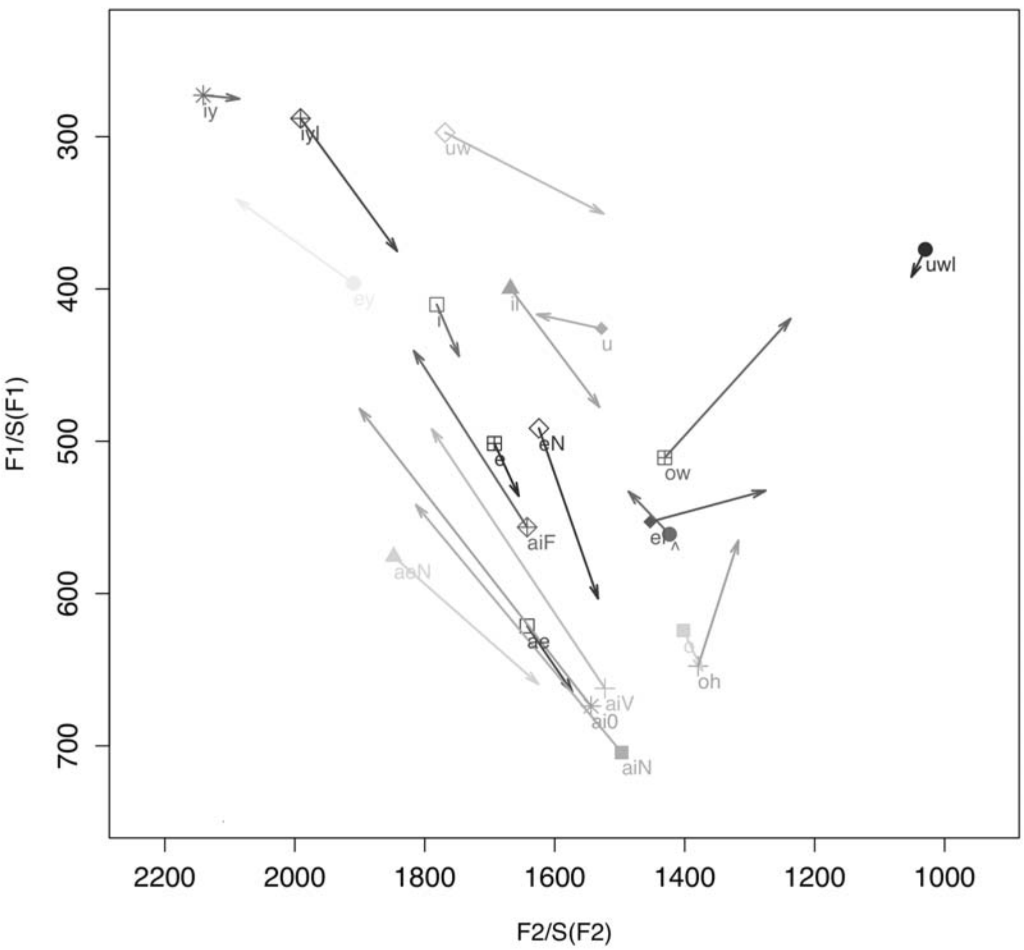


Figure B.5: N. Cartwright.

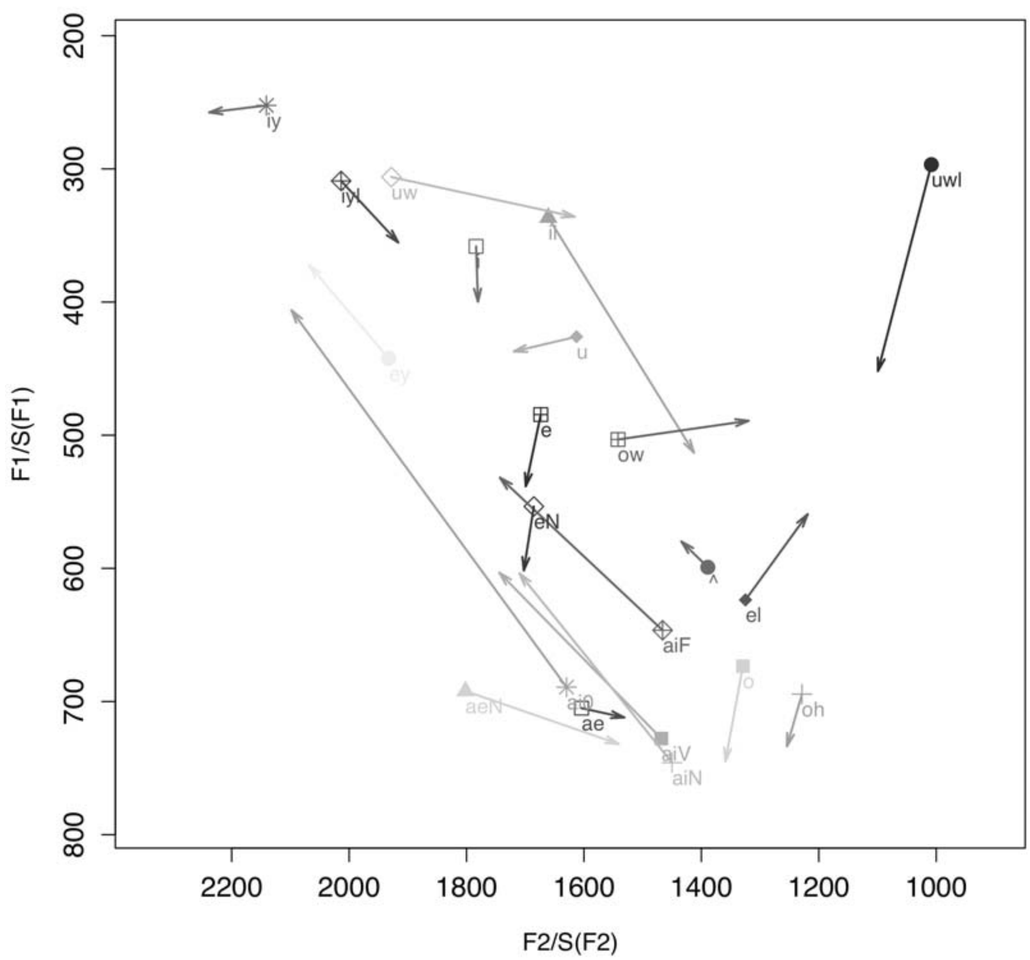


Figure B.6: P. Churchland

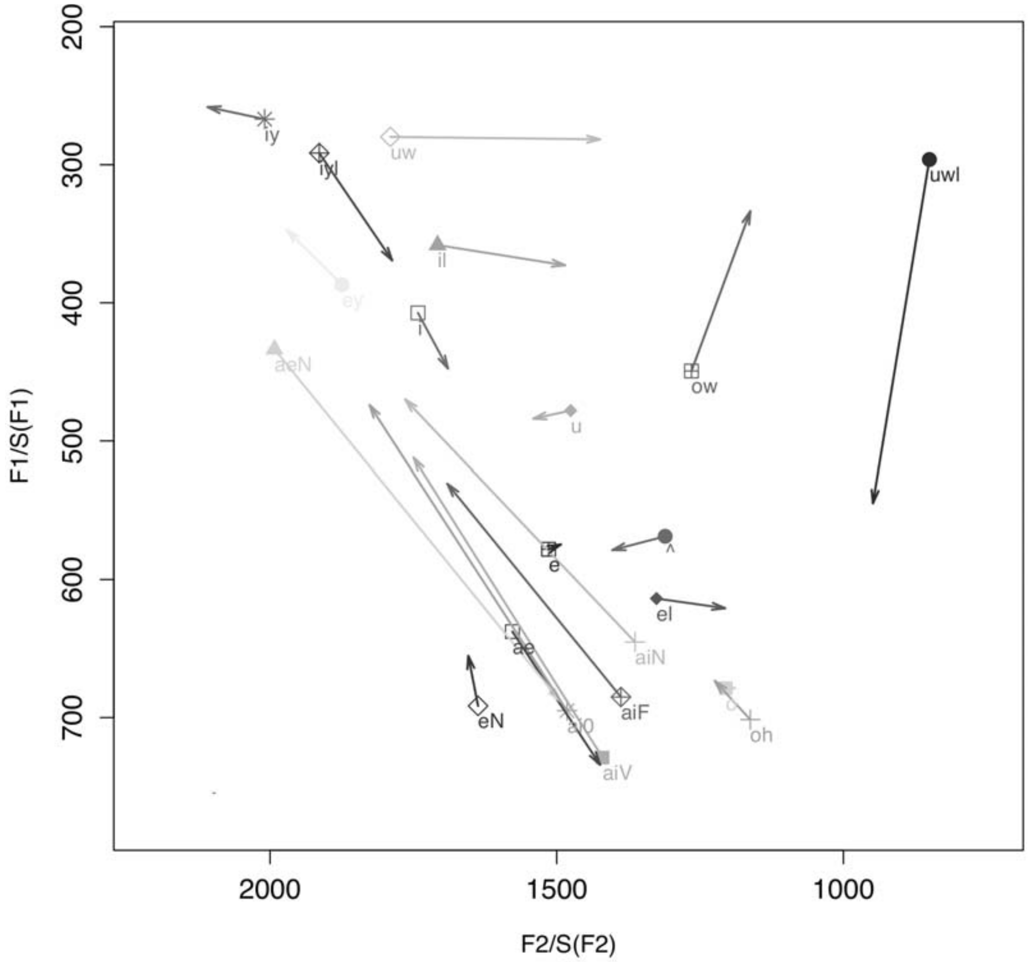


Figure B.7: S. Stebbing.

APPENDIX C

NORMALIZED VOWEL SPACES FOR INDIVIDUAL SPEAKERS — WORD LIST

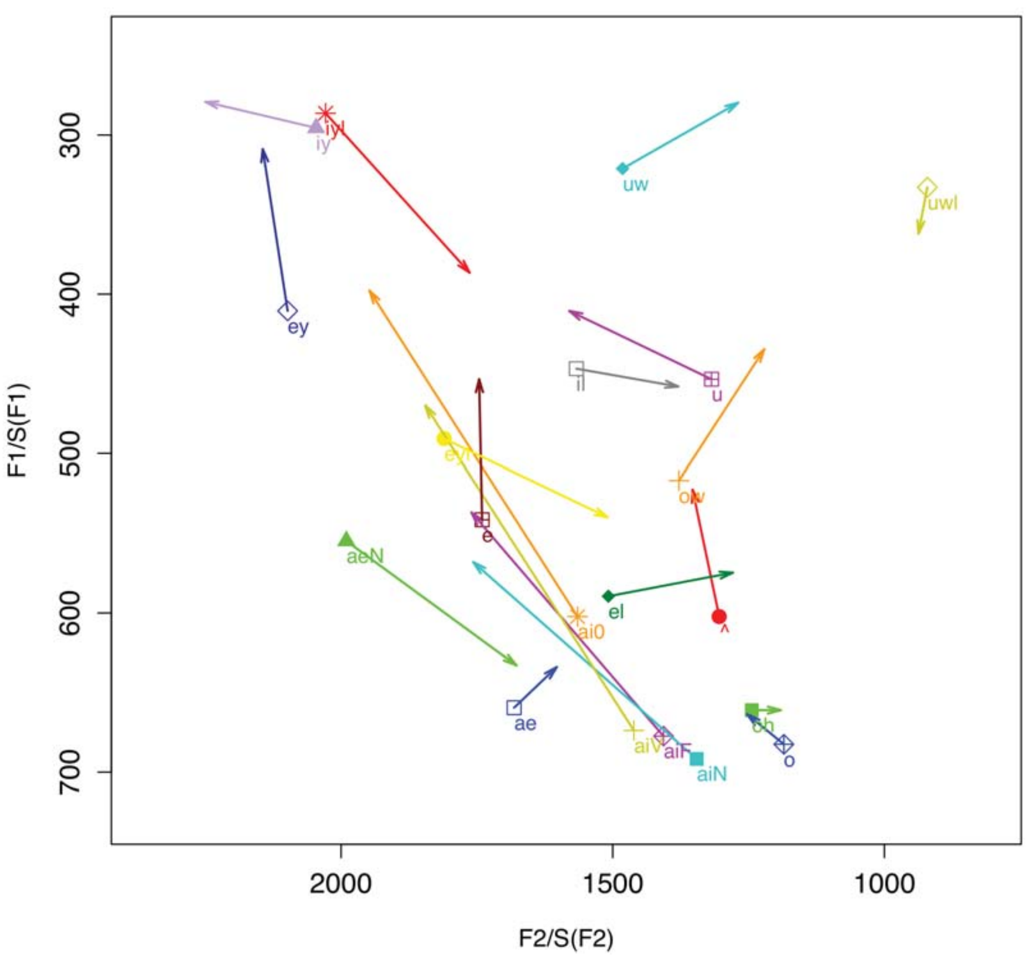


Figure C.1: J. Searle.

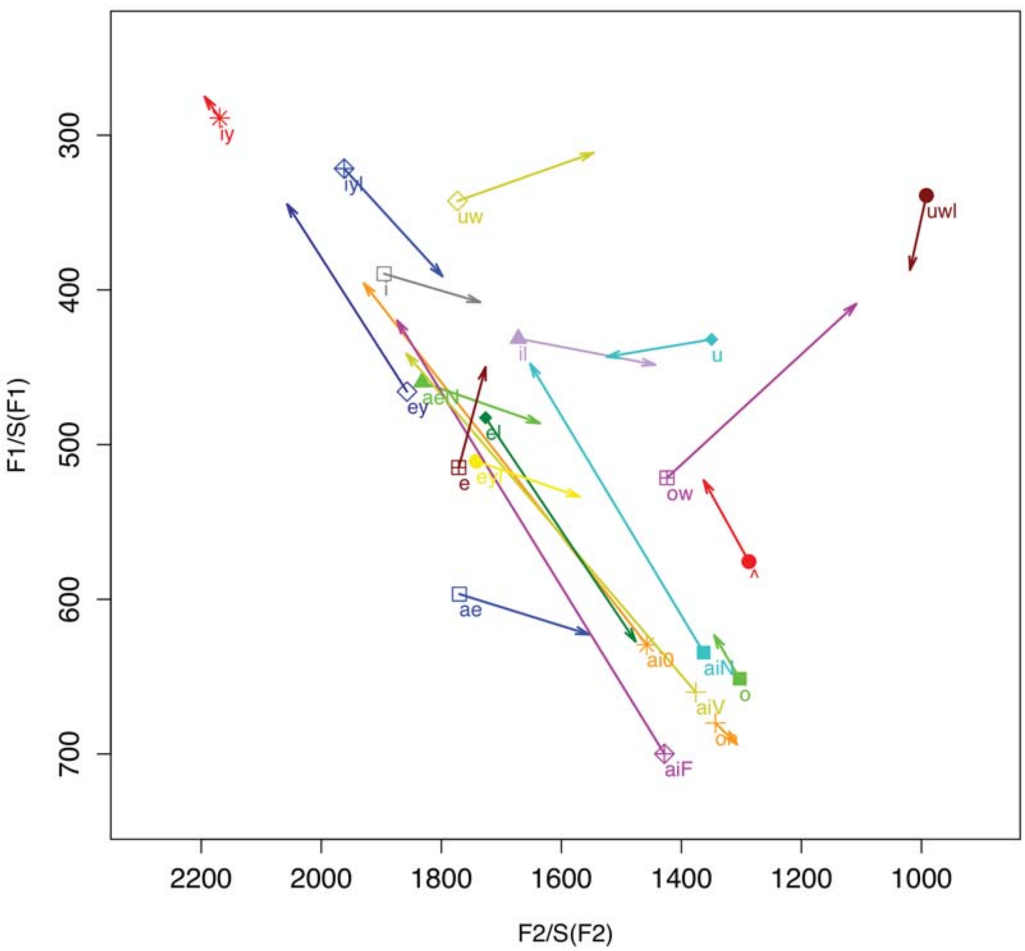


Figure C.2: L. Wittgenstein.

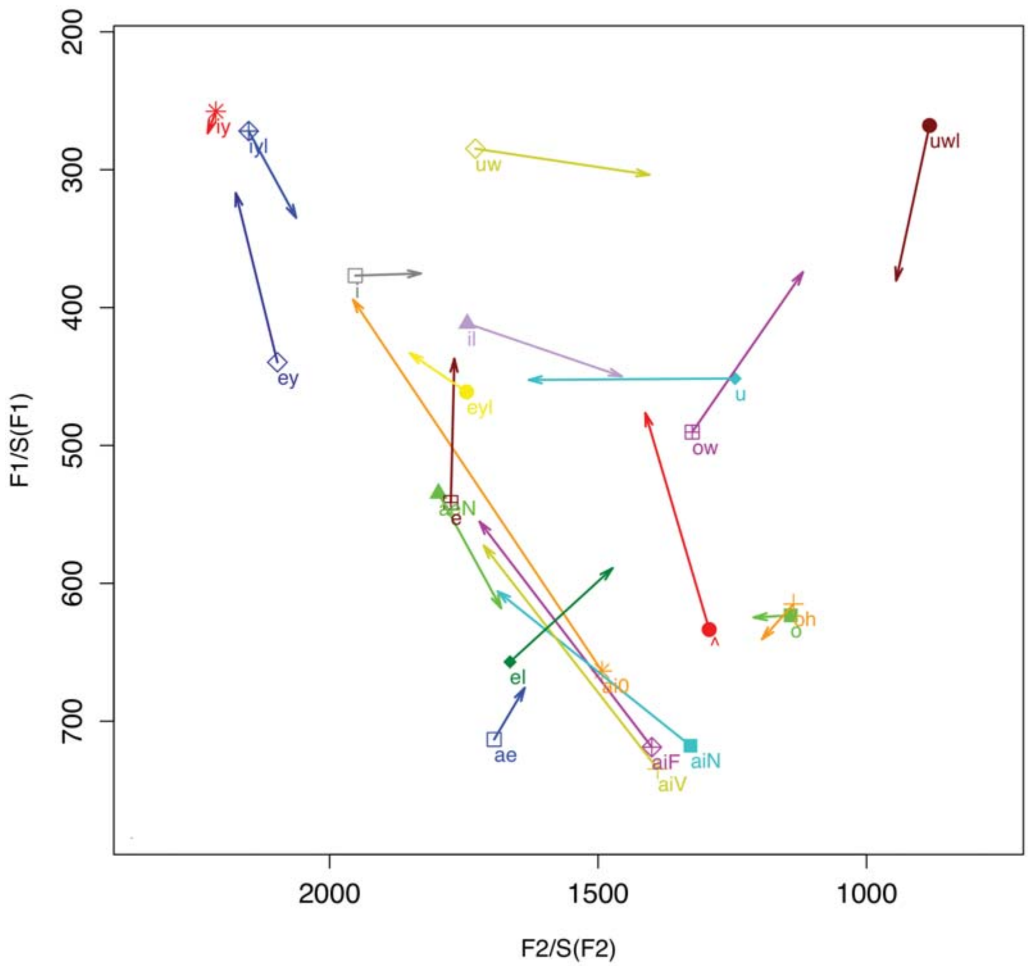


Figure C.3: B. Russell.

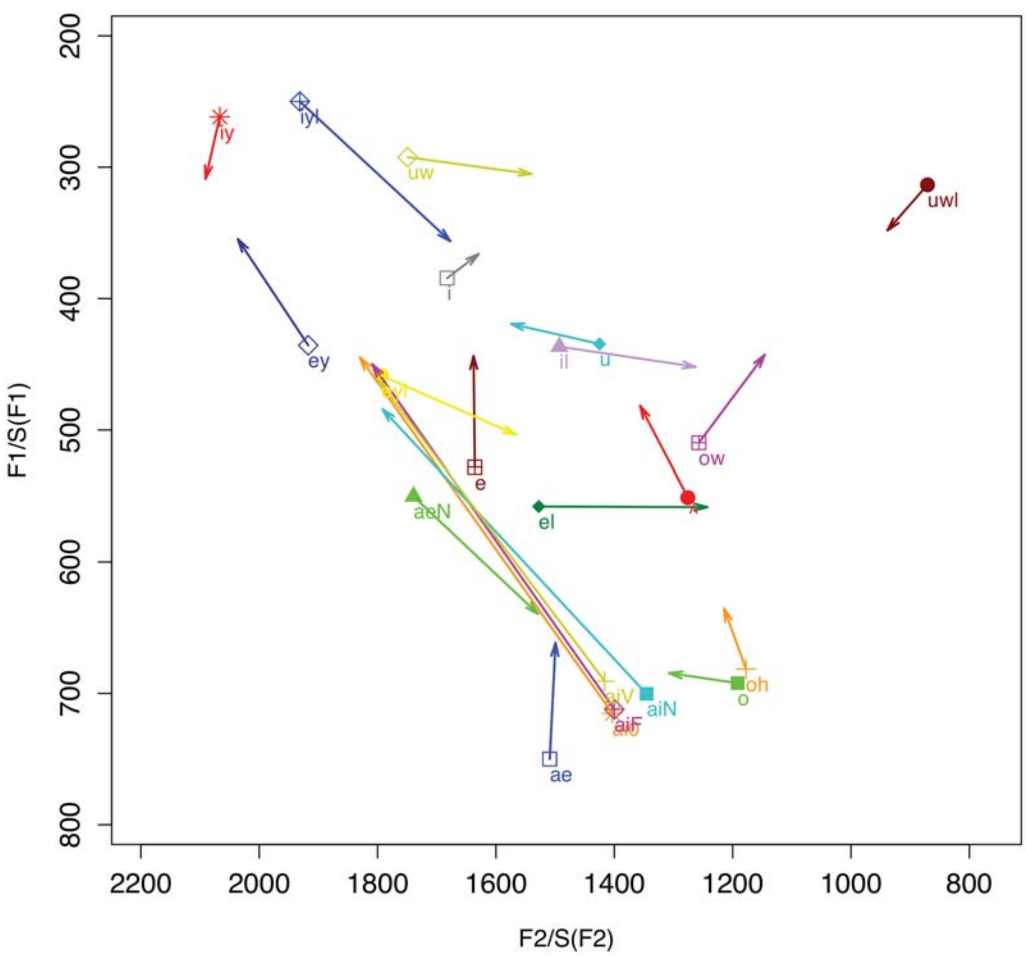


Figure C.4: N. Cartwright.

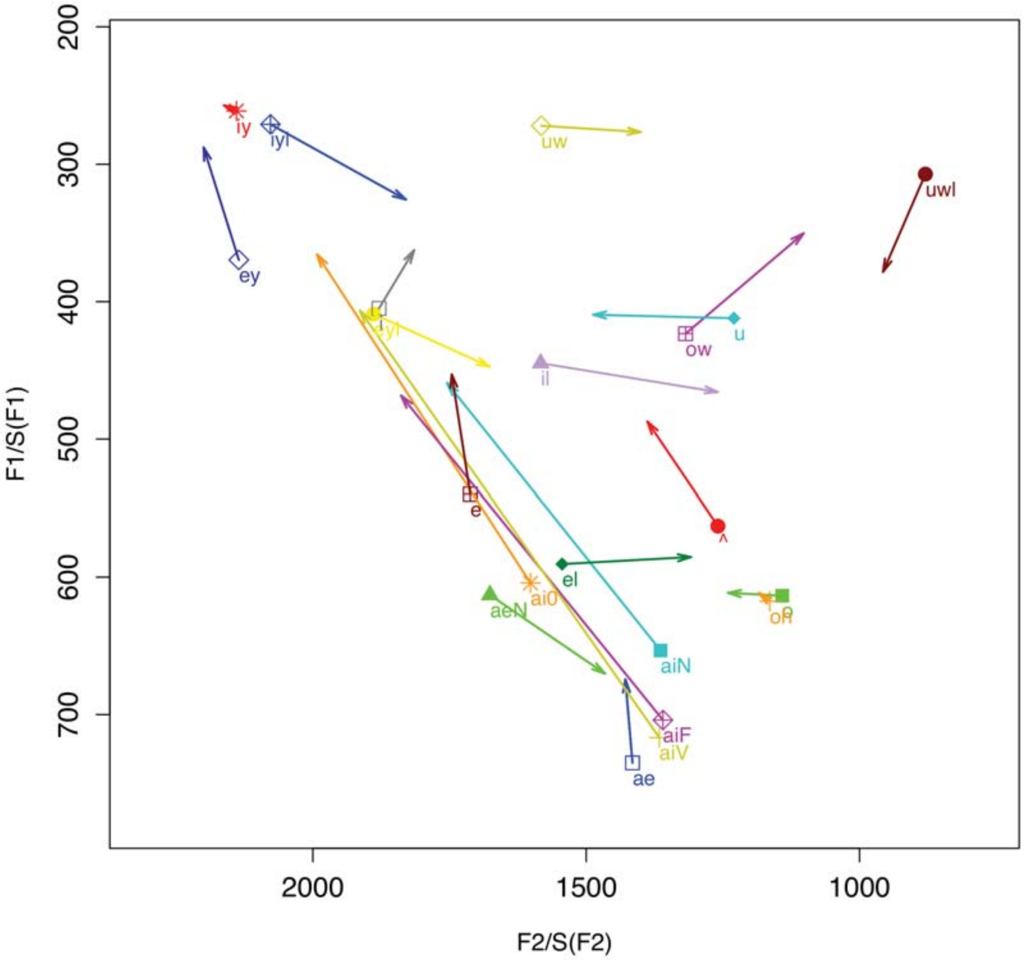


Figure C.5: P. Churchland

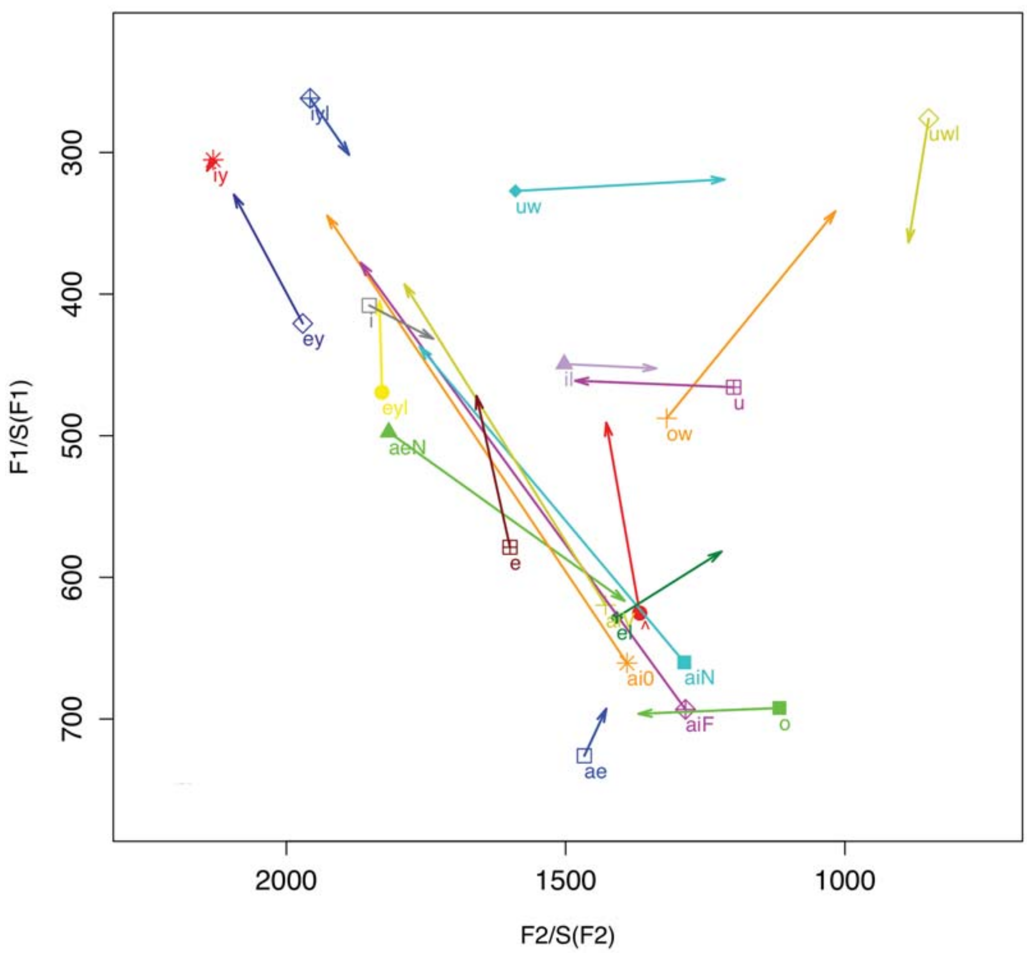


Figure C.6: S. Stebbing

APPENDIX D

INTERVIEW QUESTIONNAIRE

D.1 Getting Started

Read the following to the interviewee: I explained when we made the appointment for today that this is for a masters thesis. Were interested in how Utahns talk, what Utahns think about how Utahns talk, and how these two things may be related to what they know about Utah. As I also explained earlier, this is the first half of a two-part interview. Id be happy to tell you more about the project at the end of the second interview and to answer any questions you may have.

I can assure you that this information is used only for this project on Utah English, and no information identifying individuals is ever released. I am assigning you a pseudonym of your choice so that your name will not be released in the written record of this interview, though be aware that your name may appear in the audio record.

If we come to a question you don't think you want to answer, just tell me and we'll skip it. But I don't think you'll have a problem with any of the questions that I'm going to ask you.

This INFORMED CONSENT FORM tells you some more important things about the project. Could you take a couple of minutes to read it and then if you agree, to sign it?

After they have had time to read, ask questions, and sign the form, then give them a copy. Then say the following, just to make sure:

In order to be able to keep track of everything you tell me, I need to be able to make a recording of this conversation. OK?

Turn recorder on and tell them you have done so.

D.2 Demographics: Residential, Language Background and Affiliations

1. What year were you born?

2. Now, were you actually born in [NAME OF community THEY CURRENTLY LIVE]? How long have you lived where you live right now? (How long have you been living in the ward boundaries?)

3. Beginning at the beginning when you were born, where else have you lived for more than a year? [MAKE SURE THAT THEY START WITH WHERE THEY WERE BORN AND NAME EVERY COMMUNITY THEY LIVED IN SINCE THEN AND FOR HOW LONG THEY LIVED IN EACH COMMUNITY, THIS WILL ALSO ELICIT MISSIONARY EXPERIENCE.]

4. Where was your mother born?

5. And your father, where was he born?

6. What's your own family's background in terms of national ancestry? (–conversation?)

7. Was there any language besides English spoken in your family while you were growing up?

8. Have you studied any foreign languages in school or some other place? (What, when, how long)

9. How regularly do you attend church? [often, usually, sometimes (note: I removed never for obvious reasons here)]

10. Do you belong to any organizations or clubs? Tell me about them. [Ask if other people in the ward belong.]

D.3 Schooling

11. How many years of school did you get a chance to finish?

12. Where did you go to high school?

13. How many grades were there in your high school? Which ones are they?

14. How many kids were in your class? Did you know everybody in your class? (how many of the kids were Mormon/other religions)?

15. Were most of the kids originally from [community name], or did a lot move in from other places?

16. What sort of things did you do for fun with your friends after school or on weekends? (compared to now?)

17. Were there other things that you normally did after school?

18. Were you involved in any after-school activities at the school?

19. Were your good friends mostly kids in your classes, or kids from your neighborhood, or from organized groups that you were involved in [sports, school activities, etc.], or what?

20. In a lot of high schools, there are a couple of general groups and most kids belong to one or the other, like the goody-goodies and the rough crowd.

    - Did you have that in your school?
    - [If yes] What groups were they?
    - What were they called?
    - Could people in one group have friends in the other?
    - Which group did you belong to? [And so on.]

21. What were the main racial and ethnic groups in your school? (White, African-American, Hispanic, Pacific Islander, Asian, other?) Can you estimate what percentage there was of each?

22. Did you take any schooling beyond high school? What, where?

D.4 Miscellaneous

23. What's your occupation? (–¿ conversation?)

    - How did you get started doing that?
    - Do you enjoy your job?
    - What kinds of things does it involve?
    - Do you work with anybody in the ward?

24. What is or was your father's occupation?

25. And your mother, what is or was her occupation?

D.5 Wordlist

Please read this list of words at a steady pace, pausing between each word. Start at the top of each column and read down.

Hand him/her the Wordlist.

OK, thanks. Now read it two more times for me in the same way (or a little slower, etc.)

REFERENCES

Boersma, Paul, and David Weenik, 2010. Praat: doing phonetics by computer (Version 5.1.30) [Computer program: http://ww.praat.org].

Bowie, David. 2005. Language change over the lifespan: A test of the apparent time construct. In *University of Pennsylvania Working Papers in Linguistics*, ed. by S Wagner. Philadelphia: University of Pennsylvania Press.

Bowie, David, Wendy Morkel, and Emily Lund. 2001. Early trends in Utah English. NWAV 30.

Di Paolo, Marianna. 1989. Double modals as single lexical items. *American Speech* 64.195–224.

Di Paolo, Marianna. 1992. Hypercorrection in response to the apparent merger of (ɑ) and (ɔ) in Utah English. *Language and Communication* 267–292.

Di Paolo, Marianna, and Alice Faber. 1990. Phonation differences and the phonetic content of the tense-lax contrast in Utah English. *Language Variation and Change* 2.155–204.

Eckert, Penelope. 2000. *Linguistic Variation as Social Practice*. Oxford: Blackwell.

Eckert, Penelope, and Sally McConnell-Ginet. 1992. Think practically and look locally: language and gender as community-based practice. *Annual Review of Anthropology* 21.461–490.

Eckert, Penelope, and Etienne Wegner. 2005. Communities of practice in sociolinguistics. *Journal of Sociolinguistics* 9.582–589.

Faber, Alice, and Marianna Di Paolo. 1995. The discriminability of nearly merged sounds. *Language Variation and Change* 7.35–78.

Feagin, Crawford. More evidence for major sound change in The South. In *Diversity and Diachrony*, ed. by David Sankoff. Philadelphia: John Benjamins Publishing Company.

Frazer, Timothy C. South Midland pronunciation in the North Central States. *American Speech* 53.

Gay, Thomas. 1968. Effect of speaking rate on diphthong formant movements. *Journal of the Acoustical Society of America* 1.1570–1573.

Labov, William, 1962. The social history of a sound change on the island of marthas vineyard, massachusetts. Master's thesis, Columbia University.

Labov, William. 1991. The three dialects of English. In *New Ways of Analyzing Sound Change*, ed. by Penelope Eckert. San Diego: Academic Press.

Labov, William. 1994. *Principles of Linguistic Change: Internal Factors*. Cambridge: Blackwell.

Labov, William, Sharon Ash, and Charles Boberg. 2006. *The Atlas of North American English: Phonetics, Phonology and Sound Change*. Berlin: Walter de Gruyter.

Labov, William, Malcah Yeager, and Richard Steiner, 1972. A quantitative study of sound change in progress.

Lehiste, Ilse, and Gordon Peterson. 1961. Transitions, glides, and diphthongs. *Journal of the Acoustical Society of America* 44.268–277.

Meinig, David W. 1965. The Mormon Culture Region: strategies and patterns in the geography of the American West, 1847 - 1964. *Annals of the Association of American Geographers* 55.339–384.

Milroy, Leslie. 1987. Language and social networks.

Milroy, Leslie, and James Milroy. 1985. Linguistic change, social network and speaker innovation. *Journal of Linguistics* 21.339–384.

Morkel, Wendy, 2003. Tracing a sound pattern: /ay/ monophthongization in Utah English. Master's thesis, Brigham Young University.

Oxley, Meghan, 2009. (ay) monophthongization in Deer Park, Texas. Master's thesis, University of Washington.

Purnell, Thomas. 2010. Cognitive control of vowel space: Evidence from intoxicated speech. Linguistic Society of American Annual Conference 2010.

R Development Core Team, 2009. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0.

Shipps, Jan. 1994. Making Saints: In the early days and the latter days. In *Contemporary Mormonism: Social Science Perspectives*, ed. by Tim B. Heaton Marie Cornwall and Lawrence A. Young. Champaign: University of Illinois Press.

Thomas, Erik. 2000. Reevaluating and refining peripherality. NWAV 29.

Thomas, Erik. 2001. *An Acoustic Analysis of Vowel Variation in New World English*. Durham: Duke University Press.