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Portland Dialect Study: The Story of /æ/ in Portland

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THESIS APPROVAL

The abstract and thesis of Jeffrey C. Conn for the Master of Arts in Teaching English to Speakers of Other Languages were presented June 14, 2000, and accepted by the thesis committee and the department.

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ABSTRACT

An abstract of the thesis of Jeffrey C. Conn for the Master of Arts in Teaching English to Speakers of Other Languages presented June 14, 2000.

Title: Portland Dialect Study: The Story of /æ/ in Portland

This study reports on the hypothesized raising of the low, front vowel /æ/, which is characteristic of a regional dialect vowel shift found in cities of the Midwest and Eastern North of the United States. The raising of this vowel is the primary change in a series of vowel shifts that have traditionally been attributed to this region of the U.S. The purpose of this study is to document the production of this vowel by residents of Portland, Oregon, in order to see what light it can shed on dialect research of the Pacific Northwest, especially across age groups to see if it can be implicated in language change.

Data were collected by interviewing a convenience sample of twenty-four Portland speakers. Twelve females and twelve males from three different age-groupings were interviewed. The interviews were tape-recorded and portions of the tapes were analyzed. There was a two-part analysis of the data: 1) Formant measurements (in Hz) were measured with PCQuirer speech analysis software, 2) These measurements were plotted on a graph with Plotnik graphing software.

The study found that /æ/ produced by Portland speakers is not following Labov's theory of language change and is therefore not raising. However, some initial speculations of the lowering and fronting of this vowel can be made by the data. The study found that the working class subjects produced a more fronted vowel, and that the younger subjects produced a more fronted and lowered variant of the vowel when compared to the other subjects. The study concludes that the patterns found do not clearly support Labov's paradigm of language change and are therefore only initial speculations.

PORTLAND DIALECT STUDY: THE STORY OF /æ/ IN PORTLAND

by

JEFFREY C. CONN

A thesis submitted in partial fulfillment of the
requirements for the degree of

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in
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CHAPTER ONE

INTRODUCTION

Why a Portland dialect study?

A number of dialect studies have examined regional variation in the United States, e.g., *The Linguistic Atlas Projects* (1999) and *the Dictionary of American Regional English* (Carver, 1987). While these studies focus on lexical variation, the *Phonological Atlas of North America* (Labov et al., 1999) examines phonological variation. However, in both cases most of the data analyzed come from dialects east of the Mississippi River.

With regard to the West, the data are decidedly incomplete. Some pioneering work has been conducted in Utah (Di Paolo & Faber, 1990) and California (Hinton et al., 1987, Luthin, 1987, Moonwomon, 1987), but the dialect area labeled as “the West” is largely under-investigated. Particularly striking is the “inadequate coverage of the large populations of California and the Pacific Coast” (Labov et al. 1997: paragraph 12).

One of the states that has received attention from neither dialectologists nor variationists is the state of Oregon, part of “the West,” the vast expanse of the western United States, including Montana, Wyoming, Colorado, Utah, Nevada, California, Idaho, Washington, Oregon, Arizona and New Mexico (Carver, 1987, Labov et al., 1999). (See Figure 1.)

Figure 1. Map of dialect boundaries set forth by Carver, 1987 and Phonological Atlas of North America

During the 1950s when data were collected for the Linguistic Atlas of the Pacific Northwest (see The Linguistic Atlas Projects, 1998 for a review), Oregon was not fully covered. Reed (1961) discusses some of these findings, but Oregon data are few with the bulk of the data coming from Washington and Idaho. Due to the

relatively recent settlement of the West, studies on dialects and linguistic change there have otherwise been neglected in favor of the northeastern and southern investigations where settlement patterns are more established. Because of these gaps and because of Portland's growing emergence as a major American city, a study of Portland dialects is essential to forming a complete picture of dialect variation in the United States.

Using the dialect regions of Carver (1987) and Labov et al. (1999), Labov has developed three systems of vowel changes in progress (discussed in greater detail in chapter 2) that correspond with the dialect divisions outlined above. The Northern dialects are participating in what has been called the "Northern Cities Vowel Shift;" the Southern dialects are participating in the "Southern Shift," while the "Third Dialect," consisting of the West, the Midlands and Canada, is not participating in either of these shifts. The Third Dialect has as its two defining features: the merger of the low back vowels (the vowels in *caught* and *cot*), and a stable phoneme /æ/, which inhibits "chain shifting" by the front vowels. Chain shifting, to be described more fully in the next chapter, is when the movement of one vowel into another phonetic space causes a chain reaction that either drags or pushes the other vowels in the system into different spaces. These and other features of the Third Dialect, however, have only recently been investigated. Included in these studies is the investigation of the tense-lax distinction in the vowel pairs /i-I, e-ε, u-u/ before "dark l" [ɫ] in Salt Lake City, Utah (Di Paolo & Faber, 1990); the fronting of back vowels in San Francisco, California (Luthin, 1987, Moonwomon, 1987); the laxing of /i/ and /u/ before /l/ in Pittsburgh, Pennsylvania (McElhinny, 1999); as well as a Canadian chain shift

(Clarke, Elms & Youssef, 1996). An important city in the Third Dialect area like Portland needs to be investigated to further identify the characteristics that define the West as a region and that typify the evolving system of the Third Dialect.

The Problem

While a complete description of the entire vowel system of speakers in Portland is needed to fill the gap in American English dialectology research, an in-depth analysis of all of the vowels is beyond the scope of this thesis. Therefore, it reports on just one vowel of the system: the low front vowel /æ/, a vowel whose behavior is a feature of several dialect differences. The stability of this vowel is one of the two main defining features of the Third Dialect system, and its raising is the impetus for the Northern Cities Vowel Shift. As part of the Third Dialect, the Portland system should not be changing with respect to this vowel. If participating in the Northern Cities Shift, Portland speakers would be raising this vowel, which, if variably present and patterning properly, would represent a change in progress. The data come from several “styles” generated by different face-to-face interview tasks: sociolinguistic interviews, a reading passage, and a word list, with the first and last then analyzed using PCQuirer (speech analysis software). The resulting formant measurements are then plotted on a two-dimensional grid using Plotnik, a program that plots vowel formants to visually represent the vowel systems under investigation. The vowel charts are next compared and contrasted with the other Portland subjects to evaluate claims of a sound change in progress.

Guiding Research Questions

The purpose of this study is to investigate the vowel systems of Portland speakers. This study is based on similar studies of sound change in progress as well as on American English dialect studies, particularly the Telsur (telephone survey) project that is developing the Phonological Atlas of North America (PANA). The goals of this project coincide with the goals of PANA, to compile a set of linguistic data that reflect the current varieties of American English. While PANA has recently obtained some Portland data, it has not obtained enough information to evaluate claims about Portland's membership in any of the three vowel systems mentioned above.

Therefore, the following research questions were developed:

1. Are native Portlanders participating in a sound change in progress that includes the raising of the low front vowel /æ/?
2. If so, what is the extent of this participation?
3. If not, what claims can be made about the Portland vowel system?

Framework of this Study

Chapter 2 reviews the literature and presents the foundations for this study. Research methodology is found in Chapter 3, including criteria for the selection of the subjects, data collection techniques, and procedures of analysis. Chapter 4 contains the results of the analysis. Finally, in Chapter 5, I discuss the significance of the results and the implications for current American English dialect research.

CHAPTER TWO

REVIEW OF LITERATURE

A flood of information is conveyed as soon as people open their mouths and begin to speak. Not only are interlocutors alerted to the message being conveyed, but they are also cued in to characteristics of people's speech that identify where they are from, their race, ethnicity, gender, age, and even socioeconomic class. Therefore, in order to accurately describe a particular variety of speech associated with an American city such as Portland, it is essential to investigate these multiple layers of information comprising human speech.

In this chapter, I first present regional variation, discussing relevant studies that pertain directly to this thesis. Then, I address the more technical issues of language variation in terms of language change, relating various social variables back to the regional studies' findings. Finally, I discuss some pertinent issues involving acoustic analysis.

REGIONAL VARIATION: INVESTIGATING DIALECT

The first variable that influences a person's speech is region. While observations about dialects have been recorded for over 700 years (Trudgill & Chambers, 1998), the twentieth century has for the first time featured massive quantitative studies of American English (and other) dialects, one of the most comprehensive being those found at the web site *The Linguistic Atlas Projects* (1999). Carver (1987) details the different histories of quantitative approaches, basing his discussion of American dialects on these findings as well as on the fieldwork completed for the *Dictionary of American Regional Dictionary (DARE)*. The majority of Carver's dialect findings from the Linguistic Atlas Projects come from Hans Kurath, the director of the *Linguistic Atlas of New England (LANE)*, the first Linguistic Atlas project (Kurath, 1939-43). Carver concludes that the major dialect regions are the Upper North, Lower North, Upper South, Lower South, and the West. These regional divisions have been well documented and supported in the two sources mentioned above. These dialect regions are based primarily on lexical isoglosses, the lines drawn where word choice changes from region to region, as well as some phonological support.

The dialect region Carver labels the West has features of all of the other dialects and is the most heterogeneous, including large "holes" in the isogloss layers that exist in the Puget Sound region in Washington, the Willamette Valley in Oregon, central Colorado, as well as the metropolitan areas around Los Angeles and San Francisco. These "holes" represent sections of the Third Dialect in which

isoglosses pattern differently, resulting in smaller separate dialects. These smaller components of the Third Dialect region behave as distinct dialects, which is why the Third Dialect is the most heterogeneous dialect region. Carver details the migratory settlement patterns in the West and argues for a stronger western connection to the northern dialects than to the southern ones. In particular, he claims that at the end of the 19th century, the Northwest dialect region (Washington, northern Oregon, northern Idaho, although possibly extending to northern California and Western Montana) was originally centered on Portland, Oregon. Portland could thus be considered as the urban center serving as the locus of the Northwest dialect.

In another discussion of dialect development based on migratory patterns of settlers moving west, Wolfram and Schilling-Estes (1998) claim that the dialect area known as the Pacific Northwest (Washington, most of Oregon and Western Idaho) is the most clearly defined dialect region in the West. They also claim that this fairly coherent dialect area is centered on Portland. If their claim can be substantiated, the variety of English spoken by Portland natives becomes even more important.

Perhaps the most extensive dialect study is the Telsur Project of the Linguistics Laboratory of the University of Pennsylvania, a telephone survey of the United States and Canada designed to produce a "*Phonological Atlas of North America*" (Labov et al., 1997). While data are still needed from Canada and other areas of America (for example, the West), the organization of dialects is similar to Carver's (1987) assessment. Labov et al. identify separate dialects in the North, the Midlands, the South, and the West. This dialect division supported by the data

collected for the *Phonological Atlas* coincides with the isoglosses drawn in *DARE*, Kurath's (1949) lexical isoglosses, and Kurath and McDavid's (1961) phonological findings.

LANGUAGE CHANGE: INVESTIGATING REGIONAL VARIETIES

Language exists in a multitude of forms representing a multitude of social facts. These varieties, however, are not fixed, unchanging entities. They are constantly changing and evolving into different and new varieties. English, in particular, has evolved tremendously over the last 1,500 years. In fact, the Old English of the 11th – 12th Centuries is not only unrecognizable to its modern users, but it has undergone a complete grammatical transformation from a highly-inflected, synthetic language to a rigid word-order, analytic language (Pyles & Algeo, 1993). In addition to this grammatical change, English vowels systematically shifted in the Early Modern English period (the mid to late 16th Century). The Great Vowel Shift, as it has come to be known, transformed English into a different language; an early documented “chain shift” (see following paragraph). The language, however, has been far from idle since that time. One perspective that has gained adherents in recent years is the view that regional dialects not only share lexical, phonological, and syntactic features, but that they also change together.

It is from this perspective that Labov (1991) has developed his framework to describe North American regional variation. This framework identifies (vocalic) dialect distinctions with “chain shifts.” These chain shifts involve the movement of

one vowel to another location in vocalic space, which in turn leaves a vacated space that is filled by yet another moving vowel. Based on the dialects discussed in the *Phonological Atlas*, the dialect area classified as the North is undergoing the Northern Cities Chain Shift (Figure 2).

Figure 2. The Northern Cities Vowel Shift

The dialect area classified as the South is undergoing the Southern Chain Shift (Figure 3).

The most pertinent feature for this thesis is the raising of the low front vowel /æ/. The most amorphous of these dialects is the Third Dialect, which is characterized by its lack of any major vowel chain shift patterns. The Midlands, the West and Canada are all part of this dialect in which the two prominent features, according to Labov, are the merger of the low-back vowels /ɔ/ and /ɑ/; and the relative stabilization of /æ/. While /æ/ remains in place, it does, however, raise in

pre-nasal environments. These two defining factors, as demonstrated below, do not accurately characterize every dialect within the Third Dialect.

Figure 3. The Southern Shift

INVESTIGATIONS INTO THE THIRD DIALECT

The following is a review of investigations into features characteristic of the Third Dialect. These studies were included in this review to serve three main functions:

- to provide a general description of features common among Third Dialect varieties
- to investigate features that are not common to all varieties in the Third Dialect or are common to other vowel chain patterns discussed above
- to compare other studies within the Third Dialect that discuss the low front vowel, the predominant focus of this thesis

While the following studies provide a disparate account of this dialect, they also show some accord. In addition to describing the findings of these studies, certain implications regarding possible language changes in progress will be introduced that will later be more thoroughly discussed in terms of their significance to this thesis.

The first investigation in the Third Dialect is Di Paolo and Faber's (1990) detailing of the merger of the tense-lax distinction in the vowels /i-ɪ, e-ɛ, u-ʊ/ before tautosyllabic "dark" [ɫ] in Utah. The results of their formant analysis support the claim that these perceptually merged pairs keep some phonetic distinctions in either F1 or F2, but not both, as is common to non-merged pairs. (A detailed discussion of F1 and F2 can be found in the Acoustic Analysis section at the end of the chapter.) These distinctions, however, are found least among the youngest speakers, supporting a claim for language change in progress, which will be more thoroughly discussed below. In fact, for some of the younger speakers, the tense-lax pairs show a reversal in either F2 or F1. This change "involves the loss of the F2 distinction for the front vowels and the loss of the F1 distinction for the back vowels" (p. 188). In addition to the influence of age, the class of the speaker plays a significant role. The majority of speakers who had made clear reversals are from the less affluent, more working class neighborhoods. Also, young women display these features more widely than young men, and thus stand in the lead of the change.

On top of formant analysis, Di Paolo and Faber (1990) investigate differences in voice quality of these tense-lax pairs. They find that hearers perceptually rely on a multitude of cues to distinguish tense-lax pairs such as the ones under investigation. One cue that they use is voice quality, or laryngeal state: creakier vowels are judged to be lax and breathier ones are perceived as tense. Their acoustic data support this claim and demonstrates that speakers of all ages produce this distinction. Some of the younger speakers, however, produce voice quality distinctions that are the opposite from the older participants. Coupled with the similar reversal pattern with F1/F2 distinctions, this finding leads Di Paolo and Faber to the claim that this apparent merger is actually a reversal in tense-lax pairs before tautosyllabic “dark” [ɫ]. Whether this change is a merger or a reversal is unclear. Labov (1994) discusses similar phenomena with respect to the Southern Shift, as well as a few related cases in Albuquerque, New Mexico. These similarities suggest that if Utah is participating in the Southern Shift, then either this feature of the Southern Shift is also a feature of the Third Dialect, or that Utah, and possibly New Mexico, are to be excluded from the Third Dialect on the basis of their sharing this feature with southern dialects. These two regions would then be considered part of the south.

In a similar investigation, McElhinny (1999) discusses the laxing of /i/ and /u/ before /l/ in Pittsburgh, a city also considered part of the Third Dialect. While she compares her findings with older studies to suggest some changes in progress, she unfortunately does not provide the age ranges needed to evaluate these phenomena as change in progress. In her discussion of these features, McElhinny

provides only a phonetic explanation for the laxing of /i/ and /u/ before /l/, in terms of backing for /i/ and fronting for /u/. She claims that the direction these vowels are shifting agrees with the phonetic influence on them by the following lateral. In addition to these attributes, she also suggests that since all tense vowels are long, the vocalization of /l/ creates an environment in which the preceding long vowel becomes short, which she also claims is a process synonymous with laxing. Basically, the syllabification of /l/ changes the rhyme of the syllable from a nucleus (the vowel) plus coda (/l/) to a more complex nucleus consisting of the vowel plus the vocalized /l/ filling a glide position in the nucleus. This process results in the shortening of the vowel. In addition to the laxing of these two vowels, another related outcome of this /l/ vocalization phenomenon is the shortening of preceding diphthongs. This shortening leads to the subsequent monophthongization, which McElhinny states is a characteristic of Pittsburgh speech, previously documented in Kurath and McDavid (1961). In conclusion, her findings suggest that there is a laxing of high vowels before /l/, thus offering some support for a possibility of a merger, at least for the small population of police officers from whom she collected data. In this study, all of the participants are working class, and McElhinny provides no discussion of sex/gender as a factor influencing these variables.

McElhinny's findings are similar to the Utah study and both indicate that these two varieties are possibly participating in a merger or reversal of tense-lax pairs before /l/. This feature is also identified as part of the Southern Shift. Another attribute of the Southern Shift is the monophthongization of diphthongs, also part of

the Pittsburgh variety. Therefore, if McElhinny's findings can be supported by a change in progress study, then it appears that Pittsburgh, like Utah, might be participating in the Southern Shift, or that these are features also found in the Third Dialect.

While the tense-lax merger suggested in the above studies link these two regions with the Southern Shift, another possible feature of the Third Dialect is the fronting of back vowels, appearing in Di Paolo and Faber's (1990) Utah study. Their formant analysis shows that the high back vowels in Utah English are participating in a fronting change in progress. For one teenage speaker, the extreme case, /ʊ/ occupies the same F1/F2 space as /ɪ/.

A group of related studies investigating the fronting of back vowels comes from a research group led by Leanne Hinton. Moonwomon (1987) investigated the phonemic status of /ɔ/ for Californians, Luthin (1987) studied Californian English with a focus on /ow/, and Hinton et al. (1987) reviewed a handful of California English investigations. These studies collected data from mostly high school and college middle class, urban, white students (and a few older participants) in three different styles: a semi-casual interview, a reading passage, and a word list. They examine the effects of style, sex, age and phonetic environment on the variation they uncovered. Moonwomon's analysis suggests that /ɔ/ is in the process of merging with /ɑ/, yet there are still some environments that disfavor its full merger. According to Moonwomon, the most frequently occurring environment in their data, before /l/, does not favor lowering and thus produces a high variant of /ɔ/. She

interprets this as showing that the pre-/l/ environment is the last one where the distinction is maintained. In addition to the near merger, /ɔ/ is also showing signs of fronting. In fact, she states that speakers will more frequently and severely front this vowel than lower it. It appears that two different processes are operating on this vowel; one is pushing it forward while the other is pulling it down. By comparing the different styles, Moonwomon states that in more careful styles, speakers produced a more lowered variant, often within the same vowel space as /ɑ/, which suggests some prestige associated with the merger.

In sum, Moonwomon (1987) suggests first that back vowels are fronting. This claim is further supported by Luthin's analysis of /ow/, which is also fronting for Californians. This phenomenon has been noted in the Utah study above (Di Paolo & Faber, 1990) as well as in Northern Cities Shift participants (Labov, 1994). The second claim that Moonwomon makes is that the vowels /ɔ/ and /ɑ/ are merging into one phoneme, although the merger is not complete. This merger is seen as Labov's (1991) defining feature of the Third Dialect, as well as appears in Clarke, Elims and Youssef 's (1995) investigation on Canadian English, discussed below.

In addition to the back vowels, Luthin (1987) and Hinton et al. (1987) discuss other related studies. The results, as reported in Luthin, suggest an incipient California vowel shift. In addition to the fronting of back vowels, the data show that the front lax vowels are all lowering, as displayed in Figure 4.

Figure 4. The California Shift

While these vowels are lowering, there are certain linguistic and non-linguistic influences on the extent of the lowering. First, a pre-nasal phonetic environment inhibits lowering actually favoring a raised variant. One phonetic environment that strongly favors lowering and backing is the pre-lateral environment. For /ε/, an additional post-velar influence of raising occurs as well. While there are not really enough participants to make large generalizations, some non-linguistic constraints are also found. Whereas the majority of participants are white, urban, middle class young men and women, a few are not. These non-majority participants show much less participation in the lowering of these vowels, and in fact, produce raised variants for the majority of tokens. Furthermore, all of the studies support the claim that it is women, rather than men, who are favoring the new forms. In Moonwomon's (1987) data, women are favoring the low back merger, which is demonstrated by the fact that they are beginning to show a lowered

variant of /ɔ/ pre-laterally, the last stronghold for the phonemic status of /ɔ/. In addition, while a very limited number of older speakers are included, these new forms are not found with the older participants.

The last investigations into the Third Dialect to be discussed are studies conducted on Canadian English by Esling and Warkentyne (1993), as well as a study conducted by Clarke et al. (1995) on a Canadian vowel shift. Their data support a claim similar to the California studies. First, Esling and Warkentyne describe the behavior of /æ/ for Canadian speakers in Vancouver, B. C. A formant analysis shows that the low front vowel for Vancouver speakers is retracting. The retraction, or backing, of the low front vowel is simultaneous with lowering, as the physical vowel space of the front of the mouth is at an inward slant. While they do not discuss phonetic environment, they do report on some non-linguistic influences on this retraction, namely, age, the crucial factor for evaluating sound change. They support a change in progress analysis by showing that /æ/ is more retracted for the youngest group of participants (16 – 34 years old) than for the adult participants (35 – 60 years old), and even more than the older participants (60 years and older). In addition, women lead this change by at least one generation, and the middle class participants are more advanced than the working class. The significance of these findings will be discussed further below.

In a more comprehensive study on Canadian vowels, Clarke et al. (1995) report on a chain shift in Canadian English, which involves all of the front lax vowels, as well as the back vowels, similar to the California findings. These

discoveries are not unexpected, and in fact follow general principles set forth by Labov (1994) that lax vowels will lower, and back vowels will front in chain shifts. While Clarke et al. do not conclude that these two phenomena are necessarily related, both are key features in Canadian English. The first, and perhaps most relevant finding for this thesis, is the laxing of the front vowels. According to Clarke et al., the merging of /ɔ/ and /ɑ/ creates a vowel space in which the low central position is more open for the retraction (the lowering and backing) of /æ/ toward central open /a/. With the low front vowel's space open, this allows for the lowering of /ε/, which in turn promotes the lowering of /ɪ/, classic movements in a chain shift. These findings are quite different from the paths these same vowels take in the Northern Cities Shift (compare Figure 5 with Figure 2).

Figure 5. The Canadian Shift

Clarke et al. (1995) suggest that because the low back merger is the primary condition for this shift, then other dialects in the Third Dialect that are merging or

have merged these vowels may also be participating in a similar shift. In fact, Clarke et al. support a strong correlation between the Canadian system described above and Californian systems published in other studies (Hinton et al., 1987; Luthin, 1987). While data have not been collected to support the low back merger in Portland, based on impressionistic observations, these vowels have indeed merged. Therefore, according to Clarke et al., Portland's system may be participating in the Canadian, or California, Shift.

The second part of the Canadian evidence suggests a fronting of the back vowels, similar to the California data, Utah, and the Northern Cities Shift (Labov, 1994). In contrast with the Northern Cities data, however, the Canadian Shift involves the fronting of all back vowels, not just the high back vowels. These findings recapitulate similar findings in the California studies. Therefore, it appears that back vowel fronting is a key feature in the Third Dialect.

In addition to these two major vowel patterns emerging from the Canadian data, influences on this system are also reported. The linguistic influences discovered are that certain phonetic environments promote and disfavor vowel movements within the vowel shift pattern. For example, preceding a nasal, /æ/ is often raised and tensed in Canadian English. On the other hand, a following fricative strongly favors the lowering of front lax vowels, especially /æ/, /ɛ/ and /ʌ/. Another strong influence on the lowering/retraction of /æ/ is a following /l/. This environment strongly influences the low front vowel, but does not so strongly affect the other vowels. Clarke et al. (1995) conclude that the phonetic environment of the

following consonant can influence the vowel's progress in the Canadian Shift. These conditions, however, do not hold true for all vowels as a whole, but rather influence each individual vowel in different ways. While manner of articulation proves to influence vowel movement, the Canadian evidence does not support an influence based on voicing or place of articulation of a following segment.

In addition to these linguistic constraints, Clarke et al. also discover non-linguistic influences on the Canadian Shift. With regard to age, their data come from predominantly 20-year old Canadians. They contrast these subjects with some participants over 50 as well as Peterson and Barney's (1952) average formant measurements for Standard American English. Their findings suggest that the younger participants are much more advanced in the Canadian Shift, therefore supporting a change-in-progress interpretation.

Another non-linguistic constraint on this system is the sex of the speaker. Clarke et al. find clear evidence to suggest that women are more advanced in the Canadian Shift, and are subsequently leading this change. Their data, however, come from word list elicitations that may influence these findings. As the word list is more formal and speakers are much more conscientious of their speech, this might favor one sex or another in production toward or away from conscious prestige forms that are developing in Canada. Investigations into this situation are needed to evaluate whether women are leading this change, to what extent and how the prestige of this change influences these phenomena. They do not provide an account for social class as a non-linguistic influence on the Canadian Shift.

SOCIAL VARIATION

The regional dialect studies discussed above demonstrate both how language varies from region to region, but also how it is similar. These investigations also include findings that language, even within one region, varies based on social influences as well. The three social influences addressed in this thesis are age, sex, and class.

SOCIAL VARIATION: INVESTIGATING AGE

The most crucial social influence on language is age. The framework setting these synchronic data in a diachronic framework is the apparent time construct. This construct is used to study language change in progress by projecting future language patterns from current ones, having been used in sociolinguistic studies since Labov's (1972) pioneering work on Martha's Vineyard. The primary assumption of this construct is that the diachronic differences across generations of similar speakers reflect the actual changes in language (Bailey, Winkle, Tillery, & Sand, 1991). By analyzing data through apparent time and real time, Bailey et al. demonstrate that apparent time is equal to real time in validity. Instead of observing speakers over a number of years and then comparing their 60 year-old speech to the 40 and 20 year-olds, the proven validity of the apparent time construct allows researchers to collect data from different age groups, compare the differences, and posit that these differences represent language change in progress. This instrument relies on the concept, outlined in Labov (1981), that individuals acquire a certain vowel system by

the end of their adolescence, and that this system remains relatively constant as they age. Therefore, the speech of a 60-year old today represents the system being acquired by adolescents in the 1950s. Therefore, in order to claim change in progress, an investigation needs to include subjects from different age groups, with a separation of a minimum of a half of a generation and a maximum of two. The age groups used in Labov (1994), the model for the age groups selected for this thesis, are: an adolescent group (8-14), an adult group (20-49) and an older generation of 50 and above. The Third Dialect studies outlined above in one way or another use age as a variable to arrive at a change in progress interpretation, which is the primary goal of this thesis.

SOCIAL VARIATION: INVESTIGATING SEX

While age and region have been discussed as reasons for language variation, they are not the only factors. Many studies have demonstrated that the sex of the speaker influences the linguistic forms used and adopted by individuals and their communities. One of the most frequently mentioned phenomena in sociolinguistic studies is that women use forms closer to the standard than men do (discussed in Labov, 1990). One aspect to this phenomenon involves prestige forms, both covert and overt. According to James (1996), the claim that one sex uses more prestige forms than another needs to be analyzed in a framework that accounts for accessibility (among other things). Her discussion illustrates that women, in some

situations, do not have access to external forms because their experiences are limited to domestic contexts, as assigned by their gender roles in that society.

Along the same lines, Milroy and Milroy (1998) claim that in their variation study in Belfast, Northern Ireland, the social network of the speaker is complicatedly intertwined with gender. Basically, women have larger networks and work in situations outside of their local neighborhood. Their jobs and the people with whom they are in contact require them to speak a variety closer to the standard. The men in the study, however, speak a more local variety, a marker of their heritage and loyalty to the local neighborhood.

Investigations on segmental changes, in accordance with Labov (1990), indicate that there is variation of the adoption of certain language changes based on the sex of the speaker; with women most often being the innovators of linguistic change. Moreover, nearly all of the studies discussed above support this claim and show that the women in their investigations could be viewed as more advanced in the changes they discuss. Although many studies support the claim that women most often lead linguistic change, there are still discrepancies in the literature. According to Labov (1990), there are language change situations in which the men are leading the change; however, these are not changes in whole systems like the vowel shifts discussed above, but rather isolated variables.

As indicated above, there are differing ideas about how the sex of the speaker, the gender role within their community, and the prestige and adoption of innovative linguistic forms interact. Because of this uncertainty, both men and

women are included in this thesis in order to make claims about how language change in progress is related to the sex of the speaker, as has been shown in the above Third Dialect studies.

SOCIAL VARIATION: INVESTIGATING CLASS

Another equally controversial social factor that heavily influences the speech of individuals is social class. Like gender, the concept of social class is based on a number of elements and is not strictly orthogonal to other social factors. According to Chambers (1995), class is a multifarious factor of linguistic variation based on a wide variety of components, such as occupation type (blue-collar vs. white-collar, for example), annual salary ranges, education levels of the participant and the participant's parents, as well as housing type and amount of non-necessity luxury items. Numerous studies have demonstrated variation based on class, one of the most well known being Labov's (1972) study of New York City department stores.

Class in relation with linguistic change, discussed in Labov (1981), exhibits a curvilinear distribution (see Figure 6). According to Figure 6, this curvilinear distribution associated with language change in progress illustrates that the most innovative speakers are not found among members of the lowest or highest class of speakers, but among the interior groups (the lower middle class and the upper working class). Labov's (1980) explanation of this phenomenon demonstrates that the innovators of linguistic change are those who form the heart of the community, who have the largest number of local contacts.

Figure 6. “Curvilinear” social class distribution of a change in progress (From Guy et al., 1985)

In addition, these innovators also have the most network associations outside of the local community. Therefore, their adoption of innovative forms does not result from a lack of contact with standard varieties, but rather demonstrates a local prestige that is played out linguistically. The important status of these leaders, in turn, promotes the adoption of the forms by others in their local community. The exterior classes do not have this positive valuation of local identity. Therefore, linguistic change is led by the interior classes, resulting in the curvilinear pattern presented above.

Findings from the Utah study (Di Paolo & Faber, 1990) strongly suggest that the innovators of the change in progress under investigation are members of the less affluent community. They, however, do not identify clear working class/middle class distinctions. On the other hand, findings from the Vancouver, B. C. data (Esling & Warkentlye, 1993) clearly show a change led by the middle class, as opposed to the working class. In order to compare this thesis to these other studies,

the social variable of class was controlled for as part of the participant selection process discussed in Chapter 3.

LINGUISTIC VARIATION: INVESTIGATING STYLE

Another reason why people change the way they speak is due to the formality of the situation. Labov (1972) discusses how perceived formality and context affect speech. The more formal the context e.g., reading a passage or a word list, the more careful the speech, and vice-versa. Usually, because of the interviewer's position of authority, an interview context favors a more formal and careful style from the subject. To elicit more casual speech, Labov devised the strategy of asking questions about near-death experiences and childhood games. This technique diverts the speaker's attention away from how they are speaking as they recall events from the past, especially childhood memories. In this way a sociolinguistic interview strives to elicit more casual speech than that typically characterizing a formal interview. In the California studies, a variety of styles promoted variation. One interpretation of this stylistic variation deals with the overt prestige attached to a linguistic form in a given community. For example, in Moonwomon's (1987) investigation of the low back merger, she finds that in more careful styles, participants produce a low variant of /ɔ/, which indicate a positive value attached to the merger. The other changes, as Hinton et al. (1987) discuss, are often parodied as typically Californian, as the mark of "stigmatized" features (Labov, 1972). Conversely, these changes that are seen as typically Californian can also serve as the mark with which native-born Californians

demonstrate their pride in being Californians. Therefore, variation based on style can indicate certain implications, which may or may not be supported by the findings from socially based variation. In order to investigate these correlations for native Portlanders, two different styles were elicited, further discussed in Chapter 3.

VARIATION: INVESTIGATING INTERSECTIONS

In a detailed and complex analysis, Labov (1990) investigates the intersection between sex, class, and linguistic change. As stated above, the class pattern that develops for a change in progress is a curvilinear one. Labov suggests that this pattern might be based on the differentiation of the participation of the sexes in a change in progress. He suggests that the women of the interior groups adopt and use new linguistic forms at a higher frequency than men, which in turn becomes stigmatized for the women of these classes. Because of this, the men of the upper and lower classes use the new forms at a much less frequency than the men of the interior classes, who use the new form at a lesser frequency than the women. The result is that women lead linguistic change by one to one-and-one-half generations. Labov emphasizes that differential use of a linguistic form by sex is not a qualitative distinction, but rather a quantitative one.

In a similar vein, Eckert (1989) suggests that correlating segmental changes in progress with one sex or the other is a misguided view of the situation. In fact, it is necessary to investigate sex in conjunction with class, as well as with identity, insofar as it manifests itself in class and sex differences. It is essential to understand

that the social consequences for certain linguistic choices are also played out with identity and loyalty, both to gender and class. One result of the intersection of class and sex on linguistic change emerges in differences of level of formality. As discussed above, certain tasks are associated with more careful, conscientious speech than others. Speakers will produce a form closer to the prestige variant of that form when performing these linguistic tasks. Therefore, style shifting of one speaker can be an indication of the social consciousness of that form as well as the direction of prestige that that form is taking, which in turn can indicate which members of which communities (i.e., middle or working class, men or women) are leading or resisting change.

ACOUSTIC ANALYSIS

In order to investigate vowel shifting as a change in progress, close measurements using acoustic analyses must be used. The key components to such an analysis are the measurement and subsequent comparison of the first two formants (F_1 and F_2). One of the primary studies to discuss the methodology behind these types of analyses is Peterson and Barney (1952). This study is the most recognized for its use of a graphical display of vowels and vowel clouds on a grid that plots F_1 against F_2 .

Since that time, vowel analysis, with the help of advances in technology, has become increasingly easier and more complex. The most recent approaches can be found in the *Phonological Atlas of North America* (Labov et al., 1999), where the

goal is to measure the vowel's nucleus. The nucleus for a lax vowel, according to Boberg (1996), is the most representative and "usually corresponds to the point of maximal mouth opening and therefore the loudest and most perceptually salient part of the vowel" (p.1). He further states that the nucleus is the most crucial section of the vowel because it signifies the fundamental tendency, or "the target at which the articulators are aiming" (p.1). In order to identify the nucleus, a combination of approaches is needed. The investigator needs to pay attention to the possible on- and off-glides, as well as the influence that preceding and following consonants have on the vowel formants. A combination of examining the amplitude and formant trajectories, as well as listening to sections of the vowel, provides the investigator the best tools in which to judge the best overall impression of the vowel.

Although it is possible to identify the nucleus of the vowel, phonetic influences can alter vowel formants, both before and after the vowel. Although Labov (1994) discusses the influence of prevocalic consonants, the influences are not so great as those after the vowel (coda consonants) and therefore pre-vocalic influence have been excluded from analysis. Numerous studies have shown, however, that following consonants can strongly influence the quality of the vowel. Both Di Paolo and Faber (1990) and McElhinny (1999) frame their investigations within one particular phonetic context, i.e., before /l/. With respect to /æ/, Labov (1994) shows that a following nasal strongly favors raising of the vowel, which is strongly supported by the California data (Hinton et al., 1987), as well as the Canadian data (Clarke et al., 1995); a following nasal encourages /æ/-raising within

the systems they investigated. Clarke et al. also point out that fricatives favor the retraction of /æ/. They do not find any significant influence on this vowel based on the place of articulation of the following segment. In a study conducted on Wisconsin English, Zeller (1997) reports on the favoring of /æ/-raising by voiced velar sounds. Voiced velar stops also produce a raised variant for /ε/ when they preceded the vowel in the California studies (as reported in Luthin, 1987).

SUMMARY

This review has examined dialect studies of the Third Dialect, as well as instigations of linguistic variation based on linguistic and non-linguistic factors. The research has suggested that a Portland dialect, as a potential member of the Third Dialect cluster, exhibits certain features representative of a sound change in progress. One of these features is the possible stability of the low front vowel /æ/. Finally, I have presented information about the Labovian methodology and acoustic analytic tools used to study language change in progress.

CHAPTER THREE

METHODOLOGY

This chapter outlines the methods and procedures used to determine the acoustic features of the low front vowel /æ/ in the speech of residents of Portland, Oregon.

SUBJECTS

Before participating in this study, respondents had to meet certain criteria. All subjects were either born in Portland or moved into the area before they were 5 years old. All live within the Portland city limits, or in an outlying suburb, and commute into the city for school or work. To establish eligibility and then be scheduled for an interview, each participant was subjected to a short telephone screening process (See Appendix A for the questions asked).

The subjects were chosen with attention to: age, sex, and socioeconomic class. Three age groups were used, following Labov, 1994: “teens” (11 through 19), “adults” (20 through 49), and “older adults” (50 and above).

The two social classes investigated in this study were working and middle class. The class of each participant was determined by using a three-part system. First, during the screening call, the participants answered a series of questions based on a socioeconomic index of Portland. This index was created by using sample socioeconomic indices (Chambers, 1995) and U.S. Census data for Portland (<http://govinfo.library.orst.edu>). The index is divided into four parts: occupation, income, housing, and education. Due to the fact that one-third of the subjects were teenagers, their class was considered equivalent to their parents' class, as determined by the index. Table 1 shows the rating system used to assign the class of the participants. The maximum possible score is 16, with scores greater than 12 categorized as middle class, and scores of 12 or below categorized as working class.

Table 1. Socioeconomic Index for Portland, Oregon

I. Occupation	a. Executive, administrative, and managerial occupations (4) b. Professional occupations (4) c. Administrative support, clerical (3) d. Skilled construction, machine operator, assemblers, factory workers (3) f. Service occupations (2) g. Non-skilled labor (1)
II. Annual Income	Compared to most recent census data for Portland (1990), based on households or non-family households. a. \$40,000 / year (4) b. \$20,000 - \$40,000 / year (3)

	c. \$10,000 - \$20,000 / year (2) d. Below \$10,000 / year (1)
III. Housing	a. Own house (4) b. Rent house (3) c. Rent apartment (2) d. Rent room / shared housing (1)
IV. Education	a. College graduate (Bachelor's or above) (4) b. Some college (3) c. High school graduate (2) d. Did not graduate high school (1)

The subjects selected to participate in this study were from the “interior classes,” thereby eliminating the upper and lower classes from investigation. The index was developed so that the maximum score, 16, is the highest possible score still considered middle class. In this study, scores of 9 through 12 were designated as the working class while scores of 13 through 16 were designated as middle class. Subjects who scored less than 9 were not included in this study.

The second method used to establish class was based on self-reporting by the participants. During the interview, participants were asked with which social group they (and their family) identified most. The third method of designating class was pre- and post-interview reflection and observation by the researcher. Before or after the interview, the researcher noted characteristics of the respondent's home, such as part of town (SW, NW, SE, NE) and style of home (for example, two-story, number of rooms, apartment, duplex). These notes were later compared with the telephone screening information and the participant's self-report in order to make the final

distinction between middle and working class. No conflicts arose and all three methods were in agreement for every participant.

Data were collected from something of a convenience sample of Portland speakers. These participants were selected through a network of relatives, colleagues, and co-workers. Each informant read and signed an informed consent form (see Appendix B). The 24 subjects were divided into three age groups, each containing 4 men and 4 women, with 2 working class and 2 middle class participants in each sex grouping (see Table 2). The effects of ethnicity and/or race were not a part of this investigation; all of the participants were Caucasian.

Table 2. Subjects for Portland Dialect Study: /æ/-raising

Age-Group	Women	Men
Teens 11-19 years	Middle Class-Age 12 Middle Class-Age 17 Working Class-Age 14 Working Class-Age 18	Middle Class-Age14 Middle Class-Age17 Working Class-Age12 Working Class-Age19
Adults 20-49 years	Middle Class-Age 26 Middle Class-Age 46 Working Class-Age 26 Working Class-Age 44	Middle Class-Age 32 Middle Class-Age 40 Working Class-Age 29 Working Class-Age 40
Older Adults 50+ years	Middle Class-Age 53 Middle Class-Age 57 Working Class-Age 56 Working Class-Age 53	Middle Class-Age 53 Middle Class-Age 65 Working Class-Age 50 Working Class-Age 55

DESIGN OF INTERVIEW

The semi-structured interview was designed to elicit both a careful, more monitored speech style as well as a casual, more unmonitored speech style. The first

part of the interview elicits general biographical information designed to elicit factual responses in a somewhat casual style and allow the participant to become accustomed to the microphone and interview setting. This part of the interview includes a review of the telephone screening information as well as elicitation of further biographical information. Next, the respondent was asked open-ended questions about issues and topics of interest (to the subject) in order to elicit a more casual speech style and to encourage an extended turn at talk. Examples are: “What was your favorite vacation? Tell me about it.” or, “Have you ever been seriously injured?” (See Appendix C for a list of questions used during the interview). The last part of the interview consists of the subject reading a short passage and a word list. The participants read directly from the word list without any sentential context. (See Appendix D for the reading passage and Appendix E for the word list used during the interview). These tasks were designed to elicit more careful and monitored speech styles and controlled for the production of /æ/ in phonetic environments that the more unstructured interview might miss. These investigated phonetic environments are /æ/ in closed syllables before: [ŋ]; [n]; [m]; [k]; [g]; non-velar, voiceless stops [p], [t] and [ʔ], and the voiceless affricate [tʃ]; non-velar, voiced stops [b] and [d], the voiced affricate [dʒ], and the flap [ɾ]; voiceless fricatives; and voiced fricatives. (See Table 3 for the complete word list.) Four words with [e] or [ɛ] in similar environments (*bake, same, rain, beg*) were also included and displayed in the Plotnik graphs, in order to compare them with raised variants of /æ/. The table is organized, for the most part, so that the horizontal rows represent minimal sets, contrasting the final consonant only.

Table 3. Word List Table

Nasals			Velars		Voiceless stops	Voiced stops	Voiceless fricatives	Voiced fricatives
ŋ	n	m	k	g	p, t, ʔ, tʃ	b, d, ɾ, dʒ	f, θ, s, ʃ	v, ð, z, ʒ
	rain	same	bake	beg				
bang	ban	Bambi	back	bag	bat	bad, badge	bath	
sang	sand	Sam	sack	sag	sap sat	sad	sash sass	
kangaroo	can	camera	cactus		cap cat	cab academy	cash café	cavern casual
hang	hand	ham	hack	hag	happy hat, hatch	habit had	hash	have has
	Ann	am			apple at	ad	ash after	as avenue
rang	ran	ram	rack	rag	rap rat	rabbit rad	rash	raspberry
language				tag				

The phonetic environments represented above portray different syllable structures. Some words contain ambisyllabic consonants, i.e., *happy*, *rabbit*, *apple*, etc., but since this consonant is still a part of the syllable coda of /æ/, this was not considered to be a significant factor. Also, *kangaroo* and *café* contain /æ/ in syllables that do not receive primary stress, but rather secondary stress [in most dialects]. These vowels did not display a pattern different from tokens with primary stress, so that this factor was deemed insignificant.

The last phonetic condition to be considered is voicing in the coda consonant. As indicated in Clarke et. al (1996), voicing slightly affected the height of the lax vowels, but this effect was evaluated as “insignificant.” One effect that voicing does have on the preceding vowel is lengthening: voiced consonants cause a preceding vowel to be lengthened. Often, when /æ/ was produced in this environment, and indeed lengthened, this produced a diphthong of /æ/ with the second part of the

diphthong reduced to [ə]. In these cases, the measurements were taken at the nucleus of /æ/. The average length of recorded interview was approximately 60 minutes.

INSTRUMENTATION

Interviews were recorded on a Marantz portable cassette recorder PMD222 using TDK D90 high output IECI / TYPE I 90-minute tapes. Data were digitized at the sampling frequency of 22,050 Hz with PCQuirer speech analysis software produced by Scicon. PCQuirer was designed to analyze audio data to produce spectrograms, pitch and intensity records, as well as other features that are not relevant for this study. This software was chosen for this project because it also has the capabilities to automatically record duration and frequency measurements that measure vowel formants and put the results into a log text file that can be utilized by word processors. This automatic feature simply transfers the formant frequency measurements into the log file at any selected point in the spectrogram. In this thesis, only the first and second formants (F1 and F2) were investigated since F1 is inversely related to the height of the vowel, and F2 is related to the frontness, the two components of vowel location. Finally, PCQuirer produces high-quality printable spectrograms.

Another piece of software that was used is Plotnik, a program that displays vowel formants on a traditional two-dimensional grid representing a person's oral space, providing a visual representation of the vowel system of an individual speaker. Once all of the tokens are plotted on the graph for one speaker, this chart can be

compared and contrasted with other speakers' graphs to investigate general tendencies and possible shifts in progress. Moreover, Plotnik codes the data for phonetic context, i.e., whether the vowel occurs in closed or open syllables, what the preceding and following consonants' place and manner of articulation are, as well as the voicing of the following segment. In addition, this program calculates the mean F1 and F2 measurements for a complete set of data, as well as the mean for each phonetic environment or style (interview or word list).

DATA ANALYSIS

The first step was to measure the vowel formants for each word that contained the focus vowel. An example of this can be seen in Figure 7, with the example phrase "*and then my dad's*".

Figure 7. Visualization of digitally recorded sentence

From the word list, every token was measured, except for the first and last five words. This practice was adopted because readers of a word list produce the first few tokens differently from the rest as they adjust to the task, during the "warm up" period. The last few tokens, in the same vein, are often neglected as the reader passes through the "cool down" period of the task. After being digitized, the data were then represented

The next step was to isolate the syllable that contains the desired token, in this case the word *dad's*, to produce a spectrogram, as shown in Figure 8. The spectrogram displays the vowel formants as vertical dark striations that form horizontal bands measured in Hertz (Hz). Duration is once again displayed in ms across the bottom of the display.

Figure 8. Spectrogram of *dad's*

While most of the specifications for the spectrograph production were kept on the default settings, the display formants with step size setting was not. This option is set at 5 ms, the smallest number possible, to show the maximum number of duration step sizes, displayed as red dots on top of the spectrogram display. (See Figure 9 for an example of the example *dad* token with the formant step size display.) These indicators display the formants' increases and decreases in Hz.

Figure 9. Spectrogram of *dad's* formants with step size display

This setting was selected in order to locate the highest F1 of the vowel token under investigation, in accordance with the guidelines set forth in Boberg (1996). Once that single point of measurement is selected based on these criteria, the formant measurements can be calculated for that specific point in duration by simply clicking on that spot in the graph with the cursor. This function produces the FFT/LPC display, which provides measurement for up to five formants. From this display, the formant measurements are automatically recorded in a log text file. In order to obtain an organized and sufficient amount of tokens from the interview style, each participant's data were entered into a table corresponding with the word list table's phonetic environments. Due to its unanticipated conditioning, one additional environment, /æ/ before /l/, was added to the interview data.

After the formant analysis, all of the formant data from the word list and the interview style were entered into Plotnik. Each participant's interview and word list tokens were plotted on separate graphs for style variation comparisons, as well as on a third graph that amalgamated the two (Appendices F, G and H, respectively). These

graphs display the F1 and F2 measurement of each token, with all of the words containing /æ/ as a square. The other shapes represent the various /e/ (diamond) and /ɛ/ (triangle) vowels from the word list data. The graphs are ordered by age, with women first, then men, and middle class subjects before working class subjects. The mean F1 and F2 measurements were calculated for each person, for each style, as well as for certain, relevant phonetic environments. These measurements were then compared with other speakers', investigating the effects of age, sex, and class.

S U M M A R Y

The primary goal of this investigation is to collect and examine data from a representative sample of people who represent the Portland speech community. The data from this study will eventually be used in a larger study that will research this as well as other linguistic features associated with Portland speech.

CHAPTER FOUR

RESULTS

This chapter focuses on the results of the Plotnik mean F1 and F2 calculations and measurements mentioned in Chapter Three. To briefly recapitulate the principles of the relationship between formant measurements and vowel position, F2 is related to vowel frontness and F1 is inversely related to vowel height, so that a higher F1 represents a lower vowel, and a greater F2, a more fronted vowel. The focus of these results is not on the degree of difference between numerical values, but rather the patterns that emerge from these differences. In the first section, the F1 and F2 mean values for each speaker are given as they are affected by style. The second section shows mean values as they relate to phonetic environment. The third section treats social variables, and in the last section, these social variables are examined in comparison with each other. Brief comments are given as to the significance of the results, which will be expanded on in Chapter 5.

MEAN MEASUREMENTS BASED ON STYLE

As discussed in Chapter Two, the style of the speech event can influence the speech of the subject. In order to investigate this phenomenon, this study examines data from two styles: interview style (INT) and word list style (WL). These two styles represent the two ends of a continuum of monitored speech, with INT occurring on the unmonitored, casual end and WL on the careful, monitored end.

A prominent trend appears when comparing F1 and F2 mean values based on style. For 18 out of 24 speakers (75%), both F1 and F2 mean values are higher in WL style (formal) than in INT style (informal). These speakers use a lower and more fronted variant of /æ/ for in the more monitored style. For the six other speakers, the F1 mean is higher in INT style, thus the lower variant is produced in the informal style, and for only 2 speakers, the F2 mean is higher in INT style. In order to better understand the significance of these results, the average difference was calculated for each situation where one style promoted a higher F1 or F2 mean value than the other. The average difference in F1 and F2 means where WL is greater is 31.4 and 79.3, respectively. The average differences in F1 and F2 means where INT is greater is 20 and 49.5, respectively. These differences show that more of the speakers have a higher F1 and F2 in WL style than vice-versa, and that these differences are greater than the differences for those with a higher F1 and F2 in INT style. Therefore, these speakers front and lower /æ/ to a greater extent than the speakers that raise and/or back it. In addition, since only one speaker has higher mean values for both F1 and F2 in INT style, the lowering and fronting trend in WL style is more general.

MEAN MEASUREMENTS BASED ON PHONETIC ENVIRONMENT

As indicated in the literature review, certain phonetic contexts promote raising, lowering, and backing of the investigated vowel. For example, /æ/ is very often raised in pre-nasal environments, and before voiced velar consonants, as discussed in Zeller (1997) for natives of Milwaukee, Wisconsin. Pre-lateral /æ/ has been found to be more back and lowered in California (Hinton et al., 1987, Luthin, 1987). Finally, Clarke et al. (1995) discuss how a following fricative promotes the lowering of /æ/. These studies motivated the following analysis by phonetic environments, measuring F1 and F2 values.

Before discussing specific phonetic environments' effects on /æ/, it is necessary to detail the number of tokens for each environment. The word list style contained 70 tokens per speaker. The interview style elicited a variety of tokens in each environment from each subject, and the distribution is displayed in Table 4.

Table 4. Distribution of tokens in interview style

Nasals			Velars		Voiceless stops	Voiced stops	Voiceless fricatives	Voiced fricatives	[l]
ŋ	n	m	k	g	p, t, ʔ, tʃ	b, d, r, dʒ	f, θ, s, ʃ	v, ð, z, ʒ	
58	285	104	181	10	242	241	232	128	62

The first environment under investigation is pre-nasal. An average of all speaker's F1 and F2 mean values are displayed in Table 5.

For all speakers, the F1 values for /æ/ before nasals are less than before all consonants, while the F2 values before nasals are more than before all consonants which is demonstrated in the average values above. Speakers have a smaller F1 and

larger F2 before nasals than elsewhere. Thus, the pre-nasal context promotes both raising and fronting of /æ/, as has been observed elsewhere.

Table 5. Average mean values for nasal environments in combined styles

All Consonants		All Nasals		ŋ		Non-Nasals	
F1	F2	F1	F2	F1	F2	F1	F2
766	1845	679	2048	681	2064	800	1768

Comparing F1 for all nasals to just the velar nasal provides mixed results. For fourteen speakers, the F1 in the pre-/ŋ/ context is larger than before all nasals. For these speakers, the velar nasal does not encourage raising as much as the other nasals. For the other ten subjects, the opposite is the case. The F2 values, on the other hand, exhibit a pattern. For 11 subjects (almost half), the F2 values in the pre-/ŋ/ context are larger than before all nasals. For these speakers, then, the velar nasal promotes a fronted variant more than all of the nasals combined. For the other 13 subjects, the opposite is true. Based on the variability of these data, the velar nasal's influence on /æ/ is ambiguous in relation to other nasals.

The next phonetic environment that influences /æ/ is before velar consonants. Table 6 shows the average F1 and F2 mean values: before non-nasal consonants, before all velars, before voiced velars, and before velar stops. Because nasals strongly promote raised variants, velar conditioning is compared with respect to all tokens *excluding* nasals. Both columns three and four contain [g].

Table 6. Average mean values for velar environments in combined styles

Non-nasal consonants		All Velars		Voiced Velars (ŋ and g)		Velar Stops (k and g)	
F1	F2	F1	F2	F1	F2	F1	F2
800	1768	752	1890	714	1980	790	1806

Table 6 shows that F1 is lower and F2 is higher before velars as opposed to before non-nasal consonants. These figures indicate that the velar environment promotes raising and fronting of /æ/, although not as much as nasals.

The next series is before non-velar stops and affricates, as well as before fricatives, both voiced and voiceless, as seen in Table 7.

Table 7. Fricative and other environments

Non-Nasal Consonants		Non-Velar Stops and Affricates		All Fricatives		Voiceless Fricatives		Voiced Fricatives	
F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
800	1768	802	1775	803	1747	804	1748	800	1746

These figures do not indicate any effect on /æ/ based on these environments, at least in comparison with the degree of influence from the preceding environments.

The last phonetic environment to be discussed is pre-lateral. Table 8 displays F1 and F2 values before /l/, before non-nasal consonants, and before consonants excluding nasals and the lateral. The lateral promotes backing. The degree of influence on the backing of /æ/ is about the same as the velar and nasal influences as indicated by the high F2 average means.

Table 8. Average mean values for pre-lateral and related environments

Non-Nasal Consonants		All Cons. Excluding Nasals and [l]		[l]	
F1	F2	F1	F2	F1	F2
800	1768	800	1770	804	1663

In summary, the most crucial phonetic influence is the pre-nasal one. In accord with Labov (1994) and Clarke et al. (1995), this phonetic environment promotes /æ/-raising for all subjects. It has also been shown that voiced velars promote raising, as Zeller (1997) also found. The influence of /l/ promotes backing, but shows little effect on vowel height. Finally, although Clarke et al. suggest that fricatives promote lowering of /æ/, the results in this thesis do not support this suggestion. A summarized list of each phonetic context and its effect on /æ/ is displayed in Table 9.

Table 9. Summary of effects of phonetic environment

		Effect on /æ/
Phonetic Environment	All Nasals	raises and fronts
	[ŋ]	
	All Velars	
	Voiced Velars	
	Non-velar stops and affricates	no effect when compared to non-nasal consonants
	All Fricatives	
	Voiceless Fricatives	
	Voiced Fricatives	
	[l]	backs

MEAN MEASUREMENTS BASED ON INDIVIDUAL SOCIAL FACTORS

The first social factor to evaluate is age. A visual representation of the mean F1 and F2 values by age is displayed in Figure 10 below.

Figure 10. Graph of age distribution of F1 and F2 mean values

As indicated above by the dashed line, there is a general decrease in F1 and F2 as age increases. This indicates that younger speakers produce a more lowered and fronted vowel than the older speakers.

In order to compare the three different age groups, averages of age, F1 and F2 are displayed in Table 10 below.

Table 10. Average F1 and F2 values by age

Age Group	Average Age	Average Mean Value	
		F1	F2
Adolescents (TN)	15.4	822.3	1807.3
Adults (AD)	35.4	846.3	1754.5
Older Adults (OA)	55.3	732.4	1747.0

The average F1 mean value (inversely proportional to vowel height) is greatest for the adult age group (AD), second for the adolescents (TN for teens) and lowest for the older adults (OA). The difference between the TN's and the AD's F1 averages is only 24 Hz. However, their averages differ significantly from the OA, 90 and 114 Hz. The F2 values are more monotonic, decreasing steadily, thus showing a steady increase in vowel fronting with age. These figures indicate that the ADs have a lower /æ/ production on average than the other groups, only slightly different from the TNs. Secondly, it's the TNs who have the most fronted production of /æ/; 52.8 Hz fronter than the ADs and 60.3 Hz fronter than the OAs. The positions of each group's average vowel are visually displayed in the graph in Figure 11 below.

Figure 11. Age Comparison F1 and F2 Mean Average Graph

The next social variable is class. The averages of the F1 and F2 mean values for each class are displayed in Table 11 below.

Table 11. Average F1 and F2 mean values by class

Socioeconomic Class	Average Mean Value	
	F1	F2
Working Class (WC)	795.8	1791.0
Middle Class (MC)	804.8	1748.2

The figures above indicate that the Middle Class F1 mean value average is only slightly higher than the Working Class' (9 Hz). F2 for WC speakers is 42.8 Hz higher (thus, more fronted) than F2 for MC speakers. These numbers indicate that the MC /æ/ production is at about the same height, although slightly lower and further back than the WC. These results are displayed in Figure 12.

Figure 12. Vowel locations as to class

The last social variable to investigate is sex. The averages of the F1 and F2 mean values for each sex have been calculated and are displayed in Table 12 below.

Table 12. Average F1 and F2 values as to sex

Sex	Average Mean Value	
	F1	F2
Women	860.7	1885.3
Men	739.9	1653.8

These figures indicate that women in this study have a higher F1 and F2 than men, which means that they have a lower and more fronted production of /æ/ on average than men. These results are displayed in Figure 13.

Figure 13. Sex Comparison F1-F2 Mean Average Graph

Because the data were not normalized to adjust for the differences in men and women's physiology, this difference may be due more to physical causes rather than social ones, and may have nothing to do with language change. The following discussion, then, is non-committal on sex differences.

MEAN MEASUREMENTS BASED ON COMBINED SOCIAL FACTORS

The next section examines the combined effects of the three social variables discussed above. First, the influences of the combined categories of age and sex are presented. Then, the effects of age and class are examined, then class and sex. Finally, the combined influences of all three social factors are discussed. Discussion in this section is limited to findings that are different from the previous ones, which indicate that certain sub-groups exhibit different patterns than the larger single-variable groups. The significance of these findings will be further explored in the next chapter.

In order to investigate the effects of sex and age, the average F1 and F2 mean values for each age group separated by sex were calculated and are displayed in Table 13 below.

Table 13. Average F1 and F2 mean values as to sex and age

Age-Sex Group	Average Mean Value	
	F1	F2
TN Women	875.3	1859.3
AD Women	924.0	1904.0
OA Women	782.8	1892.8
TN Men	769.3	1755.3
AD Men	768.5	1605.0
OA Men	682.0	1601.3

The above figures do not indicate any pattern different from the one previously discussed regarding just age as a factor, with one exception: the TN women produce a variant further back (a lower F2) than other women. TN men, on the other hand, produce a more fronted variant than their older counterparts. In other words, both

produce variants different than their elders but do so in different ways, actually producing variants that are closer to each other than are the two sexes in either of the other two groups (note the proximity of the two triangles). These results are displayed in Figure 14.

Figure 14. Age-Sex Grouping Graph

The next two variables to investigate are age and class. The average F1 and F2 mean values for each age group separated by middle class (MC) and working class (WC) were calculated and are displayed in Table 14 below.

Table 14. Average F1 and F2 mean values by class and age

Class-Age Group	Average Mean Value	
	F1	F2
MC TN	826.8	1779.3
MC AD	859.0	1745.5
MC OA	728.8	1719.8
WC TN	817.8	1835.3
WC AD	833.5	1763.5
WC OA	736.0	1774.3

When these two variables are combined, the results pattern in identical ways previously discussed for age and class as single variables. One minor exception is that the WC AD group produces a variant slightly more backed than the WC OAs, which is the reverse of the pattern established by age alone. Comparing the degree of WC fronting of each age group to the larger class distinctions as a single variable, the AD groups have less difference (18 Hz) than the WC and MC groups do (42.8 Hz). The other age-class groups have about the same. These results are displayed in Figure 15.

Figure 15. Age-Class Combination Graph

The next two variables to be considered together are sex and class. F1 and F2 values for each sex by class are displayed in Table 15 below.

Table 15. Average F1 and F2 mean values by class and sex

Class-Sex Group	Average Mean Value	
	F1	F2
MC Women	857.2	1892.2
WC Women	864.2	1878.5
MC Men	752.5	1604.2
WC Men	727.3	1703.5

Men exhibit the same pattern, stated above, regarding class as a single variable, but to a greater degree (99.3 Hz difference in sex-class combination compared to 42.8 Hz difference in class alone). The women, however, do not. First, the WC women produce a more backed variant than the MC. Second, the WC and MC women's differences in F2 values are less than the class differences discussed above (13.7 Hz compared to 42.8 Hz, respectively). These results are displayed in Figure 16. Note that the symbols representing the women are quite close together while the symbols for the men show some difference as to class.

Figure 16. Sex-Class Combination Graph

The last social variable combination involves all of the social variables, age, sex and class. The average F1 and F2 mean values for each sex separated by middle class (MC) and working class (WC) in each age group were calculated and are displayed in Table 16 below.

Table 16. Average F1 and F2 mean values by class, sex and age

Class-Age-Sex Group	Average Mean Value	
	F1	F2
MC TN Women	853.5	1820.0
WC TN Women	897.0	1898.5
MC TN Men	800.0	1738.5
WC TN Men	738.5	1772.0
MC AD Women	937.0	1928.0
WC AD Women	911.0	1880.0
MC AD Men	781.0	1563.0
WC AD Men	756.0	1647.0
MC OA Women	781.0	1928.5
WC OA Women	784.5	1857.0
MC OA Men	676.5	1511.0
WC OA Men	687.5	1691.5

These figures, represented visually in Figure 17, do not suggest any pattern not already introduced by the combination of just two social variables or one variable alone. Two important claims, however, can be made from this triple combination. The first is that it is the MC TN women who establish the age-sex pattern discussed above with regards to women. That is, MC TN women produce a more backed variant than the older groups. The WC TN women, however, do not follow this pattern. They follow the pattern established by age alone, which is that TNs produce a more fronted variant than the older groups. Notice in the graph in Figure 18 that only the white

square (MC TN women) is further back than the other colored squares, whereas the white version of the other three shapes is the furthest front of its corresponding colors.

Figure 17. Age-Class-Sex Combination Graph

The second claim is that it is the MC TN men who influence the age-sex pattern to differ from the pattern exhibited by age alone. That is, the pattern exhibited by age alone show that TNs produce a higher variant than the ADs. The pattern in the age-sex combination is that TN men produce a variant lower than their AD counterpart. It is the MC TN men that establish this pattern, as indicated by the white diamond's lower position in Figure 18 than the other colored diamonds. The white triangle, the WC TN men, is positioned higher than the black triangle (WC AD men)

but lower than the gray triangle (WC OA men), which is the pattern established by age and followed by both MC and WC women. These patterns demonstrate how the influence of one specific group compares to the influences of the larger groups.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the results and presents conclusions that may be drawn from the findings. The study's limitations and some suggestions for further research are also discussed.

REVIEW OF RESEARCH QUESTIONS

In Chapter One, the following research questions were posited:

1. Are native Portlanders participating in a sound change in progress that includes the raising of the low front vowel /æ/?
2. If so, what is the extent of this participation?
3. If not, what claims can be made about the Portland vowel system?

ARE THEY /æ/-RAISING IN PORTLAND?

The first research question asks if native Portlanders are participating in a sound change in progress that includes /æ/-raising, similar to what is occurring in the North Central and Inland North United States. If this were the case, then the results

should show that the height of the vowel increases as the speaker's age decreases. In terms of F1, the F1 mean value should increase as age increases. These results, however, did not show this to be true, as Figure 10 demonstrates (replicated below as Figure 18). On the contrary, there is a tendency that the younger the speaker is, the lower the production of the vowel.

Figure 18. Graph of age distribution of F1 and F2 mean values

The average age for each age group is 20 years older or younger than the next age group. This age distribution shows that each age group is separated by one generation, the framework necessary to show sound change in progress as outlined by Labov (1994). The results, then, do not support the claim that Portlanders are participating in an /æ/-raising.

The above conclusion makes answering the second research question fairly straightforward. Portlanders are not participating in the change at all.

THEN WHAT IS HAPPENING IN PORTLAND?

In order to posit any claims about the Portland vowel system and address the third research question, it is necessary to discuss the findings presented in Chapter 4. This section investigates each social variable in terms of its implications for language change. Then, the affects of style and its implications are also discussed.

The story of /æ/ in the Portland vowel system

For evaluating sound change in progress, the most crucial social variable is age. According to Labov's (1991) claims about the Third Dialect of English, Portlanders should exhibit a stable variant of /æ/ across age groups, with the exception that there are raised variants pre-nasally. While 100% stability was not discovered in this study, neither was a clear pattern for language change. As suggested by other studies of the Third Dialect varieties (Clarke et al., 1995, Esling & Warkentyne, 1993, Hinton et al., 1987, and Luthin, 1987), some vowel systems show a lowering and backing of /æ/.

While it is possible that Portland is participating in a similar sound change, the results presented in this thesis are ambiguous. Comparing the age groups, the teenagers produce a lower vowel than the older adult group, but the adult group produces a lower vowel than the teenagers. This pattern is not indicative of language change. In fact, the two subjects with the lowest variants are the two 26 year-old women in the AD group.

In terms of fronting, however, a clearer pattern emerges. The teenagers produce a more fronted vowel than either of the older groups, which is the opposite direction in which other Third Dialect studies report that this vowel is moving. What the results suggest is that some Portlanders are possibly lowering this vowel, and probably fronting it; however the extent and the absolute certainty of this claim are not supported by the findings here.

A second social factor important in language change is class. As discussed previously, Labov (1980) states that language change is most often lead by the interior classes (the upper working and lower middle class). This thesis, however, did not separate speakers in this way. Findings from the Utah study (Di Paolo & Faber, 1990) strongly suggest that the innovators of the change in progress under investigation were the members of the less affluent community that they had investigated. The researchers, however, did not differentiate the working and middle classes. On the other hand, findings from the Vancouver, B. C., data (Esling & Warkentyne, 1993) clearly show that the middle class are leading the retraction of /æ/ change-in-progress. According to the findings here, looking at class as a single factor and at age-class combined, the working class produces a more fronted variant than the middle class. However, the role that class plays on the influence of this vowel is inconclusive.

Another social factor that has been suggested to be involved in sound change is the sex of the speaker. According to the literature, women often lead sound change by about one generation. In addition, nearly all of the Third Dialect studies presented in Chapter 2 show that women are the leaders of the changes in progress investigated.

Because the data in this thesis were not normalized for male and female physiological differences of speech organs, the role that the sex of the speaker plays on the height or frontness of /æ/ cannot provide any real insight into these matters.

As stated above, no real claims about language change in progress and the effects of sex or class on this phenomenon can be made on the basis of findings in this study. However, there are some emerging patterns. One of these patterns is the production of more fronted variants by the working class as a whole. This pattern is best represented in Figure 15 (replicated below as Figure 19), as each gray version of the shape (WC) is positioned further front than its black counterpart (MC).

Figure 19. Age-Class Comparison F1-F2 Mean Average Graph, revisited

This graph also shows another recurring pattern regarding age, which is that the OA groups produce a higher vowel than the AD and TN groups, with the TN groups only slightly higher than the AD groups. These patterns are also exhibited in the results from the combined social variables age-sex-class, displayed in Figure 18. While there is a lot of variation in terms of vowel height, vowel frontness is less

variable. In three out of four of the age-class groups (working class men and women and middle class men), the teenagers produce the most fronted vowel. The middle class teen women, however, do not show the same behavior, producing the most backed variant of their older counterparts. Therefore, any claim about a fronting or lowering change in progress is not wholly supported. In order to make any claim about a possible change in this vowel in Portland, more speech data, in addition to diachronic evidence, such as Portland speech data from many decades ago, is needed.

The effects of style

Based on social variables, no sound change interpretation can confidently be made. The effects of style, however, do exhibit a recurring pattern, thus giving some credence to a possibility of language change, or at least the social coding of (æ) variants. The results presented in Chapter 4 indicate that nearly all speakers produce a more fronted and lowered variant of /æ/ in the more careful, monitored style. In the WL style, subjects are paying closer attention to how they actually speak, which reflects their beliefs about how they should speak as well (Chambers, 1995). Basically, the variants produced in the more careful, monitored styles represent a more overtly prestigious version of the linguistic form in question. In Moonwomon's (1987) discussion of /ɔ/, she suggests that in the more careful styles, this vowel is produced lower, which she claims displays prestige for the lower variant, and in this case, the merger with /ɑ/. Similarly, in the Portland data, the possible prestige of a

lower, fronter vowel corresponds to the recurring pattern discussed above, although it is not, on its own, indicative of language change.

What do these patterns suggest?

As discussed above, patterns have emerged from these data. While not conclusive, these patterns suggest that Portlanders are lowering and fronting /æ/, as shown by the younger speakers' producing more fronted and lowered variants than the older speakers. This pattern is different from both the Northern Cities Shift and the Southern Shift. It is similar to both the Canadian and California Shifts with respect to lowering, but not fronting.

Both the middle and working classes are equally participating in the lowering of the vowel, but the WC is leading the fronting part of this change. As might be expected, Portlanders use the lower and more fronted /æ/ in a careful, monitored style than in a casual style. If this trend continues, the expected outcome is an adoption of more fronted and lowered variants for all ages, all classes, and in both styles. In addition, if more data are collected, they should further support these claims following the age, class and style distribution presented in this thesis.

LIMITATIONS

Undoubtedly, a larger sample-size is needed. Class, for example, would be more accurately portrayed if the middle and working classes were further broken down into upper and lower divisions of each, a difficult thing to do with just 24

speakers. Another social variable that was not accounted for in this investigation was race/ethnicity.

Another important limitation has to do with the lack of conclusive results. For the subjects who were investigated, patterns that did seem to emerge were often disrupted by what might be considered individual variation. If the sample size were larger, these disturbances would be somewhat smoothed.

Another important limitation has to do with the interview process as a whole. In any interview situation, there is an effect on a speaker when someone else is observing and interviewing them. I tried to reduce some anxiety on the part of the subjects by interviewing them in their homes and trying to be as casual and friendly as possible. However, subjects were indeed asked to speak with a microphone in front of them, a situation that is certain to influence their speech. I also do not feel that I have had enough experience with the interview process, although the last few interviews seemed to go better than some of the first ones. In addition, certain subjects were difficult to encourage to talk at length, especially teenage men. These differences in amount of talk also lead to differences in number of tokens and environments represented in the INT style. Another aspect that might have influenced was that the sex of the interviewer was not controlled for. The last aspect of the interview process that might have influenced the results was the word list reading task. For the most part, I allowed the subject to be alone while reading, in order to allay anxiety. Some subjects, like MYTWC11, however, exhibited problems in reading some of the words. In a related phenomenon, many subjects misread a word, or stumbled over some, or

even skipped a word all together. In addition, certain phonetic environments did not occur as frequently in the more casual INT style. For many subjects, there were no tokens before [g] or [ŋ], and some had few instances before voiced fricatives.

While the interviewing procedures posed certain problems, so did the analysis. The first stage of the analysis was measuring each vowel token for F1 and F2. My inexperience as an analyst could have affected formant measurements. While I tried to follow the guidelines set forth by Boberg (1996), many tokens did not produce clean spectrographs, or the influences of preceding and following sounds made it difficult to locate the nucleus of the vowel. Often, some instances of /æ/ were reduced due to rapid speech, and the degree of reduction that occurred excluded /æ/ from inclusion in the study.

In addition Plotnik, a computer program part of the second stage of analysis, was not working in fully operational mode. Mean values could not be calculated and plotted for all of the tokens. Instead, sub-means for each phonetic environment or style were calculated, which resulted in a backwards way of “tricking” the program into calculating the mean for all tokens. The second malfunction of the program was that it would not normalize the data to account for the differences in vocal tract size. If this had occurred, then maybe the women and men would not have been so far apart in their production of this vowel. A final problem with the computer software was in its coding system. While Plotnik has an elaborate coding system for each word, there were some discrepancies between my coding and the program’s coding. For example, I considered the “g” in *magician* an affricate, but Plotnik coded it as a velar stop.

Also, many instances in connected speech did not reflect the way the word would be said in more careful styles, and the program did not account for these phenomena. For example, a word beginning with /æ/ but following a word ending in a nasal or [l] often was influenced by these phonetic factors, yet was not coded in Plotnik since the program does not consider the word before the word containing the vowel in question. The data were just too numerous to double-check all of the coding. This lack of checking, however, could have influenced the results.

FURTHER RESEARCH

This investigation would be strengthened if more data were collected and analyzed, especially by real time data to evaluate the language change claims. Therefore, it is the hope of this researcher that with the larger data sample of a full-blown study of Portland dialects, this study on one vowel may be examined in a larger context and compared to other vowels in the Portland system.

SUMMARY

The lowering and fronting of /æ/ is a possible feature of Portland English. This study begins to posit some claims about a possible sound change in progress through the use of speech analysis software and a variationist approach to sound change.

Interestingly, these findings are the opposite of what I originally thought I would find. I recognized the raised variants before nasals, especially velar nasals, as

an indication of a raising change in progress. What I was really noticing was the effect of lowering, yet retaining raised variants in this position, giving the perception that the younger subjects were raising. In fact, on some levels, the vowel space for /æ/ is becoming more spread out through this sound change, which is corroborated by the Plotnik displays in the appendices. It is apparent that Portlanders are not raising this vowel, and are therefore not participating in the Northern Cities Shift. While the lowering is similar to what is happening with other Third Dialect varieties, the fronting phenomenon is not consistent with these other Third Dialect investigations, which might indicate that either Portland is exhibiting characteristics different from other varieties in the Third Dialect, or that some of the more anomalous subjects were not the exception, but rather the direction of change. Another point of view might indicate that what has been labeled as the Third Dialect needs more divisions into smaller regional dialects, possibly participating in distinct sound changes. A related issue is that while this change might have some prestige, there certainly is no social awareness around this phenomenon. If Portlanders are indeed lowering and fronting /æ/, this might be in subconscious opposition to the lowered and *backed* perception of California /æ/. In fact, the social ramifications of Californian influence on the Portland speech community is an area for further research. It might be through this social lens that sound change can be explained, not just described.

REFERENCES

- Bailey, G., Winkle, T., Tillery, J., & Sand, L. (1991). The apparent time construct. Language Variation and Change, 3, 241-264.
- Boberg, C. (1996). Procedures for the acoustical measurement of English vowels. Plotnik, Version 3. W. Labov. Philadelphia, PA, U.S. Regional Survey: 1-3.
- Carver, C. M. (1987). American regional dialects: A word geography. Ann Arbor: The University of Michigan Press.
- Chambers, J. K. (1995). Sociolinguistic theory. Oxford: Blackwell.
- Clarke, S., Elims, F., & Youssef, A. (1995). The third dialect of English: Some Canadian evidence. Language Variation and Change, 7, 209-228.
- Di Paolo, M., & Faber, A. (1990). Phonation differences and the phonetic content of the tense-lax contrast in Utah English. Language Variation and Change, 2, 155-204.
- Eckert, P. (1989). The whole woman: Sex and gender differences in variation. Language Variation and Change, 1, 245-267.
- Esling, J. & Warkentyle, H. (1993). Retraction of /æ/ in Vancouver English. In S. Clarke (Ed.), Focus on Canada (pp. 229-246). Amsterdam: John Benjamins Company.
- Guy, G., Horvath, B., Vonwiller, J., Daisley, E., & Rogers, I. (1986). An intonational change in progress in Australian English. Language in Society, 15, 23-50.
- Hinton, L., Bremmer, S., Corcoran, H., Lerner, J., Luthin, H., Moonwomon, B., & Clay, M. V. (1987). It's not just the Valley Girls: a study of California English.

Paper presented at the Thirteenth Annual Meeting of the Berkeley Linguistics Society, Berkeley, CA.

James, D. (1996). Women, men and prestige forms: a critical review. In V. Bergval, J. Bing, & A. Freed, (Eds.), Language and gender: Theory, research and method (pp. 98-125). London: Longman.

Kurath, H. (1939-43). Linguistic atlas of New England. (Vols. 1-3). Providence, R. I.: Brown University.

Kurath, H. (1949). A word geography of the Eastern United States. Ann Arbor: University of Michigan Press.

Kurath, H., & McDavid, R. (1961). The pronunciation of English in the Atlantic States. Ann Arbor: University of Michigan Press.

Labov, W. (1972). Sociolinguistic patterns. Philadelphia: University of Pennsylvania Press.

Labov, W. (1980). The social origins of sound change. In W. Labov (Ed.), Locating language in time and space (pp. 251-265). New York: Academic Press.

Labov, W. (1981). What can be learned about change in progress from synchronic description? In D. Sankoff & H. Cedergren, (Eds.), Variation omnibus (pp. 177-199). Edmonton, Alberta: Linguistic Research.

Labov, W. (1990). The intersection of sex and social class in the course of linguistic change. Language Variation and Change, 2, 205-254.

Labov, W. (1991). The three dialects of English. In P. Eckert (Ed.), New ways of analyzing sound change (pp. 1-44). New York: Academic Press.

- Labov, W. (1994). Principles of linguistic change: Vol. 1. Internal factors. Oxford: Blackwell Publishers.
- Labov, W., Ash, S., & Boberg, C. (1997, July 15, 1997). A national map of the regional dialects of American English. Available: http://www.ling.upenn.edu/phono_atlas/NationalMap/NationalMap.html [1999, November 5].
- Labov, W., Ash, S., Boberg, C., Bowie, D., Banuazizi, A., Baranowski, M., Albergottie, J., & Maciejewski, T. (1999, 5/10/99). Phonological atlas of North America. Available: http://www.ling.upenn.edu/phono_atlas/home.html [November 15, 1999].
- The Linguistic Atlas Projects. (1999, 7/28/99). Available: <http://hyde.park.uga.edu/index.html> [December 1, 1999].
- Luthin, H. (1987). The story of California (ow): The coming-of-age of English in California. In K. M. Denning, S. Inkelas, F. C. McNair-Knox, & J. R. Rickford (Eds.), Variation in language: NWAV-XV (Proceedings of the Fifteenth Annual Conference on New Ways of Analyzing Variation) (pp. 312-324). Stanford: Department of Linguistics, Stanford University.
- McElhinny, B. (1999). More on the Third Dialect of English: Linguistic constraints on the use of three phonological variables in Pittsburgh. Language Variation and Change, 11, 171-195.
- Milroy, J., & Milroy, L. (1998). Mechanisms of change in urban dialects: The role of social class, social network and gender. In P. Trudgill & J. Cheshire (Eds.), The

sociolinguistics reader: Volume 1. Multilingualism and variation (pp.179-195).

London: Arnold.

Moonwomon, B. (1987). Truly awesome: (O) in California English. In K. M. Denning, S. Inkelas, F. C. McNair-Knox, & J. R. Rickford (Eds.), Variation in language: NWAV-XV (Proceedings of the Fifteenth Annual Conference on New Ways of Analyzing Variation) (pp. 325-336). Stanford: Department of Linguistics, Stanford University.

Peterson, G. E., & Barney, H. L. (1952). Control methods used in a study of the vowels. Journal of the Acoustical Society of America, 24, 175-184.

Pyles, T. & Algeo, J. (1993). The origins and developments of the English language (4th Ed.). Fort Worth, TX: Harcourt Brace Jovanovich, Inc.

Reed, C. (1961). The pronunciation of English in the Pacific Northwest. Language, 7(4), 559-564.

Trudgill, P., & Chambers, J. K. (1998). Dialectology (2nd ed.). Cambridge: Cambridge University Press.

Wolfram, W. & Schilling-Estes. (1998). American English: Dialects and variation. Oxford: Blackwell.

Zeller, C. (1997). The investigation of a sound change in progress: /æ/ to /e/. Journal of English Linguistics, 25(2), 142-155.

APPENDIX A. TELEPHONE SCREENING

Introduction: This is a study that is being done by two graduate students in linguistics at Portland State University. The study was designed to learn about the experiences and the speech of native Portlanders. I have some questions to make sure that you are eligible to participate in the study.

Were you born in Portland / move here before the age of 5 years? Y / N

Do you live in Portland, or in an outlying suburb and commute into the city for either work or school? Y / N

Participant Name: _____ Male / Female

Age: _____ YT OT YA OA*

Contact Phone Number: _____

When would you like to be interviewed? _____

Where would you like to be interviewed? Address and directions:

What is your occupation: _____

What is your annual income: _____

Which best describes your situation:

I own my house.

I rent my house.

I rent an apartment.

I rent a room or share a living space with roommates.

Did you graduate from High School? Y / N

Have you taken any college courses? Y / N

Are you a college graduate? Y / N

*Young Teen, Older Teen, Adult, Older Adult

APPENDIX B. INFORMED CONSENT

PORTLAND DIALECT STUDY – Informed Consent

I, _____, agree to take part in this research project on _____ (date). I understand that the study involves a tape-recorded interview that will take approximately 45 minutes. I understand that my voice will be analyzed by speech analysis software, and that the results of this study may be published on an Internet web site.

Jeff Conn / Rebecca Wolff has told me that the purpose of the study is to learn about the experiences and speech of people in Portland, Oregon.

I may not receive any direct benefit from taking part in this study, but the study may help to increase knowledge that may help others in the future.

Jeff Conn at 725-4105 or connj@nh1.nh.pdx.edu / Rebecca Wolff at 295-1118 or wolffrebecca@hotmail.com has offered to answer any questions I have about the study and what I am expected to do.

He / She has promised that all information I give will be kept confidential to the extent permitted by law, and that the names of all people in the study will be kept confidential.

I understand that I do not have to take part in this study, and that this will not affect my course grade or my relationship with Portland State University. I understand that I may also withdraw from this study at any time without affecting my course grade or my relationship with Portland State University.

I have read and understand the above information and agree to take part in this study.

Date: _____ Signature: _____

Signature of Parent (if under 21 years) _____

Date: _____ Signature of Witness: _____

If you have concerns or problems about your participation in this study, please contact either the Human Subjects Research Review Committee, Office of Research and Sponsored Projects, 111 Cramer Hall, Portland State University, (503) 725-8182, or Jeff Conn at 1015 SE 17th, Portland, OR 97214 / Rebecca Wolff at 1110 SW Clay #55, Portland, Oregon, 97201, (503) 295-1118.

APPENDIX C. INTERVIEW QUESTIONS

When we talked on the phone, I asked some questions to determine that you would be eligible to participate in this study and to learn a bit about you. I would like to review the information that I collected to make sure that I got it right.

You were born in Portland, or moved here before the age of 4?

Where are your parents from?

Have you always lived in _____ (i.e., the SE area, Milwaukie, Downtown, etc.)?

What other areas have you lived in? What areas of Portland do you like and why?

You work as a _____. How long have you done that? Do you like it? Is your annual income about _____?

You rent / own, your house / apartment / room. How long have you lived here? Do you like it?

You did / did not graduate high school. Did / Do you like school? What are / were you studying?

- ☐ Have you ever done anything that you are really proud of?
- ☐ Have you ever been in an accident? Really been hurt / ill / at a hospital?
- ☐ What is something that you really like to do?
- ☐ Has there ever been a time that you were really scared, when you thought that you were going to die?
- ☐ Is there a place that you think is really beautiful? Can you describe what it looks like?
- ☐ What was your favorite vacation? Tell me about it.
- ☐ Tell me something important or complicated about your work.
- ☐ Have you ever done anything that you are really proud of?

APPENDIX D. READING PASSAGE**The Cat and the Mice**

(From Aesop's Fables)

There was once a house that was overrun with Mice. A Cat heard of this, and said to herself, "That's a place where I would be happy," and off she went and took up her quarters with the family that lived in the house. She quickly made a habit of catching the Mice one at a time and eating them. At last the Mice could stand it no longer, and they decided to take to their holes and stay there. "That's awkward," said the Cat to herself: "The only thing to do is to coax them out by a trick." So she considered a while, and then climbed up the wall and let herself hang down by her back legs from a peg, and pretended to be dead. By and by a mouse peeped out and saw the cat hanging there. "Aha!" it cried, "You're very clever, madam, no doubt: but you may turn yourself into a bag of meal hanging there, if you like, yet you won't catch us coming anywhere near you."

If you are wise you won't be deceived by the innocent actions
of those whom you have once found to be dangerous.

APPENDIX E. WORD LIST

Stay	Cactus	Ban
Wag	Rad	Hash
Paid	Sash	Rat
Head	Hack	Bath
Leg	Same	Sass
Bang	Cafe	Can
Habit	Tag	Bad
Sack	Cap	Sap
Rap	Badge	Hand
Avenue	Apple	Sat
Bat	Sand	Rag
Rain	Cavern	Back
Language	Hag	Has
Have	Ash	Cash
Sad	At	Sang
Hat	Beg	Ham
Am	Happy	Sag
Bake	Ad	Cat
Cab	Rang	Ran
Sam	Had	Rash
Raspberry	Ann	Bag
Kangaroo	Camera	San Francisco
Rabbit	Hatch	Imagine
Academy	Ram	Lavender
Rack	After	Rather
As	Casual	Lather
Bambi	Hang	

APPENDIX F. WORD LIST GRAPHS

FYTWC01, 14, WL, Portland, OR

FOTWC01, 18, WL, Portland, OR

MYTMC11, 14, WL, Portland, OR

MOTMC02, 17, WL, Portland, OR

MYTWC11, 12, WL, Portland, OR

MOTWC11, 19, WL, Portland, OR

MADWC01, 29, WL, Portland, OR

MADWC02, 40, WL, Portland, OR

MOAMC11, 53, WL, Portland, OR

MOAMC12, 65, WL, Portland, OR

APPENDIX G. INTERVIEW GRAPHS

FYTMC11, 12, Interview, Portland, OR

FOTMC01, 17, INT, Portland, OR

FYTWC01, 14, Interview, Portland, OR

FOTWC01, 18, Interview, Portland, OR

MYTWC11, 12, Interview, Portland, OR

MOTWC11, 19, Interview, Portland, OR

FADMC01, 26, Interview, Portland, OR

FADMC03, 46, Interview, Portland, OR

FADWC01, 26, Interview, Portland, OR

FADWC02, 44, Interview, Portland, OR

MADMC01, 40, Interview, Portland, OR

MADMC02, 32, Interview, Portland, OR

MADWC01, 29, Interview, Portland, OR

MADWC02, 40, Interview, Portland, OR

FOAMC11, 53, Interview, Portland, OR

FOAMC12, 57, Interview, Portland, OR

MOAMC11, 53, Interview, Portland, OR

MOAMC12, 65, Interview, Portland, OR

MOAWC01, 50, Interview, Portland, OR

MOAWC11, 55, Interview, Portland, OR

APPENDIX H. COMBINED GRAPHS

FYTWC01, 14, Combined, Portland, OR

FOTWC01, 18, Combined, Portland, OR

FADWC01, 26, Combined, Portland, OR

FADWC02, 44, Combined, Portland, OR

FOAMC11, 53, Combined, Portland, OR

FOAMC12, 57, Combined, Portland, OR

MOAMC11, 53, Combined, Portland, OR

MOAMC12, 65, Combined, Portland, OR

MOAWC01, 50, Combined, Portland, OR

MOAWC11, 55, Combined, Portland, OR