PORTLAND DIALECT STUDY:

THE FRONTING OF /OW, U, UW/ IN PORTLAND, OREGON

by

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ABSTRACT

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Title: Portland Dialect Study: The Fronting of /ow, u, uw/ in Portland, Oregon

The fronting of the mid and high back vowels /ow, u, uw/ differentiates the major dialects of English in North America. In particular, the fronting of these vowels has been described as a feature of two regional vowel movements: the California Movement and the Canadian Shift. The purpose of the present study is to document the production of these vowels in the speech of residents of Portland, Oregon, and see if this Pacific Northwest speech illuminates dialect research by seeing how patterns here conform or do not conform to patterns others elsewhere.

Data were collected from a sample of eighteen Portland speakers. Nine males and nine females from three different age groupings and two different social classes were interviewed in order to elicit naturalistic speech. Word-sized files containing relevant vowel tokens were extracted from each interview. Each vowel token was then analyzed in a three-step process:

1) Vowel formants were calculated and measured with spectrographic analysis.

2) The data from each speaker were normalized to account for physiological differences.

3) Vowel format measurements were then correlated with social factors, including age, gender and class.

The study found that a pattern of fronting of /ow, u, uw/ was present across age groups, with “Young Adult” speakers showing the greatest degree, followed by “Teen” speakers. Patterns of fronting relative to gender and social class were not as salient, although “Female” and “Working Class” speakers generally showed a greater degree for fronting compared to “Male” and “Middle Class” speakers. Fronting among ‘Young Adult” speakers provides evidence for sound change in Portland, similar in nature to preliminary descriptions of both the California and Canadian. vowel movements.

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CHAPTER ONE: INTRODUCTION

The word on the street is that Portlanders don't have an accent—or at least nothing as easily caricatured as the speech of Texans, New Yorkers or California surfer dudes, all of whom native Portlanders immediately recognize as outsiders. Linguists, on the other hand, recognize that everybody speaks a distinct variety of English. What distinguishes Portland speech is not known—we can only know if there is a *unique* Portland speech variety, or dialect, by identifying the features that would make it so, and by comparing those features to other speech varieties. As of yet, there is no strong linguistic evidence to suggest that the Portland dialect is unique *per se*, mostly because the data collected are incomplete. Because of this, we can't say very much at all about Portland speech until it has been properly and systematically studied.

1.1. GOAL FOR THE PORTLAND DIALECT SURVEY

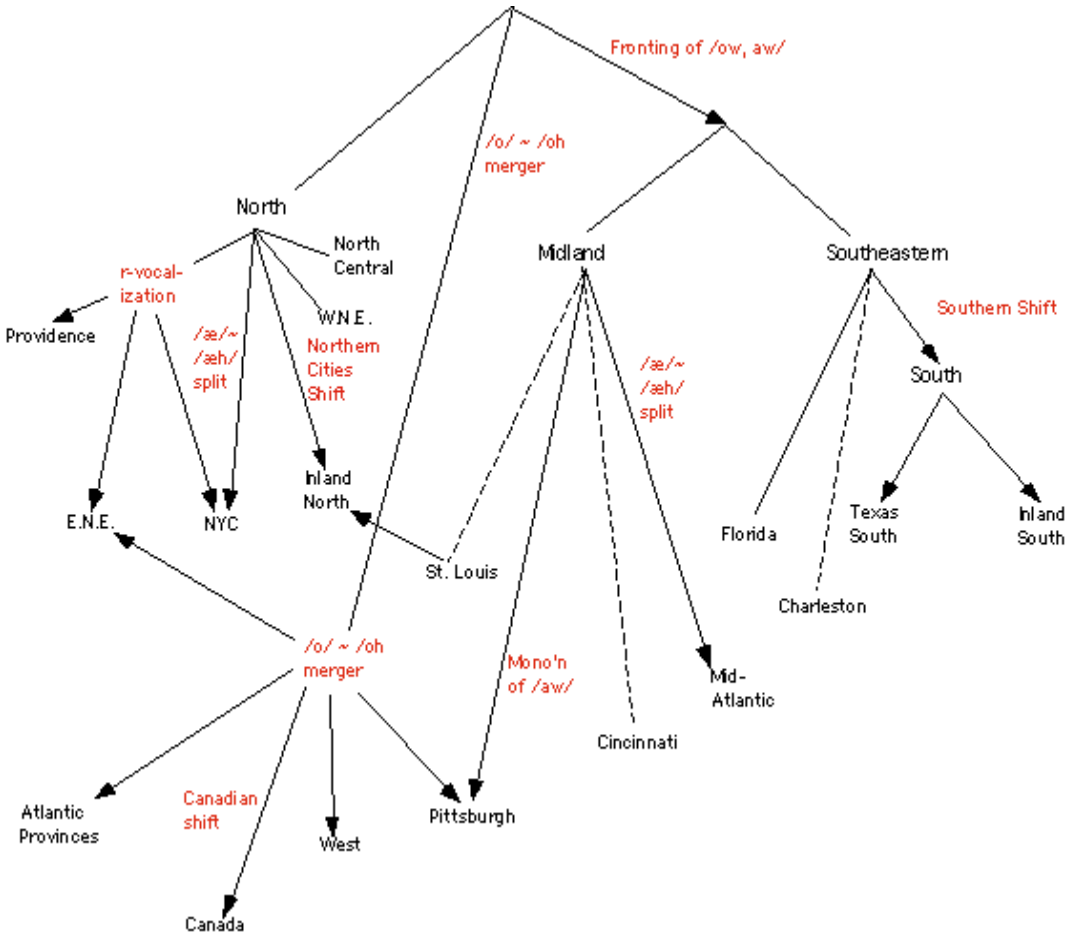
The goal of the Portland Dialect Survey (PDS) is to develop a comprehensive database that documents the character of Portland-area speech through the systematic description of its most salient features. The PDS could ultimately determine whether or not Portland speech is distinctive, and if so, in what ways. Provided with this database, the PDS will explore three main research strands: comparing Portland speech data to that generated by other regional dialect studies; describing language change taking place in Portland; and investigating the underlying social structure and

its relationship to language as revealed by the former two strands. The PDS, in turn, will complement the efforts of others describing the many varieties of English.

Dialect studies of the past have mostly focused on differences in word choice, forming lexically-defined regional isoglosses that roughly manage to divide the United States into three main dialectical areas: The North, the Midlands and the South (Carver 1987). Yet Labov (2002) claims these lexical isoglosses fail to show structural relationships that would allow for comparison among different regions and this has contributed to reluctance among traditional dialectologists to define discreet dialectical boundaries. Labov has instead focused almost exclusively on the acoustic analysis of speakers' vowels. Instead of purely regional features, he extends the study to social features such as class and gender that may influence dialectical differences among speakers within regions. By attempting to make a systematic study of all the phonological relations in the vowel system across the United States and by placing it within a social context, Labov seeks to more closely define the dialectical boundaries of American English than have previous researchers.

The following figure by Labov shows the relationships among the North American English dialects that he has defined to date:

Figure 1.1. Hierarchical display of North American English dialects (Labov 2002)



Each main area he defines is characterized by fairly rapid language change involving the chain shifting of different vowel systems (to be explained later in full detail). As he states, "It is radical rotations of vowel systems, and not differences of inventory, that account for the greatest differences between vowel systems. In these rotations, whole sets of vowels reverse their relative positions to each other; phones that represent one phoneme in one dialect represent an entirely different phoneme in

another" (Labov 1991: 3). As Figure 1.1. above illustrates these chain shifts often result in one salient feature, either a merger or a split, separating different dialects.

The West, where Portland, Oregon is physically located, has not experienced the degree of change undergone by dialects in the North, Midlands and South. It is most easily identified by the merger of /oh/ (as in *caught*) and /o/ (as in *cot*). This reduces the inventory of back vowels, and subsequently there is no raising of the vowel /ow/ (as in *coat*). To some extent, the relative stability of /æ/ (as in *cat*) also prevents any fronting of back vowels.

However, Labov recognizes that the stability of the West has also been overestimated (Labov 1991: 33) and there is indeed a fronting of the back vowels described in a few Western areas. Some work has been done describing varieties of Utah speech (Di Paolo 1990); California speech (Luthin 1987), (Hinton, Bremmer, Corcoran, Learner, Luthin & Moonwoman 1987); and similarities between California and Canadian speech (Clarke, Elims & Youssef 1995). Yet for the most part, no comprehensive effort has been made to systematically describe the West. In addition, Labov's TELSUR project, a telephone survey of hundreds of speakers from throughout the United States, is still pending completion. The PDS may help to ultimately determine if the West is as cohesive as Labov seems to suggest by showing how Portland does or does not differ from other previously studied Western dialects.

So far two other Portland State University Master's students have contributed to the PDS by examining Portland speech. The first is Wolff (2000) *Portland Dialect Survey: High Rising Contours in Portland Speech* which deals with pitch contours, what have been called "upsweep" or "High Rising (Non-final) Terminals." Pitch is a suprasegmental feature that gives even declarative statements a question-like intonation. Because her study was limited to just this feature, her findings do not generalize to Portland speech behavior as a whole. Conn (2000) *The Story of /æ/ in Portland,* seems to uncover some uniqueness in Portland speech, although ironically it is in the direction of /æ/ lowering rather than raising as he had anticipated. These two studies represent only limited snapshots of Portland speech.

1.2. RESEARCH QUESTIONS

Does Portland has a distinct dialect and if so, what are its distinguishing features? This larger question must be addressed piecemeal by investigating candidate features of a Portland dialect. The focus of this study is three vowels: /ow/ (as in *coat*), /u/ (as in *could*) and /uw/ (as in *boot*). The PDS–the purpose of which is to create a detailed and accurate description of Portland speech—will amalgamate the separate findings into a coherent picture. The specific questions of this study are:

1. Is the fronting of the mid back vowel /ow/ and high back vowels /uw/ and /u/ taking place in Portland, Oregon?
    a. Does the general phenomenon show variability across age groups, suggesting language change?

b. Does it show patterned variability between genders and among social groups, providing evidence that particular groups can be identified as leading the change, while other groups demonstrate a more conservative speech style?

2. If so, does this provide evidence for Portland speaker's participating in the Western dialect area, or does it constitute a separate trend forming a dialect isolate? What kind of social factors can help explain this change or lack of change?

1.3. PRESENTATION OF FINDINGS: WEBSITE

In addition to the written thesis itself, the thesis will be made available on the PDS website. The PDS website will detail the ongoing results of the Portland Dialect Survey which will include the findings of PSU students and researchers as they relate to the PDS.

1.4. NOTATIONAL SYSTEM

For describing vowels and vowel classes, this thesis employs a notational system developed by William Labov (1994), which will be explained in greater detail in Section 2.4.1. of the next chapter. However, a table is provided below to assist the reader in understanding the system as it relates to the International Phonetic Alphabet (IPA). A complete vowel diagram of the IPA is also provided in Appendix B. The reader is cautioned to observe that Labov's phonemic system takes into

account the fluidity of the phonetic realization of these vowels. IPA vowel symbols are far more fixed to the phonetic expression of the phonemes they represent, and thus a one-to-one correspondence between the two is not always possible.

Table 1.1. Labov's vowel notational system and IPA equivalents

Vowel (Labov)	iy	i	ey	e	æ	^	o	oh	ow	u	uw
IPA symbol	i	ɪ	ej	ɛ	æ	ʌ	ɑ	ɔ	ow	ʊ	u
Typical word	keep	kid	cape	get	cat	cut	cot	caught	coat	could	boot
Note: A "Typical word" is one in which the vowel is commonly used in General American English.											

CHAPTER 2: LITERATURE REVIEW

> "At any time we care to look at a language...it is variable and in a state of change." (Milroy & Milroy 1992: 2)

2.1. LINGUISTIC VARIATION

Linguistic variation is an indisputable fact. It did not require the advent of modern linguistics for even the most casual observer to notice the different ways people speak the same language. It is not just the content of our speech, but the way it sounds that announces who we are and where we are from. This synchronic variation, regional and social, is built into the structure of language itself. Language also shows variability over time. Diachronic change is responsible for the incomprehensibility of *Beowulf* to the modern reader. Gradual changes in vocabulary, syntax, morphology and phonology have rendered Old English and Modern English essentially different languages, although intermediate varieties suggest the continuity in form that binds the two.

This change over time has not been a uniform process among all communities of English speakers. It would be wrong to assume there was one uniform variety of Old English that evolved into one particular form of Modern English. Some speech communities have been relatively innovative and their form of English has changed quickly, while others have been rather conservative and have retained older speech forms. Diachronic change draws from synchronic variation. This dynamic is made more complex by the synchronic variability among different

social groupings—with age, gender and social class being the most prominent. Often the variation is so subtle as to escape conscious attention. The relative frequency of usage of a particular variant may depend on a constellation of social and/or psychological factors that can only be demonstrated by sophisticated instrumental analysis. Searching for synchronic variation within Portland and understanding how it may represent diachronic change will ultimately allow us to come closer to defining Portland's dialect.

2.2. QUANTITATIVE ANALYSIS

What English speakers commonly refer to as 'accent' are variations in the realization of vowels and in some cases consonants at a *conscious* level of awareness (Wolfram 1991: 51). This conscious awareness allows average language users to make meaningful judgments about the geographical and social origin of their interlocutors. However, by demonstrating a quantifiable tendency of one socially defined group of speakers to use a particular phonetic variant with greater frequency than another group, researchers may be able to describe a pattern that reflects a speaker's usage at lower levels of awareness. If subtle variation of this kind can be demonstrated to be structured and regular, we can suppose that it is capable of serving a distinct sociolinguistic function.

Instrumental analyses, as opposed to qualitative descriptions, allow the identification of fine-grained differences that correlate with social factors that may augur language change. It was only with the advent of modern recording devices and

computerized methods of phonetic analysis in the latter half of the twentieth century that more minute measurements could be made and great masses of data analyzed and compared. As Milroy and Milroy note, "[There is] no need to rely on the skill and memory of the transcriber, especially crucial when studying very minor variations in phonetic realizations" (1997: 48). Each individual vowel can be quantified by measuring the acoustically derived value of its distinctive formants (explained in further detail below in Section 2.2.2). Data collected from measuring many vowels in this manner allows for the fine-grained quantitative analysis—the target of analysis for this thesis.

2.2.1. Vowel descriptions

Vowels are classified according to the place in the mouth where they are formed by the main articulator, the tongue. Two spatial dimensions, *height* and *frontness/backness*, refer to the tongue's position. Vertical position and movement employ the terms *high, mid* and *low* to describe the tongue's position relative to the acoustic space formed in the oral cavity. These terms also describe the vowels themselves formed by the tongue in these positions. The terms *raising* and *lowering* describe the phonological processes that characterize the position of vowels relative to an established norm. Horizontal tongue position and movement employ the terms *front, central* and *back* to describe vowels and corresponding tongue positions, and the relative terms *fronting* and *backing* are used to describe phonological processes. The term *centralizing* encompasses both dimensions.

Figure 2.1. Schematic of vowel acoustic space and phonological processes (Calvert 1986)

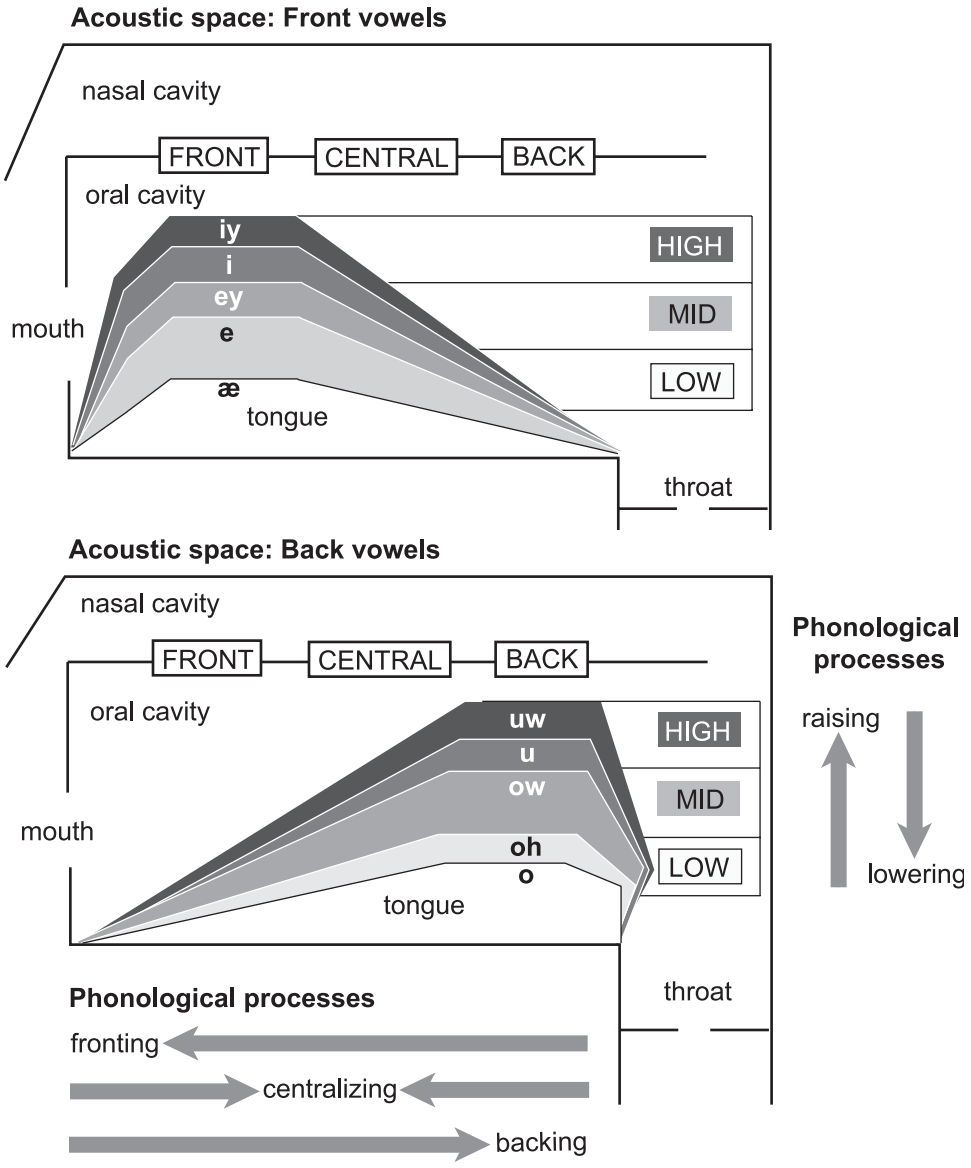


Figure 2.1 above presents a schematic of the acoustic space in which the tongue moves, and how different vowels are formed by that movement. The tongue is represented by the series of overlapping polygons, with each shade of grey representing a different tongue height and a different vowel corresponding to that

height. The top schematic illustrates the series of front vowels in English and the bottom the series of back vowels. Phonological processes are illustrated along the vertical and horizontal axes of the bottom schematic.

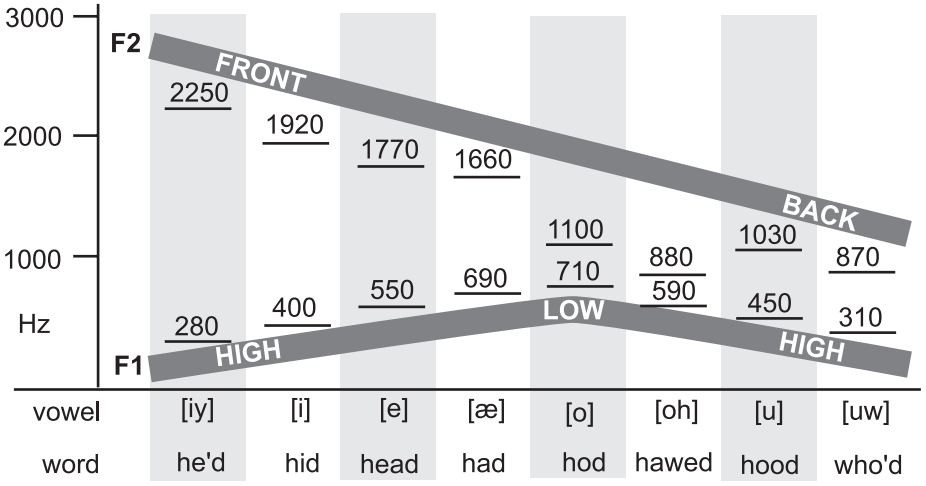
At its most extreme phonetic realization, fronting of the vowel of the diphthong /ow/ (as in *coat*) would contain as its initial element a phonetic realization that a speaker of the standard American variety would use for the front vowel /e/ (as in *get*), followed by lip rounding that represents the off-glide [w]. The fronting of the vowel /u/ (as in *could*) would be realized with the high front lax vowel /i/ (as in *kit*), albeit with lip rounding. Similarly, the fronting of the vowel /uw/ (as in *boot*) would be realized as a high front tense vowel /iy/ (as in *keep*) with lip rounding, much like vowel of the French word *lune* or the umlauted German vowel in *über*. Front rounded vowels have generally not been a feature of the English language since their disappearance from Middle English more than 500 years ago.

2.2.2. Significance of F1 and F2

The quality of an individual vowel can also be quantified by measuring the frequency of its formants in cycles per second, expressed as hertz (Hz). The pitch at which the vowel is actually spoken is basically the same as the fundamental frequency, expressed as f_0. This is the frequency that gives one individual speaker a high voice and another speaker a low voice. Yet as the tongue moves, it changes the configuration of the vocal tract for the articulation of each particular vowel, so that each vowel sound actually contains a number of different pitches simultaneously.

These various overtone frequencies produced as whole-number multiples of f_0 are otherwise known as the vowel formants. Some of these frequencies are damped, while others are boosted, depending on the particular configuration of the oral cavity, giving each vowel its distinctive quality. For most purposes, only the first two formants, F1 and F2, are used (Peterson and Barney 1952), although others exist. F3, for example, can be indicative of lip-rounding and rhotacization, which are not under investigation in this study. F1 is inversely correlated with vowel height, so that a higher F1 indicates a lower vowel. F2 directly corresponds to the dimension of frontness/backness so that a higher F2 indicates a more fronted vowel (Ladfoged 1993).

Figure 2.2. Relationship of F1 and F2 to vowel position (Ladfoged 1993)

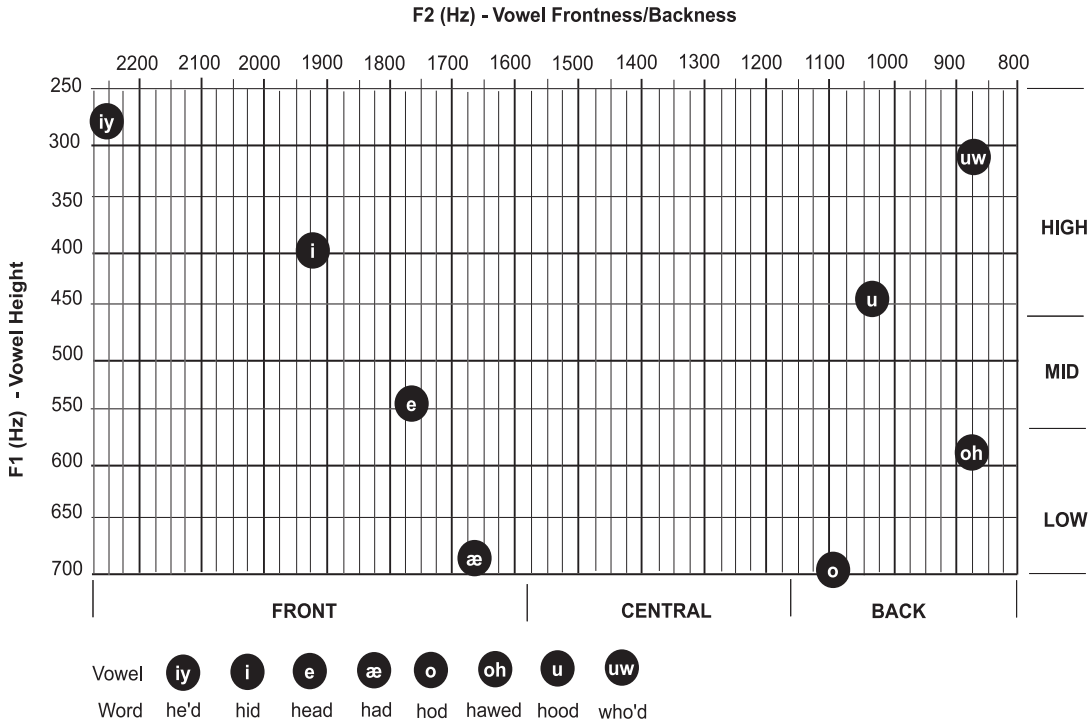


In Figure 2.2 above, the top grey trend line labeled "F2" illustrates the direct relationship of F2 to vowel frontness, where [iy] is the most fronted vowel and [uw] the most back. The bottom grey trend line labeled "F1" illustrates the inverse

relationship of F1 to vowel height, with [o] being the lowest vowel, and [iy] and [uw] being the highest. Perhaps the best way to visualize the relationship between formant values and the articulatory positions of the vowels within the oral cavity is to view the vowel chart of Figure 2.3 below, which illustrates a rough correspondence between formant values and tongue positions, similar to what was illustrated in the Figure 2.1 schematic. The top of the chart corresponds to the roof of the mouth, the left portion of the chart corresponds to the front of the mouth and the right portion to the back of the mouth. The plotted values for particular vowels correspond to the movement of the tongue within the oral cavity. Thus along the top and left of the chart, the formant values provide a quantitative description of the vowels, and the bottom and right side of the chart contain labels which represent qualitative descriptions of the vowels. As the chart illustrates, the arrangement of the English vowels form a trapezoid shape.

Both Figure 2.2 above and Figure 2.3 below use the same formant data and represent the dialect Ladfoged (1993) calls General American English. These values provide a somewhat idealized display of formant values. The values obtained in this thesis will follow the same general pattern, yet will differ in the realization of particular vowels. The headings “Word” in the figure legends refer to the actual word Ladfoged elicited from which the token was taken.

Figure 2.3. Formant chart of selected vowels (Ladfoged 1993)



2.2.3. Allophonic variation

Because the tongue is a rather sloppy articulator and does not "lock' into absolute positions as would the transmission gears of a car, vowels occupy a phonetic space in the mouth that resemble a cloud rather than single points. Thus the same vowel phoneme will have phonetic variants, or allophones, that are higher, lower, more backed or more fronted from one another. Preceding and following consonants, stress patterns and other phonetic factors determine each phoneme's phonetic shape (Ladfoged 1993).

Particular classes of consonants, including liquids and nasals, have been demonstrated to exert the greatest influence on a preceding vowel. In general, Labov

(1994) observes that the post-vocalic environment is the most influential on the quality of the preceding vowel. For example, a following, tautosyllabic /l/ causes vowels to be backed, whereas a following, tautosyllabic /r/ causes them to be centralized. Labov (1994), Hinton *et al.* (1987) and Clarke *et al.* (1995) all report that a following nasal /n/ encourages a greater raising of /æ/. Conversely, Conn (2002) observes the damping effect of a following nasal on /ow/ in his preliminary investigations of the Portland dialect.

However, even with phonetic environment held constant, no two vowels produced by any one speaker are ever exactly alike. This requires differentiating what variation is due to phonetic conditioning, what can be ruled out as merely a trivial fluctuation in the physical medium, and what has social and dialectical significance.

2.2.4. Vowel measurement conventions

Thomas (2001) states "It is not possible to determine a single definitive spot at which a vowel truly lies because the context pervades all aspects of vowel production" (10). Because the articulation of a vowel is a dynamic, highly variable process involving a trajectory of movement through the articulatory space, acquiring a meaningful set of measurements of a particular vowel is not straightforward, and has been the subject of much discussion in the literature. In brief, vowel trajectory describes a dynamic path through which the main articulators change their position over time as they aim towards a target point representing the central tendency, or

nucleus of the vowel. Tracing the entire trajectory of the vowel from one consonantal transition to the next could potentially yield dozens of separate points of measurement and preventing its simple categorization. Such a data clogged method is not feasible for a study that includes thousands of vowel tokens.

Labov (2001) recommends a single point, or perhaps two to be selected. "Ideally, the point of measurement will be the central tendency of the nucleus as both the target the speaker is aiming at, and the central acoustic impression that the listener obtains" (155). In this context, a system of single-point measurement that measures the central tendency of the vowel trajectory is better than a system that provides an average of formant measurements. The selection of the single point, however, must be based on a set of consistent criteria. Otherwise, comparison to other tokens of the same and neighboring vowel phonemes would be meaningless. Thomas (2001) points out that adequate quantity of tokens within the sample should insure that the mean value for that vowel class be considered reasonably accurate. What is important is where a vowel appears relative to the speaker's vowel system as a whole.

2.2.5. Normalization

Men, women and children will all have different formant values for the same set of vowels because they are generally of different physical sizes. The longer vocal tracts of men will lower all the formant values whereas the shorter tracts of a child or a small woman will raise all the values. Taking into account the varying physiologies

of different speakers, each person's voice is in a sense a unique instrument, which the listener's auditory system manages to normalize through complex psycholinguistic processes.

The goal of a quantitative dialect study is to allow for an entire series of different speakers' vowel systems to be superimposed on one grid, allowing for direct comparison. Yet to allow for any meaningful comparison and contrast of the vowels among speakers, a means of mechanical normalization must be applied to the data. Hindle (1978) notes that "it is essential to have a [normalization procedure] that will minimize formant differences between individuals due to inherent physiological factors, but will preserve distinctions that correspond to perceptibly different vowels" (4). With regard to a group of speakers, the normalization process should then cluster like phonemes on a vowel plot and separate different phonemes. Yet the essential caveat of any normalization procedure is that it is sensitive enough to do this without being so robust that it normalizes away any socially significant distinctions between speakers.

Many different normalization procedures have been proposed and all involve the application of mathematical formulae whose details are beyond the scope of this thesis. No one procedure is without its problems. Hindle (1978) examines three methods and finds a log-mean procedure based on a single scaling factor to be the best at preserving social distinctions. The data analysis program employed in this thesis, *Plotnik,* uses a log mean normalization developed by Neary (1977), cited in

Labov (1997). Briefly, it is a uniform scaling factor based on the geometric mean of both F1 and F2 for all the speakers to be compared, using all the tokens in the sample. Generally, a man's scaling factor will be greater than 1 and his vowel system will be expanded because of his lower voice, while a woman or child's scaling factor will be less than 1 and theirs will be contracted. The vowel systems of some individual speakers will undergo little change, while others might be quite dramatically altered during the normalization process. In Table 2.1 below, the data for Marcia have been normalized so that her F1 values for the most part have been lowered, which raises her entire vowel system, and her F2 values have also been lowered, which backs her entire vowel system.

Table 2.1. Data sample of speaker formant values before and after normalization for "Marcia," Teen / Middle Class / Female, age 17

Word	Formant	Before	After
dip	**F1**	620	515
	F2	2041	1696
bee	**F1**	421	349
	F2	2633	2188
peg	**F1**	715	594
	F2	2307	1917
day	**F1**	708	588
	F2	2150	1787
had	**F1**	920	764
	F2	2041	1696
pop	**F1**	847	704
	F2	1366	1135
thought	**F1**	856	711
	F2	1698	1411
mow	**F1**	636	528
	F2	1878	1561
good	**F1**	628	528
	F2	2118	1760
who	**F1**	440	365
	F2	1980	1645
Note: All formants are measured in Hz			

2.3. SOCIALLY DEFINED VARIATION

When we pay attention to who is speaking as well as to the manner in which he or she speaks, we acknowledge that a wealth of social meaning may be conveyed as part of his or her linguistic message. Apart from that part of the acoustic signal that cues the listener to the physiology of the speaker, such as the deep gravely voice of an older man or the breathy squeak of a child's voice, there are other, more subtle phonological cues that may reveal age, gender and social class to native speakers of English. In contrast, a speaker may confuse us when his or her speech does not conform to the social identity to which we have them pegged. The language someone speaks forms an essential part of his or her identity and is used by others to identify those characteristics the speaker projects. "People want to be considered as a part of a particular social group as opposed to other groups, and part of this identity is symbolized by talking like other members of the group" (Wolfram 1991: 28). Furthermore, some groups may adopt a particular change and others will not. "The end result of this selective adoption process results in a dialect difference if the adopted form stabilizes as a characteristic of some social group of speakers" (1991: 31).

Indeed, if language is one badge of individual and group identity, then linguistic variation serves to include the speaker in one group and signal his or her exclusion from another. To demonstrate meaningful variation, we would show that one group of speakers has an acoustical target of a particular phoneme different from

another group—not necessarily all the time or even most of the time—yet enough to show some quantifiable pattern. If men are more likely to use one phonetic variant more than women, if working class more than middle class, if young more than old, then we can say that this patterned variation has sociolinguistic significance. It has social meaning.

2.3.1. Age and the *apparent time construct*

Rarely if ever do researchers have the resources or the time to launch a long-term study over several score years to investigate language change in progress. There are also problems with real-time studies: subjects will become unavailable over the course of the study and regional demographics may change significantly. Also, relying on pre-existing data collected by other researchers may prevent incompatibilities to the present research design. For example, data from many past dialect studies were collected by a skilled transcriber recording an impressionistic interpretation of vowel qualities that he or she heard. Such data could not by fully integrated into a later study based on the analysis of formant measurements. The *apparent time construct* is a research device used to study diachronic variation that mitigates the effect of these particular problems. It allows researchers to measure variation at one point of time by examining synchronic language variation across a generational age range of speakers. Labov's (1963) Martha's Vineyard study and his subsequent research in New York City (1966, 1972) demonstrate the utility of the apparent time construct. It has since been a mainstay feature of his research and that

of others who have followed his method. Baily, Winkle, Tillery & Sand (1991) concludes that the apparent-time construct is "…an unquestionably valid and useful analytical tool" (263).

One of the underlying assumptions of the construct is that adolescent speakers are in the vanguard of change. This is consistent with Labov's (1994) observation that the most advanced vowel systems are found in young adults and late adolescents. Adolescents experiment with innovative forms that some day may or may not become part of the everyday language of their generation (Baily, 2002). As they mature into young adults, those innovative forms that do stabilize in their speech become somewhat fixed for that particular generation of speakers for the rest of their lives. In this manner, an 80-year-old speaker today is assumed to be using the forms that stabilized in his speech when he was in his early twenties. As successive generations of speakers mature, this process of stabilization provides a window into the contemporaneous language of the time when any one particular generation became young adults (Labov 1981).

The difference between language innovation and language change should be noted, however. According to Milroy and Milroy (1997), innovation is the "act of speakers that may or may not become established in the linguistic system and become part of the language." Change, on the other hand, is innovation that "comes to display a regular structure in variation in terms of the social variables" (51). Another important caveat in using the apparent time construct is to differentiate true

language change from age-graded patterns, which are linguistic forms associated with a particular life-stage that repeats every generation. Eckert (1997) argues that certain life stages or turning points for speakers may be more significant than their chronological age. The formation of peer groups in late adolescence or joining the workforce in early adulthood has been shown to demonstrably affect linguistic behavior. Teenagers are especially subject to age-grading phenomenon, as the confusion of late adolescence with its concurrent social insecurities and identity-searching, could make their language somewhat experimental. Accordingly, data collected from teens should be viewed with some caution.

2.3.2. Gender

There are widespread findings in the literature that men and women of the same age, social class and regional background often show clear speech differences. In some cases women are a generation ahead of men within the same community, most notably, those participating in the Northern Cities Vowel Shift (explained in greater detail in Section 2.4.2) (Labov 1994). In addition, Moonwoman (1987) and Luthin (1987) report that young women front the vowels /oh/ and /ow/ more than men in California speech. Milroy and Milroy (1997) claim that variation due to gender is universal in western societies and that the trend is for females to be on the "careful end of the continuum and males on the casual end" (55). The authors were informed mostly by their study in Belfast, Northern Ireland, where they observed that men favor local patterns, women supra-local patterns. They concluded that these

differences were due to the more extended social networks of the women in this particular community, whose jobs and contacts outside the local neighborhood influenced them to speak a more standard variety.

Eckert's (1988) study of high school social structure provides another explanation for gender variance. She compared teenage boys and girls within two polarized social classes which she called "Jocks" and "Burnouts". The Jocks identify with the school and its middle-class authority structures while the Burnouts seek identification with the more working-class adult world outside the school. Eckert observed that the girls in general lead the boys in their use of variant forms, that the Burnouts lead the Jocks, and that the Burnout girls use the most innovative forms. She concluded that the boys gain prestige and power more through accomplishments (sports, academics, fighting and other recognized activities) whereas girls rely on personal identity and relationships with others to gain prestige. For the girls, their personal identities are more closely tied to their group identity, which is in part maintained by language. This encourages the girls more than the boys to adjust their language accordingly.

The relationship between gender and social class is inevitable. Labov (1972) describes a form of "linguistic insecurity" present among the lower middle-class in particular, a status group often characterized by an upwardly mobile striving to become like the next higher social group. Often denied the occupational status by which men are judged, women in this group are in a particularly insecure position,

and may learn to signal their social status linguistically. For this reason they are more likely to use careful language, what is or what they think is a prestige variety. In a similar manner to the conclusions of Eckert (1988), this analysis reflects the common wisdom that men are judged more by what they do, and women by how they present themselves.

Eckert cautions, however, that sex does not have a uniform effect on language variation which could eventually represent language change. Gender, as the social construct of sexual identity, involves a far more complex orientation to other social categories than the categories of male and female would suggest. For example, female norms may become the prestige variety in the course of time, independent of class. Horvath (1985, cited in Milroy and Milroy, 1997) re-graphed Labov's (1966) influential New York City department store study data in terms of gender instead of class and finds stronger correlations with the former.

2.3.3. Social class

Most people have clear intuitions as to what social class is and they certainly recognize—and react to—the more obvious markers of both 'low-class' and 'highfalutin' speech. The efforts of Eliza Doolittle to drop her Cockney slang (and pick up her 'h's') represent just one popularized perception of linguistic variation based on social class. Labov's now famous (1966) study mentioned above helped to open a productive avenue of research for most of his subsequent work and for many other researchers in the field of sociolinguistics, due in part to the politically

provocative nature of the subject of social class. From a methodological point of view, however, defining social class as a constraint on linguistic variability is difficult to operationalize. Unlike age or sex, which have a biological basis, social class is a socio-psychological construct informed by more abstract criteria.

Guy (1988) provides a concise definition of social class, stating that, "Ultimately, social class distinctions seem based on status and power, where status refers to respect and deference in society and power refers to the social and material resources a person can command and the ability to make decisions and influence events" (cited in Chambers 1995:49). However, as Carver (1987) states, "The challenge is to reduce these abstract notions to objective, measurable units that can be correlated with linguistic variation" (92). Using just one indicator of class such as occupation may have what Chambers refers to as "a salutary practical effect" (1995: 47) for its methodological convenience. Yet this also presents problems; he adds, "When several class indicators are used, each one increases the fuzziness of the individual index….The less discrete the class continuum—the vaguer the correlations" (47). People in occupations that require public communication may be required to conform more often to public expectations of what is standard. Teachers and receptionists, for example may speak a more standard variety than their social-class cohorts. This is the concept of the *linguistic market,* e.g., where the extent to which a speaker is required to use the standard in his or her occupational capacity is measured independent of social class (Sankoff & Laberge 1978).

Many studies also suggest that different social strata tend to exhibit different rates of language change. It is the working and middle classes, what Labov (1974: 57) defines as the "interior classes," that show the greatest frequency of innovative forms and that participate most actively in language change. Milroy and Milroy (1997) provides one explanation for this. They state that strong solidarity ties are characteristic of lower and higher social groups. In contrast, groups centrally located in the class hierarchy have a weaker social network density but are less marginalized from regional norms because of a larger overall network. Because of this, the highest social groups are not as likely to follow local norms, and the lowest social groups do not have strong local ties or broader community allegiance to serve as a model for change. Yet whether the working class or the middle class exhibits a greater propensity for change may be regionally defined. Although Di Paolo and Faber (1990) do not clearly differentiate working and a middle classes in their Utah study, they found the greatest innovators of change in the less affluent community. In contrast, Esling and Warkentlye (1993) showed the middle class to be clearly leading change in Vancouver, BC.

2.3.4. Stylistic Variation

Most speakers will adjust their speech according to the perceived formality or informality of the conversation, a phenomenon known as style-shifting. This can be influenced by both the interlocutor and/or the subject of the conversation. Delivering a written speech in front of large group of people is a much more formal speech

context than an impassioned conversation about personal problems with a close friend, and a speaker will adjust his or her speech accordingly.

Stylistic variation is generally regarded as universal (Schilling-Estes, 2001), so much so that Labov (1994) labels those speakers who never style shift, who do not make distinctions in their speech among particular linguistic registers, as "abnormal and defective" (158). Labov (1972) demonstrates an extreme example of style-shifting as it interacts with social class in the usage of post-vocalic /r/ in New York City. In casual speech, the upper-middle class subjects had an appreciably higher index for using post-vocalic /r/, yet in the more self-conscious task of reading a word list, the lower middle-class subjects exceeded them by the same index value. With the /r/ variable serving as a prestige variant, the lower-middle class subjects exhibited a pattern of hyper-correction. Comparing interview style to the somewhat more formal reading style for /ow/-fronting in California English, Luthin (1987) finds a greater degree of fronting in the former. He concluded that these speakers don't consider the expression of this particular variable appropriate in more formal situations. Similarly, when looking for innovative forms, Labov (1994) states that the "most advanced tokens appear in emphatically stressed words in personal narratives" (158).

In a conversational interview focused on relatively neutral topics of discussion, the fact that a person is being interviewed and tape recorded is a formidable obstacle to obtaining ordinary, everyday speech-the kind of speech that is

so central to most studies of dialect variation. This problem has become know in sociolinguistics as the observer's paradox (Labov 1994: 158). To account for this, the sociolinguistic interview is designed to elicit casual, spontaneous speech where the speaker's conscious attention to form in minimal. This is mostly accomplished by engaging the interview subject in topics of conversation that are linked to strong emotions or excitement.

2.4. CHAIN SHIFTING AND LANGUAGE CHANGE

Vowels are particularly revealing of dialect differences because they tend to function as rotating systems or subsystems of linked elements rather than isolated individual entities. The allophonic wandering of one vowel over time may cause it to eventually encroach into the phonetic space of another vowel. At this point the two vowel phonemes can merge, as their phonetic realizations become the same, reducing by one the entire phonemic inventory in that dialect. In another view, vowels move in unison to preserve their ability to distinguish words, reflecting the "functional economy of the vowel system" (Martinet 1955, cited in Labov 1984: 117). In this manner, the movement of one vowel phoneme can initiate a movement in the neighboring vowel phoneme, with it in turn moving its phonetic realization. This pattern of phonetic rotation in vowels is known as chain shifting. A vowel that moves and leaves a space behind that attracts another vowel into that space initiates a "pull chain." A vowel that encroaches on another vowel's phonetic space and forces it to move is part of a "push chain."

Labov (1994) presents 3 universal principles of chain shifting:

Principle I	Long vowels rise
Principle II	Short vowels fall
Principle IIa	Nuclei of upgliding diphthongs fall
Principle III	Back vowels move to the front

The most obvious evidence of chain shifting in the English language is preserved in its rather conservative spelling system, which has managed to capture quite well the pronunciation of late Middle and early Modern English before it underwent a radical rotation of English long vowels within the Great Vowel Shift in the mid to late 16th century. Modern North American English has proven to be no less dynamic. It continues to show several chain-shifting patterns that differentiate its dialects. Labov (1994) provides extensive details of chain-shifting phenomena in English and other, European and non-Indo European languages, which suggests the universality of the phenomenon.

2.4.1. Historical vowel classes

Because the chain shifting pattern of any particular vowel phoneme will very often radically alter its phonetic realization over time, it is advantageous to use a notational system that retains a consistence reference to this vowel, as well as indicating a historical starting-off point in its movement. As mentioned above, conventional English orthography does this to some extent. It also allows speakers of

very different varieties of English to read and understand the same written passage while assigning their very different modern phonetic values to the words they read. Regardless, English spelling is for the most inconsistent due to its centuries-long development by a myriad of independent scribes and writers.

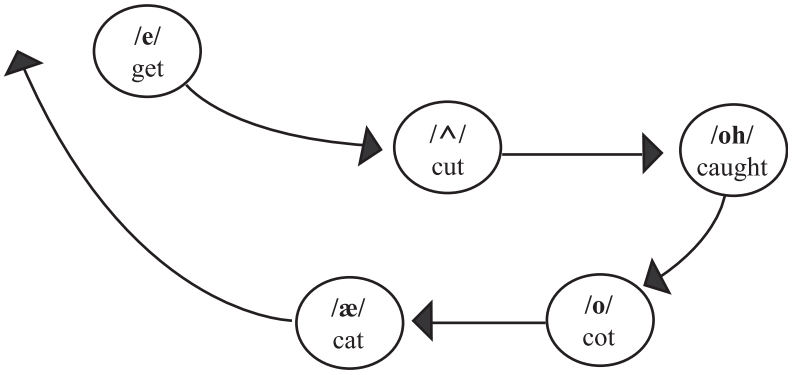
The vowel notation used in this thesis was developed within the American Structuralist tradition and further developed within Labov (1991), who defines a word class as "a group of words defined by a common segment derived from the same historical source" (13). He also recognizes that while these word classes "do not represent the most appropriate phonetic or phonemic notation for any one dialect, instead, they represent a framework that allows us to compare dialects" (Labov 1994:164). These vowel classes represent a jumping off point dating back to the standard variety of late 18th or early 19th century English. At this point, the Great Vowel Shift and the subsequent dipthongization of mid and high tense vowels were generally completed. Labov acknowledges that for any current dialect, the phonetic realization of a given word class may be far from what the notation suggests. However, by keeping the notation, "We retain the ability to trace the development of sound changes from their recent starting point, and to demonstrate the opposing movements of the same elements in different regional dialects" (164). Because Labov's research depends on the recognition of historical trends in the development of dialectical differences between groups of speakers who may have once shared an antecedent vowel system, this notation is appropriate for studies examining

diachronic change through the lens of synchronic variation. This thesis has therefore adopted this notation.

2.4.2. North American English chain shifting patterns

Based on Labov's (1984, 2002) Telephone Survey (TELSUR) data for his Phonological Atlas of North American English (PANA), he identifies two major chain shifts in operation in North American English: The Northern Cities Vowel Shift (NCS) and the Southern Shift.

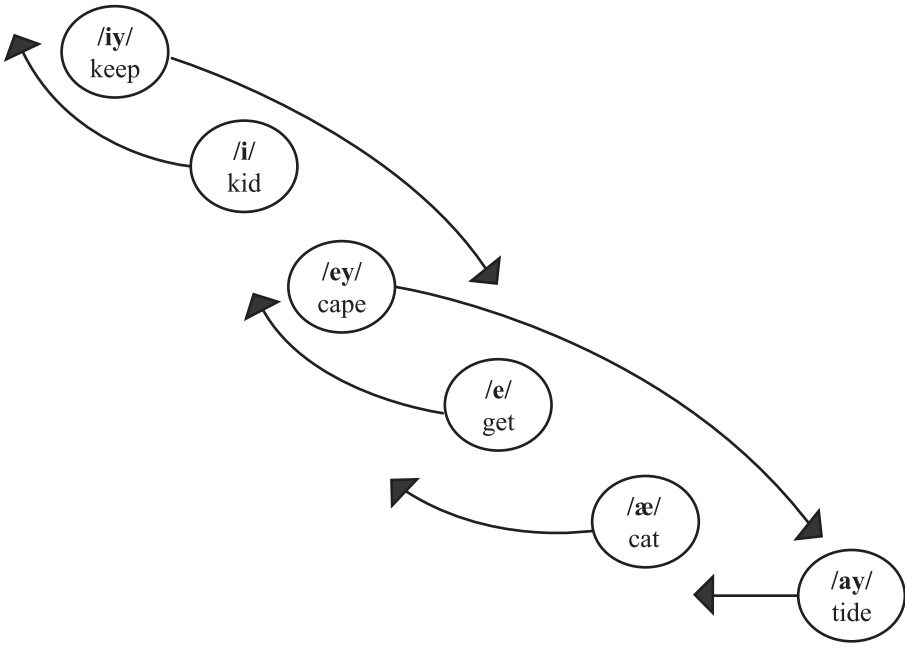
Figure 2.4 Northern Cities Vowel Shift (Labov 2002)



The NCS shift corresponds to large area Labov defines as the Inland North, essentially the region of large American cities bordering the Great Lakes and continuing through western New York State. (See Figure 2.6 in Section 2.5.1 below for a geographic illustration.) Illustrated in Figure 2.4 above, the NCS consists of five correlated movements, and is the first systematic chain shift to affect the short vowels of English, a vowel system which has been relatively stable for over a

thousand years (Labov 2002). Its main features are its resistance to the merger of /o/ and /oh/, the fronting of /o/ and the raising of /æ/.

Figure 2.5. Southern Vowel Shift (Labov 2002)



Labov defines the Southern dialect, characterizing a large area stretching from Virginia to Texas, as based on the single criterion of the monothongization of /ay/ before voiced obstruents. The high-frequency usage of this vowel and its qualitative definition make this feature particularly salient to the average speaker. Furthermore, the movement of /ay/ is triggering the Southern Shift, illustrated in Figure 2.5 above, which is creating space for the mid-front position diphthong /ey/ to descend towards the lowest position, with /iy/ following a parallel track down. The lax front vowels /i, e, æ/ then move up and develop inglides, in the process switching positions with their tense counterparts /iy, ey/.

2.5. REGIONAL DIALECT STUDIES

So how many regional dialects are there in the United States? "Depending on the criteria used to delimit a regional dialect, the answer may range anywhere from two to two hundred." Furthermore, "Discrete boundaries between dialects are often difficult to determine and the types of differences that uniquely set apart regional varieties are not always easy to establish" (Wolfram 1991: 67).

2.5.1. Lexical studies of the Pacific Northwest

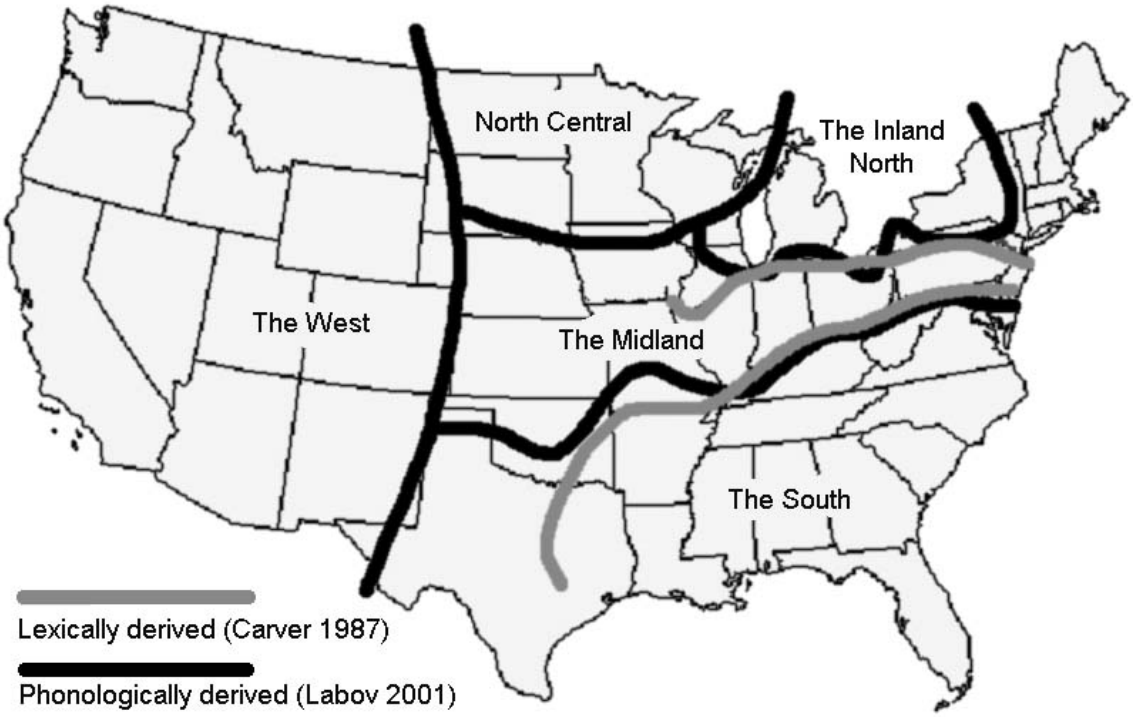
The first dialect studies more often than not focused on the creation of lexical isoglosses, which attempt to map regionally-defined word choices. For example, if people north of an imaginary line generally use the term "pail" and those south of the line use the term "bucket" to refer to the same object in the same linguistic context, these terms can then be employed as indicators to create an east-west isogloss separating the north from the south. Better yet is to note a constellation of lexical items that concur and form a bundle of isoglosses, or dialect boundary.

American dialect studies of the Northwest began in earnest in the twentieth century. Reed (1957) finds that while Washington and Idaho have the highest frequency of Northern terms, Oregon speakers have greater preference for Midland words. As expected, Southern terms are rarely encountered anywhere in the Northwest. These findings suggest that the early settlement patterns of the first English-speaking emigrants to Oregon may have influenced its dialectical patterns. Beginning in the mid 19th century, a large influx of emigrants arrived in the

Willamette Valley from the American Midland region, including: Ohio, Tennessee, Illinois and Iowa, with the largest group coming from Missouri. Washington state and Idaho lagged somewhat behind Oregon in their settlement, and in contrast, Upper Northerners formed majorities in these states (Carver 1987). However, although the largest group of settlers came from the Midland region, and would suggest this region being the primary influence on dialectical development, Portland's population has continued to grow with input from all over the United States and Canada, providing the region with many and varied linguistic inputs.

Carver (1987) furthermore suggests that Oregon is the locus of the Northwest dialect according to these settlement patterns. Based on lexical isogloss data supplemented with some phonological information, he describes the major dialect regions of the United States as consisting of three areas: North, with finer divisions into an Upper North and Lower North; South, with finer divisions into an Upper South, Lower South: and the West (See Figure 2.4 below). He sees the West as a speech region both continuous with the East through its link through the Northern and Midland dialect layers, but also set off from the east by distinct Western isoglosses. Drawing heavily from Carver, Wolfram and Schilling-Estes (1998) claims that the Pacific Northwest, including Washington, Western Idaho and most of Oregon, is the most clearly defined dialect region in the West. The also agree that Portland is the focal point for this Pacific Northwest dialect.

Figure 2.6. Comparison of American English dialectical divisions (Labov 2002)



Reed's and Carver's analyses are based mostly on lexical differences. Yet the lexicon is often considered by many linguists to be a superficial subsystem of language when compared to the more formal structures of syntax, morphology and phonology, thus making it a less reliable criterion for dialect delineation (Labov 2002). Nonetheless, Wolfram (1991) recommends that the significance of lexical variability continue to be recognized, suggesting that it may point to broader culture and historical foundations which may help define regional dialects. Based on his ongoing Phonological Atlas of North American English, Labov (2002) notes that there is a high degree of convergence between the dialect isoglosses based on regional vocabulary and phonological variation, as illustrated in Figure 2.6 above.

He attributes the differences between the two methods of delineating dialect to differential rates and types of language change in progress that have a far greater effect on phonology than they do on vocabulary within any particular dialect. Note in the figure below that the regional labels are provided by Labov.

2.5.2. Phonology-based regional studies

The dialect areas defined above by the different North American chain shifts still leave large portions of the continent to be defined by other criteria. The Midland area, for example, does not have structures associated with the North or the South, and is defined negatively in relation to these two regions. Likewise, Labov defines the West negatively as an area that participates in neither the Canadian shift nor the Southern Shift, yet distinguishes it from the North and Midland by the complete merger of /o/ and /oh/. As opposed to the Inland North, the North is defined by an /ey/~/ow/ criterion, where the F2 of /ey/ is below 2200 Hz. American English is particularly undefined in the Northeast, the North Central states and the Midland regions, all of which show a dense distribution of dialects that make regional identification difficult. Wolfram (1991) explains, "In American society, metropolitan areas have become the locus of change, and rural areas have been slower to change. In this respect, language is just one of the areas in which this pattern of 'cultural lag' is indicated" (26).

Di Paolo and Faber (1990) is one of the first studies of the West to use the quantitative paradigm. This study looks at phonation differences and the phonetic

content of the tense-lax contrast in of the vowel pairs /iy-i, ey-e, uw-u/ before tautosyllabic /l/ or "dark l" in Utah English. Previous studies as well as casual observation show that tense vowels are perceived as lax by transcribers and speakers alike. What Di Paolo and Faber discovered is that the front vowel pairs lose their F2 distinction, while the back pair lose their F1 distinction. For some of the younger speakers, F1/F2 values are in fact reversed. Yet speakers still manage to maintain distinctions based largely on differential laryngeal states—sometimes with creaky voice. The young, the less affluent and women display these features the most, seeming to place them in the vanguard of language change in progress. The authors suggest the loss of F1/F2 distinction in the Utah data shows an association with features of the Southern Vowel Shift (See Figure 2.5 above), which involves the raising of front lax vowels and the concurrent lowering and centralizing of front tense vowels.

If Utah were participating in the Southern Shift, it would suggest either one of two things: that other Western regions may also be participating within this shift, or that Utah could be excluded from the Western dialectical region. However, the loss of the F1 distinction in the back vowels in the Utah data is accompanied by the fronting of /u/, so that in extreme cases it occupies the same space as /i/, albeit presumably with lip rounding. Usually back vowels before tautosyllabic /l/ are the most conservative. They are the last to front during the movement of a vowel class due to the strong backing effect of the post-vocalic lateral environment. As in the

Utah study, Luthin (1987) also notes that tautosyllabic dark /l/ strongly inhibits the fronting of /ow/ and /uw/ in his investigation of Southern California speakers.

2.5.3. The California movement

Hinton *et al.* (1987) review several early studies concerning California speech patterns. First of all they note that a distinctive Southern California speech style is nationally recognized, at least in popular parodies of San Fernando "Valley girls," "surfer dudes" and by character actors playing California bit parts on television and in the movies. The parodies consistently display some prominent phonological features: the fronting of /ow/ and /uw/; the lowering of /i/ and /e/; and the lowering and backing of /æ/. In contrast, a previous Linguistic Atlas of the Pacific Coast (LAPC) survey including 270 native-born speakers across California reported none of the vowel features of the present-day parodies. Hinton and her graduate seminar ran a pilot study to examine this discrepancy, with each member of the team choosing a vowel to investigate. They selected a common pool of 22 subjects. The majority were young, middle-class speakers in the age range of 16-22. Three additional subjects were 27, 40 and 60 years old. The data collection was not instrumental, but based on a subjective 2-point scoring system. A zero point was agreed upon and vowels were rated 0, 1 and 2 depending on the degree movement.

Luthin (1987) finds no record of fronting in the LAPC records he examines, yet finds a marked degree of /ow/-fronting in his own study as well as some phonetic environments that conditions it. Both nasal and alveolar post-vocalic environments

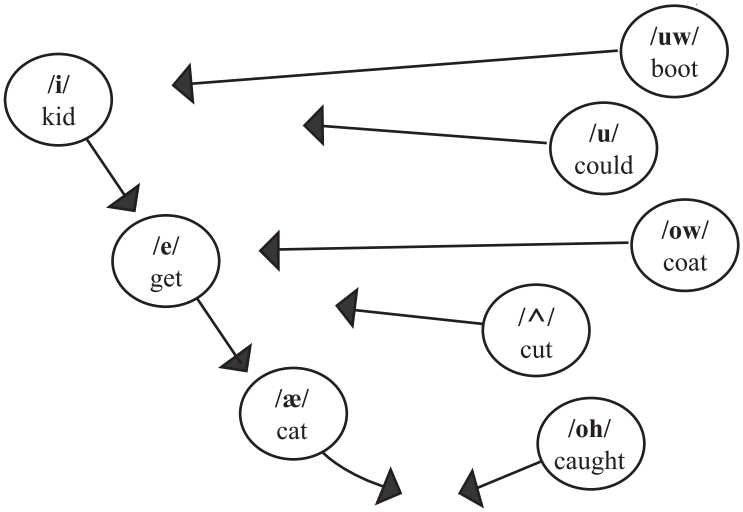
(excluding liquids) tend to inhibit fronting. A contrast between closed and open syllables in the post-vocalic environment does not appear to make any difference to degrees of fronting. In particular, a tautosyllabic /l/ promotes lowering, unrounding and laxing of the /ow/ nucleus. He adds that another research team member noted the same effect of tautosyllabic /l/ on /uw/ in her unpublished results.

Moonwoman's (1987) investigation of /oh/ movement also finds that tautosyllabic /l/ discourages fronting and lowering. Otherwise, speakers front /oh/ more consistently, and on average do so towards a further extreme than they lower it. Her most significant findings suggest that the /o-oh/, or *cot/caught* merger is far advanced, though not complete in California. The post-vocalic lateral environment in particular inhibits a full merger, and young women show a lowered pre-lateral variant of /oh/. The new forms are not found in the older speakers.

The general findings of the (Hinton *et al*. 1987) research team suggest a nascent California vowel shift, or what they more modestly label a vowel movement. As illustrated in Figure 2.7 below, it is characterized by a marked fronting of /uw, u, ow/, a fair degree of fronting and some lowering of /oh/, and some evidence of lowering in the front lax vowels. The speakers with the highest cumulative scores for fronting form a coherent social group: young, female, either white or Asian and raised either in the city or the suburbs. Those who score the lowest are the three oldest speakers and four young speakers: one Black, one Hispanic, one from a small rural town and one White suburban speaker who expressed his open disdain for the

much-parodied California speech style in his interview. Although this concentration of fronted features in the young speakers seems to indicate a nascent chain shift in progress, the lack of a true generational age range in the study precludes too strong of a conclusion. Alternatively Hinton *et al.* also suggest that possibility that the age-specific pattern could also be a function of age-grading, where the faddish speech style of California adolescents is adopted for its prestige value, only to be abandoned as adolescence wanes.

Figure 2.7. The California vowel movement (Hinton *et al*. 1987)



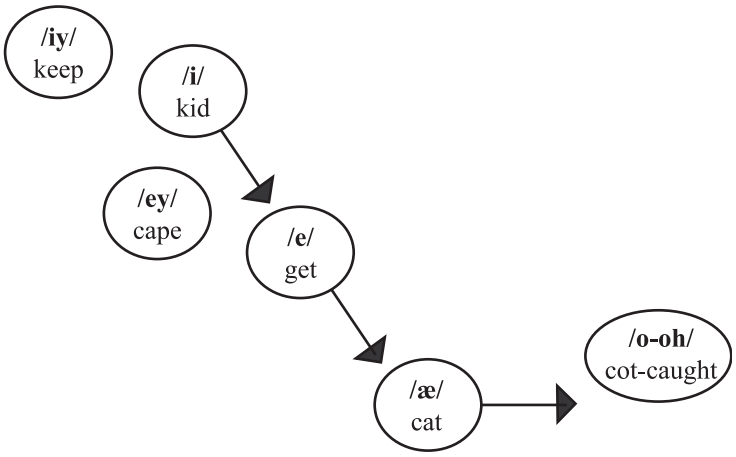
Luthin (1987) notes that /uw/-fronting is more pronounced than /ow/-fronting. Women lead men in both cases, but there is a much greater difference between male and female speakers in /ow/-fronting. Because women in general lead in sound change, this may suggest a relative chronology of movement, with /uw/ fronting before /ow/, leaving the males speakers with still not enough time to "catch

up" with /ow/ as they've done with /uw/. With /uw/ leading forward, it could create a pull chain effect on /ow/, as it vacates its former space.

2.5.4. The Canadian vowel shift

Clarke *et al.* (1995) provides evidence for a Canadian vowel shift that shows remarkable similarities to the California Movement. The Canadian vowel shift covers a region in Canada hugging the border with U.S., extending from Ontario to the Pacific Coast. According to Clarke *et al.*, both Canadian and California English share the low back vowel merger, a lowering of front lax vowels, a retraction of /æ/, a centralization of /^/, and some degree of fronting in the tense back vowels /ow, uw/ and the back lax vowel /u/.

Figure 2.8. Canadian Vowel Shift (Clarke *et al.*, 1995)



The pivot point for this shift is the /o-oh/ merger of the low back vowel, illustrated in Figure 2.8 above. According to Labov (2002), the low back vowel merger in Canada usually occupies the low back rounded position (IPA [ɒ]), as

opposed to the California movement (and elsewhere in the U.S.), where the merged vowel occupies a low central unrounded position (IPA [a]). (See Appendix B for an full IPA vowel diagram). Because this low back vowel remains tense and opens up the low central space formerly occupied by /o/, it serves as a trigger in a pull chain for the lowering and retraction for the entire front lax vowel system, according to Principle II of chain shifts (Labov 1994). This leaves more space for the lowering and retraction of /æ/ into the low central space formerly occupied by /o/, and with a more advanced movement of /æ/, permitting a more vigorous lowering of the front lax vowels than in the California movement. This would suggest that although the Canadian shift and California movements are analogous, they may not be the same.

2.5.5. Where does Portland fit in?

As Portland lies geographically between Southern California and Canada, it could possibly be influenced by or be participating in either or both dialectical trends identified with these regions. In a recent paper delivered at the NWAV31 conference, Conn (2002) reports that the low back merger in Portland speech was all but complete except in one 90-year-old female speaker. His findings suggest that even if this one speaker represents just one possible input to an emerging dialect system, the merger was just beginning for speakers even as late as the 1920's. This dates the triggering for the shift as a fairly recent event, within the lifetime of at least one of the Portland speakers. Conn also examines the fronting of back vowels. As in the California data, /uw/ has the most fronting. One 28-year-old female speaker has

the most extreme realization, with her /uw/ mean nearly as front as her /iy/ mean. The most conservative speakers are also the oldest, suggesting a change in progress. Degrees of /ow/-fronting are nowhere near as dramatic as /uw/-fronting, but still conform to the generational pattern, with younger speakers showing a greater fronted mean for back vowels. As to be expected, the post-vocalic lateral environment inhibited fronting to such an extent that such lateral environments were not included in the mean. Conn also finds the post-vocalic nasal environment inhibits fronting. In particular, the word 'home' is backed for all speakers who have it in their data. For five speakers, it shows an extreme lowering and backing into the space of the merged back vowel. This is similar to Clarke *et al.*'s (1995) conclusion that the post-vocalic environment may strongly influence vowel movement, with each vowel behaving idiosyncratically.

At this point, there is not enough data to determine whether the California movement and the Canadian shift are related, whether one is a subset of the other, or whether they are simply coincidental vowel movements caused by language-internal phonetic factors that follow a coincidental low-back merger in both dialect systems. Clarke *et al.* (1995) suggests that the relationship could be socially motivated by an increasing identification by young Canadian speakers with U.S. speech patterns. They ask, "Why is it that younger female speakers in a city like Toronto seem to be involved in a vowel shifting process similar to one occurring in urban California, thousands of miles away?" Where does Portland fit into this relationship? At least on

the surface, Canadians display a disdain for Americans, and Oregonians display a disdain for Californians. So just who is influencing whom?

CHAPTER THREE: METHODOLOGY AND DESIGN

The following chapter details the methods and procedures used to collect and analyze the naturalistic speech of Portland natives.

3.1. SUBJECT CRITERIA

3.1.1. Solicitation

Subjects were selected partially through via the researcher's network of friends, coworkers and acquaintances and an open solicitation of subjects through a university e-mail listserv for the PSU Applied Linguistics Department. In addition, interview subjects from the existing PDS corpus collected by Conn (2000) and Wolff (2000) were used in this study. Each interview subject read and signed an informed consent form approved by the PSU Human Subjects Research Review Committee. Legal minors required an additional signed parental consent form. Subject anonymity has been maintained during the data analysis and reporting phases of this study through the use of first-name pseudonyms. These are linked to the subjects' real identities within the PDS subject database.

3.1.2. Eligibility

Eligible subjects were those who were either born in Portland or arrived before the age of five years. Portland residents who had spent significant periods of time outside of Portland, i.e., more than a year, during the period of socialization

preceding age 21 were considered ineligible due to possible dialect interference (Labov 1994).

The geographical definition of Portland includes the political unit of metropolitan Portland as well as the area communities surrounding the city that form a demographic contiguity with the urban area at the core. Residents from these communities, which include suburban towns such as Beaverton, Hillsboro and Gresham, can be expected to share features of the Portland Dialect. However, those subjects who don't live within the metropolitan city limits all commute into the city for either work or school, insuring that they retain significant social networks within the core. In all cases, the specific residence history of the subjects was collected for inclusion in the PDS database.

3.1.3. Selection

Subjects were selected with three main social criteria in mind: age, gender and socio-economic class (see Table 3.1 below). The greater number of subjects in the Young Adults cells and in the Teen MC cells reflects the greater availability of subjects in that age range. All selected subjects are white/Caucasian, thereby reducing the chance of any possible language variation correlated with the social factors of race and/or ethnicity, neither of which is considered within the present study.

Table 3.1. PDS Subjects for present study

Age Grouping	Social Class	Males (M)	Females (F)
Teens Ages 11-19	**Working Class (WC)**	Ralph (12)	Stacy (14)
	Middle Class (MC)	Robbie (14) Erik (13)	Karen (12) Marcia (17)
Young Adults (YA) Ages 20-39 years	**WC**	Kent (29) Fireant (30)	Melissa (30) Annette (32)
	MC	Michael (32) Marcus (28)	Sabrina (28) Lori (28)
Older Adults (OA) Ages 40-60	**WC**	Greg (55)	Daisy (56)
	MC	Kenneth (50)	Jan (53)
Note: Each subject's age is provided in parentheses after his or her pseudonym.			

3.1.4. Defining social class

Social class was broken into the two categories of Working Class (WC) and Middle Class (MC). Two methods were used to determine social class: one quantitative and the other qualitative. The quantitative method is a socio-economic index for Portland following the design employed by Conn (2000) and Wolff (2000), created from a sample provided by Chambers (1995) and the 2000 U.S. Census data for Portland (http://www.govinfo.library.orst.edu). The index is based on four categories: occupation, income, housing and education. Within each category, subjects are assigned a rating from 1 to 4, depending on their type of occupation, annual income, housing and education. The highest possible rating across all four categories is 16. Any cumulative number higher than 12 places the subject in the Middle Class, anything lower than 12 places him or her in the Working Class. The index is detailed in Table 3.2 below.:

Table 3.2. Socio-economic index for Portland

	Index rating			
	4	**3**	**2**	**1**
Occupation	Professional / Executive / Administrative / Managerial	Clerical /Administrative support / Skilled construction	Service / Machine operator / Factory worker / Assembler	Non-skilled labor
Annual income	*$45,000* More than national median	*25,000-45,000* More than Portland median but less than national median	*12,000-25,000* More than minimum wage but less than Portland median	*Below $12,000* Less than minimum wage
Housing	Homeowner	Rent house	Rent apartment	Rent room / shared housing
Education	4-year college graduate +	Some college	High school graduate, GED	Did not graduate high school

The second, qualitative method of designating social class is subject self-reporting based on casual observation and reflection. Subjects were asked during the interview which social class they and their family identified with the most and then asked to describe why they thought this was so. The researcher's judgment of the subject's social class was only used when the index and the subject self-reflection were in conflict, with precedence given to the subject's choice of identity and the index rating.

Teenagers and young adults up until the age of 20 years old in the study were assigned the same social class as their parents, as the categories in the index cannot give a reliable description of a person whose occupation, income and housing may be simply transitory while his or her education is being completed. Problems associated with delineating social class will be discussed more in Chapter 5.

3.2. INTERVIEW DESIGN

All the interviews generally followed a similar format. Each began with a warm-up period eliciting biographical and demographic information which also served to acclimatize the subject to the microphone and recording apparatus and to the interview format itself. To account for this warm-up period, the first five minutes of each interview were not analyzed unless no satisfactory tokens were found elsewhere in the interview. Depending on which location was most convenient for the subject, interviews were conducted in three main settings: the subject's home, an empty conference room on the PSU campus and a public café or restaurant. The average length of each interview was between 30 and 45 minutes.

The goal of the sociolinguistic interview is to elicit naturalistic speech from the subject. Such speech is associated with a casual or informal setting and conversation topic. For this purpose, all interviews were conducted face-to-face, and conversation was stimulated with a series of open-ended questions concerning topics of the personal interest or of an emotional nature, to encourage the subject to "lose" him or herself in the narrative or emotion of the topic at hand and not pay as much conscious attention to the rather artificial nature of the interview itself. In addition, the subjects were asked questions designed to encourage extended turns at talk to achieve the same effect, e.g., "What have you done that you are really proud of?" "Do you remember when Mt. St. Helens blew?"

Subjects were also given a word list to recite. This served the dual purpose of providing insight into more formal speaking styles and provided the production of specific tokens which may have been absent in the unstructured portion of the interview. A complete range of tokens is necessary for the normalization procedure employed by the graphing program, *Plotnik*, which will be explained in greater detail below.

3.3 DATA COLLECTION

3.3.1. Instruments and procedures

Interviews were recorded on a Sony Digital Audio Tape (DAT) TCD-D8 stereo recorder on 124-minute stereo DAT micro cassettes, using Audio-Technica 831b lavaliere microphones. In joint interviews with two subjects, two of the same microphones were employed with each plugged into a separate audio channel.

After recording the interview, the procedures outlined below were followed to isolate vowel tokens for analysis:

1. Interviews were digitized and saved in the WAVE audio file format. This format is one of the most common for digital sound storage and is also the native format employed by the speech analysis software *PCquirer*. Files were saved at the maximum sampling rate of 16 bits at 22,000 Hz. The sampling rate in the analog-to-digital conversion process should be twice the sampling

rate of any spectral components to be captured (Johnson 1997). Most, if not all of the vowel formant values examined occur below 3,000 Hz.

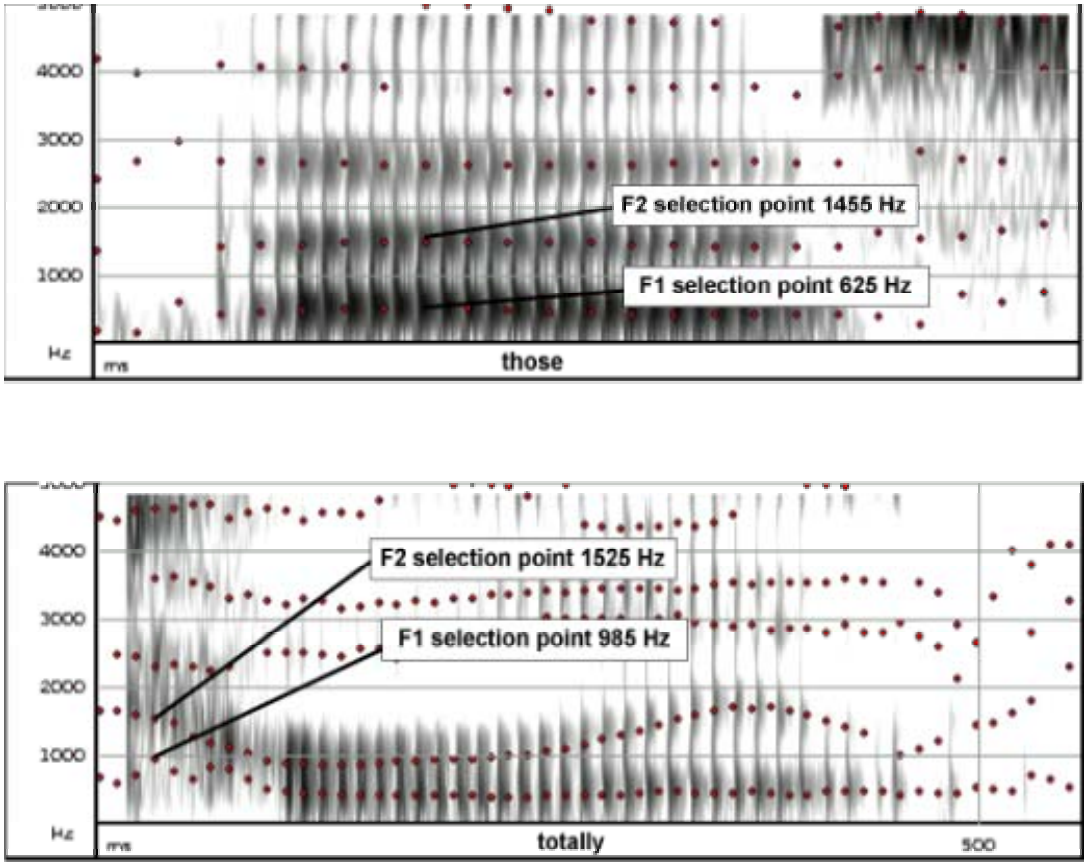
2. Word-sized files were then extracted from the digitized interview files. Each word-sized file contains the relevant vowel token as well as preceding and following segments in order retain the immediate phonetic context. Criteria for the selection of individual words will be detailed in Section 3.3.2 below.

3. Concurrent with this process, an interview log file was created in a word-processing program that recorded the phrase from which the word was lifted, and its occurrence within the interview relative to other phrases from which other words were selected. This allowed a particular word file to be easily relocated within the full interview for reanalysis, if that would prove necessary. See Appendix E for a sample of the Interview Log File.

4. Waveform and spectrographic analysis of vowel tokens was done with the aid of *PCquirer*. The waveform display graphs the intensity peaks over time and the spectrographic analysis provides the vowel formants. See Figure 3.1 below for an illustration of the two displays. Formants are represented by dark horizontal bands, where darkness represents intensity or loudness. The formants are produced by a Linear Predictive Coding (LPC) algorithm that takes a small duration of an acoustic waveform and from it estimates vocal tract resonance (Johnson 1987). Superimposed on the formants is a trail of red points plotted at 10 millisecond intervals (grey in the illustration) which

indicate the formant values at specific points in time. Labov (2001) estimates the LPC algorithm to have an internal accuracy between 5-10 Hz.

Figure 3.1. Spectrographic analysis of the words "those" and "totally"



5. Measurement points that best reflected the vowel nucleus were then selected. This process is part mechanical and part intuitive, so procedures and problems associated with the selection are outlined in greater detail in Section 3.3.3 below.

6. Within *PCquirer*, a log file was created for each speaker that documented six relevant data items for each word file. Each line of data has the following format:

214	566	1282	62	stories2	-- heavy rhotic, weak F2
a.	b.	c.	d.	e.	f.

   a. The time point where the selection was made (in ms)

   b. F1 value at the selection time point (in Hz)

   c. F2 value at the selection time point (in Hz)

   d. Vowel class label (necessary for further coding in the graphing and analysis program *Plotnik*).

   e. The word in which the vowel appears. This also serves as the label for the word file. Multiple instances of words are distinguished with a numerical suffix. For example, the "2" in the datum "stories2" represents the second time the word "stories" was used.

   f. Any supplementary notes about factors that may have affected measurement.

7. After some trivial modifications to accommodate the format conventions of *Plotnik*, each speaker data file was then loaded into the program for the process of vowel normalization, vowel system interpretation and display. Details on the functions of *Plotnik* are presented below in Section 3.4 of this chapter.

Table 3.3. Selection of vowel tokens

Number of tokens selected	Plotnik Vowel Class		Additional description	IPA	Typical word	Reason for inclusion
5	1	i	always free	ɪ	bit	Front vowels define the front vowel space
3	11	iyC	checked, +/- voice	i	beet	
3	12	iyF	free		bee	
5	2	e	always free	ɛ	bet	
3	21	eyC	checked, +/- voice	ej	bait	
3	22	eyF	free		bay	
5	3	æ	always free	æ	bat	
3	41	ayF	free	aj	buy	Rising diphthongs can be the lowest central vowels
3	47	ay0	checked, - voice		bite	
3	41	ayV	checked, + voice		tide	
3	42	awF	free	aw	now	
3	42	aw0	checked, - voice		bout	
3	42	awV	checked, + voice		loud	
2	43	ah		ɑ	father	Highly variable vowel
5	44	ahr	rhoticized		car	Defines central vowel space
3	5	o	always free		cot	Define back limit of vowel space, non-merger may be present in older speakers
3	53	oh	always free	ɔ	caught	
3	54	ohr	rhoticized		horse	
3	64	owr	rhoticized	ow	hoarse	
3	6	^	coronal onset	ʌ	cut	Define central space
3	6	^	non-coronal onset		but	
all	62	owC	checked, +/- voice	ow	boat	Main focus of thesis
all	63	ow	free		toe	
all	7	u	always free	ʊ	book	
all	72	uwC	checked, +/- voice	u	boot	
all	73	uwF	free		shoe	
all	62	owL	lateralized	ow	bowl	Main focus of thesis, also define high back wall, post-vocalic /l/ resists fronting
all	7	ul	lateralized	ʊ	full	
all	72	uwl	lateralized	u	fool	
5	94	^r	rhoticized	ər	bird, heard	Define central space

3.3.2. Selection of vowel tokens

Table 3.3 above displays relevant information regarding the selection of vowel tokens. The first column refers to the number of tokens selected for each vowel class. The second column is split in two: the first half displays the numerical

coding employed by *Plotnik* in its internal calculations, and the second the more transparent alphabetical notation developed by Labov (1991) and used throughout this thesis. The third column labeled "Additional description" provides some of the justification for each vowel class definition. In the next column, International Phonetic Alphabet (IPA) equivalents are provided to better interpret the vowel class notation. There is not a one-to-one match up between Labov's vowel classes and the IPA, as the former is purely phonemic and the latter is both a phonemic and phonetic system of notation. The column labeled "Typical word" provides an example word that is typical of that vowel class, regardless whether or not that word has been part of the data corpus. The selective shading of individual cells is maintained to provide continuity with categories on either side of the IPA column. The final column details the reason for collecting representative tokens, mostly having to do with providing sufficient raw data for the normalization process.

Vowel selection criteria were developed through consultation with Jeff Conn, a doctoral candidate and research assistant on the TELSUR project, which is presently creating the Phonological Atlas of North American English (PANA) (Labov 2002).The selection of vowel tokens was undertaken with two goals in mind:

1. Provide an adequate representation of the entire vowel space for the normalization procedure employed by *Plotnik*. In order to calculate a meaningful log mean, tokens must be selected that provide a representation

of each vowel space within a speaker's vowel system. In addition, the perimeter of the entire space must be adequately represented.

2. Provide the same for an accurate mean to represent the positions of the vowels /ow, uw, u/ relative to the speaker's entire vowel system.

In accordance with conventions employed by TELSUR researchers (Labov, 2002), at least 5 tokens were selected for each major vowel class to define the entire vowel space while as many tokens as possible (labeled "all" in the first column of Table 3.3 above) were collected for the vowel classes under investigation to create more accurate mean values for these vowels and to account for all possible phonetic contexts. Generally, between 10-15 tokens were collected for these vowel classes, although in some cases the interviews yielded less tokens with the lower frequency vowels classes such as /uwF/ and /uwL/.

The following caveats and guidelines were observed when selecting representative tokens:

1. Preceding glides /w, y/, liquids /l, r/ and consonant clusters containing these segments cannot easily be isolated from the nucleus. These were avoided. Often the glide is not represented in the conventional orthography, e.g., tokens of /uw/ that contain an initial palatal glide [j] as in pure.

2. Post-vocalic /l/ after high back vowels was deliberately selected for its strong backing effect, helping to define the back wall of a speaker's vowel space for normalization.
3. Multisyllable words tend to centralize the vowels they contain, making them less representative of their class. Monosyllabic words are preferred and were used when available.
4. More than two tokens of one word may represent an idiosyncratic pronunciation that would skew the mean for that vowel class. No more than two were included from any one speaker.
5. When in doubt as to which particular historical class a vowel belongs, Kenyon's (1953) *A Pronouncing Dictionary of American English* was consulted.

According to Labov (1994), the movements of the diphthongs are differentiated in most English dialects undergoing sound change by the Checked (C) versus Free (F) opposition, where free vowels occur in an open syllable not followed by a consonant coda and checked vowels are enclosed by a coda. During the process of sound change, free vowels are well in advance of the checked vowels until the change becomes complete. This opposition is represented by different vowel class labels in Table 3.3 above. *Plotnik* can also code each vowel as to its consonantal onset and offset. In general, the following segment exerts a stronger influence on the

vowel than the preceding, manner of articulation a greater influence than place, sonorants more than non-sonorants, and liquids more than nasals. Post-vocalic /l/ in particular has a profound backing affect and post-vocalic /r/ tends to centralize vowels (Labov 1994).

3.3.3. Vowel measurement

The primary focus in measuring vowel quality is at the place of articulation—the degree of tongue height and advancement—which correlate with the vowel formants F1 and F2, respectively. For guidance in determining the formant values for the individual vowel tokens, the 200+ sample spectrograms in Olive, Greenwood and Coleman (1993) were consulted. Keeping in mind the conventions of Boberg (1986) and Labov (2001), the following three main criteria for identifying the vowel nucleus were developed, in descending order of significance.

1. A maximal F1, especially if it displays a salient peak, will correspond to the articulatory target:
    a. Should be chosen outside of any consonantal transition area
    b. Applies to short vowels, long vowels and diphthongs
    c. Does not apply to in-glides or centralizing off-glides
    d. Not to be confused with a raised F2 of a neighboring sonorant
    e. Within an F1 steady state, an F2 minimum or maximum is selected
2. A steady state portion of F1 and F2 is ideal for identification but rare in most phonetic contexts:

a. Coronals in particular may create a raising or falling F2 into the vowel. Between two coronals, a dip in F2 may serve as a guide

b. A high F2 can be mistaken for F3, which does not generally indicate frontness

3. The maximum intensity of a vowel represents the loudest, or most perceptually salient portion of the vowel, this usually (but not always) corresponds to maximal mouth opening and the vowel nucleus: Neighboring sonorants, especially following liquids, may have a greater intensity.

With all the above factors taken into account, the maximum F1 that corresponded to the steady state portion of the vowel that is as close as possible to the maximum intensity of that vowel was selected. If indeed all three of these factors were consistently present, this process could be automated by a computer program. In reality, they rarely are. Thus, in addition to the criteria above, it is necessary to listen to each vowel to help identify its nucleus and to exclude other segmental affects.

After measurement, each vowel class was examined as a set to see if they were in a consistent range and any outliers were re-measured to guard against any initial measurement error. Labov (2001) cautions that errors that produce outliers may be detected more easily than errors that lie close to the mean. Because no one criterion can be relied upon exclusively, in the end it is human judgment that selects

which point best represents vowel quality. There is, unfortunately, a certain degree of artistry to vowel measurement that eludes the scientific method.

3.4. DATA ANALYSIS

Once the tokens were selected and measured, the data were compiled and analyzed within a spreadsheet program after being normalized with *Plotnik*. Created by William Labov for the explicit purpose of investigating language change in progress, *Plotnik* also creates a visual representation of the vowel space utilized by any particular speaker or group of speakers. Individual tokens are categorized by historical vowel class according to a unique color and shape. In this manner, different speakers' vowels systems can be quickly graphed and compared. Although *Plotnik* does provide a valuable graphic means of viewing and comparing individual speaker's vowel systems, it was discovered to be more expedient and more illustrative to develop a hand-plotted format for comparing social groupings of larger numbers of speakers, as in those graphs employed in the following chapter 4, i.e.; Figure 4.1. *Plotnik* also provides statistical analysis for data, yet lacks the flexibility and robustness that can be realized by using a spreadsheet program such as *Microsoft Excel.* It's normalization function was particularly useful, though, and employed for the data in this thesis.

A spreadsheet program allows the manipulation of very large data sets, including the calculation of individual and group speaker means as well as statistical operations. Levels of statistical significance were derived with a student's t-test

using a two-tailed distribution and a two-sample unequal variance. In sociolinguistic research, the significance level of the t-test is generally established at the <.05 level, although relationships that demonstrate the <.10 level are considered if they help to illustrate some general trends (Anshen 1942).

CHAPTER FOUR: RESULTS

This chapter discusses the results of the procedures presented in Chapter Three. A set of tokens representative of each speaker's vowel system was collected and each token individually measured. F1 and F2 means were calculated by combining all tokens of any particular vowel class for all speakers within specifically defined social categories. In this manner, the Young Adult /owF/ vowel class mean is an aggregate of all /owF/ tokens for all speakers who conform to that age grouping (See Table 4.1 below for a summary of vowel class descriptions). Means for individual speakers were also calculated, but these 16 mean values left too little data to allow for a subsequent manipulation required to reveal any patterns indicating socially conditioned language variation.

Three main comparisons were conducted: an age comparison, a gender comparison and a social class comparison. The age comparison involved Young Adults relative to Teens and Older adults. The gender comparison was made twice: an all-age gender comparison and a YA gender comparison. The social class comparison was also made twice: an all-age social class comparison and a YA social class comparison.

Lack of statistical significance with some results shouldn't prevent all speculation on those results. Dialect studies of the past have rarely relied upon statistical analysis as the preeminent means to qualify their results. Rather, dominant

patterns in the data have been what is most worthy of comment. Statistical significance adds additional clarity to any variation patterns which are described.

4.1. PHONETIC ENVIRONMENT

4.1.1. Vowel class expansion

It quickly became apparent during the initial stages of analysis that a post-vocalic nasal has a noticeable effect on the F2 value of the preceding vowel /ow/, justifying its placement in its own vowel class /owN/. There was no analogous expansion of the vowel /uw/ into a vowel class /uwN/ because there was no similar indication that a post-vocalic nasal had such an effect on the preceding vowel /uw/ as noticeable as that on /ow/. An expansion of the vowel classes to include /owN/ is provided in Table 4.1 below.

Table 4.1. Vowel classes under variation analysis

Vowel	Vowel class	Typical word	Description
/ow/	owF	bow	Open syllable
	owC	boat	Post-vocalic consonant, exclusive of nasals and liquids /r, l/
	owN	bone	Post-vocalic nasal, inclusive of /m, n/
	owL	bowl	Post-vocalic lateral
/uw/	uwF	two	Open syllable
	uwC	boot	Post-vocalic consonant, exclusive of liquids /r, l/
	uwL	tool	Post-vocalic lateral
/u/	u	book	Always closed, exclusive of liquids /r, l/

Note the distinction in the terms “Vowel,” which denotes the phoneme, and “Vowel class,” which denotes the specific consonantal environment following a particular phoneme. A typical word which would be representative of each vowel

class is also given in the legend to assist readers unfamiliar with the notational system used in this thesis.

4.1.2. Grand speaker means for post-vocalic phonetic environments

In order to make comparisons between individual social groupings, it was necessary to establish a baseline of average formant values. Some subject cells contained unequal numbers of subjects, particularly among the age groupings (see Table 3.1 in the previous chapter). Young Adults were overly represented, and in order to prevent any possible variation characteristic of this group from skewing the average towards this type of variation, a separate mean for Young Adults (YA), Teens, and Older Adults (OA) was calculated first, then these means were subsequently averaged to arrive at a grand mean, as detailed in Table 4.2 below. This method was used rather than deriving the grand vowel class mean from all the tokens of all speakers individually.

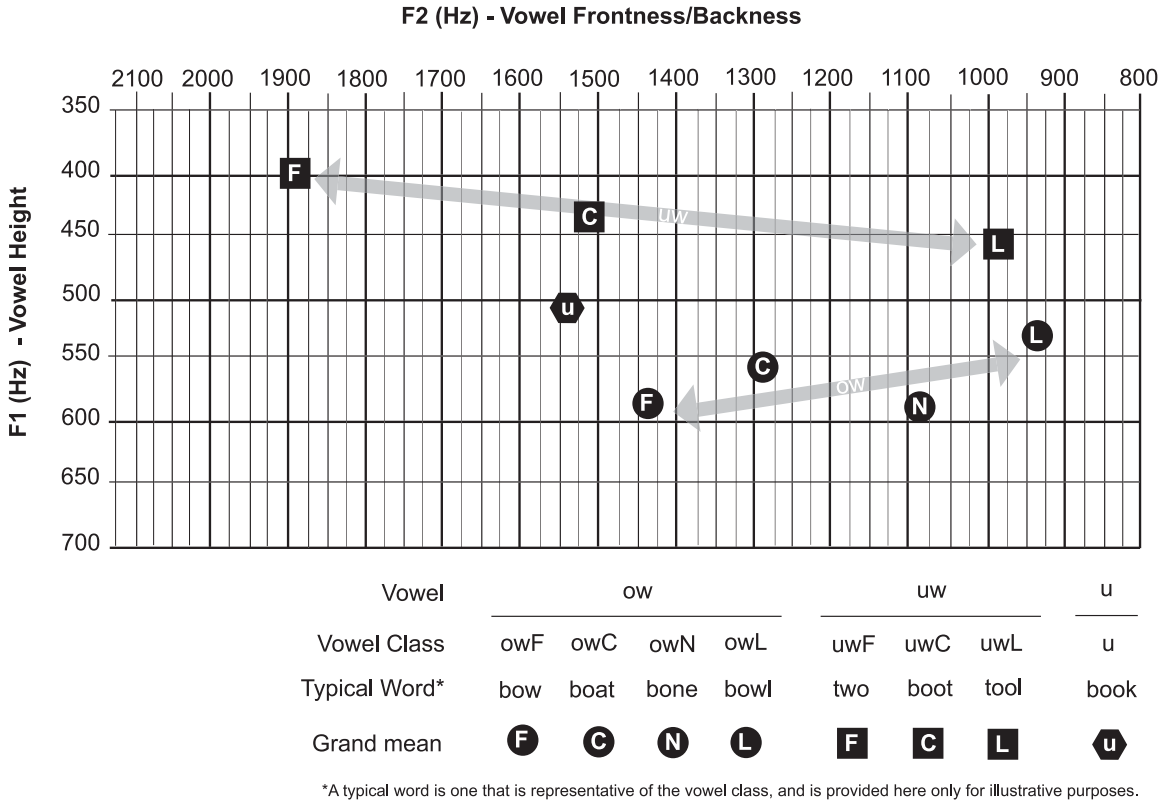
These articulatory positions of the vowel classes relative to one another are best illustrated graphically with a formant chart, as in Figure 4.1 below. The plotted values are based on the Grand mean values illustrated in the last column of Table 4.1 below. The icons representing each vowel are different shapes: circles for /ow/, squares for /uw/ and a hexagon for /u/. A single letter designating the vowel class for that particular vowel is superimposed upon the icon. This format is likewise maintained in the other hand-plotted formant charts throughout the chapter.

The figure shows a consistent pattern of fronting in the vowels /ow, uw/ relative to similar conditioning environments. Again, higher F2 values correspond directly to a greater degree of fronting, and higher F1 values correspond inversely to a greater degree of lowering. The grey trend lines in the figure illustrate that the greatest degree of fronting is evident in the free syllable position represented by the vowel classes /owF, uwF/; an intermediate degree in the closed syllable position: /owC, uwC/ and the least degree in a syllable closed by a lateral consonant: /owL, uwL/. This trend was anticipated in Chapter Three. The chart also illustrates that the nasal environment /owN/ conditions a lower /ow/ variant than any other post-vocalic consonantal environment, which was not anticipated. Each vowel has a different pattern of movement in respect to vowel height.

Table 4.2. Young Adult, Teen, Older Adult and Grand means

Vowel Class	Formant	Young Adults	Teens	Older Adults	(Grand mean) YA-Teen-OA
owF	F1	635	575	554	588
	F2	1530	1473	1305	1436
owC	F1	574	548	544	555
	F2	1382	1317	1176	1291
owN	F1	657	587	526	590
	F2	1140	1111	1005	1085
owL	F1	539	525	542	535
	F2	897	924	1037	953
uwF	F1	400	400	399	400
	F2	1987	1887	1805	1893
uwC	F1	441	442	411	431
	F2	1596	1545	1385	1509
uwL	F1	471	456	448	458
	F2	933	989	1019	980
u	F1	523	516	475	505
	F2	1646	1526	1460	1544
Note: All formant values are measured in Hz					

Figure 4.1. Grand means (all speakers) relative to post-vocalic environment



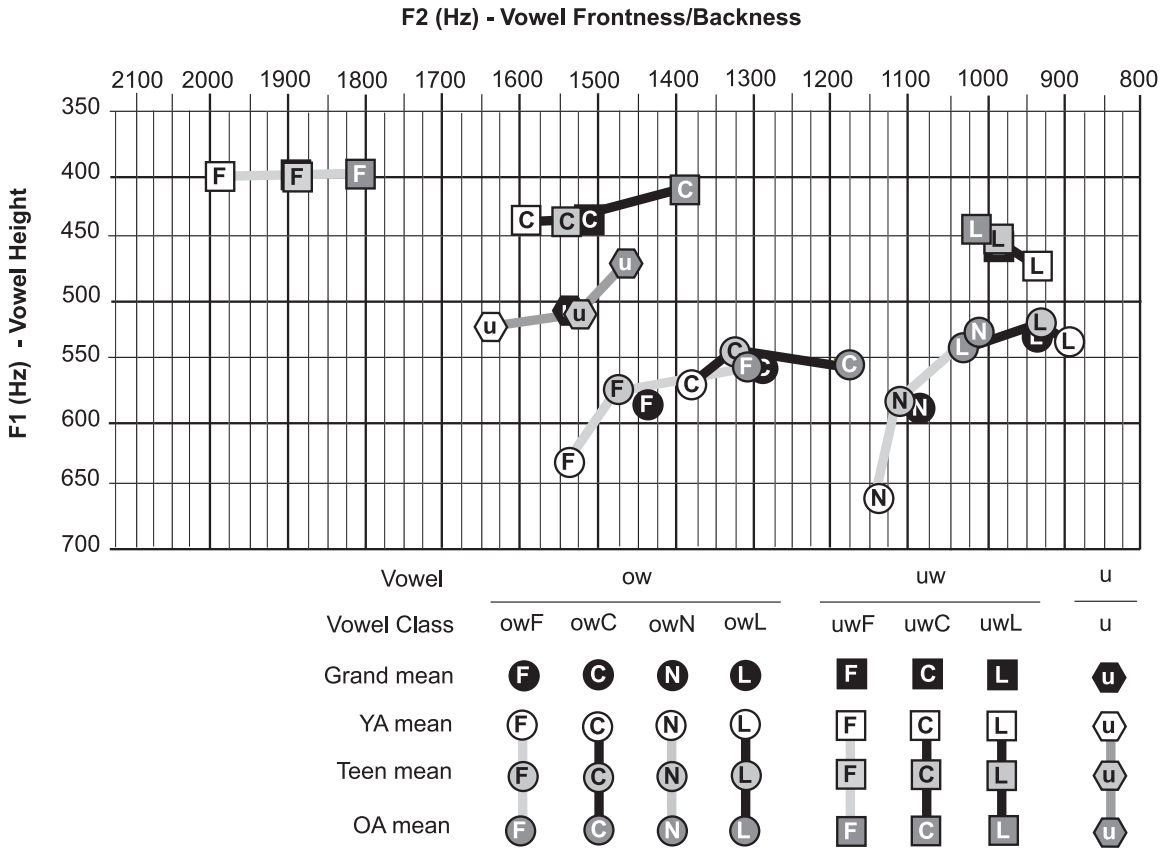
The convergence of /ow/ and /uw/ vowel trend lines at the post-vocalic lateral vowel classes /owL, uwL/ can be explained by the similar conditioning effect of the semi-vocalic dark "l" characteristic of American English phonology. Although the Grand means for /owL/ and /uwL/ are distinct, individual token values for some speakers under the age of 30, particularly those of Fireant, Annette and Karin, demonstrated overlapping mean values, suggesting a future merger of post-vocalic laterals, if indeed this turns out to be a dynamic process. See Appendix A for additional tables of individual speaker's vowel class formant means.

4.2. SOCIAL FACTORS

4.2.1. Age

The social category of age yields reveals the most consistent patterns of variation relative to phonetic conditioning environment, as is evident in Figure 4.2 below. The Young Adult (YA) speaker means for each vowel class are represented with white icons, Teens with light grey icons, and Older Adults (OA) with darker grey. Differently shaded grey lines are provided as a means for the reader to visually group each cluster of icons within its particular vowel class where different vowel classes overlap in the plotting. The Grand means are represented with black icons, as in the previous Figure 4.1. Once again, each vowel is represented by a distinctively shaped icon, and each vowel class by a distinctive letter label within that icon. All mean values from which Figure 4.2 is plotted are provided in Table 4.3 which follows.

Figure 4.2. Age comparison: OA vs. Teen vs. YA



The YA speakers clearly lead the general trend compared to Teens and OA, in which fronting is associated with lowering of all the vowel classes /owF, owC, owN, uwF, uwC, u/, exclusive of the post-vocalic laterals /owL, uwL/. With these laterals, the YA lead in backing associated with a convergence in height: /owL/ raises and /uwL/ lowers. The Teens represent intermediate values between the YA and OA speakers, with the OA seeming to have the most conservative mean values for all vowel classes.

Table 4.3. Age comparison of speaker means: OA vs. Teen vs. YA

				Teen means relative to Younger Adult means					Older Adult means relative to Younger Adult means			
VC	**Fmt**		**YA mn**	**Teen mn**	**Dif**	**Sig**	**t-test**		**OA mn**	**Dif**	**Sig**	**t-test**
owF	F1		635	575	-60	yes	>.001		554	-81	yes	>.001
	F2		1530	1473	-57	yes	0.082		1305	-225	yes	>.001
owC	F1		574	548	-26	yes	0.019		544	-30	yes	0.034
	F2		1382	1317	-65	yes	0.044		1176	-206	yes	>.001
owN	F1		657	587	-70	yes	>.001		526	-131	yes	>.001
	F2		1140	1111	-29	--	0.407		1005	-135	yes	0.006
owL	F1		539	525	-14	--	0.376		542	3	--	0.876
	F2		897	924	27	--	0.396		1037	140	yes	0.003
uwF	F1		400	400	0	--	0.950		399	-1	--	0.939
	F2		1987	1887	-100	yes	0.018		1805	-182	yes	0.001
uwC	F1		441	442	1	--	0.961		411	-30	yes	0.069
	F2		1596	1545	-51	--	0.357		1385	-211	yes	0.001
uwL	F1		471	456	-15	--	0.405		448	-23	--	0.222
	F2		933	989	56	yes	0.116		1019	86	yes	0.010
u	F1		523	516	-7	--	0.611		475	-48	yes	0.004
	F2		1649	1526	-123	yes	0.012		1460	-189	yes	>.001

Note: All formant values are measured in Hz; **YA**—Young Adult, **OA**—Older Adult, **VC—**Vowel Class, **Fmt**—Formant, **Dif**—Difference between *x* and YA mean, **Sig**—Statistical significance, **t-test**—2 tailed distribution, unequal variance

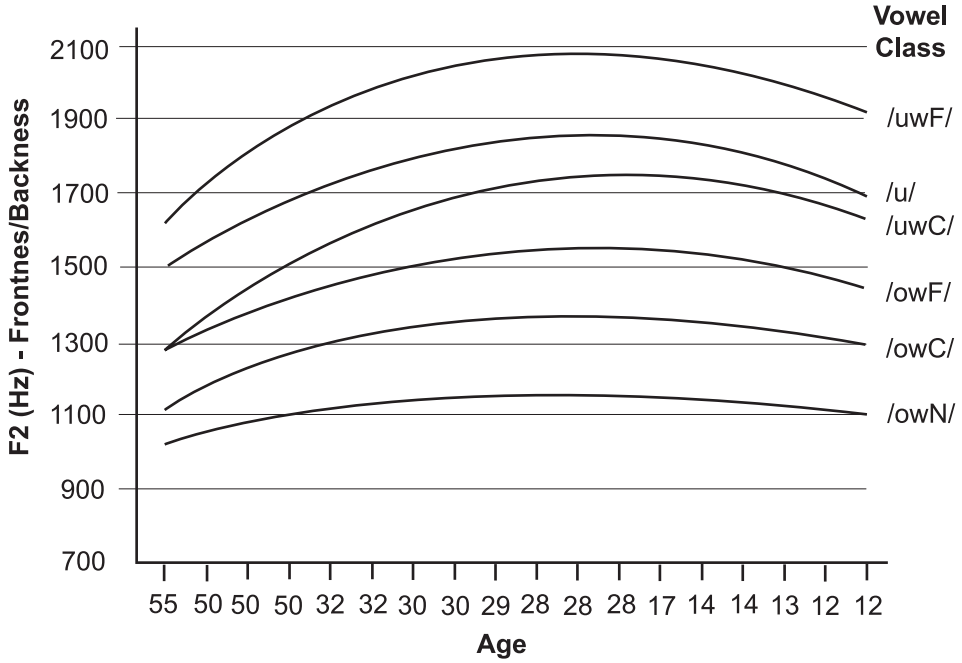
As Table 4.3 above details, there are greater differences in formant mean values between the YA vs. OA speaker comparison as opposed to the YA vs. Teen speaker comparison. For example, where the /owF/ F2 mean for YA is 225 Hz higher than that of OA, for Teens it is only 57 Hz higher. Correspondingly, where an /owL/ F2 value is 140 Hz lower for OA, it is only 27 Hz lower for Teens. Furthermore, more of the values in the YA vs. OA comparison are statistically significant, including the F2 values for every vowel class, and they are generally of greater statistical significance for the same vowel classes. For example, both comparisons show that F2 means for /owF, owC, uwF, u/ are statistically significant,

but the t-test values are clearly lower, i.e., more significant, for the YA vs. OA comparison. This indicates that the YA vs. OA comparison allows a more confident identification of the fronting pattern.

In summary, the back vowels exclusive of the post-vocalic laterals are fronting and lowering, while the vowels before laterals are backing and converging in height. Yet the apparent time construct would predict that the youngest generation be leading the trend in any language change, with the next oldest generations speaking progressively less advanced, more conservative varieties. With this data, however, YA speakers seem to represent the change in progress, with Teen speakers not yet fully participating in that change. While the Teen F1 and F2 values represent advancement of the general trends stated above in relation to the OA speakers, they appear to be intermediate between OA speakers and the YA speakers.

If we use only frontness as an index of change, a curvilinear distribution of change is evident when it is graphed as a function of age. In Figure 4.3 below, the ages of all subjects are graphed along the x-axis from oldest to youngest, taking their exact dates of birth into account. Speculation as to why the YA and not the Teen group is leading the trend will be presented in Section 5.1.2 of the next Chapter.

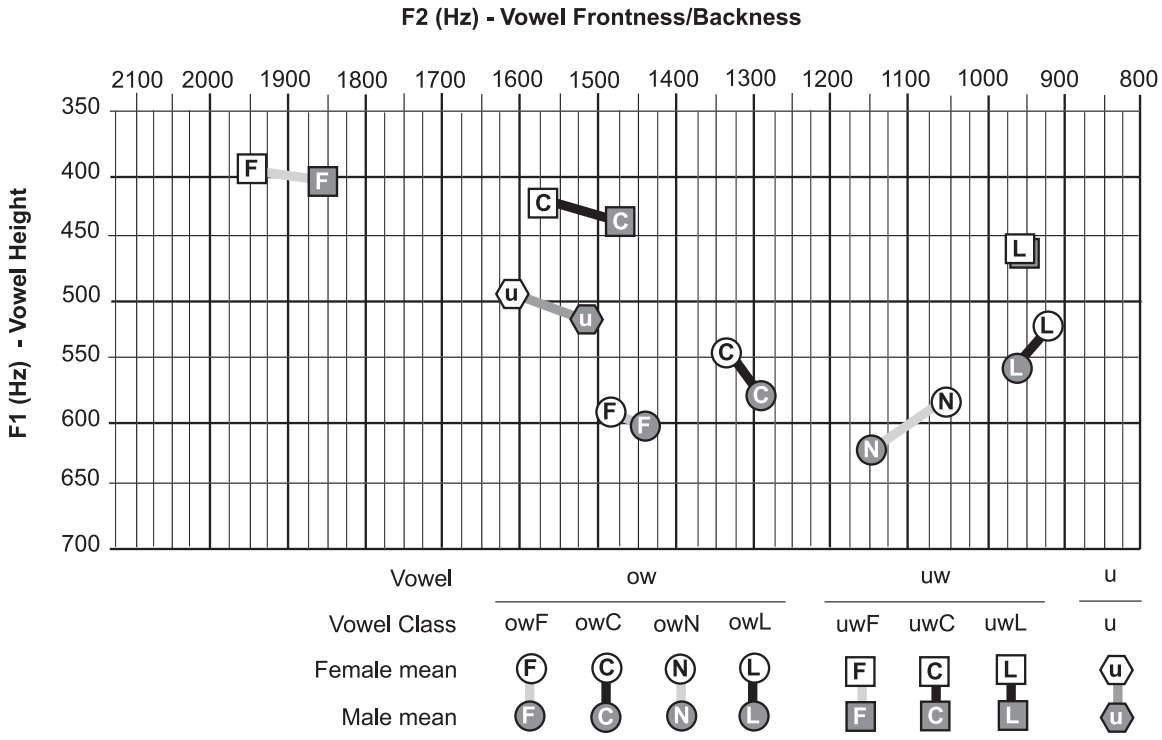
Figure 4.3. Curvilinear distribution of frontness by age



4.2.2 Gender

Figure 4.4 below illustrates the comparison of Male vs. Female means for all speakers. Table 4.4 below contains the data from which it has been plotted. The white icons indicating Female means generally show a greater degree of fronting in relation to Male means among the non-post-vocalic laterals. The exception is /owN/, which shows the opposite pattern: where the others front and raise, /owN/ is backed and raised. The vowel class /owL/ shows the pattern of fronting and raising that is also characteristic of the YA trend leaders in the age comparison. Vowel class /uwL/ shows little variation.

Figure 4.4. Gender comparison: Female vs. Male



An inspection of Table 4.4 below shows that there is a some statistical significance in this gender comparison, although less so than in the age comparison. Both F1 and F2 values for the checked syllables /owC, uwC/ and the post-vocalic nasal /owN/ demonstrate significance, as do the F2 values for /uwF, u/. The F1 value for /owL/ is significant, and the F2 value approaches significance. In the age comparison, fronting is generally associated with raising, which is not the case in the gender comparison.

Table 4.4. Gender comparison: Female and Male means

Vowel class	Formant	Female	Male	Difference	Statistical significance	T-test 2-tailed
owF	F1	594	604	10	--	0.469
	F2	1487	1448	-39	--	0.203
owC	F1	548	573	25	yes	0.023
	F2	1337	1292	-45	close	0.110
owN	F1	589	621	32	yes	0.106
	F2	1055	1147	92	yes	0.005
owL	F1	517	554	37	yes	0.009
	F2	920	962	42	--	0.196
uwF	F1	395	404	9	--	0.406
	F2	1948	1858	-90	yes	0.024
uwC	F1	420	446	26	yes	0.043
	F2	1570	1477	-93	yes	0.057
uwL	F1	460	464	4	--	0.769
	F2	965	965	0	--	0.985
u	F1	497	515	18	--	0.214
	F2	1610	1518	-92	yes	0.022
Note: All formant values are measured in Hz.						

4.2.3. Social class

Comparing Working Class (WC) to Middle Class (MC) means in a social class comparison reveals fewer differences than the previous two comparisons of age and gender, both in the plotted means and the statistical significance of different mean values for the same vowel class. Figure 4.4. below is plotted with the data from the following Table 4.5. Generally, the WC speakers lead the trend in fronting, as do the YA in the age comparison and the Females in the gender comparison. More like the pattern established in the gender comparison though, the WC /owF, owC, u/ means front and raise, and likewise, the WC /owN/ backs and raises.

Figure 4.5. Social class comparison: Working Class vs. Middle Class

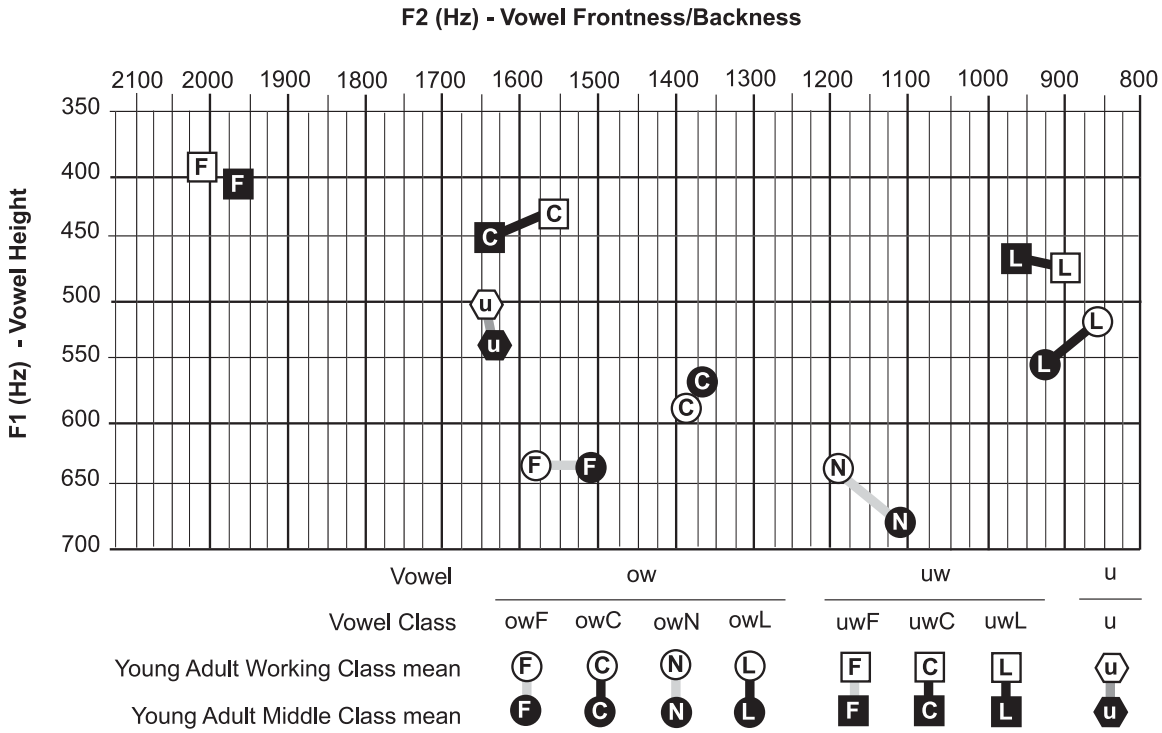


Table 4.5. Social class comparison of speaker means: WC vs. MC

Vowel class	Formant	Working Class	Middle Class	Difference	Statistical significance	T-test 2-tailed
owF	F1	584	609	-25	yes	0.095
	F2	1495	1450	45	--	0.161
owC	F1	554	565	-11	--	0.346
	F2	1340	1297	43	close	0.128
owN	F1	567	629	-62	yes	0.002
	F2	1079	1113	-34	--	0.340
owL	F1	527	543	-16	--	0.254
	F2	947	936	11	--	0.738
uwF	F1	399	400	-1	--	0.871
	F2	1922	1885	37	--	0.367
uwC	F1	425	438	-13	--	0.286
	F2	1517	1526	-9	--	0.852
uwL	F1	462	462	0	--	0.996
	F2	935	996	-61	yes	0.033
u	F1	495	516	-21	yes	0.094
	F2	1568	1554	14	--	0.738
Note: All formant values are measured in Hz.						

Overall, the data from the social class comparison presents the weakest evidence for variation informed by a social grouping. If the WC were leading a trend, analysis of the data provides weak evidence of this. Examining gender and social class alone are not enough to illustrate clear patterns of variation and change; age grouping must also be taken into account.

4.2.4. Combined social categories

Among the three comparisons, both age and gender are the most indicative of language variation between social groupings, and the social class comparison appears to be the least revealing. However, two general trends emerge: in the age comparison, the back vowels examined generally front and lower unless they are followed by a lateral, and in the case of a following lateral they back and converge, i.e., /uwL/ lowers and /owL/ raises; in the gender and social class comparisons, a different pattern is evident, with the back vowels generally fronting and raising, yet with no clear pattern among the post-vocalic laterals. By combining social categories it may be possible to determine if either of the trends mentioned above would best describe the variation illustrated in the data. There is evidently a significant deal of variation along the frontness/backness dimension. If language change is in progress, the trends need to be described: which vowel classes correlate fronting with raising, which correlate fronting with lowering, and where the correlation is significant and where it is most likely due to chance.

Judging from the age comparison, the YA speakers are in the lead of change. Because their token means show the greatest variation compared to the other two age groups, and because the greatest number of subjects is represented in their age group, it is most likely that a better investigation of gender and social class would be pursued within the YA category alone. Figures 4.6 and 4.7 below are plotted from data provided in the following Table 4.6. Figure 4.6 shows the plotted mean values for YA speakers separated by gender. Figure 4.7 shows the plotted mean values in the combination of YA speakers separated by social class.

YA Female speakers clearly display a greater degree of fronting and some degree of lowering than do the YA Males. Female F1 and F2 means for vowel classes /owF, owC, uwF, uwC, u/ are all higher. In addition, the F2 differences all show statistical significance at the <.05 level, which creates greater confidence that there is true variation between YA Females and Males for at least these vowel classes. Vowel class /owN/ also shows YA Females to front more, although the difference is too small to be significant. Generally, these trends mirror those found in the age comparison, except for the mean values of the post-vocalic laterals. Here the Female YA speaker means are slightly more fronted than are the Males, where we would expect the opposite to be true.

Figure 4.6. Young Adult gender comparison: Male vs. Female

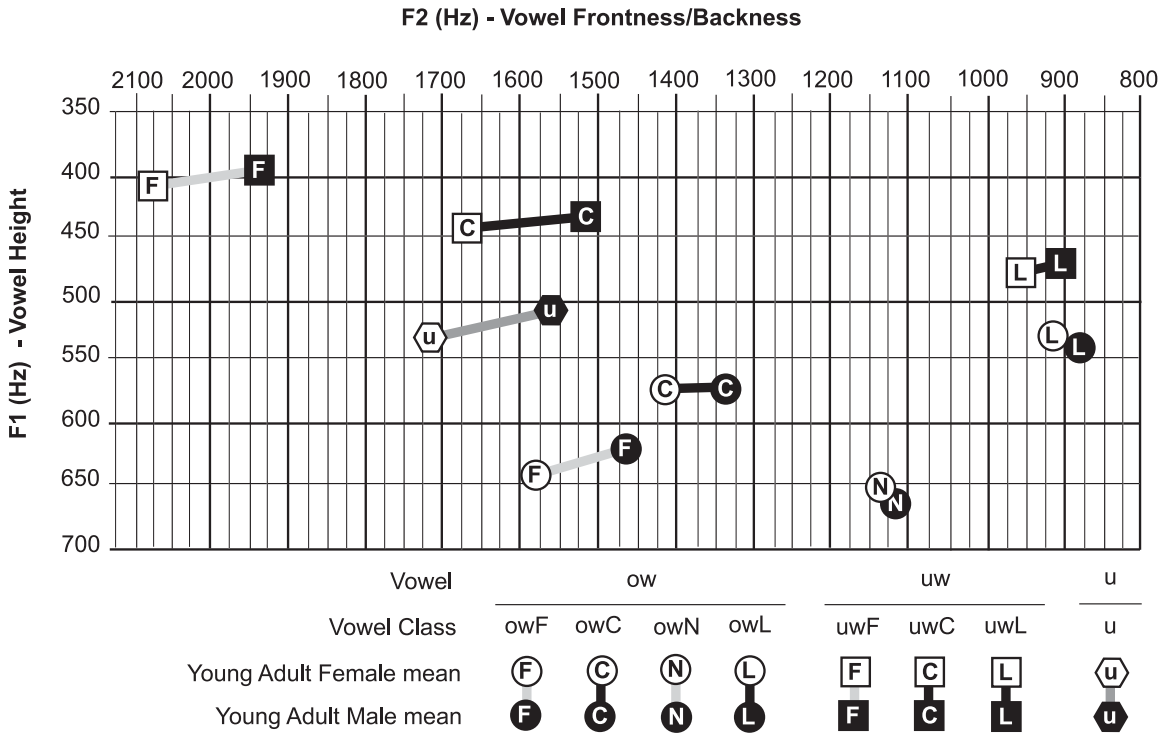


Figure 4.7. below illustrates the YA social class comparison. The YA Working Class (WC) shows a general tendency to front more than the Middle Class (MC), although the data do present some anomalies. Specifically, the MC /uwC/ mean is more fronted. On the other hand, the post-vocalic laterals /owF, uwF/ show the pattern of backing and height convergence in the trend leader that is similar to the age comparison. In order to determine the significance of social class in relation to language variation, examining class differences while holding this one age category constant, i.e., Young Adults, seems more useful than grouping Middle and Working Class speakers together irrespective of age.

Figure 4.7. Young Adult social class comparison: WC vs. MC

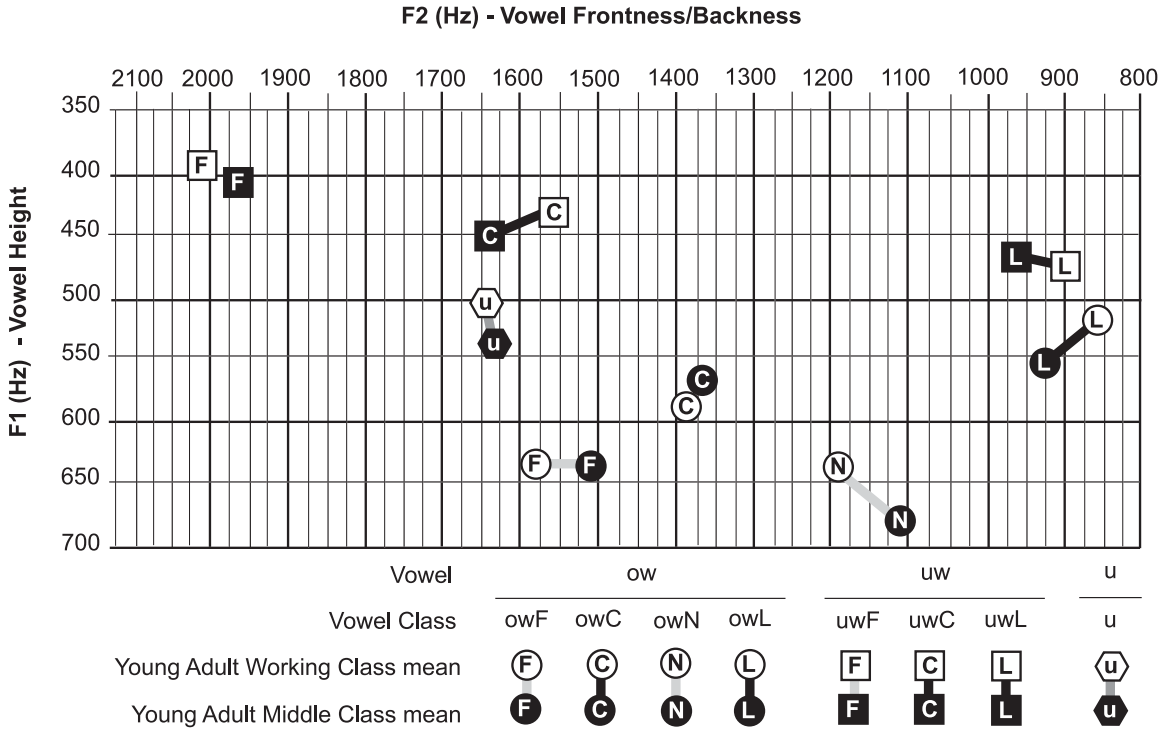


Table 4.6. Young Adult gender and social class comparison of speaker means

			Young Adult gender comparison						Young Adult social class comparison				
VC	**Fm**		**F mn**	**M mn**	**Dif**	**Sig**	**t-test**		**WC mn**	**MC mn**	**Dif**	**Sig**	**t-test**
owF	F1		647	623	-24		0.146		635	636	-1		0.498
	F2		1588	1467	-121	yes	<.001		1560	1504	+56	yes	0.080
owC	F1		575	572	-3		0.433		583	565	+18		0.146
	F2		1420	1341	-79	yes	0.020		1393	1372	+21		0.294
owN	F1		652	662	10		0.319		639	670	-31	yes	0.083
	F2		1146	1133	-13		0.371		1188	1105	+83	yes	0.019
owL	F1		532	546	14		0.294		519	556	-37	yes	0.072
	F2		917	878	-39		0.170		865	925	-60	yes	0.069
uwF	F1		406	396	-10		0.304		393	405	-12		0.243
	F2		2077	1937	-140	yes	0.006		2014	1967	+47		0.200
uwC	F1		445	437	-8		0.362		431	451	-20		0.199
	F2		1668	1517	-151	yes	0.047		1557	1639	-118		0.189
uwL	F1		474	468	-6		0.414		476	465	+11		0.339
	F2		959	908	-51	yes	0.101		901	966	-65	yes	0.047
u	F1		539	505	-34	yes	0.102		502	539	-37	yes	0.069
	F2		1716	1568	-148	yes	0.007		1648	1629	+19		0.378

Note: All formant values are measured in Hz; **F**—Female, **M**—Male, **WC**—Working Class, **MC**—Middle Class, **VC—**Vowel Class, **Fmt**—Formant, **Dif**—Difference between F and M mean or MC and WC mean, **Sig**—Statistical significance, **t-test**—2 tailed distribution, unequal variance

From the data presented above, it appears that YA Female speakers generally lead the trend in the trend in the gender comparison, and YA WC speakers generally lead the trend in the social class comparison. If we take into account the previous age comparison, it seems that Young Adult Working Class Females are in the vanguard of language change.

CHAPTER FIVE: CONCLUSION

This chapter summarizes the results and presents conclusions that are drawn from the findings of Chapter Four. Limitations of this study and some suggestions for further research are also discussed.

5.1. REVIEW OF RESEARCH QUESTIONS OR HYPOTHESES

In Chapter One, the following research question questions were introduced.

1. Is the fronting of the mid back vowel /ow/ and high back vowels /uw/ and /u/ taking place in Portland, Oregon?
    a. Does the general phenomenon show variability across age groups, suggesting language change?
    b. Does it show patterned variability between genders and among social groups, providing evidence that particular groups can be identified as leading the change, while other groups demonstrate a more conservative speech style?
2. If so, does this provide evidence for Portland speaker's participating in the Western dialect area, or does it constitute a separate trend forming a dialect isolate? What kind of social factors can help explain this change or lack of change?

5.1.1. Are /ow, uw, u/ fronting in Portland?

Vowel fronting refers to a process of linguistic variation that is both relative and dynamic. It describes a change in the articulation patterns of individuals or of entire age or social groups when compared to other individuals or groups (or even within a single individual, if the formality of the conversational context, i.e., style, is evaluated). Analysis of the data shows that there is a great degree of fronting present in Portland. Of the three main comparisons, the age comparison shows the strongest evidence of fronting, both in absolute values of speaker means and in statistical significance. The gender comparison also shows fronting, though the results can not be accepted with as much confidence as in the age comparison. The social class comparison is the weakest of the three. The YA gender and social class comparisons were generally more revealing than the all-age comparisons alone. Taken together, however, the three main comparisons do suggest that the Young Adults lead the Teens and the Older Adults, the Females lead the Males and the Working Class lead the Middle Class.

5.1.2. Variability across age groups

The Young Adult speakers in this study clearly have more fronted variants of the examined back vowels /ow, uw, u/ (exclusive of post-vocalic laterals) when compared to the other two age groups, the Teen and Older Adult speakers. Table 5.1 below summarizes the F2 mean values for the three different age groups represented

in the study. Labov (1984) states that a 200 Hz difference along the frontness/backness dimension is enough to indicate a salience in vowel quality differences, and the data show that the differences of F2 values for the vowel classes /owF, owC, uwF, uwC, u/ are within that 200 Hz range for the YA vs. OA comparison. For this age comparison, F2 means for all vowel classes show a great deal of statistical significance, even for the backing of the post-vocalic laterals /owL, uwL/.

Table 5.1. Age comparison of F2 means: YA vs. Teen and YA vs. OA

Vowel Class	YA	Teen			OA		
	mean	mean	Dif	t-test	mean	Dif	t-test
owF	1530	1473	-57	0.082	1305	-225	>.001
owC	1382	1317	-65	0.044	1176	-206	>.001
owN	1140	1111	-29	0.407	1005	-135	0.006
owL	897	924	27	0.396	1037	140	0.003
uwF	1987	1887	-100	0.018	1805	-182	0.001
uwC	1596	1545	-51	0.357	1385	-211	0.001
uwL	933	989	56	0.116	1019	86	0.010
u	1649	1526	-123	0.012	1460	-189	>.001

Note: All formant values are measured in Hz; **YA**—Young Adult, **OA**—Older Adult, **Dif**—Difference between *x* and YA mean, **t-test**—2 tailed distribution, unequal variance

Whether or not the YA and Teens are participating in a process of language change would depends on how the results conform to the operation of the apparent time construct, in which the youngest group leads change, followed by the next youngest generation, etc. Yet Teen speakers have less fronted variants of these vowels than the YA, with F2 means falling in an intermediate position between the YA and OA. Graphed as a function of age (See Figure 4.3 in the previous chapter), this curvilinear distribution still illustrates that Teen speakers have more fronted

variants than do the OA, illustrating a change in apparent time, but it demands explanation as to why the generation ahead of them would be leading change.

There is the possibility that Teen speakers will not participate in the change until they reach their late adolescence. This would not contradict the principle of the apparent time construct that states that speakers' language forms are generally stabilized by the time they are in their early twenties. Presumably, the Teen speakers' language is still in a developing state. Another possibility is that the Teen speakers are displaying some form of age-graded phenomenon, where their less fronted speech (relative to YA speakers) is merely part of a passing phase of adolescence. If this were true, then presumably all these speakers would eventually settle into more fronted speech patterns some time in late high school or college. Yet the one speaker who is somewhat intermediate within the age categories, 18-year-old Marcia, gives no clear indication of participating in such a settling process as yet. Her F2 means are not appreciably higher than those of the other Teen Females (See Tables A.4 and A.5 in Appendix A for individual speaker's vowel class means).

An alternate possibility to explain the intermediate position of the Teen speakers involves the interview format itself, in which all the Teens were questioned by an older interviewer, essentially a non-peer. This may have inhibited casual speech, and resulted in more speech forms that Teens reserve for communicating with adults and in formal situations, rather than the naturalistic speech of their own peer groups. Although the likelihood is slim that this condition has generalized to

every Teen who was interviewed for this study, is still in itself a worthy topic of further research.

5.1.3. Variability across gender

Fronting is more pronounced in Female speakers than it is in Males. The all-age gender comparison indicates that Females generally lead Males in the fronting of /owF, owC, uwF, uwC, u/, with no fronting of the post-vocalic laterals. The only vowel class that defies this pattern is /owN/, which is not only more fronted for the Males but shows statistical significance, an unexpected idiosyncratic behavior. When the age category is held constant, the YA Females also demonstrate a greater degree of fronting than do the YA Males. This fronting is generalized for all vowel classes, including the post-vocalic laterals, which was not expected, and the post-vocalic nasal, which was. However, neither of the F2 means for /owL, uwL/ show statistical significance, so the results can be more easily discounted. But /owN/ in this YA gender comparison does show significance in its fronting, contradicting its movement in the all-age gender comparison.

Another discrepancy between the all-age gender comparison and the YA gender comparison is that in the former, the non post-laterals front and raise (exclusive of /owN/, while in the latter, they front and lower. In data that has not been normalized to account for the physiological differences between men and women, Male vowels will generally have higher F1 values, indicating a degree of greater lowering, because of the longer length of the male's vocal tract. Any

weakness inherent in the normalization procedure employed by *Plotnik*—the one used in this thesis—would be most evident in the Male vs. Female comparison.

5.1.4. Variability across social class

The category of social class illustrates similar patterns of fronting among the non-pre-lateral vowel classes when Working Class and Middle Class speakers are compared. However, with both the two social class comparisons, i.e., all-age and YA, there are less absolute differences in means between the same vowel classes and less statistical significance among the vowel classes in relation to the age and gender comparisons. Just within the YA social class comparison, however, WC speakers show a greater tendency to front than in the all-age social class comparison. This supports an earlier assertion that examining social categories is more revealing when the factor of age is held constant.

In the southern California data, young middle class female speakers seem to be leading the change (Luthin 1987, Moonwoman 1987, Hinton et al. 1987). In the Canadian data, Esling & Warkentyle (1993) also show young middle class females to be leading the retraction of /æ/ in Vancouver, BC. Clark *et al.* (1995) examined only young middle class speakers, and so offers no indication whether they are indeed leading the trend for the Canadian Vowel Shift, although they suggest that the phenomenon may be limited to urban speakers. Conversely, findings from Di Paolo and Faber's (1991) Utah study suggest that it is the young female working class who are in the vanguard of change. This is consistent with Labov's (1974) suggestion that

the interior classes, in particular the upper working class, show a greater deal of "linguistic insecurity" and are more likely to lead change when that change involves prestige forms. If the fronted variants of the back vowels revealed in this thesis showed variation relative to an investigation of style, which was not done, then some claim can be made for Working Class speakers adopting innovative prestige norms.

The mostly likely reason for the weakness of the social class comparison is this study and the contradictory results from other western studies is that recognizing a distinction between middle class and working class is problematic in Portland, and possible in other western cities as well. A further examination of the problems in distinguishing between social classes and speaking styles is presented in Section 5.2.

5.1.5. Is Portland participating in the Western dialect area?

We can only make the claim that Portland is participating in the Western dialect area if that area were indeed adequately described and defined. Labov (2002) notes that there is usually a fair degree of overlap in the dialect areas described by both lexical and phonological studies, and lexical studies have suggested that the Northwest in particular forms a unique dialect area (Reed 1957, Carver 1987, Wolfram and Shilling-Estes 1998). Yet the phonological studies that could in many ways reinforce what the lexical studies propose have so far been less confident in their predictions. According to Labov's (2002) hierarchical display of North American English dialects (see Figure 1.1. in Chapter 1), the West shares one of its most distinctive features, the /o-oh/ merger, with areas of the U.S. as eastward as

western Pennsylvania and in Canada all the way to the Atlantic provinces. And considering back vowel fronting alone, a feature associated with the West, is a phenomenon common in many American dialects; Labov's TELSUR project (2002) makes much use of relative degrees of /ow/ fronting as an indicator of dialect boundaries within North America. Di Paolo and Faber (1991) suggest that the western state of Utah may be participating in the Southern Shift based on such fronting phenomena. Clearly, more detailed phonological descriptions of areas within the West need to done to discover those features that illustrate its uniqueness as a dialect area, and those features that illustrate its internal composition: either cohesion or lack thereof.

In this study, the fronting trends associated with Young Adult speakers, and especially YA Female speakers, seem to be representative of change in progress, and thus likely participation in a more generalized vowel shift. Simple geographic propinquity would suggest that Portland would be participating in a Californian (Luthin 1987, Moonwoman 1987, Hinton et *al.* 1987) or Canadian (Clarke *et al.* 1995) vowel movement rather than a movement such as the Southern Shift, which is localized for the most part south of the Mason-Dixon line and east of Texas, and has other prominent indicators not shared in the West, such as a consistent monothongization of /ay/ before voiced obstruents. Both Conn's (2002) investigation of Portland speakers and this study support the participation of Portland speakers in the California movement, and possibly the Canadian shift. That Portland is

geographically positioned between the loci of both vowel movements, and shares features with both, may indicate some kind of relationship between the California movement and the Canadian shift.

5.2. LIMITATIONS OF THIS STUDY

The limitations of this study are many and can be roughly divided into two categories: those having to do with the nature of the data and those having to do with the nature of the study. The former category include problems in adequately defining both the class structure in Portland and defining the boundaries of Portland proper. The latter includes limitations of the study precipitated mostly by the mechanical constraints of time and resources. The varied types of limitations seemed to be cumulative and synergistic.

Portland is a relatively new city undergoing a rapid expansion in population. This seems to be creating a more fluid class structure than is evident in some of the older cities of the East which have more established neighborhoods and longer histories of social class division. The socio-economic index employed in this study for identifying social class was created on the model of other such cities, both larger and older than Portland. One of the traditional indicators of social class, the presence or lack of a college education, is becoming less useful as a distinction as college is becoming more commonplace for many who may be considered working class by other criteria. In addition, income and housing are not always reliable indicators of social class, with many tradesman earning twice as much as office workers, the

distinction between traditional blue-collar occupations and white collar is less in income but in type of work: manual versus clerical. An adequate investigation of social class would require resources well beyond the scope of this thesis. The categories as defined in this thesis are methodologically convenient, but perhaps not operationally valid.

Another facet to the rapid growth of Portland is the urbanization of the areas surrounding the city. Today, the urban center of Portland is fairly coherent with the surrounding suburbs, but this might not have been true in the past, where suburban areas today may once have been country farms. Luthin et al. (1987) notice some distinction between urban and rural speakers, and Wolfram (1991) notes that most dialect development is generally associated with urban areas. The definition of what comprises Portland may be in flux, and therefore some of the older speakers in this study may not represent urban speech norms. Also, many of the older informants in this study spoke about definite working class and ethnic neighborhoods located within Portland city limits, these older working class and ethnically defined neighborhoods that were once present in Portland have since disappeared.

The age groupings may also prove to be problematic, particularly the difference between YA and Teen speakers. The age gap does not quite represent a twenty-year generation difference that Labov (1972) recommends. In addition, it is quite possible that the Teens in this study displayed age-grading, and their speech was not quite representative to what it will be when they mature into Young Adults.

Chronological age does not provide a direct correlation with emotional or social (maturity) age, especially in adolescents – which in turn may influence group identity and thus language usage.

Another limitation was the inability to examine the effects of style on variation, which would shed light onto the identification of any prestige variants. Because this study used many interviews gathered from the PDS corpus, there was no way to systematically examine style differences in the articulation of the back vowels. Previous interviewees were not given a comprehensive word list or reading passage that included enough of these particular tokens to provide a meaningful analysis based on style. The tokens selected in this study were selected from conversational speech, which is, albeit, within the interview format, but do not generally represent the formal styles associated with word lists and reading lists.

Finally, this study may have suffered from a paucity of data. Ideally a survey sample of this type would sample a few hundred individuals, and include a full description of the vowel systems. Gillian Sankoff states:

> A speech community sample need not include the large number of individuals usually required for other kinds of behavioral surveys…The literature as well as our own experience would suggest that, even for quite complex speech communities, samples of more than about 150 individuals tend to be redundant, bringing increasing data handling problems with diminishing analytical returns. [cited in Chambers 1995: 40]

It would take an entire research team to conduct the ideal study that Sankoff describes. Data from only 18 individual subjects represented in this survey. Due to

this limitation, many of the cells only have one representative speaker. It would be almost meaningless to define social groupings with only one member of the set defining the whole group (e.g., Bryan, T M WC), as any individual variation may prove to be more significant than any group variation. Within the YA group, there were 8 speakers, or 2 per cell, and in this case data from just 4 speakers was available to represent of a combined social grouping of either gender or class. The results of doing so are somewhat tenuous, though, and do not illustrate general trends of usage within these multiply defined groupings as well as a larger ratio of speakers to each cell presumably would.

5.3. DIRECTIONS FOR FURTHER RESEARCH

Many of the directions for further research are informed by the limitations of the present study. The same study replicated with a larger survey pool would certainly provide greater statistical significance to the variation patterns observed here. An adequate investigation of style is also warranted, to interpret the prestige value of any change. In addition, both /ow/ and /uw/ are diphthongs, and /ow/ in particular may also be triphthongized in extremely stressed variants as it fronts in a trajectory through vowel space. Although the kind of extreme triphthongization of /ow/ present in the California Valley Girl parodies was not observed in any of the Portland data, it is certainly diphthongized. Only the central tendency of the diphthong was measured in this study, which gives no indication to the direction of the glide. The single point vowel measurement methodology does allow for the

tracking of diphthong measurements, with a point selected at the beginning and end of the glide. This necessarily complicates the task of measurement and analysis, as four data points relating to formants must be tracked for each vowel token instead of just two. Regardless, a future study dedicated to describing the trajectory of each vowel in question may establish a more revealing description of the vowels in question.

5.4. SUMMARY

The back vowels /ow, uw, u/ in Portland speech show a significant degree of variation, depending on both phonetic and social factors. Overall, the tense high back vowel /uw/ fronts to a greater degree than does the tense mid back vowel /ow/. The vowel /uw/ generally fronts and raises unless followed by a lateral, although /uw/ in an open syllable does not raise or lower. In the pre-lateral environment, /uw/ is more backed and more lowered. The vowel /ow/ fronts and lowers unless followed by a lateral, in which case it is more backed and raised.

Taking social factors into account, age is the most revealing category. Young Adults show the greatest degree of fronting for these vowels, followed by Teens. Comparison of gender categories also reveal that Females front more so than Males. Comparison of social classes is the least revealing category, yet it generally shows the Working Class to front to a greater degree than does the Middle Class. The most significant fronting variation is concentrated in the speech of Young Adult Working Class Females.

This pattern of variation may suggest a generalized vowel movement that is consistent to what has been observed in both the California movement and the Canadian shift. Portland may be participating in either or both of these vowel movement patterns, depending on how much each vowel movement—in Portland, in California, in Canada and elsewhere in the West—is distinguished by more comprehensive descriptions of their linguistic features in future research.

REFERENCES

Anshen, Frank. (1942) *Statistics for Linguists*. Rowley, Mass.: Newbury House Publishers.

Baily, Guy, Tom Wikle, Jan Tillery and Lori Sand. (1991). "The apparent time construct." In *Language Variation and Change*, 241-264.

Baily, Guy. (2002). "Real and apparent time." In *The Handbook of Language Variation and Change*, ed. P. Trudgill and N. Schilling-Estes J.K. Chambers. Malden, MA and Oxford, UK: Blackwell.

Boberg, Charles. (1996). "Procedures for the acoustical measurement of English vowels." In *A Plotnik Tutorial*, ed. William Labov. Philadelphia PA: U. of Pennsylvania Linguistics Laboratory.

Calvert, Donald R. (1986). *Descriptive Phonetics.* New York: Thieme Inc.

Carver, Craig M. (1987). *American Regional Dialects: A word geography*. Ann Arbor: University of Michigan Press.

Chambers, J.K. (1995). *Sociolinguistic Theory*: Language in Society. Cambridge, Mass.: Basil Blackwell.

Clarke, Sandra, Ford Elims and Amani Youssef. (1995). "The third dialect of English: Some Canadian evidence." *Language Variation and Change* 7:209-228.

Conn, Jeff. (2000). Portland Dialect Study: The story of /æ/ in Portland, Portland State University Department of Applied Linguistics MS, Oregon. Master's.

Conn, Jeff. (2002). *An investigation into the western dialect of Portland Oregon*. Paper presented at NWAV31. San Diego, CA:

Di Paolo, Marianne and Alice Farber. (1990). "Phonation differences and the phonetic content of the tense-lax contrast in Utah English." *Language Variation and Change* 2:155-204.

Eckert, Penelope. (1988). "Adolescent social structure and the spread of linguistic change." *Language in Society* 17:193-208.

Eckert, Penelope. (1989). "The whole woman: Sex and gender differences in variation." *Language Variation and Change* 1:245-267.

Eckert, Penelope. (1997). “Age as a sociolinguistic variable.” In *The Handbook of Sociolinguistics*, ed. F. Coulmas. Cambridge: Blackwell.

Esling, J and H. Warkentyle. (1993). “Retraction of /æ/ in Vancouver English.” In *Focus on Canada*, ed. S. Clark, 229-246. Amsterdam: John Benjamins Company.

Giegerich, Heinz J. (1992). *English Phonology: An introduction.* New York: Cambridge University Press.

Guy, G., B. Hornvath, J Vonwiller, E. Daisley and I. Rogers. (1986). “An intonational change in progress in Australian English.” *Language in Society*. 21-34.

Guy, G. and J. Vonwiller. (1989). *Variation in Australian English: the sociolects of Sydney*: Cambridge University Press.

Hindle, Donald. (1978). “Approaches to vowel normalization in the study of natural speech.” In *Linguistic Variation: Models and Methods*, ed. David Sankoff, 161-172. New York: Academic Press.

Hinton, Leanne and S. Bremmer, H. Corcoran, J. Learner, H. Luthin, B. Moonwoman. (1987). “It's not just the Valley Girls: A study of California English.” Paper presented at *Thirteenth Annual Meeting of the Berkeley Linguistics Society*, Berkeley, CA.

Johnson, Keith. (1997). *Acoustic and Auditory Phonetics*. Cambridge, Mass.: Blackwell.

Kenyon, John and Thomas Knott. (1953). *A Pronouncing Dictionary of American English*. Springfield, Mass: G.C. Merriam.

Kurath, Hans. (1949). *Word Geography of the Eastern United States*: University of Michigan Press.

Labov, William. (1963). “The social motivation of sound change.” *Word* 19:273-309.

_____(1966). *The Social Stratification of English in New York City*. Washington, D.C.: Center for Applied Linguistics.

_____(1972). *Sociolinguistic Patterns*. Philadelphia: University of Pennsylvania Press.

_____(1974). “Linguistic change as a form of communication.” In *Human Communication: Theoretical Explorations*, ed. A Silverstein, 221-256. Hillsdale, NJ: Lawrence Erlbaum.

_____ (1991). “The three dialects of English.” In *New Ways of Analyzing Sound Change*, ed. P. Eckert. New York: Academic Press.

_____(1994). *Principles of Linguistic Change: Internal Factors*. Cambridge: Blackwell.

_____ (1996). The Organization of Dialect Diversity in North America. Philadelphia, PA: ICSLP4, Fourth International Conference on Spoken Language Processing.

_____(1997). Plotnik Documentation. Philadelphia, PA: U. of Pennsylvania Dept. of Linguistics.

_____ (2001). *Principles of Linguistic Change: Social factors* vol. 2. Cambridge: Blackwell.

_____(2002). Phonological Atlas of North American English, ed. Charles Boberg Sharon Ash: http://www.ling.upenn.edu/phono_atlas.

Ladfoged, Peter. (1993). *A Course in Phonetics*. New York: Harcourt, Brace, Jovanovich. [Reprinted in 3rd].

Luthin, Herbert W. (1987). “The story of California (ow): the coming-of-age of English in California.” In *Variation in Language: NWAV-XV at Stanford*, ed. K. M. Denning et al, 312-324. Stanford, CA: Stanford University Department of Linguistics.

Milroy, James. (1992). *Linguistic Variation and Change: on the historical sociolinguistics of English*: Language in Society. Cambridge, Mass.: Basil Blackwell, Ltd.

Milroy, Lesley and James Milroy. (1992). “Social network and social class: toward an integrated sociolinguistic model.” *Language in Society* 21:1-26.

_____ (1997). “Varieties and variation.” In *Handbook of Sociolinguistics*, ed. Florian Coulmas, 47-64. Cambridge, Mass: Blackwell.

Moonwoman, Birch. (1987). “Truly awesome: (oh) in California English.” In *Variation in Language: NWAV-XV at Stanford (Proceedings of the Fifteens Annual Conference on New Ways of Analyzing Variation)*, ed. Sharon Inkelas

Keith Denning, F. C. McNair-Knox and John R. Rickford, 325-326. Stanford, CA: Department of Linguistics, Stanford University.

Murray, Stephen O. (1994). *Theory Groups and the Study of Language in North America: a social history*. Philadelphia: John Benjamins.

Olive, Joseph P., Alice Greenwood and John Coleman. (1993). *Acoustics of American English Speech: A dynamic approach*. Murray Hill, NJ: AT&T Bell Laboratories.

Peterson, Gordon E. and Harold L. Barney. (1952). "Control methods used in a study of vowels." *Journal of the Acoustic Society of America* 24:175-184.

Reed, Carroll. (1957). *Dialects of American English*. Cleveland, Ohio: World Publishing.

Schilling-Estes. (2002). "Investigating stylistic variation." In *Handbook of Language Variation and Change*, ed. P. Trudgill and N. Schilling-Estes J.K Chambers. Oxford: Blackwell.

Thomas, Erik K. (2001). *An acoustic analysis of vowel variation in New World English*. Published by Duke University Press: American Dialect Society.

U.S. Census. (2002). Metropolitan Area Population Estimates: United States Department of Commerce. (http://govinfo.library.orst.edu)

Wolff, Rebecca. (2000). Portland Dialect Study: High Rising Terminal Contours (HRTS) in Portland Speech, Portland State University Department of Applied Linguistics MS, Oregon. Master's.

Wolfram, Walt. (1991). *Dialects and American English*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Wolfram, Walt and Natalie Schilling-Estes. (1998). *American English: Dialects and variation*. Malden, Mass, and Oxford, UK: Blackwell.

APPENDIX A: ADDITIONAL DATA TABLES

Table A.1. Age comparison: Statistical analysis of differences

VC	Fmt	Young Adults			Teens			YA/Tn
		Mn	SD	#	Mn	SD	#	t-test
owF	F1	635	93	67	575	73	53	0.000
	F2	1530	162		1473	189		0.082
owC	F1	574	83	91	548	42	38	0.019
	F2	1382	185		1317	155		0.044
owN	F1	657	66	35	587	66	24	0.000
	F2	1140	122		1111	140		0.407
owL	F1	539	81	41	525	41	24	0.376
	F2	897	127		924	122		0.396
uwF	F1	400	52	39	400	52	35	0.950
	F2	1987	184		1887	173		0.018
uwC	F1	441	76	46	442	58	41	0.961
	F2	1596	306		1545	208		0.357
uwL	F1	471	82	37	456	45	18	0.405
	F2	933	119		989	123		0.116
u	F1	523	106	66	516	42	37	0.611
	F2	1646	256		1526	210		0.012

VC	Fmt	Older Adults			YA/OA
		Mn	SD	#	t-test
owF	F1	554	67	27	0.000
	F2	1305	115		0.000
owC	F1	544	73	44	0.034
	F2	1176	121		0.000
owN	F1	526	75	18	0.000
	F2	1005	169		0.006
owL	F1	542	61	23	0.876
	F2	1037	189		0.003
uwF	F1	399	51	31	0.939
	F2	1805	226		0.001
uwC	F1	411	66	31	0.069
	F2	1385	217		0.001
uwL	F1	448	47	14	0.222
	F2	1019	92		0.010
u	F1	475	61	42	0.004
	F2	1460	198		0.000

Note: All formant values are measured in Hz; **VC—**Vowel Class, **Fmt**—Formant, **Mn**—Mean, **SD**—Standard Deviation,**#**--Number of tokens in sample, **YA**—Young Adults, **Tn**—Teens, **OA**—Older Adults, **t-test**—2 tailed distribution, unequal variance

Table A.2. Gender comparison: Statistical analysis of differences

VC	Fmt	Male			Female			F/M
		Mn	SD	#	Mn	SD	#	t-test
owF	F1	604	79	72	594	97	75	0.469
	F2	1448	181		1487	185		0.203
owC	F1	573	63	85	548	82	88	0.023
	F2	1292	166		1337	200		0.110
owN	F1	621	74	37	589	94	40	0.106
	F2	1147	101		1055	171		0.005
owL	F1	554	58	44	517	70	44	0.009
	F2	962	171		920	134		0.196
uwF	F1	404	51	56	395	51	49	0.406
	F2	1858	211		1948	192		0.024
uwC	F1	446	59	60	420	76	58	0.043
	F2	1477	261		1570	262		0.057
uwL	F1	464	74	38	460	59	31	0.769
	F2	965	129		965	108		0.985
u	F1	515	50	81	497	111	67	0.214
	F2	1518	216		1610	258		0.022

Note: All formant values are measured in Hz; **VC—**Vowel Class, **Fmt**—Formant, **Mn**—Mean, **SD**—Standard Deviation,**#**--Number of tokens in sample, **F**—Female, **M**—Male, **t-test**—2 tailed distribution, unequal variance

Table A.3. Social class comparison: Statistical analysis of differences

VC	Fmt	Working Class			Middle Class			WC/MC
		Mn	SD	#	Mn	SD	#	t-test
owF	F1	584	92	60	609	85	87	0.095
	F2	1495	204		1450	173		0.161
owC	F1	554	69	73	565	81	100	0.346
	F2	1340	180		1297	191		0.128
owN	F1	567	90	31	629	82	46	0.002
	F2	1079	159		1113	144		0.340
owL	F1	527	61	40	543	75	48	0.254
	F2	947	194		936	115		0.738
uwF	F1	399	51	43	400	52	62	0.871
	F2	1922	202		1885	221		0.367
uwC	F1	425	53	45	438	78	73	0.286
	F2	1517	235		1526	295		0.852
uwL	F1	462	70	35	462	71	34	0.996
	F2	935	106		996	113		0.033
u	F1	495	56	62	516	109	86	0.094
	F2	1568	228		1554	256		0.738

Note: All formant values are measured in Hz; **VC—**Vowel Class, **Fmt**—Formant, **Mn**—Mean, **SD**—Standard Deviation,**#**--Number of tokens in sample, **WC**—Working Class, **MC**—Middle Class, **t-test**—2 tailed distribution, unequal variance

Table A.4. Female speaker means

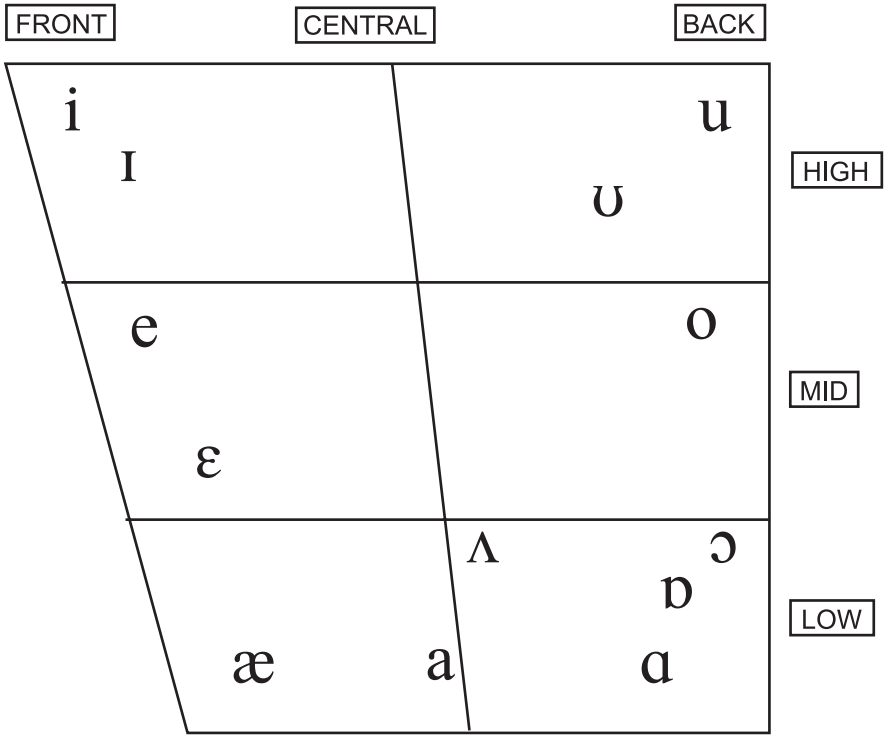
Vowel class	Formant	Daisy WC 56	Jan MC 53	Annette WC 32	Melissa WC 30	Lori MC 28	Sabrina MC 28	Marcia MC 18	Stacy WC 14	Karin MC 12
owF	F1	483	532	682	584	699	497	601	551	532
	F2	1409	1193	1590	1569	1476	1612	1546	1350	1424
owC	F1	478	520	629	572	642	428	553	529	527
	F2	1210	1089	1468	1353	1423	1453	1317	1422	1386
owN	F1	478	516	627	635	666	682	633	537	598
	F2	903	851	1145	1162	1096	1079	1248	1027	1161
owL	F1	477	497	551	500	620	416	548	500	499
	F2	920	896	1007	764	1009	841	1059	871	862
uwF	F1	394	334	--	382	512	387	464	385	396
	F2	2007	1901	--	2078	1361	2209	1960	1810	1820
uwC	F1	419	353	532	410	574	372	469	385	419
	F2	1444	1375	1956	1496	1801	1985	1427	1609	1607
uwL	F1	432	390	543	434	532	426	505	439	478
	F2	1012	1003	980	878	1061	1124	1040	935	908
u	F1	438	432	510	506	718	417	514	492	502
	F2	1429	1445	1790	1501	1730	1730	1684	1583	1777

Table A.5. Male speaker means

Vowel class	Formant	Greg WC 55	Kenneth MC 50	Michael MC 32	Fireant WC 30	Kent WC 29	Marcus MC 28	Robbie MC 14	Erik MC 13	Ralph WC 12
owF	F1	624	616	598	641	516	662	569	656	515
	F2	1599	1306	1453	1472	1594	1395	1424	1445	1529
owC	F1	540	627	555	620	513	617	561	571	534
	F2	1184	1214	1290	1331	1396	1364	1258	1171	1383
owN	F1	509	601	690	679	592	638	615	639	511
	F2	1156	1159	1071	1184	1231	1154	1203	1071	1048
owL	F1	597	548	572	552	465	564	528	563	515
	F2	1235	971	906	878	780	925	910	914	911
uwF	F1	451	401	398	448	360		393	479	345
	F2	1901	1596	1898	1943	2042		1854	2055	2012
uwC	F1	449	454	421	450	380	568	424	517	413
	F2	1267	1326	1501	1606	1607	1212	1456	1659	1607
uwL	F1	477	459	403	567	422	540	442	507	421
	F2	1008	1055	871	927	837	999	1122	940	926
u	F1	513	531	500	578	471	561	518	531	520
	F2	1598	1471	1481	1735	1557	1767	1395	2067	1418

APPENDIX B: VOWEL CHART OF IPA VOWELS

Figure 6.1. Vowel chart of IPA vowels



Note: ɒ is a Canadian realization of the *cot/caught* merger and is not a consistent feature of General American English.

APPENDIX C: INTERVIEW QUESTIONS

Biographical information

1. Have you always lived in (i.e., the SE area, Milwaukee, Downtown, etc.)? What other areas have you lived in? What areas of Portland do you like and why?

2. What do you do for a living? How long have you done that? Do you like it?

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

4. Are you a renter or a homeowner? How long have you lived there? Who lives in your home with you?

5. Where are your parents from? What did they do for a living?

Narrative elicitation

1. Have you ever done anything that you are really proud of?

2. Have you ever been in an accident? Really been hurt / ill / at a hospital?

3. What is something that you really like to do?

4. Has there ever been a time that you were really scared, when you thought that you were going to die?

5. Is there a place that you think is really beautiful? Can you describe what it looks like?

6. What was your favorite vacation? Tell me about it.

7. Tell me something important or complicated about your work.

8. (older subjects) Where were you when Mount St. Helens blew?

APPENDIX D: INFORMED CONSENT LETTER

Informed Consent Letter

I am Mike Ward, a graduate student in the Department of Applied Linguistics at Portland State University (PSU). I am conducting a study on the way people native to Portland speak and I would like you to participate in the study. It is being conducted in partial fulfillment of my Master's Degree and I will be working under the supervision of Dr. Tucker Childs at PSU.

I am asking you to participate in this study because you were either born in Portland, or moved here when you were a young child. If you decide to participate, I will ask you to be interviewed in order to obtain a sound recording of your speech. The interview questions will ask you about your life or your life experiences. You don't have to talk about anything that makes you feel uncomfortable or anxious or upsets you in any way.

The interview should last about an hour. During this time your voice will be recorded and later measured and analyzed with a computer to provide spectrographic images of your speech. This data may be published in journals or on the Internet, although your identity will not be revealed in any such public forum.

Any information that is obtained in connection with this study and that can be linked to you or your identity will be kept confidential by giving your speech sample a unique code and referring to you by a pseudonym.

All records of this study will be kept secure at my residence or in the office of Dr. Childs for a minimum of three years. Future researchers in the Portland Dialect Survey may also use the records, as the interviews will form part of a database of Portland speech.

You may not receive any direct benefit from this study, aside from perhaps learning a little bit more about language and linguistics. The data collected from your participation, however, should help increase knowledge about Portland speech patterns, and provide information and direction for a larger dialect survey by later researchers.

Your participation is entirely voluntary. Your decision to participate or not will not in any way affect your relationship with Portland State University or me. If you do decide to take part in this study, you many choose to withdraw at any time without any penalty.

Your signature below indicates that you have read and understood the information above and have agreed to take part in this study. By signing you are not waiving any legal claims, rights or remedies. The researcher will provide you with a copy of this form for your own records.

Signature_____ Date_____

If you have questions about the study itself, contact Mike Ward at 4025 SE Hawthorne Blvd., PDX. OR 97214, (503-235-7213). You can e-mail me at: noloquiero@yahoo.com.

If you have problems or concerns about your participation in this study or your rights as a research subject, please contact the Human Subjects Research Review Committee, Office of Research and Sponsored Projects, 111 Cramer Hall, Portland State University, (503) 725-8182.

APPENDIX E: INTERVIEW WORD LOG FILE

Marcus, 28, Portland, OR, PDS 047
Analyzed by: Mike Ward
Date: 11/15/2002

some different courses in anthropology and - one of the anthropologists there- discovered some ancient - million-year-old artifacts in Siberia – which puts you know evolution back – like tools stuff – yeah this is after – man should have come - came out of Africa later two hundred – now3 there finding stuff in Asia and stuff too – to this conference in Simon Frasier – interesting things to say and –you know2 they want – tired of taking – they just snapped - get tired2 of dealing with everybody every person sort of just feeding – not worth going after2 – worked at a company called – when I got back – company called GES – we did advertisements – one the computer – were real old – with graphic design – what type of what type2 of skills- to get that job – what do you use – do you use special draw things and paint – designing these cards on Word – it's really basic – been back for seven years- people thought I was Russian – just flown back in – I was really thin – had dark lines – characteristics which make you know3 – other than my speech3 – speaking slow or something – couldn't notice or anything – that I spoke very little – out 'em both up – you're a vegetarian – the veggie Rubins are killer-– hear more about it – like the coffeshops there – the twin towers – another coffeeshop that I like to go2 to – Starbucks opens up – I don't usually believe – actually more2 prone to just start seeing – happen more and more and more3 –talk about with a Portlander - that you know you see – so they're part of the population – like the lighter roasts – they have like five – organic Costa Rican- organic Costa Rican is lighter – wouldn't be a dark coffee – that's were everything goes – fatty organism organ – which is located on – I grew up in Northwest Portland –there's an abortion clinic and there's a park – hill comes down – every day of my life – my dad still owns the house – born and grew up – Mom passed away – been purging everything we own (verb) – antique store next door – our house was completely – that's what she spent – played the violin in – but at the same time – things came home in boxes – of those rooms you – sale next door – everything at home – becomes more daunting everytime we go3 over there – I've thrown stuff out – own2 (verb) stuff over there