

SPEECH IN THE U.S. MILITARY: A SOCIOPHONETIC PERCEPTION APPROACH TO  
IDENTITY AND MEANING

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By

M. Joelle Kirtley

Thesis Committee:

Katie Drager, Chairperson

Patricia Donegan

Richard Schmidt

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## ABSTRACT

Linguistic variants can index different social meanings so that speakers who use those variants are perceived as being associated with different social characteristics or social categories. Perception studies provide an effective means by which to better understand the interaction of linguistic variation and social meaning. These studies can also help to identify the specific social meanings that are associated with particular linguistic variants.

This thesis describes a perception study of speech by members of the U.S. Military; investigating the correlation between Southernness, dominance, efficiency, and stoicism, and some of their respective linguistic correlates: /ai/ monophthongization and /u/ placement,  $F_0$ , speech rate, and pitch width. The study employs the Matched-Guise Technique. This technique compares participants' responses to a single speaker in two different 'guises,' in this case, guises created with digital manipulation. The results show evidence that these linguistic variables are associated with specific social meanings and with the U.S. Military.

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# Chapter One: Introduction

With every new encounter, we are judged and judge others by the way we walk, the way we dress, and the way we talk. While many scholars and laypeople are interested in the construction of identity through these avenues, sociolinguists seek to learn how talk and identity interact. Fine phonetic detail in another person's speech can lead us to think they have come from a certain place, completed a certain amount of schooling, make a certain amount of money, or associate with certain people. Sometimes, we are right. Oftentimes, our judgments are based on specific linguistic traits in the other person's speech stream, and we associate those traits with particular social meanings; meanings that we may have learned from experience with other people, from stereotypes in our communities, or from the media. Recent scholarship in sociolinguistics has begun to look at speech and speech perception as composed of linguistic variables, each variable attached to a field of social meanings, present in larger society (Eckert 2003, 2005, Campbell-Kibler 2009). These traits are used in concord and in nuanced ways to shape the identities that each of us project in our daily lives.

This thesis investigates four such linguistic traits and their relationship to various social meanings and to an association with U.S. Military involvement. Linguistic traits were chosen based on interviews with military personnel and a qualitative survey of American native-English speakers, used to determine what people think they think about speech and people in the military. Each linguistic variable may have complex ties to social meanings and categories for the listeners; experimental techniques can be used to examine those ties. Experiments One and Two tested what character traits were associated with each linguistic variable. The results can potentially shed light on whether the process of associating people with a social group first involves associating them with character traits that would be found in members of that group. The experiments also served to test whether people's qualitative ideas of how they would determine a member of the military were actually used in making that decision.

The linguistic traits examined in this study are  $F_0$  (or overall fundamental frequency (pitch)), speech rate, pitch width, monophthongization of /ai/, and frontness of /u/. Experiment One was designed to gain a nuanced understanding of how some of these traits are interpreted by listeners. The results of Experiment Two reflect the relationships between  $F_0$  and physical dominance, arrogance, and military membership; faster speech rate and efficiency, helpfulness, competence, and military membership; pitch width and expressiveness; and /ai/ monophthongization and /u/ fronting and Southernness, leadership, and military membership.

There exists little scholarship on the speech of members of the U.S. Military, but it is not a subject left untouched by laypeople in everyday conversation. It is common knowledge that people in the military use acronyms and jargon, but it is also common knowledge that people in the military come from all over America and from all walks of life, so what can really be said of U.S. Military speech generally? Even though people in the military may use all of the American dialects, the military is still a group of speakers sharing a common goal and a group that undergoes institutionalization from basic training through retirement. These common goals and common training shape members of the military in a particular way, and though this may not affect every member's speech, it is likely to have some effect on most. In addition, there exists in the U.S.A. wide and common stereotypes of what it is to be a member of the U.S. Military, including the way that a person might speak. The judgments made by listeners about someone's membership in this social category would rely heavily on these preconceptions. Stereotypes can be powerful tools that people use to assess others. The purpose of this study is to investigate not which linguistic traits members of the military actually possess, but which traits listeners listen for in order to determine that someone is in the military.

The results of this study have theoretical implications for ideas both within sociolinguistics and in other fields of linguistics as well. Consistent with Campbell-Kibler (2007), the findings support ideas about linguistic traits being connected to a complex indexical field of social meanings which can be interpreted differently in different contexts. They also provide evidence that phonetic variation and social information have linked representations in the mind that are accessed during speech perception. Evidence of this relationship between phonetic and social information challenges the traditional view that

such variation is filtered out by listeners. The results provide evidence that listeners not only notice variation in the speech stream, but they use it to make judgments about the speaker. While this study does not exclusively support exemplar theories of lexical processing, wherein listeners retain memory traces of each instance they hear of a given word, it does suggest that some degree of detailed phonetic information must be stored and must be taken into account when modeling speech processing.

An additional goal of this study is to improve on the methodologies being used for perception work in sociolinguistics. The methodologies used in past studies attempting to understand how specific differences in people's speech affects judgments made about them have left room for improvement. It is difficult to control for all of the factors that are present in one person's speech stream in order to isolate what about a voice brings about a judgment. Some studies used different speakers who used the different variants that were under investigation. A technique known as the Matched-Guise Technique (Lambert 1966) sets up groups of stimuli spoken by a single speaker in different guises in order to keep constant as many linguistic variables as possible except for the one being investigated. With the advent of improved and open-source resynthesis software, recent studies have been able to use this technique with digital manipulation. The experiments in this thesis use various digital manipulations to create matched pairs of a single speaker using different linguistic variants.

Chapter Two provides an overview of the field of sociophonetics, examining past studies and theories in order to establish how this thesis contributes to an understanding of identity and speech. Chapter Three presents a look at people's qualitative perceptions of speech in the military and why such a view is important to this study. Experiments One and Two are discussed in Chapters Four and Five respectively. Chapter Six provides a close examination of the results of the experiments and offers insight into how the results fit into sociolinguistic theory.

## Chapter Two: Literature Review

### 2.1. Sociophonetics

Sociolinguistics is a broad field that investigates how social information and language interact. The field includes both discourse analysis and a more structural study of language. The structural side of the field took off in the 1960's with the famous studies carried out by William Labov to expand the notions of linguistic structure within traditional linguistic study to include formal treatment of speech variation (Labov 1969). His first projects included the famous Martha's Vineyard study (1963) in which he found that participants of different age groups and ideologies represented themselves using different speech patterns, and his department store study (1972b) in which he found that retail workers at more prestigious stores used more standard variants of /r/ than those at the less prestigious stores. Inquiry into structural variation includes examination of lexical items, grammar, morphology, and phonetics, and though production studies have made up the majority of scholarship in variation work, perception studies are also being carried out more and more frequently.

Studies of variation in phonetics were identified as a special field within both phonetics and sociolinguistics beginning in 1979, when the term 'sociophonetics' was first used by phoneticians to describe phonetic studies that considered social variation as a factor (Foulkes et al. 2010). More recently, Penelope Eckert divided this work into three main branches of theory which she calls the first, second, and third waves of variation studies (Eckert 2003). These waves are not related in a linear succession, but overlap in time and are distinct because of their underlying treatments of variation. The first wave was spurred by Labov's department store study (1972b), which actually came after the publication that spurred the second wave, his Martha's Vineyard study (1963). The first wave is called such because it was the predominant approach to variation for decades, before a return to investigation of local meaning in the last twenty years (Eckert 2005). Studies within the first

wave of variation theory connected linguistic variables to broader social categories such as region, sex, socioeconomic class, or ethnicity. These studies used survey methods to access the speech of large groups of speakers. Surveys involved quick exposure to the speech of the participants, usually requiring speakers to read from a passage and a word list, answer some questions about themselves, and answer a question that was meant to put them in an emotional state wherein they would use the speech that came most naturally to them. For an example of this type of survey instrument, see Labov (1966). Both the casual and the read speech would be compared across speakers for one or more variable and correlations would be drawn from sociological information about the speakers and the particular variants they used.

One of the first principles espoused by the first wave was that non-standard variants of linguistic traits were used more often by those lower on the socioeconomic hierarchy, and this use interacted also with the speaker's membership with other broad social categories such as gender, region, and ethnicity. Non-standard variants in this case were those that were either more stigmatized or more likely to be associated with a particular group of speakers (Eckert 2003). Standard speech was that which could be associated with a wider group of speakers. Labov also proposed that register and use of standard or non-standard variants were correlated (Labov 1972b). Formal and read speech were more standard, while informal speech, particularly that used when the speaker was in an excitable state, would be less standard. His 'Principle of Style Shifting' proposed that "styles can be ordered along a single dimension, measured by the amount of attention paid to speech" (Labov 1972a).

Labov (1966) first proposed the class stratification of linguistic variables, reporting the findings of a broad study of speech in New York City. He first determined the socioeconomic status of the participants, setting this variable up as the primary one, and then discussed how the different classes use several linguistic traits: the presence or absence of final /ɪ/, the height of the vowels /æ/ and /a/, and the realizations of both /θ/ and /ð/. He also discussed ethnicity as a determiner of the use of particular variants. Wolfram (1969) discussed a similar survey study of the speech of African-Americans in Detroit. His work examined several social variables and their relationship with grammatical and phonetic traits and found that social class was the greatest determiner of variation. A more recent example of work within this wave of study is Gorman (2010), where the author applied new statistical

methods to older data with the goal of finding correlations between socioeconomic factors and the use of negative concord. His pursuit, though executed 44 years later than Labov (1966), was in keeping with the basic presuppositions of first-wave sociolinguistic studies.

While these studies found a relationship between the socioeconomic hierarchy and use of standard and non-standard variants, this correlation was not always a linear one. Despite the popular belief, sometimes supported by evidence from sociolinguistic studies, that the vernacular is spoken by those of less socioeconomic standing, studies found that the greatest use of non-standard variants is not found in the speech of members of the lowest rung of the socioeconomic hierarchy, but in that of members of the upper working class or lower middle class (Labov 2001). Researchers postulated that this had to do with these groups' greater community involvements. Therefore, speech is not a direct reflection of membership in a particular socioeconomic group, but instead a reflection of what it means to belong to a certain socioeconomic group. There is something about being in the upper working class or lower middle class that causes one to utilize the vernacular more than others. Similarly, something *about* being a man or a woman, or being part of a certain age group or ethnicity might be the driving force behind the link between these groups and their speech. The question of what that something is led to the second wave of variation studies, research which strove to determine the local meaning behind the use of particular variants.

Again, the second wave did not necessarily follow the first wave in time, but rather, is an alternative approach to the study of variation. Scholars as early as 1948, when the term 'idiolect' was first used, were interested in the speech of the individual (Bloch 1948), and thought that studies of the speech of a single individual within the context of a community could prove profitable. This idea was set up in opposition to studies using wider surveys searching for generalizations that could be drawn across society. Linguists following the second line of thinking emphasize that individuals can use language to index the different social groups to which they belong at any given point in time. These studies use ethnographic methods in order to understand a particular speech community and the way that vernacular and standard variants are used within that community to construct the identities of its speakers. To investigate these identities, scholars do not necessarily seek out the usage of predetermined variables, but instead spend time studying the social groups and dynamics



within the community and investigating how linguistic traits interact with and display these dynamics.

For example, Milroy and Margrain (1980) examined the social networks of 46 working-class speakers from Belfast to determine how their social involvements interacted with their use of vernacular speech norms. Specifically, they discussed the interaction of key phonological variables with the speakers' individual social networks to determine if linguistic behavior can be predicted by social involvement. They concluded that speakers may begin to use a greater number of standard variants when their social networks are less dense, and they suggested that this may be because in these cases, institutions rather than local community practices have more sway over the speakers.

Eckert (1989) spent time in high schools in Detroit to examine the relationship between the progression of the Northern Cities Chain Shift and the two traditional classes of adolescents in Middle America: the Jocks and the Burnouts. She found that the burnouts, students who associated their status and social standing with the community at large rather than with the high school status hierarchy, were more likely to use more recent, urban linguistic changes, and their use of linguistic traits was more strongly correlated with the social category with which they associated than to which class their family belonged.

Mary Bucholtz (1999) spent a year in a high school in California studying the relationships, ideals, and linguistic practices of a group of middle-class European-American girls. In the first wave, these girls would have been placed neatly into a single category (e.g. young, middle-class, European-American, female), but spending time with them revealed the strategies they used within their own community of practice (a group of people oriented on a daily basis towards achieving similar goals) (Eckert 2005). Bucholtz described one group who self-identified as nerds. She claimed that linguistic practices worked in conjunction with other practices within the group to create meaning and identity. She used as an example the participant Bob's linguistic work to distance herself from stereotypical femininity, which Bucholtz argued is merely part of Bob's overall work to participate in anti-feminine practices.

Robert Lawson carried out a similar study of adolescent males in Glasgow (Lawson 2005). He spent three years with males who were self-reportedly in different social groups to determine what linguistic traits might correlate with community membership. He

investigated how violence and adolescence interacted with speech and discourse. Mary Aleene Rose interviewed 36 speakers at a Senior Citizen's Center in Wisconsin and observed the participants' activities and memberships over time. She investigated realizations of /dh/ and /ow/ and found that variation correlated with ethnicity, gender, occupation, and education (Rose 2006). Quantitative analysis coupled with ethnographic observation can provide much richer insight into how and why some variants are used for different groups and how identity is created within a specific community of practice.

Even with this different approach to sociolinguistic variation, the second wave, like the first, still dealt with variation in regards to social categories: what links are formed between social group involvement and specific linguistic traits? The qualities or character traits that might be indexed by a linguistic trait were mentioned sometimes as an aside, but never as a focus of the study. The third wave of variation studies views linguistic variation in terms of linguistic traits being associated with particular qualities of a person, and these qualities are then logically associated with social categories, thereby relating the linguistic traits with social categories.

Much theory within sociolinguistics has dealt with people's speech as something that they somehow fell into. The possible ways that people could speak were mandated by the social categories to which they belonged, and agency was placed in the hands of society. However, society is merely a group of individuals, and while societal practices usually constrain the action of the individual, agency still lies with individual action. Nettle writes, "One of the central insights of sociolinguistics is that learners of language do not simply pick up the most common norms going on around them. Rather, they are seen as active discriminators who aspire to membership of particular social groups and make themselves sound as similar as possible to the members of those groups" (Nettle 1999: page 97). Eckert (2003) points out that the social sciences in the last three decades have moved from a study of structure to the study of practice, rightly identifying the place of agency; the third wave of variation studies follows this concern, focusing on how speakers index social meaning using linguistic traits in order to project both their personal character traits and their involvement with various social categories. Building on the practices of the second wave of variation studies, the third wave of theory involves examining more closely what it means to belong to one category or another, determining what character traits would most likely become

representative of a social category, and also questioning why those character traits have become representative of that category. When these questions are answered, a closer look can be given to how linguistic traits map to social traits and are used in composite to display one's social membership and style. Taking Eckert's work with Jocks and Burnouts as an example, the second wave would be interested in membership in one category or the other and which linguistic traits were found in the speech of which group. The third wave would be more interested in taking a close look at what it means to be a Jock or to be a Burnout, the lifestyle and orientations that go with both groups and trying to figure out how certain linguistic traits might interact with those more specific aspects of belonging to a social category. One example of this that Eckert offers is the correlation between urban linguistic traits and the Burnout speakers: Burnouts orient themselves around their communities, holding down after-school jobs, spending time in the neighborhood, or hanging out at the skating rink (Eckert 2003). These stronger community ties mean that Burnouts use community linguistic markers more frequently, demonstrating that the expectations for belonging to a certain social category can shape how a person speaks.

One of the most compelling studies in the third wave is Zhang (2005). She examined the use of four phonological variables by speakers of Mandarin Chinese living in Beijing as working professionals employed either by Chinese or foreign companies. She found that the employees of foreign companies preferred to use more global linguistic features, while the State employees used local variants. She concluded that linguistic features are used by the professionals in foreign businesses to give meaning to their new social identities.

Other studies involve examining the social meaning of one or two linguistic traits to determine how they might be perceived by listeners or to determine how they could be perceived differently in different contexts (Campbell-Kibler 2007, Clopper and Pisoni 2004a, 2004b, and 2006, Levon 2006, 2007). For example, there are studies that investigate how pitch may affect judgments that listeners make of speakers (Puts et al. 2006, 2007). Puts et al. (2007) manipulated both the fundamental frequency and formant dispersion of male speakers' voices to determine whether listeners would find the speakers more or less physically or socially dominant in higher or lower guises. They found that both a lower  $F_0$  and a different  $D_f$  caused listeners to believe the speaker to be more dominant in both areas. Similarly, Campbell-Kibler (2007) investigated the social meaning of the pronunciation of

/ing/ as either [in] or [ɪŋ] by different speakers of American English. She reported that the manipulation had a different effect on the perceptions of the listeners according to which speaker was using the variants, thereby showing that a linguistic trait can index several social meanings according to the other linguistic traits amongst which it is found.

These different approaches to inquiry investigate whether a linguistic trait can in fact have a certain social meaning and whether that meaning exists within an indexical field of other meanings and categories. Still to be examined is how separate linguistic variables index broader categories even when found in isolation. Another question that remains is whether linguistic variables used together more strongly suggest membership in one social category or another than if they occur in isolation. The work presented in this thesis explores these two areas of inquiry.

## **2.2. Perception Studies**

With the notable exception of Puts et al. (2007) and Campbell-Kibler (2007), the work discussed in the previous section has analyzed data from speech production. While perception experiments have been used in speech processing studies for quite a while, they are newer within the field of sociophonetics. Both pursuits can offer important insight into meaning and interaction. Production studies involve collecting speech data from speakers and analyzing variation either on the spot or later on using either careful scrutiny or technological assistance. Researchers have come to value perception studies because they can approach some questions that production studies cannot; including what linguistic cues listeners use to identify speakers (Clopper and Pisoni 2004a), what linguistic traits bring about specific social judgments (Levon 2006, 2007), how listeners store social information in the mind (Sumner and Samuels 2009), and even how and why language change takes place (Hay, Warren, and Drager 2006). It is also important to supplement a production investigation with a perception study to investigate whether parameters of speech production as identified for a particular speech community are actually perceived as being related to that community by listeners. Within sociophonetic perception studies, several methods have become widely used, and new methods continue to be developed.

Some perception studies strive to determine who speaks what dialect and where, at least in the opinions of the participants. In order to inquire after popular opinions of what dialects are spoken where and by whom, researchers use both dialect map tasks and interviews to ascertain the participants' opinions of certain dialects. The map-drawing task was first presented by Preston (1989). In this methodology, participants are given an empty map and asked to draw in the boundaries of different dialects and label the regions. Some researchers also ask the participants to write any stereotypes they have for the area or words that someone from that region might use (Fought 2002). These studies found that the listeners' experiences greatly affected their responses to the tasks. They also illustrate that dialect differences can cause drastically different social judgments to be made.

The most straightforward methodology used in perception studies might be simply playing different speakers to the participants and asking them questions about what they think of the speakers or of their dialects. Clopper and Pisoni's body of work on the perception of regional origin (2004a, 2004b, 2006) requires that the participants listen to recordings of speakers from different dialect regions and guess what region they are from. They found that listeners listened for several salient traits in order to make determinations about what region a speaker was from. In the work on the perception of homosexual male speech, Gaudio (1994) found that his listeners could accurately guess the sexuality of the speaker, but he was unable to determine after the fact what speaker traits that listeners were attending to because there was too much variation in the speakers in his study to attribute differences in judgment to particular linguistic variables.

One of the most promising methodologies used to perform perception studies in sociophonetics is the Matched-Guise Technique. In this methodology, a single speaker is played to the participant in multiple guises, and opinions of the speaker or their accent are elicited from the listener each time. The purpose behind this is to control for as many phonetic variables as possible so that traits attributed to the speaker can be confidently linked with changed variables. If many things about the speech stream in question change at once, there is no way to be certain which change caused a shift in response. Using the Matched-Guise Technique, researchers can investigate the perception of an entire dialect or the meaning of just one linguistic variable. Early implementation of the Matched-Guise Technique used a single speaker who would employ multiple accents or even languages. For

example, Ball (1983) used the Matched-Guise Technique to investigate Australian participants' impressions of speakers of Standard English, Liverpool English, Glasgow English, Australian English, American English, and English spoken with a French, German, or Italian accent. Purnell et al. (1999) used this method to investigate housing discrimination in California and found that which dialect the speaker used determined how many times that speaker's call was returned. While these uses of the technique can demonstrate how listeners' perceptions shift in response to major changes in the speaker's voice, they cannot provide exact isolation of a single variable, nor can they guarantee that the manipulation is authentic and consistent.

More recently, as the technology for speech resynthesis has improved, the Matched-Guise Technique has evolved to include the use of digital manipulation to create the matched guises for a single speaker's voice. These guises are then played to the participants, who are asked to give their opinions of the speaker in both guises. Usually, the listeners have been made aware that they are listening to the same speaker (Levon 2006, 2007), and at times, they also know what variable has been manipulated (Campbell-Kibler 2007). Campbell-Kibler's study, described in section 2.2, investigated the meaning of variation in word-final /ing/ and employed this technique. She manipulated utterances from eight different speakers of various regional dialects and sexual orientations to produce 32 critical pairs of stimuli in which the speaker produced instances of /ing/ as either [ɪŋ] or [ɪn]. She then played these manipulated passages to participants and asked them about the speaker's regional background, education, sexuality, and personality. Her study showed that a large amount of speaker information can be contained in a single token, and it demonstrated how the interpretation of that information changes according to the linguistic context in which the token was heard.

With a slightly different line of inquiry in mind, Levon (2007) manipulated the speech of two speakers, one identified as gay-sounding and one identified as straight-sounding, for pitch width and sibilant duration in order to determine what effect changes in those variables might have on listener's judgments of the speakers' sexuality. Rather than focusing on the entire indexical field of a variable in different linguistic contexts as Campbell-Kibler did, Levon was interested in whether one single variant could index a social category and what degree of phonetic change would be required to evoke that social

judgment. Levon manipulated a 71-second passage of read speech for pitch width and sibilant duration. He narrowed the gay-sounding speaker's pitch width by 25% and shortened his sibilant duration by 17% and created four different stimuli: one with the original variants, one with narrowed width and longer duration, one with wider width and shorter duration, and one with both narrowed width and shorter duration. He did the exact opposite for the straight-sounding speaker. Levon found that perceptions of the gay-sounding speaker's sexual orientation and masculinity were linked with differences in pitch width and sibilant duration.

Other work in speech perception investigates how the participants' backgrounds affect both the way that they hear sounds and the decisions that they make about social categorization. Clopper and Pisoni (2004a) investigated whether listeners were able to accurately place speakers into the correct regional dialect group. Building on that research, Clopper and Pisoni (2004b) set up an experiment using the same task as their past studies wherein the participants were asked to identify the origin of six American speakers, but this time noting the participants' own regional backgrounds. Clopper and Pisoni found that listeners who had lived in several regions of America were better able to correctly identify the region each speaker was from, and they also found that listeners were the best at identifying speakers if they had lived in the particular region that the speaker was from.

Fridland (2008) built on two studies described in Fridland et al. (2004) and Fridland et al. (2005), examining the role of vowel formant changes in progress in social perception. In Fridland et al. (2004) Memphians were tested for whether they found shifted variants of certain vowels to be more Southern than non-shifted variants, and for whether shifts in front vowels were more salient as markers of Southernness for the participants than shifts in back vowels. Adding to this, Fridland et al. (2005) investigated how perceptions of the variant as Southern interacted with perceptions of pleasantness and education. In order to examine the role of listener background on the perception of shifts in progress, the same experiments were carried out with participants from Reno, Nevada. Fridland (2008) found that while both groups were competent at recognizing the more Southern variants in the token pairs, Nevadans were overall better at the task, and the two groups seemed to use different criteria in making their judgments. Fridland attributed this difference to Reno participants using distance from their own phonological systems as a gauge to determine Southernness, while Memphis participants used vowel trajectory in addition to vowel formants to make their

judgments. Fridland further concluded, in contrast to other studies, that listeners, when forced to make dialect judgments, perform better if that dialect is not their own.

### **2.3. The U.S. Military**

The experiments presented in this thesis examine how different linguistic variables are linked with the perception of military involvement. The U.S. Military is portrayed in some of the most memorable Hollywood moments, featured in the evening news all around the world, and made up of one percent of the American population at any given time. Although its members come from all over the country and from every type of background, the military is a community of speakers, one that vigorously practices institutionalization that results in greater homogeneity. Along with standardized haircuts and uniforms, the language used in the military is something that new recruits begin to adopt from the moment that they enter service. Some of this is intentionally driven by the military itself, as in the chants that recruits shout out in basic training to learn occupation-appropriate vocabulary. Some speech markers specific to the U.S. military result from the goals that the community shares while others probably have more to do with convergence that takes place among the many different members that join up with different language practices in tow.

### **2.4. A Qualitative Study on U.S. Military Speech**

Kirtley (2010) conducted interviews with seven members of the military in order to find out how they believe military and non-military speech differ. The interviewees reported a wealth of differences between the two groups' speech. The first and most frequent thing that interviewees were likely to note was the use of military-related lexical items, including acronyms and slang. They also mentioned that people in the military tend to speak more quickly and with more fluency, noting that they had noticed this change in their own speech after joining. Kirtley (2010) argues that these speech characteristics stem from the need for military communication to be efficient and concise; every communication must be clear and quick so that sensitive orders can be carried out without dangerous incident.



Other markers mentioned by the interviewees may have to do with the strict hierarchy practiced in the military. Using titles and choosing to use either direct or indirect language according to the person with whom they are communicating creates and fortifies the military hierarchy in a constant way so that servicemen are made aware of who to take orders from and who to give orders to. Participants also mentioned an increased use of slang, a decrease in pitch change, and a generally lowered F<sub>0</sub>, linguistic variants that may be a result of masculine posturing and displays of dominance that take place in a culture that is male-dominated and intrinsically violent (Kirtley 2010: page 79).

In addition, the tasks that soldiers are required to perform are emotionally taxing and, in today's society, much more violent than the tasks required of an average citizen. As such, soldiers must maintain a different level of emotional distance from their everyday activities in order to be able to perform these tasks. This distance may be partly established through using acronyms or military jargon to describe events whose words in civilian society bear a great deal of emotional semantic content (Kirtley 2010: page 79). The word *war* is latent with negative or traumatic meaning, but *O.E.F.*, the acronym for *Operation Enduring Freedom*, which is how the war in Afghanistan is referred to by the military, has much less emotional content.

Emotional distance may also be established through using a smaller pitch range; some interviewees reported a 'lack of intonation' in military speech, and previous studies have found that emotional language has greater pitch diversity (Burkhardt and Sendlmeier 2000). Therefore, stoic language is that without much change in pitch and may be a part of what constitutes military speech.

One last interesting characteristic of military speech that was reported in the interviews was Southern dialect markers. One participant thought that because military training camps, where new recruits begin to formulate their identities as soldiers, are in the South, and because military ideals and Southern ideals often overlap in American media and perhaps in American popular opinion, soldiers converge with certain markers of the Southern or South-Midland dialects.

In summation, the most consistently discussed differences about speech in the military in Kirtley (2010) were lexical items. Just as when an American speaker and a British speaker of English come together and talk about the different words that they have for the

same referents, the interviewees particularly noted the new words that they learned to use for the first time during service. In addition to these vocabulary items, there were also some phonetic differences that were either prominent to a greater number of the participants or particularly salient to at least one participant. These variables included speech rate, speech efficiency, monotonous intonation, Southernness, and authority.

## **2.5. This Study's Purpose and Contribution**

The experiments described herein explore the connections between linguistic variables and social variables within the indexical field of social meaning. The concept of a member of the U.S. Military, though not always the same for every person, is comprised of many different social characteristics; the reoccurrence of a perceived association between some of the characteristics and what it means to be a serviceman is what comprises the prototype or stereotype of 'Man in the Military'. When people come into contact with a set of characteristics in a single person, they are likely to believe that person to be part of the predetermined social category to which they have assigned those qualities. If those qualities are mapped to linguistic traits for the perceiver, coming into contact with the linguistic trait will lead the perceiver to associate the speaker to the social category as well. Therefore, the hypothesis of this study is that if an American English speaker should hear a man speak quickly, with Southern vowels, in a low pitch, and without much variance in pitch, that man will be more likely to be assigned to the category 'Man in the Military' than a man with a slow speech rate, Northern vowels, a higher voice, and more pitch variance. Levon wrote that the purpose of his 2007 study

was not testing what "gay" and "straight" speakers actually do with language, but rather what a listener population may think they do with language. For this reason, I used the stereotypical assumptions characterizing gay men's speech as having wide pitch ranges and long sibilant durations to investigate the perception of sexuality. (Levon 2007: page 538)

Similarly, for this thesis, I was not testing how men in the military actually speak, but the preconceived notions that people have of men in the military and how they speak.

Like Clopper and Pisoni (2004a), these experiments were also designed to examine the role of listeners' backgrounds in their perception of speakers. Participants were categorized into groups with military experience, with family in the military, or with no experience with the military. It was expected that these groups might make decisions about which speakers were in the military differently because of their backgrounds.

In addition to contributing to sociolinguistic theory, the experiments also provide further evidence that speech processing involves the logging of social information. For many decades, and still today for many researchers interested in speech processing, variation in the acoustic stream was considered noise that listeners had to normalize in order to access abstract phonological and lexical representations. This noise was also, and sometimes still is, attributed to universal physiological and cognitive differences in speakers. Models created under these presuppositions propose that audio input comes in, is subjected to normalization filters in the brain and reverse processing of the phonological rules supposed for the speaker, and is then associated with the best fitting abstract phonemic lexical entry. It is produced in much the opposite fashion. Sociolinguistic evidence shows that these models are not sufficient.

Sumner and Samuel (2009) found that listeners who were more familiar with the r-lessness of the NYC dialect were primed by r-less variants of words to respond more quickly to a word-judgment task while those less familiar were not primed by those same variants. This suggests that exposure to a dialect can help to speed processing when listening to speakers of that dialect. This evidence cannot be explained by abstract phonemic representation models. Experiments One and Two can show further evidence that listeners use extralexical and extrasentential information to learn more about the speaker, perhaps even storing this information to speed processing of that speaker in the future.

Exemplar theory (Goldinger 1997, Bybee 1985, 2001, 2002, Johnson 1997, 2006) has become a popular theory within sociolinguistics and beyond to deal with the evidence that variation is not noise, but carries with it important social information that listeners store and use to make future decisions about both familiar and new speakers. Theorists who propose Exemplar Theories posit that a lexical entry in the mind is comprised of specific memory traces of every instance in which that word was heard. In early versions of these models, the process of accessing a lexical item is not limited to searching only for an abstract phonemic

representation, but rather, involves searching through memory traces of specific raw speech episodes and situating the new utterance in a context of all versions of the word heard before (Goldinger 1997). A study to investigate the validity of this model revealed that listeners are able to perceive the way that an utterance is said and replicate it more closely very soon after hearing it than they do a bit later. Listeners were also shown to more closely replicate an utterance after hearing it produced the same way more times (Goldinger 1996). This shows that listeners do not immediately convert the things that they hear into phonemic representations, but produce affected tokens soon after hearing a word spoken in a certain way. More recent versions of exemplar models have both episodic memories and abstract representations (Pierrehumbert 2006), and different kinds of tasks may require activation of either or both of these levels of representation (Hay, Drager, and Warren 2010).

McQueen et al. (2006) argue that adequate models must in the future include abstract prelexical representations of words, something that is not included in extreme exemplar models. One possible model is that each lexical entry is comprised of both an abstract representation and exemplar memories of real-life encounters with the lexeme. Another is that speaker information could be stored separately from the abstract representations in the lexicon. One idea that has not been spoken of much to my knowledge is that perhaps there are abstract representations of words, and listeners do in a manner normalize the acoustic stream as it flows in, but the particular neural pathway, or more abstractly put, the filter required for each normalization, is somehow stored in the memory and associated with certain words. The memory of which filter is applied to the acoustic input may then be associated with a social or biological category. That association could become stronger as the filter or pathway is used more often. Perhaps this is what Pierrehumbert meant when she wrote,

It would be astonishing if human neural circuitry proved to encode and store every single experience separately as such, like a character in a Borges story. Instead, remembering experiences involves updating or strengthening neural circuits. Extremely similar experiences would impact the same circuits, and the cumulative effect of exposure need not be linear. In fact it is unlikely to be linear. Saturation effects for the memory of extremely high-frequency types of events are only to be expected. (Pierrehumbert 2006: page 525)

Research to further determine the nature of speech processing in the mind would help to further understanding of how social information is stored and accessed in the mind, along with helping to determine the nature of cognitive processes of linguistic interaction.

## **Chapter Three: Impressions of U.S. Military Speech**

### **3.1. Language Ideology**

Beginning with Kirtley (2010) and using a qualitative survey to corroborate those results, the experiments in this study were designed with preconceived ideas about which possible linguistic traits might be associated with the military and further, which character traits might also be associated with these linguistic traits and the military. Unlike Campbell-Kibler (2007), which began with less conjecture and manipulated one variable to see what the result might be, this study was designed with variables in mind based on past work. In order to isolate what linguistic traits signal military membership, I began with both ideas about military speech and ideas about social characteristics of members of the military. Then, I used past sociolinguistic research to choose an acoustic correlate to those social characteristics. The test questions for each linguistic trait in Experiment Two were designed to find what I already suspected might be there, although asking open-ended questions in Experiment One allowed the participants to contribute their opinions without being led to respond in a certain way by rigid categories. This methodology combines testing for results on preconceived notions with allowing the participants to project their own cognitive delineations. Additionally, by first assuming a web of connections between linguistic traits and social characteristics, I could compose experiments which tested whether people's ideas about what they thought of a certain group of people or how that group speaks actually matched up to the judgments that they made.

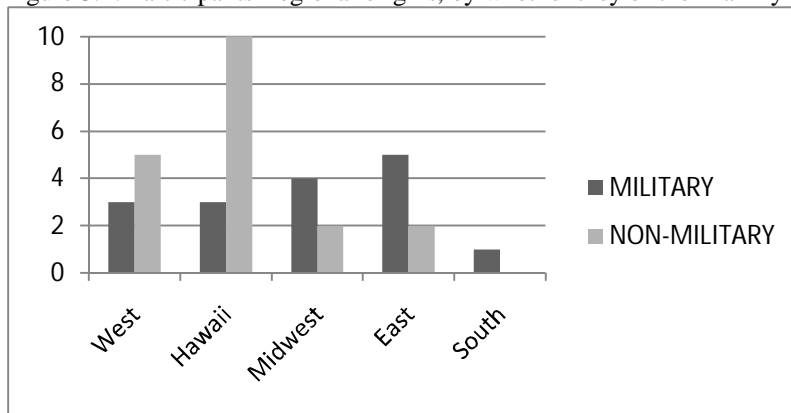
### **3.2. A Qualitative Survey**

In order to evaluate if the linguistic traits that participants from Kirtley (2010) mentioned are associated with military speakers for a wider group of participants that

includes respondents with less exposure to the U.S. Military, a qualitative survey was conducted with thirty-five American, native-English speaking participants. The respondents were asked open-ended questions about where they grew up, how old they were, what type of person they think of when they think of a member of the U.S. Military, how they think a man from the U.S. Military speaks, where they think most men from the U.S. Military sound like they are originally from, what type of women they think serve in the U.S. Military, and if they or anyone in their immediate families had ever served in the U.S. Military. Each participant was given a piece of candy for their participation upon their consent, and they were given the form in the presence of the researcher, who waited for them to finish before collecting the form. The forms were not analyzed until several days later, so the respondents remained anonymous.

Survey respondents were grouped into two groups: MILITARY and NON-MILITARY. MILITARY included those who either had immediate family members in the military or had themselves served. NON-MILITARY included those who had never served and did not have family who had served. Figure 3.1 shows the two groups of participants and where they reported to be from.

Figure 3.1: Participants' regional origins, by whether they or their family members had served in the military



Dealing with qualitative data gathered in surveys can be a difficult task. Open-ended questions lead to many answers that may be similar but are worded a bit differently. As such, the data gathered from this interview are represented in two ways: first, items that were mentioned several times in the same way are presented in Tables 3.1 and 3.2, with a

percentage of the times that that particular word or phrase was used out of all words or phrases. Second, for items that were not the same, the items that have close semantic connections with other answers are grouped into semantic categories and represented by a heading given to each semantic cloud. This method was used in Drager et al. (2010), who argued that semantically-informed tag clouds can be used as a more intuitive tool to display perceived style than tables.

Semantic clouds based on the survey data are presented in Figures 3.2 and 3.3. In these figures, the size of the font and the word’s centralness to the figure indicates how often that semantic idea was mentioned by participants. For the purposes of this thesis, only the answers given to the questions about men in the military, men’s speech in the military, and what region men in the military sound like they are from will be addressed. They will be addressed both separately in terms of MILITARY or NON-MILITARY in Tables 3.1 and 3.2, and together with no regard to the category of respondent in Figures 3.2 and 3.3 so that the reader can get an idea of both how the two groups responded apart and how they responded as a whole.

Table 3.1: MILITARY and NON-MILITARY responses to characteristics of U.S. Military personnel.

| NON-MILITARY<br>characteristics<br>n= 30 |      |                  |    | MILITARY<br>characteristics<br>n=29 |    |                  |      |
|--|------|------------------|----|-------------------------------------|----|------------------|------|
|  |      | speaking<br>n=22 |    |                                     |    | speaking<br>n=21 |      |
| white                                    | 10%  | respectful       | 9% | serving                             | 7% | respectful       | 19%  |
| young                                    | 6.6% | ignorant         | 9% | hardworking                         | 7% | confident        | 9.5% |
| strong                                   | 6.6% | loudly           | 9% | honest                              | 7% |                  |      |
| partier                                  | 6.6% |                  |    |                                     |    |                  |      |
| outgoing                                 | 6.6% |                  |    |                                     |    |                  |      |

As shown in Table 3.1, those contributing from the NON-MILITARY group reported that a member of the Military is a young, partying white male, who speaks loudly and some said either with ignorance or respect. In contrast, the MILITARY group responded that he is a hardworking and honest individual serving his country who speaks respectfully and with confidence.

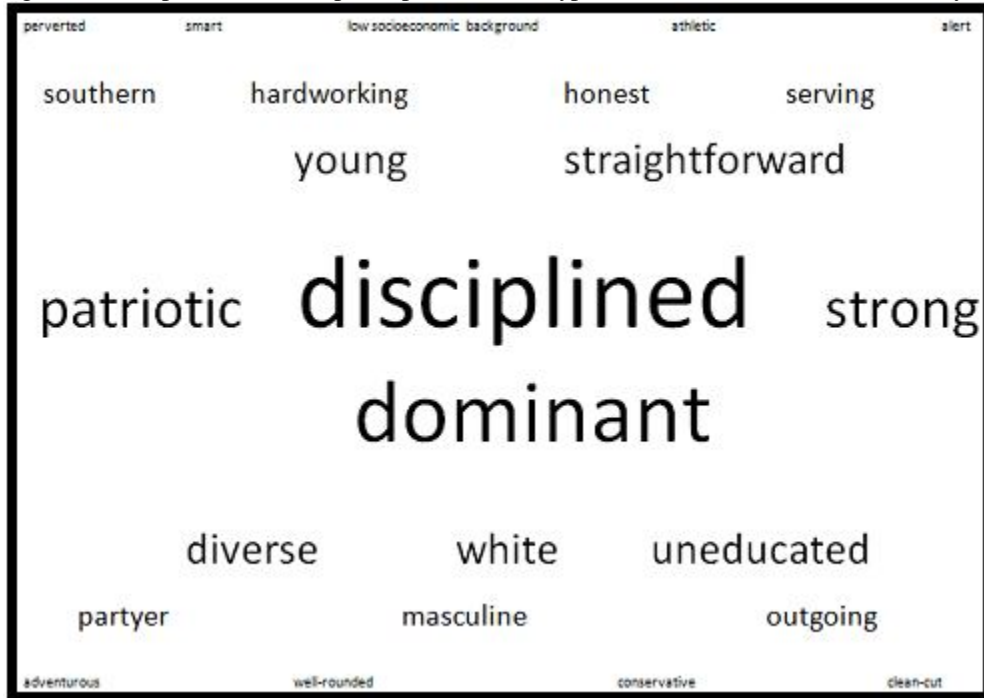


Table 3.2: MILITARY and NON-MILITARY responses to where someone from the military sounds like they are from.

| MILITARY |     | NON-MILITARY |     |
|----------|-----|--------------|-----|
| South    | 35% | South        | 29% |
| Midwest  | 22% | Midwest      | 33% |
| All-over | 22% | All-over     | 19% |
| Other    | 21% | Other        | 19% |

For both groups, the concept of a military man’s dialect region was either Midwest or South. As shown in Table 3.2, over half of the participants responded that people in the military sound like they come from one of these two regions. Other responses included “all-over” (MILITARY 22%, NON-MILITARY 19%), East (MILITARY 4%), and West (MILITARY 4%, NON-MILITARY 5%). This finding, that military speech is associated with the South and Midwest, is consistent with findings reported by Kirtley (2010) who found that even members of the military presently active made this same association.

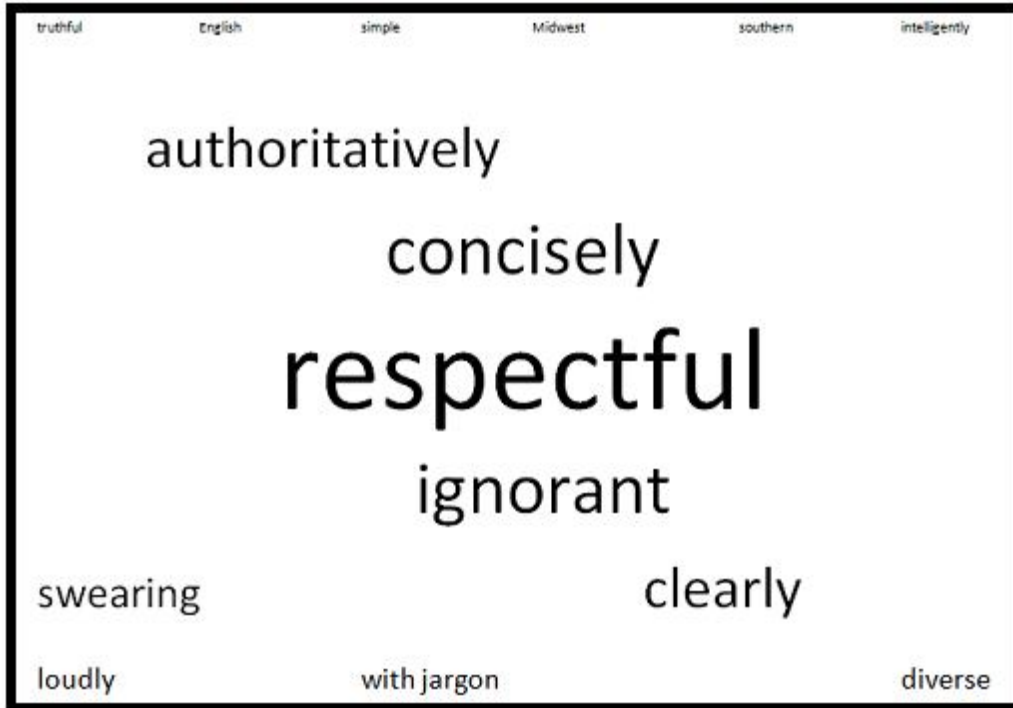
Figure 3.2: Responses from all participants to what type of man serves in the U.S. Military.



As shown in Figure 3.2, when asked about a man in the military’s character traits, participants primarily responded that a man in the U.S. Military is disciplined, dominant, patriotic, and strong. They also thought of him as young, white, and uneducated. Perhaps this

is because many people's idea of a person in the military is the new Marine recruit or infantry soldier often portrayed in the movies or seen in public places.

Figure 3.3: Responses from all participants to how a man in the U.S Military speaks.



As shown in Figure 3.3, the perception of a man in the military is that he speaks respectfully, possibly because of the hierarchical terms that he uses. He is perceived to be direct and concise and someone who speaks with authority. In responses concerning a military man's characteristics, regional dialect was also mentioned; a man in the military is reported to speak like someone from the Midwest or South.

Taken together, the survey results indicate that some of the most important conceptions of U.S. Military servicemen are that they are Southern, confident, dominant, strong, and patriotic. In terms of how they speak, participants reported that a military man speaks with authority, clearly, concisely, and he is also respectful, though somewhat ignorant. For many of the questions asked, participants had very similar answers, showing that there is a stereotype or general concept of what a man in the military is like. Though in truth there is probably a greater amount of diversity than there is of similarity among military men, there still exists a concept of the community, like there is for all communities that one regularly comes into contact with. These stereotypes help people to know what to expect

from people and how to interact with them. They also shape how people produce and perceive speech when they interact with an interlocutor perceived to be from a specific group.

### **3.3. Four Social Variables Identified for This Study**

Considering which traits from Kirtley (2010) and the survey presented in Section 3.2 can be associated with acoustic speech variables, four social characteristics were chosen as being ideologically linked to involvement with the U.S. Military and easily linked to a linguistic trait: efficiency, stoicism, dominance, and Southernness. These social characteristics were then assigned a linguistic correlate based on sociolinguistic research conducted on each trait. Efficiency was linked with speech rate (Peng, Zebrowitz, and Lee 1993), stoicism with pitch width (Burkhardt and Sendlmeier 2000), dominance with  $F_0$  (Puts, Gaulin, and Verdolini 2006), and Southernness with /ai/ monophthongization and /u/ fronting (Clopper and Pisoni 2004a). These are the traits that are examined in the experiments presented in Chapters Four and Five. By first using qualitative methods to ascertain from participants what they conceive to be different about military speech, the experiments can examine whether our conscious conceptions of differences are related to the actual process of parsing a speech stream in order to decide what kind of person the speaker is. If listeners do in fact associate these linguistic traits to members of the military when listening to speech, this indicates that people have an awareness of linguistic variables and their link with social categories, though listeners may not always have a conscious awareness of *all* the connections between linguistic variables, social meanings, and social categories. Instead, different levels of these connections may be the most salient to a listener in making a judgment, even as all levels are activated. For example, listeners may think that a person who seems physically dominant and speaks quickly is likely to be in the military without realizing that  $F_0$  and perceptions of efficiency are connected to these traits and are assisting them in making their judgments.

## Chapter Four: Experiment One

### 4.1. Purpose

Experiment One presents open-ended questions to the participants and asks them to give any answer that they find suitable. Compared with a forced-choice methodology, this kind of answer can give a more nuanced look at some of the impressions that particular manipulations give to the listeners. If participants can answer absolutely anything, the experimenter has not coerced them into saying one thing or another and has not biased them toward a certain answer. In addition, these answers can sometimes give new insights into the nature of the variables being investigated that the experimenter had not thought of.

### 4.2. Stimuli Voices

To create all of the critical stimuli, and five of the filler stimuli, I interviewed eight firemen who work at the same firestation in central Kansas. One of the men was a member of my family. Members of this community are part of the South-Midlands dialect region. This region was chosen because, taking into account the results of the qualitative survey reported in Chapter Three, the South and Midwest are the most plausible dialect regions for a person in the military to come from, and the South-Midlands dialects is much like the dialects of the Midwest, but it also shares certain vowels with the Southern dialect, such as fronted /u/ and the pin-pen merger.

All eight of the speakers interviewed are Caucasian males between the ages of 24 and 46 who grew up within forty miles of the small town where they now work. They come from similar socioeconomic backgrounds, and all of them have completed high school and some amount of college. All eight of the speakers are heterosexual. The other two speakers, whose speech was used to create five filler stimuli for the experiment, were members of the U.S.

Military who also come from the South-Midlands dialect region. One speaker, a Caucasian male, grew up within 20 miles of the small town from which the other speakers came and still lives in that area. The other speaker, an African-American male, grew up 180 miles from that small town and is now stationed in Hawai'i.

In perception experiments in the past, most of the stimuli created were taken either from recordings of read passages or from various clips of interviews with no controlled subject matter. I felt it was important for the speech to come from interviews, as judging a person's reading voice is not the same task as judging that person's natural speech. However, using natural speech can result in different topics for each speaker that might reveal social information about that person, so I wanted to control the subject of each passage so that I could have more confidence about what was causing any differences across responses of the participants. Therefore, all of the speakers participated in an interview consisting of questions about their backgrounds, including what meals were like at their houses, where they grew up, how they got to school when they were children, and how they like their jobs. They were then asked questions about how to get from one place to another in their town and about a time when they had been lost. Four of the speakers also participated in a map task, in which they gave directions to a partner about how to recreate a path that was drawn only on their papers and not on their partners' papers.

From these interviews, excerpts of speech were chosen which had little information about what type of person was speaking or to whom they were speaking. For example, speakers may describe directions from one place to another, including only street names that could be found in any American city or generic places like a grocery store. In addition, four of the stimuli describe being lost. Two of the stimuli manipulated for Southernness and one manipulated for efficiency describe getting to school, and one manipulated for Southernness is a description of a restaurant. It is believed that these passages give away little about the speakers' identities. In addition, the topic remained relatively constant across all of the speakers, so topic change would not distract the participants from listening to the manner in which the speaker spoke. The texts of all of the created stimuli are included in Appendix A. The clips are between 10 and 20 seconds long after all manipulations were performed. The filler stimuli were not manipulated.

### **4.3. Method**

#### **4.3.1. Linguistic Variables**

When people say that people's voices sound more or less efficient or stoic, dominant or Southern, they are not speaking of ideals or character traits that are inherent in speakers' voices; instead, they are talking about acoustic measures of voices that have come to signify that particular character trait for speakers of English in a particular cultural context. Pitch width can indicate a speaker's sexuality (Levon 2007); /ai/ monophthongization can indicate a speaker's regional background (Clopper and Pisoni 2004). As such, there is an indexical field that is activated when a person makes a social judgment of another person's speech (Eckert 2005). In order, then, to examine the connections between these character traits and military involvement, the connections between the traits and linguistic variables that might be associated to each of them had to be investigated. For this, I turned to sociophonetic studies of each trait.

The participants in these experiments were asked to make judgments about the characters of the speakers after they had been acoustically manipulated. Their responses will express the complex correlations between the specific acoustic measure and the character trait, the character trait and U.S. Military involvement, and last, the acoustic measure and U.S. Military involvement.

#### **Southernness**

Clopper and Pisoni (2004b) report that Southernness has several salient features: the monophthongization of /ai/, the voicing of /s/ before a high front vowel, the diphthongization of /o/, the pin/pen merger, and /u/ fronting are all prominent features in Southern speech. In this study, both /ai/ monophthongization and /u/ fronting were manipulated.

Monophthongization of /ai/ was manipulated because it is a salient cue of Southern dialects (Clopper and Pisoni 2004b). Additionally, /ai/ monophthongization was chosen because it is a manipulation that was more easily performed than that of the other Southern variables mentioned above, there were a larger number of stimuli containing this variable, and the vowel manipulation software created natural sounding monophthongs. The position of /u/ was manipulated because Clopper and Pisoni (2004b) found that the most significant

indicator of the south and south-midland dialects was /u/ fronting (2004b). Additionally, it is found in both Southern and South-Midlands dialects. Because the South-Midlands dialect might also have a strong effect on perception of military identity, it was best to choose a marker that the two dialects share.

Of the tested methods to resynthesize the /ai/ and /u/ vowels of the Southern/non-Southern stimuli, Akustyk (<http://bartus.org/akustyk/>) resulted in the most natural-sounding tokens. The excerpts chosen for this manipulation had at least one instance of each vowel type, and at least five instances total of these two vowels. In order to prepare each clip for manipulation, I first had to generate silence around each token that was to be resynthesized, as Akustyk cannot be used to resynthesize vowels well unless there is a clear closure on either side of the utterance. I did this in Audacity by using the Generate Silence function to add .25 seconds of silence on either side of the syllable. I then opened this new file in Praat. All resyntheses were performed with the Create Basic Synthesis function in Akustyk. In this function, the sound being changed can be divided into ten segments, and one can increase or decrease both  $F_1$  and  $F_2$  within each segment. For each sound, I first determined which segments corresponded to the parts of the vowel that required resynthesis. In order to monophthongize /ai/, I worked on a case by case basis, as only some of the speakers produced diphthongized /ai/. If the vowel was a diphthong, the  $F_1$  and  $F_2$  of the offglide were resynthesized to have the  $F_1$  and  $F_2$  values of the nucleus. In order to diphthongize the sound, I examined each speaker's /i/ vowel in a word where /i/ was followed by a coronal stop, and manipulated the token so that during the second half of the vowel, the formants transitioned to the speaker's  $F_1$  and  $F_2$  values for /i/. In general, the diphthongization required an approximate decrease of  $F_1$  by 100 Hz and an increase of  $F_2$  by 300 Hz. However, there were times when this manipulation did not sound natural, so for these cases, I decreased the slope until it sounded like a natural utterance.

To front or retract the /u/ vowel, I also had to find where the program segmented the sound for each word that I was manipulating. Once the /u/ vowel's segments had been identified,  $F_2$  was increased by around 300 hertz, remaining mostly constant across clips. Similarly, to back the /u/ vowel, I decreased  $F_2$  by approximately 200 hertz, and this value also remained mostly constant. After these changes were made to the vowels, the files were reopened in Audacity, and the silences that I generated earlier were removed. For some

stimuli, the resynthesis created a few blips in the waveform, so I also tried to clean up the final wav sound by deleting these blips to make it sound as natural as possible.

## **Dominance**

Perception studies concerning male dominance have commonly looked to overall  $F_0$  as a possible correlate to more dominant speech. Puts et al. (2006) found that male participants rated voices that had been lowered in  $F_0$  or  $D_f$  as more dominant than the same voices raised for these variables. In Puts et al. (2007) they further found that these correlations were stronger for physical dominance than for social dominance. Dominance is not the only trait associated with mean pitch;  $F_0$  is sometimes discussed as a marker of masculinity, and it has also been related to perceptions of low emotional states (Puts et al 2006). For the experiments presented here, I sought to tease apart the judgments induced by this variable through the use of specific wording, such as ‘What kind of sports would this person play?’ or ‘What does this person look like?’, to examine the relationship of pitch and physical dominance as opposed to ‘This person is a leader.’ or ‘What kind of boss would this person be?’ to investigate the relationship between pitch and social dominance.

Manipulations of overall  $F_0$  were also performed in Audacity. For this manipulation, I used the Change Pitch Effect. For each stimulus, I first determined how far the pitch could be manipulated before it no longer sounded like natural speech. I found that for all speakers, this threshold was roughly a seven percent increase or decrease in pitch. I then calculated the mean change that this percentage change would cause in hertz for each excerpt and checked to make sure that a seven percent change in hertz would be an equal amount of change in semitones, as semitones are a better indicator of the human perception of sound. A seven percent change in hertz is indeed a steady amount of increase and decrease in semitones. For stimuli with a higher overall  $F_0$ , I used the pitch ratio function within the Change Pitch Effect and increased the overall pitch of each clip by seven percent. For stimuli with a lower overall  $F_0$ , I decreased the overall pitch of each clip by seven percent. Table 4.1 shows the average pitch of each clip before and after the manipulations were completed.



Table 4.1: Mean pitch before and after manipulation for each stimulus for Dominance.

| Speaker   | Direction of Manipulation | Original Range (Hertz) | After Manipulation (Hertz) |
|-----------|---------------------------|------------------------|----------------------------|
| Speaker 3 | raised                    | 91.6                   | 98.2                       |
|           | lowered                   | 92.4                   | 86.1                       |
| Speaker 5 | raised                    | 104.2                  | 112.2                      |
|           | lowered                   | 94                     | 87.9                       |
| Speaker 6 | raised                    | 119.1                  | 127.3                      |
|           | lowered                   | 118.2                  | 109.9                      |

### **Efficiency**

Efficiency involves speed and accuracy, getting a job done correctly in the shortest amount of time possible. In speech, this would equate to concise wording, increased speech rate, and fewer pauses, both vocal and silent. The amount of information that a person is able to convey in a given slot of time is one of the most important aspects of efficient speech, though this of course must be balanced by clear acoustic signals. Wingfield et al. (1985) used time compression of speech clips in an experiment, showing that adults can understand speech at a rate that is twice as fast as produced in normal time, so the hindrances in the comprehension of quick speech are not speed but other confounds such as unclear syntactical structures and muddled articulatory gestures. For these experiments, I chose to use speech rate as the variable investigating efficiency because speech rate was specifically mentioned by the interviewees and because it is easily manipulated and salient to the listener. In addition, Peng et al. (1993) found that a faster speech rate was correlated with power and competence for American listeners.

Manipulations of speech rate were performed in the software program Audacity. For stimuli with a faster speech rate, the overall tempo of the entire clip was increased by ten percent. All vocal pauses were deleted at the nearest zero crossing of the waveform. Silent pauses were decreased to 500 ms. For stimuli with a slower speech rate, the tempo of silent and vocal pauses was decreased by fifteen percent, while the overall tempo of the clip was decreased by ten percent.

### **Stoicism**

Emotional speech often includes increased pitch range and raised pitch contour. Speech perceived as laden with a strong emotion like sadness or fear tends to have a wider

range of pitch (Burkhardt and Sendlmeier 2000). Pitch width may also be a factor in judging a male speaker's sexuality (Levon 2007). As such, the variable for stoicism is the width of the speaker's overall  $F_0$  throughout an excerpt, and this variable is also matched with questions about manliness. Clips were manipulated so that there were two versions: one with an increased pitch range (for emotionally imbibed speech) and the other with a decreased, more monotonic pitch range (for stoic speech).

As done by Levon (2006), in his work investigating the correlation between pitch width and perceived sexuality, pitch width was manipulated in Praat. Rather than changing the pitch width by 25 percent as Levon did, I widened or narrowed the distance of each pitch point in the pitch track from the midpoint of the clip by 50 percent. I first tried several manipulations with a 25 percent shift in the width, but the difference was hardly noticeable. The speaker in Levon (2006) had a larger pitch range than the speakers in this study, so it is likely that a percentage change would be greater for that speaker than for the speakers in this study.

For each excerpt, the file was converted in Praat to a manipulation track. In the Edit function for each manipulation track, the pitch units were set to semitones, and the pitch points set to 2.0 frequency resolution. I then determined the highest and lowest pitch points for each excerpt, excluding any obvious outliers. From these, I established a midpoint for each excerpt. For each pitch point of the excerpt, I calculated how far the point was from the midpoint and multiplied that difference by either 50 percent or 150 percent. I then added or subtracted the new value from the midpoint. Using a vertical dragging strategy, I dragged each pitch point to its new value. When all of the pitch points had been either decreased or increased according to whether I was narrowing or widening the pitch width, I then ran an overlap-add resynthesis for each manipulation, which became my final manipulated stimuli. Table 4.2 shows the pitch range of each clip before and after manipulation in both directions.

Table 4.2: Range of pitch before and after manipulation for each stimulus.

| Speaker   | Direction of Manipulation | Original Range (Semitones) | After Manipulation (Semitones) |
|-----------|---------------------------|----------------------------|--------------------------------|
| Speaker 2 | increased                 | 6.5                        | 7.4                            |
|           | decreased                 | 13.6                       | 10                             |
| Speaker 4 | increased                 | 14.1                       | 15.9                           |
|           | decreased                 | 17                         | 13.3                           |
| Speaker 6 | increased                 | 14.9                       | 17                             |
|           | decreased                 | 9.9                        | 6.9                            |

### **All Variables**

For two speakers, I also chose pairs of excerpts to be manipulated for all four variables. If it turned out that a single acoustic variable was not enough to persuade a listener that the speaker was in the military, perhaps that could be because listeners evaluate speakers' identities based on the composite of acoustic traits found in their speech. I wanted to find out if manipulating a speaker for all of the traits I believed to be associated with military speakers would influence listeners to have a stronger association of that speaker to military involvement. To perform these manipulations, I followed the procedures explained above for each variable. For each one, I tried manipulating the vowels first, followed by  $F_0$ , speech rate, and pitch width, but the final result was unnatural sounding for all four stimuli. I next tried manipulating  $F_0$  first, followed by speech rate, pitch width, and vowels, and these manipulations sounded more natural, though not perfect. They, while not being without some fault, still sound like human speech, but they sound as if the audio quality were not as good as for the other recordings. This difference was taken into account when analyzing the results of the experiment.

### **4.3.2. Experiment Design**

#### **Stimuli**

For the critical stimuli, six of the speakers contributed excerpts. For two of the speakers, six excerpts were manipulated for three variables, and for four of the speakers, four excerpts were manipulated for two variables. Table App.1, in Appendix B shows all of the stimuli, including who was speaking, what manipulation was made, and the topic of the clip.

For each manipulation: speech rate,  $F_0$ , pitch width, and two Southern vowels, pairs of excerpts from three different speakers were manipulated.

All of the stimuli, including the fillers, were played to five linguistic graduate students who would not participate in the later experiments. Each audio clip was assigned a number, and the listeners were asked to score the clip on a scale of one to five, one being unnatural and five being natural. These scores were added together to formulate a naturalness rating for each audio clip, and these scores can be seen in Appendix C. Overall, the tokens were identified as natural. The stimuli where all manipulations took place, as was expected based on my own response to these clips, had low scores. The excerpts manipulated to be slower, with diphthongized /ai/ and backed /u/, with higher overall pitch and wider pitch width especially sound too unnatural, and were treated delicately during analysis. The other clips that were considered less than ideal were the excerpts that were manipulated to be faster, with monophthongized /ai/ and fronted /u/, with lower pitch and narrower pitch width.

### **Experiment One Methodology**

Experiment One used an extension of Matched-Guise methodology like that used in Campbell-Kibler (2007) in which a single speaker is heard by participants in two different guises. For the present study, participants listened to the pairs spoken by the same person but manipulated in opposite ways, and the two clips were not played sequentially. The participants were not intended to know that they were listening to the same speakers. The participants answered the same questions about the pair of tokens so that their answers could be compared. For example, if the first clip from Speaker 1 was manipulated to be lower, the participants would be asked where he was from, what his occupation was, what sports he played, and what kind of boss he would be. The second clip from Speaker 1, taken from a different part of the interview with that speaker and heard later in the experiment, would be manipulated to be higher, and the participants would answer the same questions about the speaker without knowing that he was the same person. If their answers changed when the pitch changed, this would suggest that a difference in pitch causes listeners to envisage the speaker differently. The participants sat in front of a computer screen in a sound booth and heard the stimuli through headphones. The experiment was created in E-Prime, and while all

sound files and questions were administered through E-Prime in a consistent but initially pseudo-random order, the participants wrote their answers in an answer booklet by hand.

Before participating in the perception task, participants were informed that they would be listening to several American men speaking, and they should try to answer questions about what type of men they believed the speakers to be. They were told to be as specific as possible and that they should not necessarily listen to what the men said, but how they spoke. They were then given their answer booklet and ushered into the sound booth. The E-prime experiment began with detailed instructions about the task. Participants read that they would hear short clips of speech from 25 men. They were told that the task would be self-guided, so they should make sure that they were prepared to listen before starting the clip. After each sound file, they would be asked four questions about the speaker. They were told that they would see the questions on the computer screen and also in their answer booklets, and that they should answer in writing. After receiving these instructions, the participants experienced one practice round in which they heard a speaker and then read questions about him. After this practice round, if they had any questions about the task or problems with the listening volume, they were instructed to consult the researcher.

Experiment One had twenty five stimuli: two pairs for each of the individual variables, one pair of stimuli in which all of the variables had been manipulated, and five of the filler stimuli. As stated before, the stimuli were ordered such that no one speaker was heard twice in a row, and no one manipulation was heard twice in a row. A filler was played after every three critical stimuli to add to the number of overall stimuli and to increase the number of speakers in the experiment so that the participants would be less likely to guess that they were hearing the same men throughout the experiment.

The questions for Experiment One were open-ended so as to allow the participants to express their own preconceived social categories and perceptual spaces. For every token, the participants were first asked where the speaker was from and then what the speaker's occupation was. They were then asked two additional questions that were more specific to the particular variable that had been manipulated. For example, if the overall pitch had been manipulated, the question would concern what the speaker looked like or what kind of sports he would play. For each variable, one of the additional questions remained constant, while one question was different for each pair. Refer to Table 4.3 for a complete list of the

questions that were used and the order in which the participants heard the stimuli. For every pair, the questions were presented in the same order. A copy of the answer booklet is included in Appendix D.

The participants took between 40 and 60 minutes to complete the task. When they were finished with the experiment, they were asked to fill out a one-page survey about themselves, asking where they had grown up, where they had lived, how old they were, what language they had spoken at home growing up, if they could speak any other languages, and if they had hearing problems. They were also asked if they had spent any time in the military, and if so, in what capacity, if any of their immediate family members had spent time in the military, what they thought the purpose of the study had been, and if they thought anything was strange about the audio clips they had listened to. A copy of this survey can be found in Appendix E.

For the second to last question, inquiring after the purpose of the study, most participants wrote that it had to do with determining how listeners judge speakers based only on their voices. Some wrote things as specific as that the task was a regional dialect task or that I was looking for a correlation between socioeconomic background and region. One thought that I was looking specifically at how pitch and accent affect perception. A few also mentioned that their own backgrounds were a part of the study.

I asked the participants about whether there was anything strange about the speakers in order to ascertain if the listeners were able to tell that there were far fewer speakers in the study than they had been led to believe and whether they could tell that there was manipulation. I was also interested to find out if they thought it strange that the speakers sounded like they were from the same dialect region. Many answered that there was nothing strange about them. One participant answered that some of the speakers sounded slow; another mentioned that the emphasis that some of the speakers placed on certain words was strange; two participants wrote that some of the speakers sounded slightly distorted and that they thought this might be due to some sort of manipulation; one mentioned that all of the speakers sounded white; two mentioned that all of the speakers sounded like they were from one dialect region, either the south or the Midwest. From the answers given, it seems that only one speaker guessed that they were hearing some speakers multiple times, and only one speaker guessed that all of the speakers were from the Midwest. Largely, then, the

participants believed that they were listening to 25 speakers from different parts of America. Even the speaker who guessed that he was hearing fewer speakers did not guess that he was listening to manipulated pairs and thought that he heard only a few speakers multiple times. Also, this participant answered similarly to the other participants. Because of these responses, I did not remove any participant's results from the study, and I can be confident that the participants legitimately listened to each voice as a new speaker and the results are not confounded by participants' speculations.

Table 4.3: Questions Asked for Each Critical Stimulus

| <b>Stimuli Played</b>     | <b>Third Question</b>                           | <b>Fourth Question</b>                            |
|---------------------------|---|---|
| Speaker 9- Filler         | What kind of education does this person have?   | What kind of television does this person watch?   |
| Speaker 1- Southern       | What are this person's politics?                | What sports would this person play?               |
| Speaker 6- higher pitch   | What kind of boss would this person be?         | What does this person look like?                  |
| Speaker 2- nonSouthern    | What is this person's socioeconomic background? | What are this person's politics?                  |
| Speaker 8- Filler         | What kind of car would this person drive?       | What sports would this person play?               |
| Speaker 3- higher pitch   | What kind of sports would this person play?     | What kind of boss would this person be?           |
| Speaker 4- faster         | What would this person do in their free time?   | How would you describe this person's personality? |
| Speaker 6- widened width  | What kind of movies does this person watch?     | Does this person cry? Why or why not?             |
| Speaker 10- Filler        | What does this person look like?                | What kind of car would this person drive?         |
| Speaker 5- slower         | What kind of education does this person have?   | What would this person do in their free time?     |
| Speaker 4- widened width  | Does this person cry? Why or why not?           | What kind of television does this person watch?   |
| Speaker 1- All more       | What is this person's socioeconomic background? | What kind of education does this person have?     |
| Speaker 7- Filler         | Where would this person hang out?               | Would you be friends with this person? Why?       |
| Speaker 6- lowered pitch  | What kind of boss would this person be?         | What does this person look like?                  |
| Speaker 1- nonSouthern    | What are this person's politics?                | What kind of sports would this person play?       |
| Speaker 3- lowered pitch  | What kind of sports would this person play?     | What kind of boss would this person be?           |
| Speaker 9- Filler         | What kind of education does this person have?   | What is this person's religion?                   |
| Speaker 2- Southern       | What is this person's socioeconomic background? | What are this person's politics?                  |
| Speaker 6- narrowed width | What kind of movies does this person watch?     | Does this person cry? Why or why not?             |
| Speaker 4- slower         | What would this person do in their free time?   | How would you describe this person's personality? |
| Speaker 8- Filler         | What is this person's religion?                 | What kind of car would this person drive?         |
| Speaker 1- All less       | What is this person's socioeconomic background? | What kind of education does this person have?     |
| Speaker 5- faster         | What kind of education does this person have?   | What would this person do in their free time?     |
| Speaker 4- narrowed width | Does this person cry? Why or why not?           | What kind of television does this person watch?   |
| Speaker 10- Filler        | What is this person's socioeconomic background? | Would you be friends with this person? Why?       |

## **Participants**

The participants for Experiment One were American males who spoke English as a native language and had no hearing problems. Only American, English-speaking males were used in order to control for extra variables, and also because I wanted to include listeners that had exposure to U.S. Military personnel and stereotypes of the military. All participants were between the ages of 18 and 37 with the average age of 24. Participants were recruited through fliers and websites, and they were given either class credit through the Linguistics Beyond the Classroom program in the Department of Linguistics at the University of Hawai'i at Mānoa or food in exchange for their time.

## **4.4. Results**

In dealing with the responses of the participants, for many of the questions, I first categorized certain answers into groups of similar qualities. For the first of two questions that were asked for every speaker, "Where is the person from?" all of the answers were divided into standard regional dialect areas. Based on the participants' answers, possible regions were Northeast, North, South, South-Midlands, Midwest, Southwest, Northwest, West, California, Texas, and Hawaii. For the second question that was asked about every speaker, "What is this person's occupation?", jobs were categorized into one of twenty categories: office, military, businessman, driver, academics, coach, student, manager, technical, business owner, medical, protection, farmer, service, sales, civil, artisan, manual, unemployed, or retired. Most categorization was relatively straightforward, but some categories included several jobs. 'Academics' included professors, teachers, or writers. 'Technical' included engineers, accountants, and mechanics. 'Protection' included firefighters, EMT's, and police officers. 'Service' included hotel industry, waiters, and cooks. 'Civil' included politicians, lawyers, and judges. 'Artisan' included all craftsmen. 'Manual' included construction and building. Next, the responses to "What kind of boss would this person be?" were grouped into twelve semantic categories: laidback, strict, weak, friendly, lazy, average, not good, careful, productive, good, leader, and fair. Most of these categorizations were also straightforward, as the participants often used the same adjectives. The category 'productive' included efficient and hardworking. 'strict' included intimidating, tough, and stern. 'Laidback' included



mellow, chill, and relaxed. ‘Friendly’ encompassed all adjectives implying an upbeat and kind relationship between the boss and the employee. For the sports question, football, hockey, and wrestling were included in ‘contact.’ Basketball, baseball, and softball were categorized as ‘team.’ Other questions’ responses were left as they were and analyzed without categorization.

### **Southernness**

For the manipulation to investigate how participants viewed Southernness, listeners heard speakers whose /ai/ and /u/ vowels were manipulated. The listeners, after hearing a speaker manipulated in these ways, answered questions about the speaker’s occupation, origin, and politics, and either his socioeconomic background or his sports preferences. I expected to find for both speakers that were manipulated in this manner that listeners would respond that the speaker was from the South more often in one manipulation than the other. I also expected that the answers about his politics might lean toward Republican in the Southern guise, as many Southern states are statistically Republican. He might also be credited with playing football more often as it is most popular in the South. Despite these expectations, I found only one noteworthy difference in responses for the pairs manipulated for Southernness, and I found it for Speaker 2. When Speaker 2 was manipulated to have less Southern vowels, there was no consensus on where he was from, and the most frequent answers were California and the North with only 10 percent of the participants identifying him as Southern, whereas when his vowels were more Southern, a majority, 55 percent of the respondents, wrote that he was from the South. The following table illustrates the difference in answers for this manipulation.

Table 4.4: Responses to the Origin of Speaker 2 when manipulated for Southernness

| <b>Speaker 2</b> | <b>Less Southern</b> | <b>More Southern</b> |
|------------------|----------------------|----------------------|
| <u>origin</u>    | <u>answers given</u> | <u>answers given</u> |
| South            | 2                    | 11                   |
| Midwest          | 2                    | 3                    |
| California       | 4                    | 2                    |
| North            | 3                    | 2                    |
| Northwest        | 2                    | 0                    |
| Texas            | 2                    | 0                    |
| West             | 1                    | 0                    |

## Dominance

The manipulation of a speaker's pitch resulted in some of the most obvious differences in responses. The participants were asked about the speaker's occupation, origin, and performance as a boss, as well as either what sports he played or what he might look like. This manipulation was expected to change how a listener viewed the way that someone looked, performed as a boss, and his view of what sports the speaker might play, but I also found that it affected the type of occupation that was ascribed to a speaker. For the question about Speaker 6's looks, the lowered pitch resulted in responses that the person was tall, balding or graying, in his 40's, and average to heavy. In contrast, the speaker was described as thin, average height, in his 30's, with dark hair and glasses when his pitch was higher. It seems that the lowering of pitch in this case caused the speaker to sound older and larger to the listeners. These responses are illustrated in the following tag clouds, in which responses that were given more frequently are a larger font and nearer the center of the figure. Each word is in a font size that is the number of times that the response was given multiplied by 10. The first figure shows the description of the speaker in the higher guise, the second, the lower guise.

Figure 4.1: Responses to the looks of Speaker 6 when manipulated with higher pitch

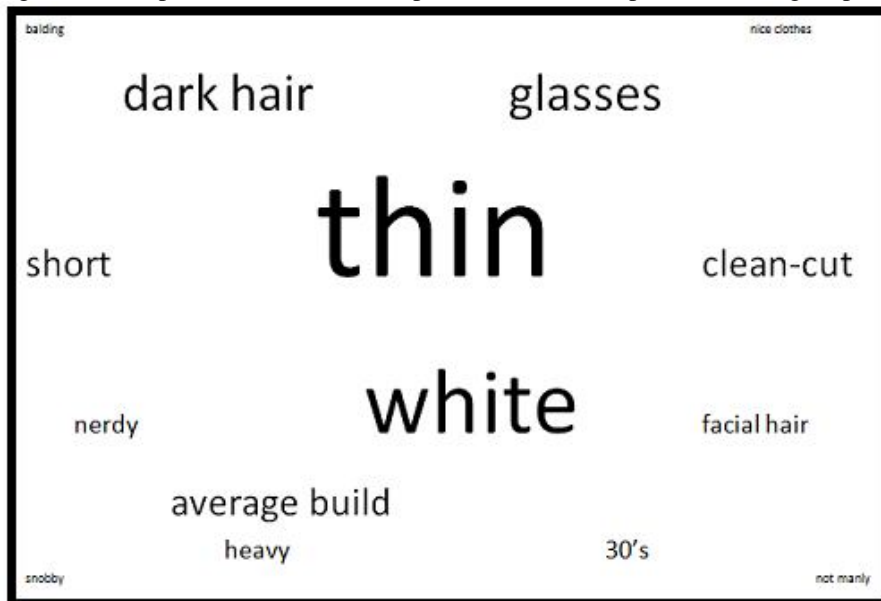
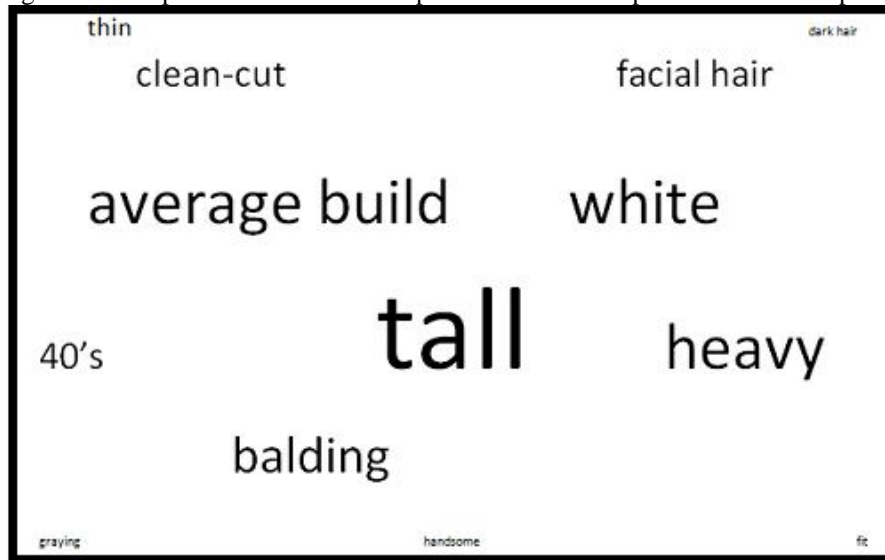


Figure 4.2: Responses to the looks of Speaker 6 when manipulated with lower pitch

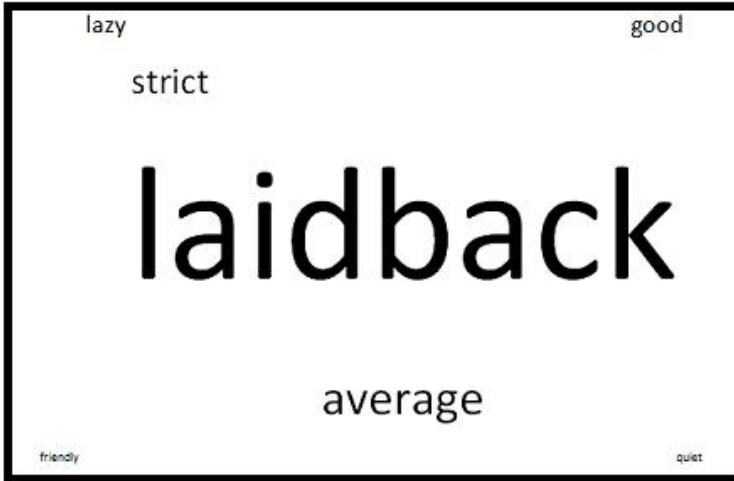


Pitch also had an effect on what kind of boss the listeners thought that the speaker would be. Participants answered this question about two different speakers, and the answers were slightly different for each, but there were some general trends with pitch change. For Speaker 3, the number of responses that he sounded laidback increased from 6 to 13 when his pitch was lowered. In addition, several people responded that he sounded weak in the higher guise, while this was never given as a response for the lower guise. It was a bit surprising to find that some respondents mentioned that Speaker 3 sounded like a leader when he was in the higher guise, but this was never written for the lower guise, as other studies have found that lower pitch correlates with both physical and social dominance. The following figures show these changes in response.

Figure 4.3: Responses to what kind of boss Speaker 3 would be when manipulated with higher pitch



Figure 4.4: Responses to what kind of boss Speaker 3 would be when manipulated with lower pitch



The most frequent comment given for the type of boss Speaker 6 would be in the lower guise was that he would make a good boss. He was also friendly and strict. In the higher guise, he was seen as laidback and again, as for Speaker 3, some participants mentioned that he sounded weak. He was also seen as careful in the higher guise, more likely to pay attention to detail. Figures 4.5 and 4.6 illustrate these differences. It seems that overall, though the higher pitch does not make someone seem like they would be a bad boss, they might be perceived as slightly more uptight and more likely to pay attention to details.

Figure 4.5: Responses to what kind of boss Speaker 6 would be when manipulated with higher pitch



Figure 4.6: Responses to what kind of boss Speaker 6 would be when manipulated with lower pitch



Pitch changed the responses to what kind of sports Speaker 3 was likely to play. When his pitch was higher, participants thought that he was most likely to play team or preppy sports. In the lower pitch guise, they overwhelmingly responded that he would play either contact sports or team sports, with no other types given as answers. This shows that the lower pitch might cause listeners to imagine a larger, more physically confrontational speaker than the higher pitch.

Table 4.5: Responses to the sports Speaker 3 would play when manipulated for pitch

| <b>Speaker 3</b> | <b>Higher Pitch</b>  | <b>Lower Pitch</b>   |
|------------------|----------------------|----------------------|
| <u>sports</u>    | <u>answers given</u> | <u>answers given</u> |
| team             | 9                    | 14                   |
| preppy           | 7                    | 0                    |
| contact          | 5                    | 14                   |
| none             | 4                    | 0                    |
| individual       | 1                    | 0                    |
| not physical     | 1                    | 0                    |

A few interesting things happened in the responses concerning the Speakers' occupation when pitch was manipulated. For Speaker 3, when his pitch was higher, he was placed in jobs that are either indoors or typically performed by younger people. In the lower guise, he performed jobs that require technical skill or outdoor labor. Again, this shift in perception may have to do with associating lower pitch with a larger, more physical speaker while higher pitch is associated with someone physically weaker.

Table 4.6: Responses to the occupation Speaker 3 would have when manipulated for pitch

| <b>Speaker 3</b>  | <b>Higher Pitch</b>  | <b>Lower Pitch</b>   |
|-------------------|----------------------|----------------------|
| <u>occupation</u> | <u>answers given</u> | <u>answers given</u> |
| student           | 3                    | 0                    |
| service           | 3                    | 4                    |
| sales             | 2                    | 1                    |
| business owner    | 2                    | 1                    |
| office            | 2                    | 0                    |
| academics         | 2                    | 0                    |
| manager           | 1                    | 1                    |
| military          | 1                    | 0                    |
| technical         | 1                    | 2                    |
| businessman       | 1                    | 0                    |
| farmer            | 1                    | 1                    |
| manual            | 1                    | 3                    |
| driver            | 0                    | 2                    |

Responses to Speaker 6 were remarkable in that he was overwhelmingly ascribed positions of management in the lower guise. With a question as open-ended as occupation, it was common for most speakers to receive only a few of the same responses for each type of occupation, but for Speaker 6 in the lower guise, eight participants wrote some type of management for his occupation. This was the only indication in this experiment that lower pitch is associated with social dominance, but it was a rather strong result.

### **Efficiency**

The other manipulation that returned some interesting results was that of speech rate. For this manipulation, participants were asked again about the speakers' origins and occupations, and they were asked about what the person did in their freetime. For one speaker, they were also asked what type of education the speaker had, and for the other, they were asked about the speaker's personality. I expected to find the most remarkable difference in responses for this manipulation to the question about personality, but instead, I found interesting responses to the origin of Speaker 4 and the occupation of Speaker 5. When Speaker 4's speech rate was increased, participants mostly responded that he was from the West or the Midwest, while in the slower guise, the largest number believed him to be from the South. This result may be caused by the popular belief that Southerners speak slower than

people from other dialect regions. Speech rate may be a salient cue for deciding on someone's regional background.

Table 4.7: Responses to the origin of Speaker 4 when manipulated for speech rate

| <b>Speaker 4</b> | <b>Faster Speech Rate</b> | <b>Slower Speech Rate</b> |
|------------------|---------------------------|---------------------------|
| <u>origin</u>    | <u>answers given</u>      | <u>answers given</u>      |
| South            | 1                         | 8                         |
| Midwest          | 5                         | 2                         |
| California       | 1                         | 1                         |
| North            | 1                         | 2                         |
| Northwest        | 1                         | 1                         |
| West             | 8                         | 2                         |

When Speaker 5's speech rate was increased, three participants believed that he could be in the military, suggesting that speech rate is indeed one of the most salient cues for military involvement. When Speaker 5's speech rate was decreased, some participants wrote unemployed, a response not found elsewhere in the experiment. Perhaps this response indicates that those who speak slowly are perceived as incompetent or lazy.

### **Stoicism**

It was hoped that the final manipulation, that of the speakers' pitch width, would result in a difference in how the participants responded to the question about whether the speaker was likely to cry, but no noteworthy difference was found for this manipulation.

In total then, results from this experiment provide evidence that social characteristics attributed to a speaker can be influenced by phonetic variables. Specifically, how a participant conceives of a person's looks, build, and leadership skills can be altered by changing his pitch. Additionally, the results show how a speaker's perceived region of origin is linked to his realization of certain vowels and his speech rate. Finally, mean pitch and speech rate appear to be linked with perceived occupation. These results will be discussed further in Chapter Six.

## **Chapter Five: Experiment Two**

### **5.1. Purpose**

In contrast to Experiment One, Experiment Two was designed to provide quantitative evidence that manipulations of a speaker's speech change listeners' perceptions of that speaker. The same linguistic variables were investigated by both Experiment designs, but in this experiment, participants were asked to respond with a numerical value correlating to how much they agreed or disagreed with a statement about the speaker that they had just heard. Then, these values were evaluated to decide on the whole whether participants might change their minds about what character traits a speaker might have or whether that speaker was in the military according to which manipulated variant they heard in the speaker's voice. Additionally, this methodology allowed examination of the correlation between linguistic variables and specific social characteristics and categories.

### **5.2. Method**

#### **5.2.1. Stimuli**

For Experiment Two, the full list of test stimuli was used. For a full explanation of how the stimuli were created, see Chapter Four. There were twenty-eight critical stimuli, with no one voice being played twice in a row, and no one manipulation being played twice in a row. A filler was played after every three test stimuli. For this experiment, there were two possible orders that the participants heard. For each matched pair, one half of the participants heard a pair's token 1 first while the second group heard that same token second. For example, if one group of participants heard Speaker 1-nonSouthern first, the other group would hear Speaker 1-Southern first. This change in order was to ensure that participants were not responding in a certain way to the tokens just because they heard them first or second.



### 5.2.2. Experiment Design

The participants were informed verbally that they would be listening to several American men speaking, and their task would be to judge the men on several accounts. They would see four statements on the computer screen after hearing each man speak, and they were to agree or disagree with the statement. They were told to listen to how the men spoke rather than what they were saying and told that the task was self-guided, so they should make sure they were ready to listen before moving on to the next speaker. The participants sat in front of a computer screen in a sound booth and heard the stimuli through headphones. The experiment was created in E-Prime, and the responses were collected through the E-Prime software.

Once the experiment began, participants read instructions that explained that they would hear 38 men who had been asked to give directions and other similar tasks speak for ten to twenty seconds, and after each man spoke, they would be asked to rate statements made about that speaker. They were asked to pay attention to how the speaker spoke rather than what they were saying. They would be asked to agree or disagree with each statement on a scale of 1 to 6, '1' being 'strongly disagree' and '6' being 'strongly agree.' After receiving these instructions, the participants experienced one practice round, in which they heard a speaker and then rated the statements made about him. This clip was created from the interview with one of the filler speakers. After this practice round, if they had any questions about the task or problems with the volume, they were instructed to consult the researcher.

The primary difference between Experiments One and Two, beyond the fact that Experiment Two had more critical pairs, is that the responses in Experiment Two were numerical. In this experiment, after the participants heard each speaker, they were presented with a series of four statements about the speaker. For each pair, the statements were presented in the same order. One statement was constant for all stimuli, and that was that the person had spent time in the military. For stimuli manipulated for Southernness, the statements presented were that the person was intelligent and from the South, and the fourth was either that the person was kind or that he would make a good leader. For stimuli manipulated for efficiency, the statements presented were that the person was efficient, good at their job, and helpful. For stimuli concerning dominance, the statements were that the

person was arrogant, would be a good leader, and would win a physical fight. For stimuli manipulated for stoicism, the statements included that the person was from the North, expressed their emotions, was a leader, and was manly. Filler statements used both the statements used for critical stimuli and also included statements that the person was from the West Coast, gentle, educated, uneducated, friendly, ignorant, cheerful, popular, and ambitious.

The participants for Experiment Two were also American males who spoke English as a native language and had no hearing problems. They were between the ages of 18 and 53 with an average age of 24. The participants came from three different backgrounds, those who had spent time in the U.S Military, those who had immediate family who had spent time in the military, and those who had never spent any time in the military. Participants were again recruited through fliers and websites, and they were given either food or class credit.

The experiment was self-paced, and the participants took between 15 and 30 minutes to complete the experiment. When they finished, they completed the same one-page survey as in Experiment One. Twenty-eight of the 51 participants for this study were born and raised in Hawaii, and many of these 28 participants commented that they found it somewhat difficult to feel confident in their abilities to identify the origins of the mainland speakers.

In response to the question concerning what the purpose of the study might be, most participants guessed that the study had to do with exploring how listeners make judgments about people based on their voices. Because military involvement was the only constant statement, many also wrote that the study had something to do with how perceptions of people are related to whether listeners will think they have been in the military. One participant also guessed that his own military background was being used as a variable of how he perceived other people's military involvement. One participant thought that the study had to do with determining how the perception of a speaker's intelligence correlated with other judgments about him. Another thought that the study was concerned with perceptions of voice pitch. One wrote that the study was exploring correlations of intelligence, arrogance, and efficiency with region or military involvement. For the last question, concerning whether any of the speakers sounded strange in any way, the participants were much more likely for this experiment than for the first to note that some of the audio had some problems. This probably had to do with the increase in number of the somewhat choppy stimuli that were

manipulated for all variables. This experiment had four of these stimuli while the first had only two.

Thirty-four of the 51 participants did not note that there was anything strange about the speakers. Three mentioned that the voices were quite similar. One of these guessed that maybe some of the speakers could have been the same person. Three participants wrote that some of the stimuli were choppy or had blips in the audio. Five participants wrote that one or two of the men sounded like they were computer-generated voices. Six participants noted that the speakers had been altered somehow, one as specific as guessing that the alterations had been made around the vowels, and another guessing that the pitch had been altered. In total, eleven participants guessed a digital alteration of some the stimuli. Perhaps this could have been avoided if the particularly unnatural stimuli altered in all ways had been left out, as every person who mentioned the alteration mentioned that it only happened on a couple of speakers. Because all of the participants thought that only a few of the voices sounded strange, many of them mentioning only thinking this of one voice, all of the participants were kept in the group for analysis.

There were four statements per speaker for thirty-eight speakers. This resulted in 112 critical responses per listener. The data from all of the participants was collected in a single data sheet in Excel, and every participant was categorized in one of three groups: military, family in the military, or civilian. Numeric responses were treated as binary, with responses of 1, 2, or 3 corresponding to disagreeing with the statement and responses of 4, 5, or 6 corresponding with agreeing with the statement. The critical comparison for this experiment was the difference in responses across the guises matched for speaker and manipulation type.

### **5.3. Results**

To test for the significance of any trends in the data, a logistic regression model with mixed-effects was run in the software interface R (R Development Core Team). These models are becoming increasingly popular in dealing with data in the social sciences. Although many variables, such as background, sex, hometown, and occupation were controlled for in the creation of the stimuli, the different participants may behave differently on the task. Mixed-effects models are more reliable in dealing with data collected from

human responses, in which there could be missing data or mistakes made, and they also account for the fact that individuals may have tendencies towards answering in a certain direction. In this experiment, there may have been individuals who had a bias toward disagreeing or agreeing, but mixed-effects models treat the participants as a random effect and therefore alleviate the possibility of a few subjects carrying the correlations. Mixed-effects models account for both fixed and random effects. Furthermore, Fox explains that “so-called mixed-effect models (or just mixed models) include additional random-effect terms, and are often appropriate for representing clustered, and therefore dependent, data – arising, for example, when data are collected hierarchically, when observations are taken on related individuals (such as siblings), or when data are gathered over time on the same individuals” (Fox 2002: <http://cran.r-project.org/doc/contrib/Fox-Companion/appendix-mixed-models.pdf>). Because the critical comparison dealt with pairs of stimuli from the same speaker, observations were indeed taken on related stimuli.

Separate models were fit to each statement for each manipulation in order to have more simple, more interpretable models. Voice and participant were included as random effects. Whether a participant agreed with the statement was treated as the dependent variable; a larger coefficient indicates a greater likelihood that participants will agree with the statement. In other words, a positive coefficient represents a positive correlation between the manipulation type and the number of agreements with the statement. To illustrate this relationship, Table 5.1 shows the model returned when the program was run for the statement concerning Southernness when the stimuli were manipulated for Southernness.

Table 5.1: Model of the likelihood of identifying the speaker as Southern, when the token had fronted /u/ and monophthongized /ai/

|                       | Estimate | Std. Error | z value | Pr(> z ) |
|-----------------------|----------|------------|---------|----------|
| (Intercept)           | -0.7058  | 0.2765     | -2.552  | <0.05    |
| manipulation=southern | 1.3238   | 0.2552     | 5.187   | <0.0001  |

The first number is the coefficient. Since it is positive, we know that the correlation between a manipulation to make the stimuli more Southern and the number of agreements

with the statement is positive. The last number,  $<0.0001$ , is the p value, and since it is much smaller than .05, the number commonly accepted as significant in the social sciences, we know that this positive correlation is statistically significant. Therefore, if the stimuli were manipulated to sound more Southern, participants were more likely to agree that the speaker sounded like he was from the South, and this tendency is highly significant.

When considering separate manipulations, there were finally 24 statements, each spread across at least two speakers, usually three speakers, to run through the model. Some of the statements were expected to return much greater results than others, and ultimately, 14 of the 24 statements returned significant results in the direction expected.

### **Southernness**

When a stimulus was manipulated for Southernness, meaning that /u/ was fronted and /ai/ was monophthongized, it was most important to find that the manipulation was successful, and that participants really did associate these changes to Southernness. Therefore, the results for the statement concerning the speaker being from the South are the foundation of this particular variable. The statistics tell us that this manipulation was in fact successful, as seen earlier in Table 5.1. The model returned a positive coefficient on this relationship. If the stimuli were manipulated to be more Southern, they were more likely to be perceived as being from the South ( $p < 0.0001$ ). Just these two vowel changes were enough to lead listeners to respond differently to the same speakers.

The next strongest effect found from this manipulation concerned leadership; the model for this is shown in Table 5.2. A positive coefficient shows that if a speaker was manipulated to sound more Southern, he was more likely to be perceived as a leader ( $p < 0.001$ ). This result was not necessarily expected, and not an emphasized aspect of the hypotheses of this study. The strength of the association is interesting and will be discussed further in Chapter Six.

Table 5.2: Model of the likelihood of identifying the speaker as a leader, when the token had fronted /u/ and monophthongized /ai/

|                       | Estimate | Std. Error | z value | Pr(> z ) |
|-----------------------|----------|------------|---------|----------|
| (Intercept)           | -1.0001  | 0.4449     | -2.248  | <0.0001  |
| manipulation=southern | 1.5681   | 0.4437     | 3.534   | <0.0001  |

In addition, stimuli manipulated to sound more Southern were also more likely to be perceived as having spent time in the military ( $p < 0.05$ ). Though this result was not as strong as the first two, it was still significant. This tendency is shown in Table 5.3. There were not significant correlations between these manipulations and the listeners' perceptions of kindness ( $p = 1$ ) or intelligence ( $p = .25$ ).

Table 5.3: Model of the likelihood of identifying the speaker as having been in the military, when the token had fronted /u/ and monophthongized /ai/

|                       | Estimate | Std. Error | z value | Pr(> z ) |
|-----------------------|----------|------------|---------|----------|
| (Intercept)           | -0.5506  | 0.2300     | -2.393  | <0.05    |
| manipulation=southern | 0.4771   | 0.2431     | 1.962   | <0.05    |

Therefore, for this variable, the results were consistent with the hypothesis that if /u/ were fronted and /ai/ monophthongized, listeners would perceive a speaker as more Southern and further, more likely to have spent time in the military. This shows that the ideologies that participants in Kirtley (2010) and the qualitative survey believed to be linked with the military were used by a different group of participants to make judgments about speakers. There is in fact a link between our qualitative impressions of others and the judgments that we make about them based on linguistic variation.

### **Dominance**

The next group of critical stimuli was manipulated with a lowering or raising of pitch in order to explore the relationship between listeners' perceptions of overall  $F_0$  and

dominance. It was expected that there would be a correlation between lower pitch and the likelihood that participants would find speakers to be arrogant, leaders, likely to win in a physical fight, and likely to have spent time in the military. Three of these hypotheses were also supported by the results of the experiment.

If a speaker’s pitch was lowered, he was more likely to be perceived as being able to win a physical fight ( $p < 0.0001$ ). The model is shown in Table 5.4. The overwhelming tendency for listeners to identify the voices in the lower pitch guise as someone who would win a fight demonstrates that listeners associate lower pitch with greater physical prowess and perhaps also with aggression.

Table 5.4: Model of the likelihood of perceiving the speaker as someone who would win a physical fight, when the token had lower pitch

|                    | Estimate | Std. Error | z value | Pr(> z ) |
|--------------------|----------|------------|---------|----------|
| (Intercept)        | -1.4229  | 0.3594     | -3.960  | <0.0001  |
| manipulation=lower | 1.7038   | 0.2731     | 6.239   | <0.0001  |

When the pitch was lowered, the speakers were also more likely to be perceived as arrogant ( $p < 0.01$ ). This may be associated with ideas about social dominance, but it is also possible that people perceive physically dominant males as more likely to be arrogant because they possess the socially valued traits of athletic ability and larger build.

Table 5.5: Model of the likelihood of identifying the speaker as arrogant, when the token had lower pitch

|                    | Estimate | Std. Error | z value | Pr(> z ) |
|--------------------|----------|------------|---------|----------|
| (Intercept)        | -2.0380  | 0.3141     | -6.489  | <0.0001  |
| manipulation=lower | 0.8941   | 0.3062     | 2.920   | <0.01    |

In addition, tokens in the lower pitch guise were more likely to be perceived as having spent time in the military ( $p < 0.05$ ), as seen in Table 5.6. This suggests that men in the military are not only perceived as having lower voices, but that these character traits that are

linked to pitch are also linked to men in the military. This is consistent with the predictions made based on the survey.

Table 5.6: Model of the likelihood of identifying the speaker as having spent time in the military, when the token had lower pitch

|                    | Estimate | Std. Error | z value | Pr(> z ) |
|--------------------|----------|------------|---------|----------|
| (Intercept)        | -0.6680  | 0.3395     | -1.968  | <0.05    |
| manipulation=lower | 0.5840   | 0.2469     | 2.365   | <0.05    |

The speakers were not, however, significantly more likely to be perceived as leaders when their pitch was lowered ( $p=0.084$ ). This suggests, consistent with Experiment One's results, that while physical dominance and lower pitch are highly correlated, social dominance is not associated with pitch as strongly.

### **Efficiency**

The next manipulation was perhaps the most expected to turn out results consistent with the hypotheses, as the connections between speech rate, efficiency, and military involvement seem strong, and this trait is one that often comes up in conversation about military speech. For this manipulation, it was expected that tokens wherein speakers' speech rates were slower would cause participants to find them less efficient, not as good at their jobs, and less likely to have spent time in the military. The results were consistent with all of these hypotheses, as well as finding that if a speaker's speech rate was decreased, he was less likely to be perceived as helpful ( $p<0.0001$ ), seen in Table 5.7. Perhaps a person's ability to be helpful is contingent upon his competence or ability to finish his own work in a timely manner. In these models, the negative coefficient expresses a negative correlation between the slower speech rate and the likelihood of the speaker being perceived as having the relevant trait.



Table 5.7: Model of the likelihood of identifying the speaker as helpful, when the token had slower speech rate

|                     | Estimate | Std. Error | z value | Pr(> z ) |
|---------------------|----------|------------|---------|----------|
| (Intercept)         | 1.5334   | 0.4961     | 3.091   | <0.01    |
| manipulation=slower | -2.1392  | 0.3508     | -6.098  | <0.0001  |

When the speech rate of the speaker was decreased, the speaker was less likely to be perceived as efficient ( $p < 0.0001$ ). This shows that the manipulation was successful and that speech rate and efficiency are in fact associated. Though it may seem obvious that being able to speak more words in a certain amount of time would be perceived as more efficient, the task in the experiment did not ask the participants to compare the guises next to one another, but rather, make a decision about the speaker without knowing what was different about the speaker's voice. This suggests that there is some sort of standard threshold for speech rate that listeners use to decide how quickly a person speaks and then associate that speaker with other character traits. The correlation is shown in Table 5.8.

Table 5.8: Model of the likelihood of identifying the speaker as efficient, when the token had slower speech rate

|                     | Estimate | Std. Error | z value | Pr(> z ) |
|---------------------|----------|------------|---------|----------|
| (Intercept)         | 1.9398   | 0.3567     | 5.439   | <0.0001  |
| manipulation=slower | -2.6664  | 0.3038     | -8.777  | <0.0001  |

In addition, the speaker was less likely to be perceived as being good at his job when he had a slower speech rate ( $p < 0.0001$ ), shown in Table 5.9, which is perhaps connected to his ability to get his work done in an efficient manner. He was also less likely to be perceived as having spent time in the military ( $p < 0.0001$ ), shown in Table 5.10. Speakers were to a great extent less likely to be perceived as having spent time in the military if they spoke more slowly.

Table 5.9: Model of the likelihood of identifying the speaker as competent, when the token had slower speech rate

|                     | Estimate | Std. Error | z value | Pr(> z ) |
|---------------------|----------|------------|---------|----------|
| (Intercept)         | 2.1530   | 0.4028     | 5.345   | <0.0001  |
| manipulation=slower | -2.5970  | 0.3821     | -6.796  | <0.0001  |

Table 5.10: Model of the likelihood of perceiving the speaker as having spent time in the military, when the token had slower speech rate

|                    | Estimate | Std. Error | z value | Pr(> z ) |
|--------------------|----------|------------|---------|----------|
| (Intercept)        | 0.8810   | 0.2195     | 4.015   | <0.0001  |
| manipulationslower | -1.4932  | 0.2539     | -5.882  | <0.0001  |

### **Stoicism**

The manipulation that I believed would evoke a perception of stoicism was a manipulation of the speakers' pitch widths. It was expected that if a speaker's pitch width were narrower, he would be perceived as less likely to express his emotions, less manly, and less likely to have spent time in the military. While the manipulation did effectively lead participants to significantly view the speakers as more or less likely to express their emotions ( $p < 0.05$ ), seen in Table 5.11, the manipulation was not significantly correlated to answers about manliness or military involvement. This will be discussed further in Chapter Six.

Table 5.11: Model of the likelihood of identifying the speaker as expressive, when the token had a wider pitch width

|                    | Estimate | Std. Error | z value | Pr(> z ) |
|--------------------|----------|------------|---------|----------|
| (Intercept)        | -1.3928  | 0.4337     | -3.211  | <0.01    |
| manipulation=wider | 0.6440   | 0.2761     | 2.333   | <0.05    |

## All Variables

The final critical pairs were manipulated for all of the acoustic variables. It was expected that if a single speaker were manipulated for all of the variables towards the direction expected to be perceived as more military, listeners would be likely to believe the speaker to have spent time in the military. Only two pairs were manipulated in this manner. If all of the variables were manipulated toward the hypothesized direction of increasing perception of being in the military (manipulation=more), the speaker was indeed more likely to be perceived as having spent time in the military ( $p < 0.0001$ ), as shown in Table 5.12.

Table 5.12: Model of the likelihood of identifying the speaker as having spent time in the military, when the token was manipulated for all variables

|                   | Estimate | Std. Error | z value | Pr(> z ) |
|-------------------|----------|------------|---------|----------|
| (Intercept)       | -0.7065  | 0.2658     | -2.658  | <0.01    |
| manipulation=more | 2.2205   | 0.3425     | 6.483   | <0.0001  |

He was also more likely to be perceived as being likely to win in a physical fight ( $p < 0.0001$ ).

Table 5.13: Model of the likelihood of perceiving the speaker as able to win a physical fight, when the token was manipulated for all variables

|                  | Estimate | Std. Error | z value | Pr(> z ) |
|------------------|----------|------------|---------|----------|
| (Intercept)      | -1.2533  | 0.3450     | -3.633  | <0.001   |
| manipulationmore | 2.7491   | 0.4946     | 5.558   | <0.0001  |

In addition, the speaker was more likely to be perceived as helpful ( $p < 0.01$ ).

Table 5.14: Model of the likelihood of identifying the speaker as helpful when the token was manipulated for all variables

|                  | Estimate | Std. Error | z value | Pr(> z ) |
|------------------|----------|------------|---------|----------|
| (Intercept)      | 0.1545   | 0.3420     | 0.452   | 0.65     |
| manipulationmore | 1.5295   | 0.4827     | 3.169   | <0.01    |

It is noteworthy that unlike the other manipulations, the strongest significance for this manipulation was found with the likelihood of the listeners perceiving these speakers as having spent time in the military. The speakers manipulated to be more military received 41 and 38 agree responses with the military statement while they received 20 and 17 agree responses respectively when manipulated to be less military-like. Taken together, the results of this experiment support the hypothesis that listeners associate specific linguistic variables to character traits and broader social categories in a complex interconnected field.

### **Summary**

Table 5.15 shows the correlations that were returned, including the statement, the direction of the manipulation, the coefficient returned by R, and the p value for each. They are ordered by both type of manipulation and degree of significance. Significant results are in bold print.

Table 5.15: Correlations for each statement and their p values

| Manipulation  | Statement                            | Trend occurred in Expected Direction | P value |
|---------------|--------------------------------------|--------------------------------------|---------|
| Southernness  | <b>is from the south</b>             | <b>X</b>                             | <0.0001 |
|               | <b>is a leader</b>                   | <b>X</b>                             | <0.001  |
|               | <b>spent time in the military</b>    | <b>X</b>                             | <0.05   |
|               | is intelligent                       |                                      |         |
|               | is kind                              |                                      |         |
| Dominance     | <b>would win in a physical fight</b> | <b>X</b>                             | <0.0001 |
|               | <b>is arrogant</b>                   | <b>X</b>                             | <0.01   |
|               | <b>spent time in the military</b>    | <b>X</b>                             | <0.05   |
|               | is a leader                          |                                      |         |
| Efficiency    | <b>is efficient</b>                  | <b>X</b>                             | <0.0001 |
|               | <b>is good at their job</b>          | <b>X</b>                             | <0.0001 |
|               | <b>is helpful</b>                    | <b>X</b>                             | <0.0001 |
|               | <b>spent time in the military</b>    | <b>X</b>                             | <0.0001 |
| Stoicism      | <b>expresses their emotions</b>      | <b>X</b>                             | <0.05   |
|               | is manly                             |                                      |         |
|               | is from the North                    |                                      |         |
|               | spent time in the military           |                                      |         |
| All variables | <b>spent time in the military</b>    | <b>X</b>                             | <0.0001 |
|               | <b>would win in a physical fight</b> | <b>X</b>                             | <0.0001 |
|               | <b>is helpful</b>                    | <b>X</b>                             | <0.01   |
|               | is intelligent                       |                                      |         |
|               | is from the South                    |                                      |         |
|               | is kind                              |                                      |         |

## Chapter Six: Discussion

### 6.1. Aims

The experiments described in Chapters Four and Five were designed to: (1), determine if particular linguistic variants lead to specific character traits being attributed to a speaker, (2), determine if beyond just relating that speaker to a single trait, the variants might also increase the likelihood of a listener associating the speaker with a particular community, (3), investigate if a listener's background could have a significant effect on the answers he gave.

The two experiments were designed differently so that different questions could be asked about the same speakers and so that a nuanced picture of the listeners' perceptual spaces could be obtained. The purpose of Experiment One was to find if listeners might already associate the manipulations made with character traits of the speakers without those traits being specifically mentioned. Experiment One was also meant to allow for the provision of a clearer picture of the actual impressions of the listeners, as they were asked to respond to broad, open-ended questions. This means that rather than just examining how, for example, pitch affects the way a listener perceives a speaker's leadership abilities, the results would provide much more detail about how that perception changes.

The purpose of Experiment Two was to be able to investigate specific character traits and their relationships to the phonetic variants, and to be able to test the robustness of the associations made during Experiment One. While use of a forced-choice methodology leads listeners into thinking about particular traits over others, it can be used to complement more qualitative data and can be used to investigate the strength of particular sociophonetic associations.

The results provide evidence that a single acoustic variable can have meaning within a language and that variables can be used in combination to create and project a person's linguistic identity. Furthermore, though every dialect is made up of several acoustical

differences that make it unique from other dialects, these findings show that the manipulation of just one of these acoustical measures is enough to associate the speaker with an identity. When a listener finds several of the relevant traits in a speaker's voice, that leads to an even stronger judgment of that speaker's affiliations.

## **6.2. Results Summary**

Results from both experiments indicate that phonetic variables can change a listener's perception of a speaker. In Experiment One, some of the variants had notable effects on perceived origin, occupation, looks, sports, or leadership traits. The manipulations of pitch, in particular, resulted in various and interesting responses that might offer more insight into exactly how  $F_0$  is related to the perception of a male speaker. Experiment One did not specifically investigate whether variation would cause listeners to think of military involvement, and even so, one variant, faster speech rate, did cause a notable amount of responses that the speaker's occupation was military. Experiment Two results indicate that there is a correlation between the linguistic variables under investigation and various social characteristics as well as with perceived involvement with the military.

### **Southernness**

In Experiment One, the combination of a fronted /u/ and monophthongized /ai/ successfully led participants to respond that Speaker 2 was from the South. This shift in perceived regional origin was expected given Clopper and Pisoni's body of work investigating the salience of different markers of regional dialects (2004a, 2004b, 2006). However, many participants believed Speaker 1 to be from the South or the Midwest in either guise, perhaps because of his particularly rural South-Midlands dialect, so the manipulation of the vowels was not enough to cause a notable difference with the open-ended question for both speakers.

In Experiment Two, manipulations of the vowels towards Southernness were successful, as evidenced by the significant positive correlation found between the stimuli manipulated in that direction and the agreement of the participants with the statements that these speakers were from the South. A positive correlation was also found between more

Southern vowels and leadership and Southern vowels and time spent in the military. The Southernness-leadership correlation was unexpected, and could have to do with the prominence of speakers of the Southern dialect in American politics of late, including two out of three of the most recent American presidents. The Southernness-military correlation confirms both that, as expected, if a speaker sounds like he is Southern, he is more likely to be perceived as someone who has spent time in the military, and that vowels that indicate Southernness can also cause listeners to make broader social judgments of a speaker, suggesting that social information is organized in a complex web of interactions, and pulling on one string of the web can activate many other connected strings.

### **Dominance**

The manipulation of  $F_0$  yielded many interesting results that might aid in understanding how fundamental frequency and perception interact. Experiment One found that overall, it seems that a speaker may be considered less physically dominant with a higher  $F_0$ , as found in Puts et. al (2007). The results also indicate that he is considered to play less physical sports, he is shorter and thinner in stature, he would sometimes be seen as a weak boss, and he performs less physical tasks in his occupation. The results of this experiment also seem to show that lower pitch may be correlated with higher age.

In Experiment Two, lowering of fundamental frequency, or  $F_0$ , correlated with perceptions that the speaker would be more likely to win a physical fight, would be arrogant, and would have spent time in the military. A correlation between lower  $F_0$  and leadership did not reach significance. These findings support the idea that  $F_0$  correlates with physical dominance, and perhaps with a speaker's self-image, but it does not necessarily correlate with social dominance. Further studies to parse these relationships would most likely prove fruitful.

These results together indicate that lower pitch is indeed associated with a bigger speaker, which makes sense, given that a longer vocal tract does actually result in a lower pitch. More importantly, though, results show that this acoustic trait is associated with a certain build which is then also associated with social characteristics that go along with being bigger. If a man has a larger build, he is better able to compete in contact sports and win in a fight. Also, he is better suited to perform physical tasks. In life, a larger build is of course not



always going to lead to a person's participation in these social categories. However, in making judgments during speech processing, an indication of a person's build as specific as his overall pitch heard in a short audio clip is enough to suggest to listeners the type of person that they are listening to.

### **Efficiency**

A decrease in speech rate led more participants to write that the speaker was from the South. The Southern dialect is famous for its drawl, something that might be salient to the participants. Southernness and faster speech rate seem contradictory, and while the results of Experiment Two do indeed support the profile that the perception of military speech is that it is both faster and more Southern, these results from Experiment One also testify that speech rate and Southernness may be negatively correlated for some participants. These seemingly contradictory results reveal that linguistic variables can obtain independent social meaning and can then be used in different contexts to evoke various social categories. The speakers in these experiments come from the South-Midlands dialect region, which shares many salient features with the Southern dialect, so perhaps decreasing the speech rate was enough for this pool of participants to cause listeners to believe that Speaker five was from the West rather than from the South. As mentioned above, increased speech rate also caused three listeners to write down military as a response to the open-ended question about the speaker's occupation. This is notable because 'military' was not a common answer overall, but occurred three times out of twenty responses for Speaker 5 in the faster guise.

A slower speech rate correlated negatively with responses to efficiency, helpfulness, job competence, and military involvement. In regards to speech, efficiency can be directly construed as meaning a greater amount of speech produced in a shorter time. When a person's efficiency is discussed, we do not usually think of speech, but rather the amount of work that he or she can accomplish in a certain amount of time. If this was what the participants were responding to for this question, then speech rate successfully influenced the listeners' perceptions of the work efficiency of the speakers. This same correlation was expected in regards to occupational competence, but the strong results of the question concerning helpfulness were a bit surprising. Perhaps a person's ability to be helpful was at issue, or perhaps a slower speech rate makes some seem less generous. Further work is

required to parse the reasons behind this result. As expected, a slower speech rate significantly decreased the number of participants who thought the speaker had spent time in the military. Statistically, this manipulation was the strongest indicator that the speaker might have military experience.

## **Stoicism**

The relationship between pitch width and perceived stoicism was not as strong as the other sociophonetic relationships tested. While a wider pitch range did positively correlate with whether a speaker expressed his emotions, it did not correlate with statements concerning manliness, nor did it correlate with military involvement. This contrasts with work by Levon, who found a correlation between perceptions of masculinity and pitch width (2007). It could be that pitch width is not the best indicator of a person's expression of emotion, or it could be that the participants do not link stoicism with manliness. It was surprising that a smaller intonational range did not lead listeners to think of military involvement, as this was a characteristic that was mentioned by several participants in Kirtley (2010), but perhaps the manipulation itself should be performed differently. This will be something to explore in the future.

## **6.3. Theoretical Contributions**

### **6.3.1. The Third Wave**

This study was designed in order to examine the perception of the social meanings of a few select acoustic variables and determine if the manipulation of a single variable, extracted from the conglomeration of acoustic markers that make up the speech of a certain community, could affect perception. The findings of this study support the claims of the third wave of variation studies, discussed in Chapter Two.

As described before, sociolinguists first considered social variation to be tied largely to socioeconomic hierarchy and to region. Non-standard varieties were spoken by lower socioeconomic groups, and formality in a conversation, no matter the speaker, would lead to the use of more standard variables (Labov 1972). Later, sociolinguists began to consider certain variables as associated with locally-defined speech communities; a speaker's desire to

be affiliated with a particular group would determine what variables he or she chose to use at the time. Finally, the third wave of variation modeled variation as acoustic variables carrying separate locally-created meanings. These variables could then be used as a resource to create a social personae, ever-changing as the speaker's needs changed. Eckert (2005) stresses that linguistic choices do not directly index the social categories or groups of speakers, but that those choices index attitudes, character traits, and involvement in certain activities that in turn are associated with different categories of people. These linguistic markers do not exist only in an isolated speech community, but in the wider community of society, where they are given broad meanings accessible to the culture. Eckert writes that stylistic practice "involves adapting linguistic variables available out in the larger world to the construction of social meaning on a local level. But the use of these variables requires that they have some general conventional meaning, which can be vivified in the particular style" (2005: page 24). Local groups fine-tune linguistic markers to have more nuanced meanings within a smaller community, meaningful only because of their delineations into broader social categories in society more generally. By examining whether participants who are parts of different speech communities find different or stronger effects of meanings when listening to acoustic variables, Experiment Two investigates whether the local meanings of acoustic variables are different in different groups. Unfortunately, there were not enough members of the military in this experiment to find significant differences, though this will hopefully be remedied by adding more military participants in the near future.

It should be noted here that it is probable that speakers use particular variants unconsciously or for a reason that is misinterpreted by the listener. Few people want to project that they are incompetent, but many do. First, the absence of a particular linguistic marker could cause a listener to judge the speaker as lacking in the trait or stance that is associated with the missing marker. It is also possible that linguistic variables are adopted in clusters as speakers move in and out of involvement with speech communities; some of those variables may independently have negative associations for the society at large, but together, the variables index the community in which the speaker has become involved. Additionally, some linguistic traits, such as pitch, stutters, lisps, or speech rate may be resistant to management by a speaker because they are products of biology or cognitive processes. Even still, they become associated with social meaning for the society at large. Therefore, the way

that a person talks is not an entirely conscious projection of who that person wants to be, but a complex combination of some linguistic markers that they unconsciously use out of habit, some that they cannot control, some that they consciously manipulate, and some that are part of a group of linguistic practices that index a speech community of which they have become a part. Despite this, listeners most likely assign social meaning to most of the linguistic practices that the speaker uses, whether they are intentional or not. This is why perception experiments are an effective way to access the social meanings of linguistic variables. The results of Experiments One and Two show that for this participant group (one that is quite broad in dialect region, background, and age) isolated acoustic variables have several strong correlations to specific character traits or social meanings, and those acoustic variables can also be heavily associated with a particular group of speakers.

In Experiment Two, each acoustic variable was associated with one or more social meanings for the listeners: /ai/ monophthongization and /u/ fronting with Southernness and leadership,  $F_0$  with physical dominance and arrogance, speech rate with efficiency, competence, and helpfulness, and pitch range with expressiveness. Furthermore, three of those variables; Southernness, dominance, and efficiency, were then also associated with the military community. The construction of military speech involves each of those individual social meanings, so the association only requires one acoustic difference, but a speaker who uses all of these acoustic variables in speech is more likely to be judged as having been in the military. Thus, a faster speech rate, Southern vowels, and a lower  $F_0$  are phonetic variants that an individual could use to project himself as a member of the military community. These variables, however, are not limited to the military; they are resources available to all speakers of American English when they would like to sound more efficient, capable of leadership, or physically dominant. It just so happens that the amalgamation of these traits is what begins to constitute the idea of a speaker involved in the military. This suggests that the identity of a person belonging to a social category is made up of traits that cause that person to be effective in that membership, and those traits are projected by the use of linguistic variables that have obtained social meanings associated with the traits. When all of those linguistic traits are used by a single speaker, listeners are likely to perceive that speaker as belonging to the appropriate social category.

Work within the third wave of linguistic variation discusses the possibility that linguistic variables are connected within a flexible indexical field, having *multiple* possible social meanings. Which meaning is applied to a particular speaker's use of the variable may fittingly change meaning according to surrounding linguistic or nonlinguistic cues. The designs of Experiments One and Two investigate the idea of each variable having multiple meanings and associations from two different directions. Experiment One, with its open-ended questions, allows the participants to express the complex possibilities of meaning for each variable. Experiment Two investigates the robustness of the associations between each acoustic variable and several specific social meanings that it might have. The idea behind these inquiries was that a phonetic trait does not have just one meaning or belong to just one group of speakers, but may have several purposes and may link to a web of interconnected ideas about character traits and social identity. The experiments herein show that a single variant may have multiple meanings which are revealed in different contexts.

The association of one meaning to a variable does not seem to exclude other associations. Though the manipulation of  $F_0$  caused the listeners to think of the speaker as physically dominant, it also made them think of the speaker as arrogant. Furthermore, one acoustic change linked the speaker to a speech community that uses that trait, but several acoustic changes create an even stronger link. Changing just the /ai/ and /u/ of a speaker caused participants to think of him as likely to have been in the military, but changing these vowels, his pitch, speech rate, and pitch width caused this association to be much stronger. These results lend support to Eckert's claim that linguistic variables are linked with multiple meanings and that variables work together to form a speaker's style. While a military style was attributed to some voices some of the time when only one variable was manipulated, when all of the variables were aligned, listeners were more likely to attribute a military speech style to the voice.

Additionally, the results may support the claim that a variable can change meaning depending on the other linguistic cues in the signal; participants shifted in their association of traits with certain variables depending on the different voices. For example, Speaker 3 is considered friendlier as a boss in the higher pitch guise, while Speaker 6 is considered friendlier in the lower pitch guise. In addition, Speaker 3 is considerably more laidback in the lower pitch guise, while Speaker 6 is considered more laidback in the higher pitch guise.

Even more interestingly, participants were likely to consider Speaker 3 a person who did physical work in the lower pitch guise, while Speaker 6 was considered more managerial in the lower pitch guise. These results are consistent with Campbell-Kibler (2007) who found that a single linguistic variable had a different effect on perception according to the social characteristics attributed to the speaker.

### **6.3.2. Models of Speech Processing**

Compared with other models of speech perception, exemplar models would best account for the results of these experiments because they highlight the possibility of listeners having a great acuity for speaker variance and an ability to use this variance to gain richer insights into the communicated message and its speaker. The present experiments do not answer questions such as when social information is accessed or how it changes perception of the speech stream, but they do confirm that speakers do not filter out all variance as noise, but rather, use it to make judgments about the speaker, and possibly, to aid in more efficiently understanding that speaker in the future.

Furthermore, most exemplar-based speech processing models deal with word recognition, rather than the processing of suprasegmental phonetic cues at the phrasal or sentential level. In an exemplar model where a token of a word heard by a listener is associated with a social category based solely on its similarity to nearby memory traces, phrasal or sentential material that could also be associated with social meaning is not addressed. In Experiment Two, it was found that speech rate and pitch width could influence the social perceptions of the participants. A single word in isolation cannot contain these acoustic traits because the traits apply at the phrasal level. Future discussion of sociophonetics in relation to speech processing models may need to take this into account.

### **6.4. Methodological Contributions**

This thesis strove also to use a methodology that overcame some of the problematic issues of sociolinguistic perception work. First, perception studies often used members of the various social categories being studied without accounting for the variety within each

category and without fully understanding what it was about each voice that participants were responding to. Use of the Matched-Guise Technique begins to control for this problem by using the same person to produce stimuli that differ in accent or language. However, early use of this technique still changed many things about the way the speaker was speaking in each guise, so it was nearly impossible to say what exactly caused a participant's opinion to change. Campbell-Kibler and Levon's work began to control for this problem by using digital manipulation to change one isolated variable about the speech stream so that any changes in opinion could be attributed to that change. The problem here is that the participants were made aware in this methodology that they were listening to the same person, in fact the same passage, and that it had been manipulated in some way. Participants have a metaawareness in this design that is not ideal because they are aware of the particular variable that they are to be listening to, which is not a natural listening task. The experiments of this thesis overcame this problem by creating stimuli from the same speaker that contain a different clip of the interview and spacing the speakers in such a way that they are not played too near one another. The participants were then told only that they were going to hear a bunch of American men speak. Most believed that each man was a different speaker. In this way, every participant could hear every speaker and every manipulation, and the experiment could maintain a within-subjects test, which is more rigorous than a between-subjects test. Another problem with past perception studies is that it can be difficult to confidently separate results caused by how the speaker speaks and results caused by what the speaker is saying. I controlled for this variable by controlling the subject of the interviews, using topics that were applicable to people anywhere in America. The speakers discuss directions and getting lost, and only ubiquitous street names like 'Main Street' are used in the stimuli.

## Chapter Seven: Conclusion

Recent theoretical contributions in sociolinguistics have postulated that linguistic traits are associated with specific social meanings in a field of connected meanings and social variables. Ethnographic production studies were able to qualitatively associate certain variables with complex social usage, and researchers have begun to use experimental methods to examine these links in the perception of listeners. By isolating single variables and asking the right questions, experiments can find correlations between changes in social judgments and changes in linguistic variants. This thesis successfully used these methods to show that four linguistic variables caused shifts in social perception when carefully manipulated. Further, the results showed that these shifts in variants also caused participants to judge the speakers as being more or less likely to be involved in the military. This suggests that though each linguistic variable can have a specific social meaning, those meanings exist in a complex indexical field in the listeners' minds, and these associations are activated as listeners process speech.

Specifically, these experiments found that lower pitch correlates with physical dominance, a faster speech rate with competence, monophthongization of /ai/ and frontness of /u/ with Southernness, and wider pitch width with expressiveness. The first three of these variables also made a speaker seem more likely to have spent time in the military. When all of these variables were combined, the speaker seemed extremely likely to have been in the military, suggesting that listeners listen for individual linguistic traits to make social judgments and also seek out combinations of variables to make connections with social categories.

This thesis also used a methodology, building on recent successful use of the Matched-Guise Technique, that had not been used before. Researchers have claimed that it is not possible to both change just one linguistic variable and use the same speaker for multiple stimuli without the participant knowing that they are listening to the same person (Levon 2007: page 542). However, these experiments were both carried out in just that manner. Only



ten speakers were used to create 25 and 38 stimuli for Experiments One and Two respectively, but the participants did not know that they were listening to the same men over and over. Instead, they made new judgments each time about speakers who they thought were different every time. In this way, the manipulation of stimuli could be better masked from the participants. In addition, the topic of each stimulus was controlled for in a way that would assist the participants in making their judgments based only on the speech stream, thus isolating any change in social judgment to a change in the manipulated variable.

Listeners in America are capable of cuing in on linguistic variables that are associated with social characteristics attributed to members of the military in order to decide whether a speaker is a member of the military or not. The results of this study suggest that during speech processing, in addition to accessing lexical items and syntactic structures, listeners process variation in order to understand more about the person speaking, and they begin to make decisions about the person. Just as when we see a person with the high and tight haircut or rigid stance and begin to integrate the possibility that he is in the military into our concept of his social identity, we also listen to his speech stream and index the variance in his speech to traits that would increase or decrease the likelihood of his involvement.

## Appendix A- Transcripts of Stimuli

### **Speaker1-All variables 1**

north dillons would be the closest from my house and uh oh as I pull out of my driveway I would take a right and go I guess that would be east to main street take another right on main street and go south uh to the intersection of main and twelfth

### **Speaker1- All variables 2**

um my house is on the intersection of on the corner of terrace drive and eighty-one highway so if you step off my driveway onto terrace drive um you'd be you could look ahead of you and see eighty-one highway

### **Speaker1- Efficient 1**

uh so I walked a lot um during the winter my folks would drop us off at a babysitter I guess and they would they'd be at work at seven in the morning so they'd drop us off at somebody's house and then we'd get a ride from them

### **Speaker1- Efficient 2**

nothing's really coming to mind um as really bad lost I was probably a child maybe and and uh probably just had to wander around until I found a major thoroughfare or a street or something that I recognized um

### **Speaker1- Southern 1**

and then uh walk north up old main to southwest third which is is quite a little ways so maybe three quarters of a mile I guess up old main

### **Speaker1- Southern 2**

I'll have it in mind you know I'll read the address and I'll say oh yeah that's here I'll head right there and it's a different street than what I had in my mind so I end up having to go All variables the way on the other side of town and so when I say lost I that's maybe not proper uh I get my street names mixed up

### **Speaker2- Southern 1**

I had to drop a co-worker off at their house cause their car was broke down at work so they kind of gave me directions but

**Speaker2- Southern 2**

basically I was just gonna drive until I hit cause I knew it was north of me uh you know probably ten miles or so north so I was like find a main road I know it's gonna go through I just gotta head north and I'll be there so

**Speaker2- Stoic 1**

I got turned around I knew what direction I was headed I was headed north so I just uh basically knew that if I hit a main road take that north

**Speaker2- Stoic 2**

so you go ahead take third over to mosley mosley south about two blocks and then there's a parking lot right there in front of first gear

**Speaker3- Dominance 1**

depending on where you were at downtown if you were if you were right in the middle of downtown it would probably be quickest to head east on broadway to the interstate take the frontage road

**Speaker3- Dominance 2**

so from freddy's that's on like twenty-first street uh I'd probably make it easy I'll just go twenty-first west to uh maize road to the new market square area

**Speaker3- Southern 1**

last year we would drive the kids to school and drop my daughter off first at the elementary school and then since the middle school starts like five minutes later we would drop my son off second and then they would ride the bus home after school

**Speaker3- Southern 2**

like kindergarten and first grade it was like maybe six blocks um and then second grade to fourth grade it was about eight blocks

**Speaker4- Efficient 1**

to um corey to lazy creek to highway fifty left on highway fifty to anderson left on anderson to fourteenth right on fourteenth to old main old main to the nearest elementary school

**Speaker4- Efficient 2**

take third to main main to twelfth twelfth you wanna make a left on and go All variables the way down you'll see it on your right

**Speaker4- Stoic 1**

and then you'll see a church you're gonna wanna go circle around the church and head north towards the farm

**Speaker4- Stoic 2**

then you're gonna go north or left around that school around behind it

**Speaker5- Efficient 1**

um I guess if was giving you formal directions I'd tell tell you as a stranger to go directly south uh to southeast fifth and then east on southeast fifth to duncan north on duncan to east first and then east on east first to the school

**Speaker5- Efficient 2**

I would tell them to walk west on windward from medical center drive and follow that to old main and go north on old main to meadowbrook and meadowbrook you just keep walking west

**Speaker5- Dominance 1**

um you actually gotta go south and then you gotta go east and then north and then east again you have to kind of jog around a big patch of ground that doesn't have any roads

**Speaker5- Dominance 2**

um just follow follow washington road to main and keep keep going north it's a straight shot so

**Speaker6- All variables 1**

from my house um I would start at uh southwest sixth street and uh I live at the at a deadend so there's only one way you can go so I would travel up southwest sixth to old main which is the first main road I'd hang a right on old main and I'd go down to southwest fourteenth

**Speaker6- All variables 2**

I would start here I would uh start at third street go to main street hang a right on main street main street's gonna be the stop sign busy street I would go all the way through town to twelfth street hang a left on twelfth street and travel west until I got to the high school high school'll be on your right

**Speaker6- Dominance 1**

to the house uh past the house to the church turn right again for a while turn right again

**Speaker6- Dominance 2**

ok I would start at the train station uh and I would turn left for a short distance I would turn right uh until I could see the water tower and I would walk for a while

**Speaker6- Stoic 1**

turn left again turn left again until I went all the way around the schoolhouse to the grocery store when I got to the grocery store I would turn right

**Speaker6- Stoic 2**

I can see the tree I'm gonna hang a right at the tree another right and then another right for a long ways to the farm where I hang a right into the farm lane

**Speaker7- Filler 1**

give it just about two inches not even like an inch and a half but this is a straight line but it's angled down just a little bit

**Speaker7- Filler 2**

now this object there shouldn't be an object there should only be about two inches between the object and the edge the right edge of that paper if you have it there yeah give or take

**Speaker8- Filler 1**

at the bottom of that railroad track like in the middle of the two rails the west like you would run over this item I'm gonna tell you to put you're gonna put a star you would drive over it if you were in that train

**Speaker8- Filler 2**

you're gonna draw a line straight to the house but leave about I don't know a little under an inch just vertical

**Speaker8- Filler 3**

this one's kind of northeast I'd say seventy degrees it's got a slight slight rise to it

**Speaker9- Filler 1**

the one on old main so we're gonna start at first and oak and we're gonna go to first we're gonna go west across first and then at old main we're gonna turn left south and it's gonna be a few blocks and it's gonna be right there on your left

**Speaker9- Filler 2**

from oak and first we'll take oak to uh main and go north all the way up to family video it's gonna be on the left

**Speaker10- Filler 1**

you would start here well I'd show you on a map you know we've got a map on the wall but um you'd go from third you'd go a block west to main street then main street you'd go north to twelfth and twelfth you'd go east no excuse me west to the high school then

**Speaker10- Filler 2**

um hmm let me think we rode the bus um some of the time but if not then our parents would take us so

**Speaker10- Filler 3**

I've I don't think I've real ever really really been lost you know to where I can't you know you get panicked and scared and stuff like that I don't think I've ever done that that I can remember

## Appendix B- Information about Stimuli

Table App.1.:Explanation of the Critical Stimuli

| Order Played in 'Order 1' | Speaker   | Topic             | Manipulation  | Direction   |
|---------------------------|-----------|-------------------|---------------|---|
| 2                         | Speaker 1 | directions        | Southernness  | Southern  |
| 3                         | Speaker 6 | map task          | Dominance     | higher pitch  |
| 4                         | Speaker 2 | restaurant        | Southernness  | nonSouthern   |
| 6                         | Speaker 3 | directions        | Dominance     | higher pitch  |
| 7                         | Speaker 4 | directions        | Efficiency    | faster  |
| 8                         | Speaker 6 | map task          | Stoicism      | widened width   |
| 10                        | Speaker 5 | directions        | Efficiency    | slower  |
| 11                        | Speaker 4 | map task          | Stoicism      | widened width   |
| 12                        | Speaker 1 | directions        | All variables | lowered pitch, narrowed width, Southern vowels, faster    |
| 14                        | Speaker 6 | map task          | Dominance     | lowered pitch   |
| 15                        | Speaker 1 | directions        | Southernness  | nonSouthern   |
| 16                        | Speaker 3 | directions        | Dominance     | lower pitch   |
| 18                        | Speaker 2 | being lost        | Southernness  | Southern  |
| 19                        | Speaker 6 | map task          | Stoicism      | narrowed width  |
| 20                        | Speaker 4 | directions        | Efficiency    | slower  |
| 22                        | Speaker 1 | directions        | All variables | higher pitch, widened width, less Southern vowels, slower |
| 23                        | Speaker 5 | directions        | Efficiency    | faster  |
| 24                        | Speaker 4 | map task          | Stoicism      | narrowed width  |
| 26                        | Speaker 3 | getting to school | Southernness  | Southern  |
| 27                        | Speaker 1 | getting to school | Efficiency    | faster  |
| 28                        | Speaker 2 | being lost        | Stoicism      | narrowed width  |
| 30                        | Speaker 5 | directions        | Dominance     | lowered pitch   |
| 31                        | Speaker 6 | directions        | All variables | higher pitch, widened width, less Southern vowels, slower |
| 32                        | Speaker 1 | being lost        | Efficiency    | slower  |
| 34                        | Speaker 5 | directions        | Dominance     | higher pitch  |
| 35                        | Speaker 2 | directions        | Stoicism      | widened width   |
| 36                        | Speaker 6 | directions        | All variables | lowered pitch, narrowed width, Southern vowels, faster    |
| 38                        | Speaker 3 | getting to school | Southernness  | nonSouthern   |

## Appendix C- Naturalness Rating of Stimuli

| Stimuli                | Naturalness rating<br>out of 5 possible |
|------------------------|---|
| 1. Practice            | 4.6                                     |
| 2. Speaker1All1        | 3.2                                     |
| 3. Speaker1All2        | 2                                       |
| 4. Speaker1Efficient1  | 4.4                                     |
| 5. Speaker1Efficient2  | 4.2                                     |
| 6. Speaker1Southern1   | 4                                       |
| 7. Speaker1Southern2   | 4.6                                     |
| 8. Speaker2Southern1   | 4.8                                     |
| 9. Speaker2Southern2   | 4.4                                     |
| 10. Speaker2Stoic1     | 4.8                                     |
| 11. Speaker2Stoic2     | 4.8                                     |
| 12. Speaker3Dominance1 | 4.6                                     |
| 13. Speaker3Dominance2 | 4.8                                     |
| 14. Speaker3Southern1  | 4.4                                     |
| 15. Speaker3Southern2  | 4.2                                     |
| 16. Speaker4Efficient1 | 4.2                                     |
| 17. Speaker4Efficient2 | 4.4                                     |
| 18. Speaker4Stoic1     | 4.4                                     |
| 19. Speaker4Stoic2     | 3.4                                     |
| 20. Speaker5Efficient1 | 3.4                                     |
| 21. Speaker5Efficient2 | 4.6                                     |
| 22. Speaker5Dominance1 | 5                                       |
| 23. Speaker5Dominance2 | 4.6                                     |
| 24. Speaker6All1       | 2                                       |
| 25. Speaker6All2       | 3.2                                     |
| 26. Speaker6Dominance1 | 4.6                                     |
| 27. Speaker6Dominance2 | 4.8                                     |
| 28. Speaker6Stoic1     | 4.2                                     |
| 29. Speaker6Stoic2     | 4.4                                     |
| 30. Speaker7Filler1    | 4.8                                     |
| 31. Speaker7Filler2    | 4.8                                     |
| 32. Speaker8Filler1    | 4.4                                     |
| 33. Speaker8Filler2    | 4.4                                     |
| 34. Speaker8Filler3    | 4.4                                     |
| 35. Speaker9Filler1    | 4.4                                     |
| 36. Speaker9Filler2    | 4.8                                     |
| 37. Speaker10Filler1   | 5                                       |
| 38. Speaker10Filler2   | 4.8                                     |
| 39. Speaker10Filler3   | 2.5                                     |

**Appendix D- Experiment One Answer Booklet**  
**(Begins on next page)**



**Practice Speaker-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What kind of friend would this person be?

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Question 4-                   What sports would this person play?

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**Speaker 1-**

Question 1-                   Where is this person from?

---

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Question 2-                   What is this person's occupation?

---

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Question 3-                   What kind of education does this person have?

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Question 4-                   What kind of television does this person watch?

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**Speaker 2-**

Question 1-                   Where is this person from?

---

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Question 2-                   What is this person's occupation?

---

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Question 3-                   What are this person's politics?

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---

Question 4-                   What sports would this person play?

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**Speaker 3-**

Question 1-                   Where is this person from?

---

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Question 2-                   What is this person's occupation?

---

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Question 3-                   What kind of boss would this person be?

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Question 4-                   What does this person look like?

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**Speaker 4-**

Question 1-                   Where is this person from?

---

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Question 2-                   What is this person's occupation?

---

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Question 3-                   What is this person's socioeconomic background?

---

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Question 4-                   What are this person's politics?

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**Speaker 5-**

Question 1-                   Where is this person from?

---

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Question 2-                   What is this person's occupation?

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Question 3-                   What kind of car would this person drive?

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Question 4-                   What sports would this person play?

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**Speaker 6-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What sports would this person play?

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Question 4-                   What kind of boss would this person be?

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**Speaker 7-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What would this person do in their freetime?

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Question 4-                   How would you describe this person's personality?

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**Speaker 8-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What kind of movies does this person watch?

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Question 4-                   Does this person cry? Why or why not?

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**Speaker 9-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What does this person look like?

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Question 4-                   What kind of car would this person drive?

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**Speaker 10-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What kind of education does this person have?

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Question 4-                   What would this person do in their freetime?

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**Speaker 11-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   Does this person cry? Why or why not?

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Question 4-                   What kind of television does this person watch?

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**Speaker 12-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What is this person's socioeconomic background?

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Question 4-                   What kind of education does this person have?

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**Speaker 13-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   Where would this person hang out?

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Question 4-                   Would you be friends with this person? Why or why not?

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**Speaker 14-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What kind of boss would this person be?

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Question 4-                   What does this person look like?

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**Speaker 15-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What are this person's politics?

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Question 4-                   What sports would this person play?

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**Speaker 16-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What sports would this person play?

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Question 4-                   What kind of boss would this person be?

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**Speaker 17-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What kind of education does this person have?

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Question 4-                   What is this person's religion?

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**Speaker 18-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What is this person's socioeconomic background?

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Question 4-                   What are this person's politics?

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**Speaker 19-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What kind of movies does this person watch?

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Question 4-                   Does this person cry? Why or why not?

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**Speaker 20-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What would this person do in their freetime?

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Question 4-                   How would you describe this person's personality?

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**Speaker 21-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What is this person's religion?

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Question 4-                   What kind of car would this person drive?

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**Speaker 22-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What is this person's socioeconomic background?

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Question 4-                   What kind of education does this person have?

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**Speaker 23-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What kind of education does this person have?

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Question 4-                   What would this person do in their freetime?

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**Speaker 24-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   Does this person cry? Why or why not?

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Question 4-                   What kind of television does this person watch?

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**Speaker 25-**

Question 1-                   Where is this person from?

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Question 2-                   What is this person's occupation?

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Question 3-                   What is this person's socioeconomic background?

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Question 4-                   Would you be friends with this person? Why or why not?

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## Appendix E- Qualitative Survey Instrument

Where did you grow up?

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How old are you?

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When you think of a man who is in the U.S. Military, what type of person do you think he is?

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How do you think that a man in the U.S. Military speaks?

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Where do most men in the U.S. Military sound like they are originally from?

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What type of women do you think serve in the U.S. Military?

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Have you or anyone in your immediate family spent any time in the U.S. Military?

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## Appendix F- Future Research

There are many avenues which further research could take. Specifically though, I would like to perform a follow-up experiment to this study in which the same stimuli are used, but the only question for each speaker is whether he has spent time in the military. If the correlations are still significant, I could be more confident that the listeners were making their decision based on the auditory data they had received without being at all influenced by the other statements asked about that speaker or by their responses to those statements. I do not think that the presence of certain statements for each speaker was responsible for the results of Experiment Two, but finding the correlation without the additional statements would strengthen my hypotheses. Additionally, I would like to continue Experiment Two as it is presently with more participants who have been involved in the U.S. Military. With more data from this group of participants, I believe I may be able to find significant results concerning the differences in responses caused by listener background. With only the present participants, trends were already becoming obvious in the differences in responses from each group, but there were not enough listeners from the military group to reach significance.

Further experiments would help to parse the social meaning of  $F_0$ . The responses of the participants for this manipulation were strong, but nuanced, and an experiment focused on just pitch would yield interesting data, particularly when informed by the results of Experiments One and Two herein.

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