

GENDER AND COMMAND: A SOCIOPHONETIC ANALYSIS OF FEMALE AND
MALE DRILL INSTRUCTORS IN THE UNITED STATES MARINE CORPS

by

Catherine Hicks Kennard

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As members of the Dissertation Committee, we certify that we have read the dissertation

prepared by Catherine Hicks Kennard

entitled Gender and command: A sociophonetic analysis of female and male Drill
Instructors in the United States Marine Corps

and recommend that it be accepted as fulfilling the dissertation requirement for the

Degree of Doctor of Philosophy

_____ Date: May 9, 2005
Diana Archangeli, Ph.D.

_____ Date: May 9, 2005
Natasha Warner, Ph.D.

_____ Date: May 9, 2005
Richard Demers, Ph.D.

_____ Date: May 9, 2005
Kimberly A. Jones, Ph.D.

_____ Date: May 9, 2005
Brad Story, Ph.D.

Final approval and acceptance of this dissertation is contingent upon the candidate's
submission of the final copies of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and
recommend that it be accepted as fulfilling the dissertation requirement.

_____ Date: May 9, 2005
Dissertation Director: Diana Archangeli, Ph.D.

_____ Date: May 9, 2005
Dissertation Director: Natasha Warner, Ph.D.

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Catherine Hicks Kennard

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ABSTRACT

This dissertation presents the results of a study conducted on the speech of male and female students training to become Drill Instructors (hereafter DIs) in the United States Marine Corps. Both high amplitude and low pitch are reported to be important characteristics of the DI Command Voice; these characteristics are also strongly associated with masculinity (Hicks 1997). However, previous research argues that female DIs do not view these qualities as the most important characteristics of the Command Voice. They focus instead on being “direct” (Hicks 1997, Hicks Kennard 1999). The question I address is whether or not the Command Voice taught in DI School is used differently by female and male DI students in authoritative speech.

The data were recorded at the DI School in Parris Island, South Carolina. Six subjects participated in the study. The two factors considered were sex and speech style, which included: 1) teachback: high-amplitude recitations of training procedures, 2) locker-box discussion: a speech style used in academic settings, 3) interviews, and 4) a reading sample. Both vowel duration and peak pitch measurements were done in each speech style; measurements on larger thirty-second “chunks” of discourse were taken for mean pitch, standard deviation of pitch, range of pitch, and speaking rate for each speaker in each speech style,.

There was a significant main effect on vowel duration for all subjects except for one male and a significant main effect on peak pitch for all subjects. For discourse measurements of pitch, there was a significant main effect for mean pitch, standard deviation of pitch, and pitch range.

Pair-wise comparisons resulted in significant differences in peak pitch for all subjects in all speech styles. Both females and males exhibited the same pattern for both vowel and discourse pitch measurements, from highest to lowest pitch: teachbacks, lockerbox discussion, reading sample, and interview. However, females' vowels were significantly longer in the most authoritative speech style—precisely where males had their shortest vowel duration. This difference suggests that in authoritative speech, females use vowel duration as part of the “directness” in authority, where males do not.

CHAPTER 1

INTRODUCTION

1.1. Introduction

The United States Marine Corps is often labeled as being the most masculine branch of the United States military both by members within the armed forces, as well as by civilians outside of the military. This dissertation explores the ways that women who work in traditionally masculine positions of authority, specifically as Drill Instructors in the United States Marine Corps, use their voices to convey their authority in roles that are historically predicated on masculine norms and ideologies. The number of women in the Marine Corps constitutes the smallest number of women in any branch of the United States military, and the Marine Corps is the only branch of the United States military that still segregates Recruit Training, or Boot Camp, based on sex. For these reasons, a study on female Marine Corps Drill Instructors' use of language to convey power and authority over their recruits is particularly appropriate.

Language is perhaps the most crucial resource for Drill Instructors (DIs) to establish "command" over their recruits. DIs use what they call "command presence" to teach their recruits how to be Marines and to instill in them the same quality of "command," which includes "how you handle the pressure (of training), how you project your voice, and whether you correct mistakes coolly or create cascades of ineptitude" (Liu 2005).

The participants in this study were all part of the twelve-week training program for new Drill Instructors at the Drill Instructor School at Parris Island, which is also the

location of Recruit Training for male recruits from the eastern half of the country and all female recruits in the United States, due to their smaller numbers. At the time of the recordings, the participants had been in DI School training, where both men and women are trained together and taught by both male and female instructors, for approximately one month. At the DI School, DI students attend classes on subjects ranging from military history, physical training, standard operating procedures (i.e. the regulations on what is permissible and not permissible with respect to managing recruits), Close Order Drill (i.e. leading a large body of recruits in formation), weapons handling, stress management, time management, and recruit counseling. Upon graduation, these DI students will become Marine Corps Drill Instructors, and they will begin their first cycle as a Drill Instructor in a three-year contract.

Because the norms of DI speech were established by men for men, it is necessary to compare female DI speech to the speech of their male peers. While many studies in language and gender criticize research in which characteristics of female speech that differ from male speech are viewed as deviating from the male “norm” (see Eckert and McConnell-Ginet, 1992, for a discussion on this issue), it must be taken into consideration that the environment in which female Drill Instructors live and work is historically predicated on male norms, and because of the recent introduction of females in this environment, they are still viewed in some sense as exceptions to the rule. However, because of the nature of sex-segregated Boot Camp, it would not be surprising for women and men to begin to speak differently within their own squad bays, even though they were trained to become Drill Instructors in the same way in DI School.

1.2 The Drill Instructor Command Voice

One of the most important skills that DI students must develop is the use of the Command Voice. The Command Voice falls into two main uses. First, it is used to call out commands in Close Order Drill, when a platoon or company is in formation doing movements as one body, or corps. This Close Order Drill Command Voice has a very distinctive pattern, and it is only used during drill exercises. It should be viewed as part of a ceremonial or ritualized activity.

The second use of the Command Voice is to give direct orders to individuals or groups of recruits during the daily routine of training. It is this kind of authoritative voice, often referred to by DIs as “speaking with command,” that will be part of the focus of this dissertation. In an interview that I conducted in 1997, the Drill Master, who is the DI Instructor responsible for teaching the Command Voice at DI School, described the Command Voice as “a very effective tool if used properly.” He defined the Command Voice as:

. . .using your voice to get a group to react to you in a smartly manner. And what I mean by that is the way you give an order is the way basically that an individual recruit is gonna respond to you. . . .It’s geared to develop the Marine’s presence, and that is to show an aggressive nature, and a controlled aggressive nature, nevertheless, but it develops force and to acquire an immediate response from those individuals when they’re given an order (Hicks Kennard 1999: 7).

Male Drill Instructors describe the Command Voice in terms of its physical acoustic properties, of being “huge,” “booming,” or “thunderous,” while female Drill Instructors describe it as part of a mental attitude, as being both “confident” and “direct” (Hicks Kennard 1999). For the female DI, the source of “command” comes from within,

as a “state of being,” and this state is in part carried out in their voice; for the male DI, it is what he *does* physically with his voice that gives him “command.”

Both male and female Drill Instructors state that the quality of their voice is reflected in their recruits’ response. For male DIs, high amplitude and speed were most often cited as the most important characteristics of the Command Voice in terms of getting the desired recruit response. This is true for both the loudness of a recruit’s verbal response, and for the reaction time of a recruit’s physical movement. The Drill Master described the relationship between a loud Command Voice and the louder recruit response:

you’ll have one Drill Instructor who’s got got a loud Command Voice, and his recruits are gonna resp-they’re gonna be loud. The louder you get with them, the louder they get toward you. And on the other hand-on the flipside of that if you see uh a Drill Instructor who’s got a mild voice, who’s kinda low and not very loud, then the recruits more than likely are not are not gonna be very loud themselves.

For female DIs, directness and confidence were most often cited as the most important characteristics of the Command Voice. One female DI discussed the need to avoid what is often referred to as indirect or hedged speech, commonly associated both with politeness and female speech patterns. Although her voice does get louder during her example of a good Command Voice, she does not focus on the amplitude as the salient characteristic of command, but rather on the use of directness and confidence. These two qualities produce what she described as a “crisp, more obedient, more disciplined result”:

If I was to come up and tell Sergeant Jones “Hey, could you, uh, get on line¹ now” ((spoken in a soft polite voice)), she would move exactly the way I talk to her to move...If I say “HEY SERGEANT JONES GET ON LINE NOW!!,” it is more of a command voice, and they will move quicker with more obedience to orders than if you were to speak to them in a more soft, subtle tone...So if you say it with command and confidence, that’s how they will obey it, with command and confidence.

While her amplitude and speaking rate do increase, this idea of directness, violated above with “could you, uh...” emerges as an important characteristic of the Command Voice not often described by the male Drill Instructors.

The female DI’s idea that “command” comes from the entire individual and not just the voice is a common theme in female DI descriptions of the Command Voice. One female Drill Instructor claimed that confidence and command presence were *more* important, and not entirely dependent on, how the voice sounds. When asked to describe the Command Voice, she stated:

I think the command voice comes from your presence. It comes from how you carry yourself. If you’re a commanding person, people will respond to your voice, either voice whether it’s loud or whether it’s low [meaning amplitude]. I think the command voice is stern, it’s forceful, and it can be either loud or quiet (Hicks 1997).

She also noted that it is important for female DIs to avoid “screeching” or “whining,” both of which are caused by using a higher pitch. If a DI’s voice does not “have to right tone to it,” they risk sounding “not confident in their abilities,” or that they are “whinin’ and pleadin’ with them (the recruits) to get it (the job) done instead of telling them that you want it done” (Hicks 1997). Therefore, while confidence is most

¹ To “get on line” means to quickly move to the line that runs perpendicular to the “racks” or beds to stand at attention. So in essence, when a DI says “get on line,” she will get two parallel lines of recruits along the beds.

important in conveying command, the female DI must still avoid certain vocal characteristics that could be perceived as “screechy” or “whiny.”

This idea of “command” coming from a state of mind and not entirely from what one does parallels descriptions of female Marines’ attitudes toward femininity, documented by sociologist C. Williams (1989), who reported:

For women in the Marines, femininity does not inhere in a particular occupation. A woman Marine can be a feminine drill instructor, machinist, or meat packer, possibly even a combat soldier. Femininity has more to do with a particular state of *being* than with actually *doing* anything, which points to an asymmetry in the meanings men and women attribute to femininity...[boys must] prove they are “masculine” by accomplishing specific tasks—by doing things (Williams 1989: 78).

While femininity appears to be inherent in their “state of being,” female Drill Instructors must also avoid vocal characteristics that could be perceived as being masculine, such as implementing too low of a pitch or too high of an amplitude—two qualities that men commonly use to describe the Command Voice. According to Williams, the Marine Corps is “especially concerned about maintaining the femininity of its female recruits” (Williams 1989: 63). During a study commissioned on the possible “defeminization” of female Marines, one female Drill Instructor reported being asked questions including whether or not she felt that Drill Instructor School made her change her voice to sound more masculine, because as she put it, “I guess because they’re worried about us sounding like men” (Williams 1989: 63).

Both men and women described the importance of using the diaphragm to force the air out of their lungs, losing their voices in training, becoming hoarse, and, because women typically have a higher pitch, they have to, as one female DI put it, “dig a little bit

deeper.” However, for women, there appears to be a change in how they are using the Command Voice, particularly with respect to amplitude. While male Drill Instructors place most of the emphasis on being loud, females seem to be moving away from amplitude as being so important. The Series Gunnery Sergeant (an administrative position) of a female company and a former instructor and Drill Master at the Drill Instructor School stated:

The way we were taught to develop our voices, you have to become hoarse. . .to the point where you you break down your vocal cords and then as they rebuild you are able to become stronger. And um, so we were really highly encouraged to lose our voice frequently and with as much you know intensity as we could, whereas now I hardly, you when you’re talking out talking to Drill Instructor School students, they’re not hoarse anymore, and they come over here and they’re not they don’t get hoarse. You know, it’s like um we, so there’s kinda been a shift in the mentality of how, of how, is being loud really a positive thing? And um, I tell ya there’s a downshifting from that the volume is not necessarily equal to intensity anymore. And um, but the guys still you know, volume is everythingBeing loud is still a you know a good- good macho thing to do (Hicks Kennard 1999: 8).

In her above statements, the Series Gunnery Sergeant, who had been in the Marine Corps for fourteen years at the time of this interview in 1997, gave the impression that DI students do not focus on amplitude as much anymore and hardly lose their voices the way she had when she went through DI School. However, as I observed in 2003, amplitude is still very much an important characteristic of the Command Voice for both males and females, at least during DI School training. The DI students I recorded claimed that they battled sore throats and loss of voice due to the loudness level that was expected of them. The change that the Series Gunnery Sergeant referred to above may be a change within the female Drill Instructors once they reach the female battalion. Nevertheless, loudness is still, and has always been, a priority for male Drill Instructors.

Therefore, it appears that there is an asymmetry in the linguistic resources, like pitch and amplitude, used by male and female Drill Instructors in the Marine Corps. The vocal characteristics most valued by men, like high amplitude, are either not available to or not valued by female DIs. With respect to the Command Voice, female DIs face an interesting gender paradox. On the one hand, if they adopt vocal characteristics that could be perceived as “feminine,” like a higher pitch, which might become “shrill” or “screeching,” then they risk not being perceived as authoritative enough to train recruits, which would have a negative impact on their career. On the other hand, if they are perceived as being “masculine” by adopting a lower pitch, then they risk being labeled as “not feminine,” or being stereotyped by others as being “butch” or a lesbian, a characteristic not only detrimental to a career in the military, but one that is actually illegal for members of the United States military.

Because an increase in amplitude can cause an increase in pitch, it is possible that women are avoiding using higher amplitudes in an effort to not sound “shrill.” For male DIs, the increase in amplitude also increases their pitch, but this increase is not perceived as “screeching” or “whining.” In this sense, males are free to increase their pitch as they increase their amplitude. In response to why women do not feel like loudness is as important as being direct and confident, one female DI stated:

I think it is part of a feminine thing to a degree, you know, and a lot of us, you know...the Marine Corps does not train women to become men. They, you know, we're still expected to be feminine and we're still expected to be WOMEN, we're women and that's ok...we don't have to be men to train. We don't-female drill instructors do not have to act like males to train women.

1.3 Summary of research questions

This dissertation researches the following questions. First, how do female Marine Corps DI School students use their voices when they are functioning in an authoritative position? Specifically, what acoustic characteristics in their voice of authority differ from their voice in non-authoritative contexts? Do these characteristics actually convey authority? Second, what are the properties of male Marine Corps DI School students' voice of authority? Are there acoustic characteristics that are specific to male authoritative speech styles, and if so, how are they different from the properties of male non-authoritative speech? Third, are the acoustic characteristics of female authoritative speech different from the acoustic properties of male authoritative speech in the same contexts? That is to say, do women and men do different things with their voices to convey authority as Drill Instructors? If there is in fact a difference in the acoustic properties of male and female DI students' speech, why are those differences present? Why would women use one method of producing authoritative speech and men use another? Are these differences attributable to differences in biology, as many believe, or are they socially conditioned?

1.4 Organization of the dissertation

This dissertation is divided into five chapters. The rest of this chapter is devoted to a review of the relevant literature covering the major issues on language and gender in general, research on women in positions of power and in non-traditional occupations, and recent phonetic and sociophonetic research on female and male speech. Chapter 2 provides the reader with background information on the important institutional

characteristics of the Marine Corps that are necessary for an understanding of the context in which the recorded interactions took place, as well as a brief overview of the language used by Drill Instructors and recruits. Chapter 3 presents the methodology for the data collection for this study, including a description of the four different speech styles that were analyzed, background information about the six participants in the study, the conditions under which those speech styles were recorded, and a description of how the acoustic measurements were taken. Chapter 4 presents the results of the analysis of the effect of gender on vowel duration, syllable peak pitch, mean discourse pitch, standard deviation of pitch, pitch range, and speaking rate for each speaker in each of the four speech styles. Finally, Chapter 5 provides a discussion of the results presented in Chapter 4, with special attention paid to both the importance of looking at gender as something that changes within various social contexts, and the risks of misinterpreting and misrepresenting such sociopolitical data, particularly in light of the stereotypes that both female and male Marines face in their day to day lives. Chapter 5 concludes with plans for the directions of future research.

1.5 Language, gender, and power

The great debate in the language and gender literature over the last thirty years has been the source of the asymmetries in women's and men's language laid out in R. Lakoff's (1975) book *Language and Woman's Place*. Lakoff argued that "women's language" contains certain features not found in "men's language," e.g. hedges like "sort of," "kind of"; extreme polite forms; tag questions like "It's hot in here, isn't it?"; empty

adjectives like “lovely” or “divine”; and hypercorrect grammar or more formal enunciation. What Lakoff ultimately claimed was that because of societal expectations of women at that time, women could either ascribe to the expected speech of women, which, because of its indirect nature, relegated women to secondary roles at best, or they could choose to not ascribe to such norms and “be less than a woman” (Lakoff 1975: 3). While times have clearly changed since this groundbreaking work, women in traditionally masculine environments like the military are still faced with this same issue. If a female Drill Instructor were to talk like a “lady,” even in a 2006 world, she would not be authoritative enough to be a successful Drill Instructor, or even a successful Marine. However, if she were to veer too far from being a “lady,” she would not only be perceived as less than feminine, but possibly masculine, which could bring into question her sexual orientation and jeopardize her career in the military.

Two main camps of scholars reacted to Lakoff (1975), resulting in two separate ways to account for the differences in women’s and men’s speech. The first camp was sparked by the work of O’Barr and Atkins (1981), who claimed that the asymmetries between men’s language and women’s language are not solely attributable to their gender, but to their relative social status, and thus reflective of women’s subordinate status in society. In other words, men’s language contains forms of power; women’s language contains forms of subordination. The second camp, inspired by Gumperz’s (1982) work in problems that arise in cross-cultural communication and led by Maltz & Borker (1982), argued that the differences between men’s and women’s speech are actually a reflection

of the fact that men and women grow up in different subcultures and operate in cross-sex conversation according to different rules².

In this section, I briefly review the claims of this dominance vs. difference debate and provide a summary of the main criticisms other researchers have made. Much of the research on language and gender has so far been based on exploring differences between men's and women's language in cross-sex conversation. While this research is not entirely related to research questions presented in the current study, it is important to lay out the major divisions within the field of language, gender, and power in order to understand the research claims that lead to the current investigation.

1.5.1 The Dominance model

O'Barr & Atkins (1981) explored the so-called features of "women's language" within the context of the institutional setting of the American court room. Intrigued by manuals on the handling of witness testimony that contained special instructions on how to handle female witnesses, the researchers analyzed thirty hours of court transcriptions of witness testimony to investigate the occurrence of features like those described in Lakoff (1975). While they did find that female witnesses' testimony contained more of the features, like hedges "sort of" or "kind of," argued by Lakoff to be indicative of women's insecurity revealed through language, O'Barr & Atkins (1981) found that some of the males' testimony also included such features.

² According to A. Freed, Barrie Thorne and Nancy Henley pointed out the need to consider both difference and dominance as early as 1975. However, this dichotomy was more publicly established by Maltz & Borker (1982) and O'Barr & Atkins (1981).

When they took into account other factors such as social position (e.g. a witness testifying as an expert vs. a witness who testified without such expert qualification) or court room experience (e.g. someone who has never testified in court vs. someone, like a police officer, who regularly testified in court), they found that features of “women’s language” also occurred in the speech of male witnesses who either had a lower social status or had never testified in court before, while female witnesses with a higher social status or court room experience displayed fewer features of “women’s language.” They renamed the features of “women’s language” as features that exhibit “powerless language.” The fact that women’s speech in general contains more “powerless language” features reflects the fact that women in general maintain lower levels of social power in American society. Importantly, however, the fact that some male speech contained these same features showed that what had been described as a gender difference was in fact not gender related entirely, but rather a reflection of women occupying relatively lower social status.

1.5.2 The Difference model

Maltz & Borker (1982) claimed that the differences between women’s and men’s speech in cross-sex conversation are due to the fact that women and men operate conversationally with different rules of engagement in conversation. Their work was inspired by Gumpertz’s (1982) work on cross-cultural communication, where problems that arise between members of two cultures in verbal interaction are the result of misinterpretations of cultural norms that differ between cultures. Their argument for applying this framework to gender differences in American culture was based on

Goodwin's (1980) research on interactions within African American children's play. Goodwin claimed that girls and boys learn to play according to different rules and in different play groups. For example, while girls tend to play in pairs, boys tend to play in hierarchically organized larger groups. This results in a cooperative basis for girls' play and a competitive basis for boys' play.

The different features of women's language and men's language that Maltz & Borker (1982) attempted to account for included the findings of Hirschman (1974), Zimmerman & West (1975), West & Zimmerman (1977), and Fishman (1978). Hirschman (1974) claimed that women ask more questions in conversations and are responsible for doing what she termed the "shitwork" of conversation, i.e., "mak(ing) utterances that demand or encourage responses" (3). Women also do things in conversation to ensure that the conversation continues and to promote solidarity, as evidenced by women's use of positive minimal responses, such as "mm...hmm." Hirschman also noted that women use greater numbers of inclusive pronouns 'you' and 'we' (3), which contribute to solidarity between speaker and addressee as well.

While the features of women's language above focused on solidarity and continuance of conversation, the features of men's language included events such as interruptions of conversation partners, both male and female (Zimmerman & West 1975; West & Zimmerman 1977; West 1979). Further, men were more likely to dispute or challenge their conversation partners' utterances and were more likely to ignore comments of other speakers with no acknowledgment or response (Hirschman 1974). Further, men responded to their conversation partner more slowly (Zimmerman & West

1975), or unenthusiastically (Fishman 1978). Men also had a tendency to control the topic of conversation (Zimmerman & West 1975) and asserted “direct declarations of fact or opinion” (Fishman 1978: 402).

Maltz & Borker (1982) claimed that these differences in conversational features are directly related to Goodwin’s findings that girls tend to play in cooperative partnerships and are therefore likely to engage in linguistic strategies that promote that cooperation, such as the use of positive minimal responses and inclusive pronouns. Boys, on the other hand, play in hierarchical groups where interruptions and control of topic, for example, are evidence that men tend to compete for their place in the hierarchy. When they engage in friendly cross-sex conversation as adults, women approach the interaction with the intent of cooperating with their fellow interlocutor, while men approach the interaction with habits of vying for position within the interaction.

While some researchers claim that these differences in language between men and women are attributable to differences in social power or differences in behavioral sex-role expectations (West & Zimmerman 1975; Zimmerman & West 1977; Fishman 1978), Maltz & Borker argue that these differences arise from men’s and women’s cultural socialization in different linguistic subcultures. They state:

(A)merican men and women come from different sociolinguistic subcultures, having learned to do different things with words in a conversation, so that when they attempt to carry on conversations with one another, even if both parties are attempting to treat one another as equals, cultural miscommunication results (Maltz & Borker 1982: 200)

1.5.3 *Critique of the difference model*

Many gender scholars take issue with the difference model because it overlooks the asymmetries in social power between men and women in American culture. One work within the difference framework that has been the target of much of the criticism is Tannen's (1990) book, *You just don't understand: Men and women in conversation*, which, while characterized by some within the discipline as overly simplistic, successfully popularized the idea that men and women communicate using different conversational rules outside of the domain of academia. What many view as a major flaw in Tannen's analysis is the implication that miscommunication between men and women is merely the result of different cultural rules, and that interlocutors otherwise are making good faith attempts to "get along."

Uchida (1992), among others (namely Freed (1992) and Troemel-Ploetz (1998)) criticized Tannen's work for treating dominance "at the individual level, as a matter of intention and interpretation. It (gender) is not being treated at the social and institutional levels, which many studies taking the dominance/power-based approach actually do" (Uchida 1992: 552). Further, Tannen's description of men's speech as generally being "direct" and women's speech "indirect" (1990: 226) comes into direct conflict with other influences, like ethnicity, or in the case of Drill Instructors, occupation. Such a view of women's speech cannot account for situations in which women take on roles where direct speech is not only necessary, but also valued. For example, in the speech of female Drill Instructors, mitigated directives like 'Come on' and 'Let's' that are often used by girls in cooperative play (Goodwin 1980, 1988) are never used when giving orders to recruits, yet these directives, along with empty words like 'stuff,' are common in female recruits'

speech when they first begin Recruit Training. This is seen in the transcript below, where R2 represents a female recruit, SDI represents a female Senior Drill Instructor, and DI1 and DI2 are female Drill Instructors³. In line 01, a recruit, R2, uses a mitigated directive, and in line 06 one of the Drill Instructors, DI1, mocks her:

Example of the use of mitigated directive by female recruit:

- 01 R2: Come on recruits, let's get this stuff in gear! ((high pitch, whiny))
 02 SDI: Who was that? ((almost laughing))
 03 DI2: That was Horwood ((with tone of disgust))
 04 DI1: [Horwood. . . ((she starts towards where Horwood is standing))
 05 SDI: Horwood? ((to DI2))
 06 DI1: "Come on recruits, let's get this stuff. . . ((mocking))

Drill Instructors, both female and male, never use mitigated directives when giving orders, and it is their expectation that their recruits do not use them either. Orders in the Marine Corps must be direct, and it is the occupation or institution that dictates this, not the gender of the speaker. In the next transcript, one female recruit, R3, uses a mitigated directive when giving orders in line 01, and another female recruit, R4, uses a direct command in line 02, which is recognized by a female Drill Instructor, DI2, as an acceptable means of giving an order in line 05:

Example of correct use of directive by female recruit:

- 01 R3: Come on recruits, let's get this stuff done!
 02 R4: [Recruits need to pick up trash in the front!
 03 DI2: Okay, who was that? Cato?
 04 R4: Aye ma'am.
 05 DI2: Good!

³ This data comes from the transcripts of the 1997 data collection at Parris Island and is also discussed in Hicks Kennard (1999). All participants' names have been changed. Jeffersonian transcription conventions are used.

1.6 Women in positions of power and in non-traditional roles

According to Brown & Gilman (1960), “(o)ne may be said to have power over another in the degree that he (or she) is able to control the behavior of the other. Power is a relationship between at least two persons, and it is nonreciprocal in the sense that both cannot have power in the same area of behavior” (255). Most research that has been done on women in positions of power analyzes the ways that women control the behavior of others through the use of directives. For example, West (1990) analyzed the difference in directives issued to patients by both male and female doctors. Under the assumption that “doctors’ orders” are issued asymmetrically from doctor to patient, patients are obligated to comply with their doctors’ directives (Shapiro 1978); yet estimates on patient compliance to their doctors’ instructions suggest that on average one out of two patients in fact fails to follow doctors’ directives (Ley 1983).

In West’s study on directive-response sequences in patients’ visits to female and male doctors, she analyzed 21 encounters between doctors in their late twenties and thirties and patients ranging in age from 16-82 in a family practice medical office. Of the 21 physicians, 17 were white males and 4 were white females. The patients were fairly evenly divided between ethnicity and sex: 5 white men, 6 white women, 5 black women, and 4 black men. Two classes of directives were considered, including aggravated or bald directives, such as orders and demands that impose on the addressee, and mitigated directives, such as pleas and suggestions that avoid imposition on the addressee and downplay the speakers’ wishes (Labov & Fanshel 1977).

West found that 81% of the directives used by male physicians were aggravated, including imperatives; “need statements,” where the physician told the patient what he or

she needed to do; “want statements,” where the physician told the patient what he (the physician) wanted the patient to do; quasi-directives, or imperatives in interrogative forms like “why don’t you X”; permission provisions, where the doctor specifically stated what the patient is or is not allowed to do; and directives by example, where the doctor told the patient what he (the doctor) would do if he were the patient. Non-aggravated directives used by male physicians included embedded imperatives, where the use of ‘can’ or ‘could’ functions to downgrade an imperative to a request, and false collaboratives, where what appears to be a suggestion for collaborative action proposes an action that can only be performed by one person, in this case the patient, e.g. “Let’s have you come back in two weeks” (West 1990: 332-339).

West found that the female physicians, unlike the male physicians, used mostly mitigated directives, including proposals for joint action, as in the construction “Let’s talk about X” described in Goodwin (1980, 1990); singular suggestions, such as “you could X”, which was similar to the form of embedded imperatives like the male physicians used; permission directives, such as “Lemme just say one thing at this point”; and inverse imperatives, where physicians used imperatives to direct the patient to tell them (the physician) what to do, e.g. “You tell me if I got this right” (West 1990: 339-343).

West analyzed the compliance of the patients to each directive issued by the physician who gave it and found that the more aggravated the directive given, the less likely the patient was to comply with the directive. In some cases, male physicians who gave an aggravated directive had to change to a mitigated directive in order to get the patient to comply with that directive, but after the patient complied, the male physician

reverted to using the aggravated forms. West argued that while the male physicians in this study used aggravated directives to establish a hierarchical physician-patient relationship, female physicians minimized the status difference between themselves and their patients, stressing “their connectedness to one another” (West 1990: 350). She stressed that while the sample of doctors, particularly the number of female doctors, in her study was too small to generalize to the larger population, she did postulate that her results could shed light on why patients are more satisfied with female doctors (Linn *et al.* 1984, cited in West 1990) and why patients are less likely to sue female doctors for malpractice (Holder 1979, cited in West 1990).

In an analysis of interruption patterns in interactions involving the same physicians in the same family practice, West (1980) found that male physicians interrupted their patients far more than their patients interrupted them, and she argued that this interruption pattern is further evidence of the asymmetrical relationship between male physicians and their patients. For female physicians, however, the pattern was reversed: patients interrupted them more often than they interrupted their patients. Further, male patients interrupted female physicians more so than female patients interrupted female physicians, where the interactions were more or less symmetrical.

Because of the previous research on interruptions in conversation, where men interrupted both male and female conversation partners more so than females did (Zimmerman & West 1975; West & Zimmerman 1977; West 1979), West suggests that this asymmetry in interruptions, particularly those where male patients interrupt female physicians, supports the notion that “gender can have primacy over status where women

physicians are concerned” (West 1990: 409). If it were simply that the interruption patterns followed the patterns of directives described above in West (1980), then one would expect both female and male patients to interrupt female physicians equally. However, it appears that the male patients controlled the interactions with members of the opposite sex through interruptions in spite of their interlocutor having a higher social status. While the number of physicians in West’s studies above was too small to generalize her findings to the larger population, the number of women in the studies did parallel the percentage of women in medicine at the time the data was collected (West 1980: 405), and therefore the results must be seriously considered in light of women moving into occupations historically dominated by men, like the Marine Corps.

McElhinney (1993) moved away from investigating the nature of differences in cross-sex conversation and from identifying static differences between women’s and men’s speech. In her work on female police officers in the Pittsburg police department, she explored the construction of gender and other social categories, such as class and ethnicity, in an environment traditionally dominated by men that falls within the class of working-class men’s work, i.e., the work of police officers is typically associated with events involving physical force and otherwise aggressive behaviors. Her work followed the institutional affirmative action initiative within the Pittsburgh Police Department that resulted in a slow and steady increase in the numbers of both African Americans and women, so that each group constituted approximately 25% of the police force (McElhinney 1993: 5). In the complex role women take on in such an environment, she

found that female police officers “may, at any moment, be perceived as a woman, as a man, or simply as a police officer” (1994: 220).

McElhinney was interested both in how female police officers would act in situations where there was a possible typical “female” expected reaction, i.e. whether women would respond to a domestic violence call with the empathy usually associated with female jobs. Further, she examined the use of both phonological and discourse features of Anglo-American and African American speech to explore how such features are incorporated by women into blue-collar jobs commonly associated by men. She found:

(T)hat female officers do not, counter to the expectations of some, produce the empathetic warmth associated with many traditionally female jobs (such as mothering, secretarial work, and social work). Instead, they choose to embody an image of police officers as rational, efficient, and professional. In doing so they challenge the hegemonic definition of a police officer (and of working-class masculinity) as centered on displays of physical force and emotional aggression and replace this image with a more middle-class masculine norm (1994: 220).

Like women in the military, female police officers face particular judgments about their very character simply because of the career they have chosen. With jobs that are rooted in masculine norms, people, particularly but not exclusively males, often assume that women who choose to become police officers, or Marines for that matter, are either “tomboys” or “lesbians” (McElhinney 1994: 225). Younger generations of women appear to be joining the police force because they did in fact grow up wanting to be police officers, perhaps in response to the increasing presence and glorification of female policing in the media (225). This is also true of women in the Marine Corps. According to the Drill Instructors I interviewed in 1997, many women look to the military as an escape from abuse or poverty or as a means of getting an education and a career.

However, the DI students I interviewed in 2003 either wanted to be in the military to follow in their father's footsteps or because they were looking for a challenge. Several of the DI students, both male and female, stated that they wanted to avoid becoming a crime or poverty "statistic" in the neighborhood in which they grew up.

In response to the judgments that female police officers face, McElhinney showed that from the female officers' perspective, many view women as being better at the job because of their temperament as women:

Some female police officers believe women are better at the job because they are more likely to stay calm and cool in conflictual situations—precisely because they cannot as easily resort to force and must use talk as a tool instead (1994: 223).

The main characteristics that were labeled as masculine by both female and male officers that McElhinney worked with include the inability to control one's temper and allowing oneself to "get too angry too fast, as 'not treating people right', and as using 'too much' profanity" (1994: 224). When asked if women who become police officers feel that they must act in masculine ways on the job, some women described their attempts at "being tough" by using profanity and not smiling:

I try to be like such a hardass. I don't smile as much...I think it's mostly language. Mine's atrocious sometimes. I've toned it down a lot. When I first started you know cause I worked with a lot of guys it seemed like—They didn't—may not even have swore but I felt like I had to almost like be tough or something around them. And that was my way of being tough (1994: 226).

While profanity appears to be allowed within the police force, DIs are specifically instructed within the rules laid out in the Standard Operating Procedures that they are not allowed to use any sort of profanity around or towards recruits. Further, in all of the recordings that I have done, both in 1997 and in 2003, I did not witness any profanity

used in the presence of recruits⁴ by either male or female DIs. However, common euphemisms, particularly “daggone” and “friggin” were used often. When both male and female DIs were in the duty hut, or their office, and the doors were closed, profanity was sometimes used, accompanied by immediate apologies to me for being rude. All of the DIs that I observed were quite preoccupied with the use of profanity in my presence, but not so much because they thought they were going to get “caught on tape” as because they thought it was disrespectful and unprofessional. In fact, one male DI recorded in 2003 requested that I erase a recording that he made outside of my presence because he may have used profanity. The tape was destroyed without ever being listened to by any party. Both female and male Drill Instructors admitted to slipping and using profanity on occasion.

While most of the features of masculinity have involved verbal language, one feature mentioned by female police officers as part of their change within a masculine job was a decrease in smiling. This is also true for female DIs. Smiling can play a critical role in power; by *not* smiling, a person holds the power. When McElhinney asked the above female police officer why smiling mattered, she responded:

(W)hen a person smiles she drops her guard. Letting down your guard means that someone can challenge you, test you, or hurt you (1994: 226).

Like female Drill Instructors, who intensely value their appearance as being feminine, McElhinney found that it was the actions of female police officers that were perceived as masculine and not their appearance. For female Marines, it is not only their

⁴ Presumably the DIs were on their best behavior during recording; I cannot attest to whether or not profanity is ever used.

actions, but their voices, that can contribute to negative judgments about their status as a woman or as a Marine. While McElhinney focused on phonological and discourse features associated with working class or non-standard speech, the focus of the present study is to examine the acoustic properties of the Command Voice, which has been described by Drill Instructors as being high in amplitude and low in pitch. These acoustic properties conflict with common perceptions of female voices; thus, if women adopt such characteristics, they face being “unfeminine.”

In another study on women in traditionally male roles, Haugen (2003) explored how female gangsta rappers have appropriated the male gangsta rap style for their own female expression. Gangsta rap is a notoriously male-dominated art form that not only has historically excluded women from participation, but further objectifies women as the property of men, as “ho’s” and “bitches.” However, recently, several “unladylike divas” have emerged on the scene to challenge this lack of female representation within this genre and to provide “alternative femininities that are counterhegemonic to both the norms of femininity in mainstream American society, and the norms of femininity imposed by traditional categories used by males in gangsta rap” (Haugen 2003: 429).

Of particular relevance to the present study, one female rapper, by the name of Lady of Rage, claims to belong to a new female category. Like female Drill Instructors, she identifies herself as a ‘lady’, yet she does not participate in the kinds of activities that ‘ladies’ engage in. As a singer with a deeper voice than the average woman, she addresses this in her lyrics in *Big Bad Lady* when she states that she is: “Not soprano, or alto, the Rage is a tenor.” While an ‘alto’ is a label for a female who sings with a lower

average pitch than most women, a ‘tenor’ is a term reserved for males who sing with a higher than average pitch within the male pitch range. Haugen claims that “(t)his disjunction between her average pitch and the expected average pitch for females can be connected to the disjunction between her attitude (one of assertiveness, toughness, and, ultimately, power) and that which is typically associated with or expected from women in the dominant society” (Haugen 2003: 433).

1.7 Phonetic research on sex and gender

Although much research has been conducted to uncover differences between men’s and women’s voices, no consensus has been reached on either the extent of those differences or the source of those differences. Most work on the differences between men’s and women’s voices has been on the fundamental frequency (or F0), and it has consistently been found that men speak at a lower fundamental frequency than women. The average fundamental frequency of a woman’s normal speaking voice has been reported as 220 Hz, with men’s as 130 Hz (Peterson & Barney 1952), though the difference between averages reported has ranged from 85-115 Hz (Lewis 2002: 1).

While there may be some biological explanation for pitch differences between men and women, it appears that there is at least some sociological component of this difference. For example, Shevchenko (1999) found that pitch varied not only with sex of speaker, but also with socioeconomic class. In a study on American English speakers, it was found that American men and women’s F0s varied by social class: for women—185 Hz for upper-class, 227 Hz for middle-class, and 198 Hz for working class; for men—102 Hz for upper-class, 111 Hz for middle-class, and 126 for working class. Further, Graddol

(1983) found that while the pitch used by males in normal speech seems to correlate with their physical size (coinciding with a biological explanation of pitch), the pitch used by women does not. One argument given for this is that men and women use different pitch ranges in their speech.

It has been observed, at least impressionistically, that range of pitch within an utterance tends to be narrower for men than for women, who reportedly use a more variable pitch range (McConnell-Ginet 1978; Graddol & Swann 1989, among others). According to McConnell-Ginet (1978), what appears to be an inflated difference in pitch between men and women is socially motivated. She argued that women tend to have a higher and more variable pitch as a strategy to get and hold their interlocutor's attention.

For the subjects in Graddol's (1983) study, there was a significant overlap between the pitch ranges of men and women—enough overlap that it would be physically feasible for both men and women to adopt the same average pitch, if men were to restrict themselves to their upper range and women to their lower range (Graddol 1983: 19-20). However, it was found that “(m)en's voices reflected their physical size because they use the lower limits of their pitch range and adopted intonation patterns which were more monotonous than women's; women by contrast, were more variable in their use of voice, both in the sense of using more expressive intonation and in differences between individual women” (Graddol 1983; Graddol & Swann 1989: 20-21

However, Henton (1989) investigated men and women's pitch ranges using semitones, a measure of pitch that is more reflective of perception than Hertz, and found that there was no significant difference in pitch ranges between American men and

women in read speech. Further, Henton (1995) found no significant difference between men's and women's rate of pitch change in semitones. From these two studies, Henton concluded that the expectations and stereotypes of women's speech do not in fact reflect the reality of women's speech. What remains uncertain is the source of such stereotypes.

In a study of the phonetic effects of gender identity, Biemans & van Bezooijen (1996) hypothesized that Dutch women that self-identified with a more masculine identity (measured via a questionnaire that reflected cultural values and beliefs about gender in the Netherlands) would speak with lower average pitches and smaller average pitch settings, calculated by subtracting a speaker's lowest possible pitch from their average pitch, than those women who self-identified as more feminine. However, their results did not support this hypothesis. While there was a positive correlation between masculinity and pitch setting, there was no correlation between masculinity and average pitch, indicating that speakers who self-identify as masculine were still using an average pitch far above their lowest pitch. They concluded that their results reflect inaccurate stereotypes about gender and pitch and not the acoustic reality in the subjects' speech.

Biemans (1998) extended the earlier study to include both male and female Dutch speakers in male-female dyadic conversations. The purpose of this study was to explore whether male and female speakers used pitch patterns consistent with gender identity or whether pitch patterns might be reflective of speakers' accommodations towards their addressee, where speakers change their speech style with a change in audience design (Bell 1984). The result was the opposite of what was expected: there was no correlation for either male or female speakers for gender identity scores and average pitch. For both

men and women, the only significant correlation was between higher masculinity scores and *higher* minimum pitch. Further, Biemans found that both men and women used a higher average pitch when speaking to persons of the opposite sex, and that women did have a significantly larger pitch range than men, presumably due to their higher overall maximum pitches. The fact that both men and women used higher average pitches when speaking to the opposite sex than to same-sex partners, regardless of the speakers' gender identity, was concluded to be a result of speakers' attempts to "appear less dominant and competent than in same-sex conversations" (Biemans 1998: 50).

Lewis (2002) investigated the effect of interlocutor gender and status and conversation topic in the speech of twelve white, heterosexual, female American college students paired with same-sex and opposite sex peers and professors. Topics included those that were intended to elicit gender-related performance, like rushing for a fraternity or sorority, those that were gender-neutral in nature, like college courses students were enrolled in, and those that were intended to elicit a face-threatening act (see Brown & Levinson 1987 for a full discussion of face threatening acts), where the interviewer disagreed with the subject on a topic, for example on whether or not the subject believed in God.

While there was no effect of topic, Lewis did find an overall effect of interlocutor gender on pitch range, where subjects had a larger pitch range with female interlocutors than with males. This use of pitch was interpreted as being indicative of camaraderie and politeness with the female interlocutors. With respect to status of interlocutor, where the interlocutor was either a peer or a superior (i.e. a professor), two subjects exhibited a

significant increase in pitch with professors, interpreted to indicate deference, and two subjects exhibited a significantly higher pitch variability of pitch with peers, interpreted as a means of marking solidarity.

With respect to other phonetic markers of gender aside from pitch, it has been found that women's voices are perceived as being "breathy" or characterized as "soft" or "airy" (Price 1989, Sodersten & Lindestad 1990, Lewis 2002, among others). What causes this physiologically is that for women, the vocal cords remain closed a shorter portion of the time they are involved in making vibrations for sound, resulting in a shorter "closed quotient" of vocal cord vibration (Price 1989). This means that more time is spent letting air through the vocal folds, creating a breathy voice quality. Interestingly, changes in voice quality appear to be socially manipulated. Explanations for the use of this kind of voice quality manipulation range from the speaker seeking sympathy from the hearer (J. Ohala 1994), to expressing arousal (Henton & Bladon 1985), to signaling intimacy (R. Lakoff as cited in Lewis 2002). However, the study of voice quality, particularly as it is used in spontaneous speech in a naturalistic setting, is difficult to carry out, and therefore not much research has been done on gender and voice quality in non-laboratory settings.

As described in Section 1.2 above, one phonetic feature that appears to be valued differently for male and female Drill Instructors is amplitude. Very little research has been done on differences in amplitude between men and women; however, Markel *et al.* (1972) found that men speak more loudly than women, and that both men and women speak more loudly when they are speaking to a member of the opposite sex than when

they are speaking to a same-sex conversation partner. Lewis (2002) postulates that either speakers have some awareness that it is appropriate to speak more loudly to speakers of the opposite sex, or that women are accommodating to men's loudness (Lewis 2002: 30). Another possible interpretation is that women must raise their amplitude to compete with the loudness used by males in cross-sex conversation. Given that in conversations men do more of the interrupting (cf. Zimmerman & West 1975, 1977; West 1979), more of challenging of their interlocutors' utterances (cf. Hirshman 1974); and more of the controlling of topics of conversation (cf. Zimmerman & West 1975), an increase in women's intensity to match that of a male interlocutor's would not be surprising.

1.8 Concluding remarks

This is not just a gender study of women, but also of men. The goal of this study is to explore the variation of acoustic properties associated with powerful speech of both women and men as they train to become Marine Corps Drill Instructors, especially given the differing attitudes about the important characteristics of the Command Voice as laid out in this chapter. Because there has been little acoustic research on women who are in positions of social power or serving in non-traditional roles, it is particularly important to investigate female DIs and the voices they use to be authoritative and powerful while they resist being perceived as masculine. Within the Marine Corps, women must be perceived as both authoritative and 'ladies' simultaneously. By the very nature of female Drill Instructors' position within the larger institution, we find a situation where women are engaging in powerful roles very much not considered to be expected behavior of women.

As women move into more and more non-traditional roles, it is simply no longer enough in inquiries of language and gender to describe what women are doing with words, since the changing contexts and roles in which women, and men for that matter, find themselves will at least in part determine the linguistic forms used. As stated by Ochs (1992), “certain linguistic features directly index social acts or social activities, and it is those acts and activities that are in turn associated with male speech or female speech” (341). As women participate in social acts and activities that differ from those that fit within traditional sex-role expectations, we can expect the linguistic forms that index gender to change as well. The present study addresses a unique situation where gender, language, and power, particularly what is thought of as masculine power, all meet. Female Drill Instructors, by the activities they engage in, are challenging current notions of femininity—in fact, they are redefining what exactly femininity can encompass.

From the situation currently being explored, it is clear that gender cannot be defined simply by the activities associated with a particular sex. Women in mainstream American society do not carry weapons and bark direct orders. This simply is still not considered to be a sex-role expectation in our culture, remaining a marked activity for women in American culture, as evidenced by the terms ‘Marine’, which typically refers to male Marines only, and the marked term ‘female Marine’. As Drill Instructors, both males and females are in the same position of authority over their recruits, but it is the different perspectives on both the properties of the Command Voice and their relationships with their recruits that result in what are interesting and unexplored phonetic features in language and gender and sociophonetic research.

One last point that should be taken into consideration before moving into the next chapter is the idea that, while DI School is not sex-segregated, the system that DI students are preparing to work in, Marine Corps Boot Camp, is designed as a sex-segregated “separate but equal” training facility. As I show in the next chapter, there is an underlying gender dichotomy, i.e. that men and women are different, that is built into the very structure of the institution of the Marine Corps, and American society in general. This gender dichotomy is perceived by both sides as fact, mostly based on beliefs about differences in biology.

Many gender studies, such as West & Zimmerman (1991), are criticized for linking their analyses to a dichotomous view of gender, for assuming that “there is one ‘commonsensical’ view that allows people to organize their understandings of the world” (McElhinney 1994: 219). While we as researchers should explore the nature of such dichotomous views of gender and question such hegemonic definitions, the fact remains that within American culture at least, the “commonsensical” approach to gender as a dichotomous construct is a prevalent force that is based in, and affects, people’s perceptions of reality. Discovering that there are exceptions to this dichotomous construction of gender is important, as is discovering the effect that this dichotomy has on those on which it is imposed.

CHAPTER 2

THE UNITED STATES MARINE CORPS AS A COMMUNITY OF PRACTICE

2.1 Introduction

The United States Marine Corps is an institution, much like that of a university or a corporation, composed of many people from all different walks of life. In order to understand how the language of Drill Instructors fits into this institutional setting, we must obtain an understanding of the institution itself and what kinds of ideologies underlie its organization and dynamics. This chapter is devoted to providing the reader with an overview of some of the fundamental factors that contribute to the framework in which Drill Instructors live and work. First, the Communities of Practice framework (Lave & Wenger 1991; Eckert & McConnell-Ginet 1992) is introduced as the framework within which this study is carried out. Second, I discuss general characteristics that are important to our understanding of military culture, including hierarchy, Chain of Command, and rank; the division of enlisted personnel and officers; and masculinity and the gender dichotomy. I then turn to the sub-institutions within the Marine Corps, Drill Instructor School and Recruit Training, that function as “total institutions” (Goffman 1962). The chapter concludes with a discussion of the relationship between Drill Instructors and their recruits.

2.2 The Communities of Practice Framework

According to Eckert & McConnell-Ginet (1992), a sociolinguistic analysis based on community practice “attempts to reconstruct the practice from which [certain] characteristics (e.g. sex, age, socioeconomic class, ethnicity), and the linguistic behavior

in question, have been abstracted” (94). They adopt Lave & Wenger’s (1991) notion of the community of practice, which “focuses on a community defined by social engagement—after all, it is this engagement that language serves, not the place and not the people as a collection of individuals” (95). Within the context of the community of practice, I frame the existence of the participants in this study, which I take to be representative of the kinds of women and men who not only have volunteered to join the Marine Corps, but have decided to become Drill Instructors. With their enlistment, they left behind the “civilian world”; however, they bring with them into the military their own ideas about gender, ethnicity, and social class, among others. These values that they bring in from the outside world may or may not be easily reconcilable with the underlying values established in the Marine Corps as an institution. For women, this reconciliation is more challenging, as they are entering an institution historically created by men for men.

In contrast to Gumperz’s (1982) localized notion of the speech community, the communities of practice framework is particularly applicable to subcultures like that of the Marine Corps, which is further divided into smaller subcultures of military occupation (e.g. pilots, truck drivers, medical staff, Drill Instructors), military status (rank and position within the Chain of Command), gender (particularly with respect to Recruit Training), socioeconomic class and education level, which is reflected in the officer and enlisted distinction, among many other civilian values that the military members bring with them upon enlistment. The military itself acknowledges that their society does not exist in a vacuum, exempt from influences from the outside world and from the

experiences of each individual prior to becoming a member. As Eckert & McConnell-Ginet state:

A way of speaking as a community does not simply constitute a turning on of a community-specific linguistic switch, or the symbolic laying of claim to membership in that community, but a complex articulation of the individual's forms of participation in that community with participation in other communities that are salient at the time. In turn, the linguistic practices of any given community of practice will be continually changing as a result of the many saliencies that come into play through its multiple members (Eckert & McConnell-Ginet 1992: 97).

2.3 Institutional characteristics of the Marine Corps

The Marine Corps is one of the four branches of the United States military, and as such, it exists as separate from, or a subculture of, American culture as a whole. The people who make up the various branches of the military view themselves as being separate from the “civilian world.” Most of their time is spent in military institutions where they work, and many of them live on military bases, although this is not mandatory for most occupations. Like members of all branches of the military, people in the Marine Corps hold a variety of different jobs, from administrative positions to supply positions to infantry positions, with many in between.

2.3.1 *Hierarchy, Chain of Command, and rank*

The Marine Corps, like the other branches of the military, is a hierarchical system where superiors give directions and orders to their subordinates. These directives flow through the Chain of Command, or “(t)he succession of commanding officers from a superior to a subordinate through which command is exercised” (*Guidebook for Marines*: 548-549). This hierarchical system is not entirely unlike any other institution, such as a

university, where there is a Chain of Command from the university's president down to various college deans and on to department heads and their professors. Also, like other institutions, including universities, the Marine Corps and other branches of the military have a rank system, beginning at graduation from Recruit Training (or Boot Camp,) where a graduate holds the rank of Private or Private First Class,⁵ and each successive promotion leads to a higher rank, increasing both a person's pay and a person's responsibility within their Chain of Command. The following table gives the ranks in the Marine Corps, from highest to lowest. The column on the left lists the enlisted ranks; the column on the right lists the officer ranks. The distinction between enlisted personnel and officers is described more fully in the next section.

Marine Corps Enlisted Personnel	Marine Corps Officers
--	General
Sergeant Major/Master Gunnery Sergeant ⁶	Lieutenant General
First Sergeant/Master Sergeant	Major General
Gunnery Sergeant	Brigadier General
Staff Sergeant	Colonel
Sergeant	Lieutenant Colonel
Corporal	Major
Lance Corporal	Captain
Private First Class	First Lieutenant
Private	Second Lieutenant

Table 2-1: Enlisted and officer ranks in the Marine Corps (Guidebook for Marines: 70-71)

All officers outrank all enlisted personnel. Thus, a Second Lieutenant (an officer) outranks a Sergeant Major (an enlisted person). Within the enlisted ranks, any rank

⁵ A recruit does not hold a rank, as she or he is not yet considered a Marine. Recruits are addressed by "recruit" and their last name, e.g. Recruit Hicks.

⁶ In the case of the pairs Sergeant Major/Master Gunnery Sergeant and First Sergeant/Master Sergeant, both titles hold the same rank. The difference has to do with occupational responsibility.

above Corporal falls in the class of NCOs, or Non-Commissioned Officer, which gives them special status within the class of enlisted personnel. All Drill Instructors hold at least a rank of Sergeant, sometimes Staff Sergeant, as do students in Drill Instructor School.

2.3.2 *The division between officers and enlisted personnel*

Socioeconomic class is a fundamental underlying ideological characteristic of the military, where one class of individuals, the officers, is viewed as having more social power and prestige than the enlisted personnel, who are viewed as being socially and economically inferior. Officers typically come from middle to upper class backgrounds, while enlisted personnel tend to come from working class to middle class families. In order to become an officer in the military, a person must have a college degree. While enlisted personnel *can* have a degree, this is not common or necessary. Therefore, there is a fair amount of tension between the officers and the enlisted ranks on the basis of education and social class.

Because Drill Instructors and DI Students are NCOs, they are entitled to a higher social status than regular enlisted personnel; however, because they are not *true* officers and they work in the enlisted sphere, they typically identify much more with the ideologies that govern the enlisted ranks. There are true officers present at both Drill Instructor School and the Recruit Training Depot; however, they take on administrative roles and have minimal contact with the enlisted personnel, including the Drill Instructors.

While the current work does not attempt a full account of socioeconomic influences in the Marine Corps, it is important to understand that this underlying social class distinction interacts with notions of masculinity, particularly ideas of working class masculinity as distinct from white-collar masculine norms.

2.3.3 *Masculinity and the gender dichotomy in the Marine Corps*

The military in general is considered by mainstream American culture to be a masculine environment, predicated on masculine norms, much like that of the police force investigated by McElhinney (1993, 1994). As of September 2003, women made up only approximately 15% of the United States military. The Marine Corps has the lowest percentage of women in a single branch of the military with 6% of total personnel, as compared to 15% in the Army, 14.5% in the Navy, and 19.6% in the Air Force (*Women's Research and Education Institute* 2005). Further, only 62% percent of all positions in the Marine Corps are open to women, the lowest percentage of all positions open to women in any branch, as compared to 70% in the Army, 91% in the Navy, and 99% in the Air Force. These statistics reflect what is known as the “teeth-to-tail” ratio, or the number of combat positions (“teeth”) relative to the number of support positions (“tail”). The Air Force has the most females of all military branches and the Marine Corps the least because the Air Force is considered to be “the most ‘technological’ of the services, require(ing) the most ground support personnel to maintain each fighter....A greater proportion of Marine Corps troops is involved in direct fighting—it has a low “teeth-to-tail” ratio” (Williams 1989: 45).

The difference in percentages within a single branch of the military correlates with masculine ideologies perpetuated within military culture. The result is a continuum of a kind of masculinity based on ideas like physical power, bravery, mental stability, and aggression; the Marine Corps stands at the most “masculine” point of the continuum, and the Air Force at the least “masculine” point of the continuum, sometimes relegated even to feminine status. There is an abundance of cultural evidence for such a gender-based continuum, which is exemplified below in the form of a joke (Shiles 2005), where masculinity is equated with testicular size:

Armed Forces Favored Recreation	
Marines	Bowling
Navy	Football
Army	Baseball
Coast Guard ⁷	Tennis
Air Force	Golf
<i>Notice the lower down you get, the smaller the balls are.</i>	

Table 2-2: Cultural evidence for masculinity continuum within the branches of the U.S. military

In the above table, the alleged favorite sport of each branch of the military is given. The punch-line reference to “the size of the balls” is meant to show that the Marines, with the largest “balls,” are more masculine than the Air Force, which has the smallest “balls.” This continuum correlates with the percentages of women in each

⁷ The U.S. Coast Guard is included in this particular joke, but it is not in fact a branch of the U.S. military. While the four branches of the military are funded by the Department of Defense, the Coast Guard operates under the Department of Homeland Security.

branch, where women are the smallest minority in the Marine Corps, and still a minority, but definitely a stronger presence, in the Air Force. While this joke is meant to serve as a source of humor and should be considered an extreme example of this masculinity continuum, it is representative of part of the underlying tone of military culture, where Marines are considered to be the most masculine.

Further, the Marine Corps remains the only branch within the United States military that still has sex-segregated training. This segregation is rooted in the belief that women and men are inherently different. This difference is usually based on “facts” of biology, in terms of physical strength and stamina, and this distinction is an important concept that underlies the very structure of the Marine Corp’s Recruit Training, serving as the basis of the socialization process for the community’s members. The very design of Boot Camp is based on the need to keep men and women separate—the three battalions devoted to male recruits are situated on the opposite side of the base from the fourth and only female battalion. While this is partly historical, as the fourth battalion was added to the base much later, it is an important part of the “separate but equal” premise under which Marines of both sexes are trained.

Unlike the officer and enlisted distinction, which highlights differences in socioeconomic class and education level, the division between women and men in Recruit Training is not a superior/subordinate division; both women and men can be officers and enlisted Marines, and both women and men can be either active Marines or reservists. The Marine Corps maintains that the best way to train recruits is to segregate them by sex. This in part is to avoid the problems of sexual harassment that occurs during

sex-integrated recruit training and in military schools. It is also due to the fact that women are held to different physical standards, and they are not allowed to serve in combat roles, although women did begin training for combat roles starting in 1996.

This gender dichotomy, based on sex-segregation, is also reflected in the attitudes of some Drill Instructor School Instructors. When asked whether or not female Drill Instructors speak differently to the female recruits than the male Drill Instructors speak to the male recruits, one DI School Instructor presented his answer in the form of a truism: “you know there’s males and there’s females...of course, there’s gender re- differences there. . .males and females are different, so they’re gonna obviously have some differences”(Hicks Kennard 1999). Another DI Instructor reported the same dichotomy when asked if he thought that women and men developed the Command Voice equally: “I think that there is a difference, there is a definite difference because of just a sex difference” (Hicks Kennard 1999).

2.4 Institutional characteristics of Drill Instructor School and Recruit Training

In order to become a Drill Instructor, enlisted Marines, averaging over eight years of Marine Corps service, attend Drill Instructor School, an intense twelve-week program⁸. There are nine DI School Instructors, who hold the rank of Gunnery Sergeant and have completed at least one three-year tour as a Drill Instructor. Each DI School Instructor is responsible for teaching classes in a specialized area of study, and additionally, he or she is in charge of an 8-10 person squad of DI students. Drill Instructor School is divided

⁸ There are on average 55 students in each of four yearly classes of Drill Instructor School, with an average of 85% graduation rate (www.mcrdpi.usmc.mil).

into the following areas of study: physical training, leadership by example, basic warrior training (e.g. field skills, rappelling), general military knowledge (e.g. Marine Corps history, uniform regulations, sexual harassment and equal opportunity policies), weapons, instructional techniques, drill and ceremonies (e.g. Close Order Drill), core values (i.e. honor, courage, and commitment), and standard operating procedures (e.g. the rules and regulations of Recruit Training). DI students are evaluated in both written examinations and practical applications in all of these areas.

Upon graduation from DI School, graduates are assigned to their first platoon at Recruit Training. There are typically three to four Drill Instructors assigned to a platoon, and they all take different roles in training recruits. As a new Drill Instructor, DI School graduates typically take on the role of the Third Hat (sometimes Fourth Hat, depending on the number of DIs in the platoon). The Third “Hat,” who takes on the role of the disciplinarian, is typically the least experienced and lowest ranked Drill Instructor of the 3-4 DIs in a platoon, which typically consists of 50-60 recruits for females and 60-80 recruits for males. The term “Hat” is another name for Drill Instructor and refers to the campaign cover⁹, or “Smokey the Bear” hat, worn by all Drill Instructors.

The second lowest ranked DI typically takes the role called the Heavy A, whose main job is to teach academic material to the recruits, such as military history. The Senior Drill Instructor is the highest ranked position in the platoon, and she or he serves as the recruits’ mentor and ultimate role model. It is not uncommon for the other DIs to

⁹ The campaign cover is a coveted symbol of the Drill Instructor. It was worn prior to World War II, and then reintroduced in 1956. Although the first female Drill Instructors graduated from DI School in 1978, female DIs were not allowed to wear the campaign cover until 1996. Prior to this date, female DIs were marked with a scarlet shoulder cord (www.mcrdpi.usmc.mil).

refer to the SDI as “momma” or “daddy,” particularly when it is the SDI’s turn to go home for the night on liberty (i.e. “Your momma/daddy is leaving you”). While the Third Hat must come across as intimidating to the recruits, the Senior Drill Instructor has the freedom to be more empathetic, handling recruits’ personal problems. This is not to say that DIs other than the Third Hat are never involved in discipline, nor is it to say that they will not take on a Third Hat type role temporarily as it is needed. In order to become an SDI, Drill Instructors must have completed several cycles of training recruits, and they have therefore gained experience in each of the DI roles.

The Recruit Training Regiment is organized into four training battalions. The Fourth Recruit Training Battalion is the only female enlisted training facility in the country and is composed of three companies that average two 50-60-recruit platoons; the other three battalions are all male. Like Drill Instructor School, Recruit Training, or Boot Camp, is a twelve-week program, and in many ways mirrors the training of Drill Instructors at DI School. Recruits, both male and female, undergo intense training in physical fitness, Close Order Drill, martial arts instruction, weapons handling, and basic warrior training. Boot Camp ends with The Crucible, which is a 54-hour rite of passage for recruits, who must apply all of the knowledge and skills they have developed to complete a series of physical and mental challenges on very little sleep and only three meals. The end of The Crucible, for those that complete it and qualify for graduation, is the Warrior’s Breakfast.

Within the Marine Corps, sub-institutions like Drill Instructor School and Recruit Training share some striking similarities and are very different from the rest of the fleet.

Both DI School and Boot Camp are “total institutions” (Goffman 1962). A total institution is “a place of residence and work where a large number of like-situated individuals, cut off from the wider society for an appreciable period of time, together lead an enclosed, formally administered round of life” (Goffman 1962: 1). Crucially, a total institution involves the incorporation of all major areas of one’s life into a single realm, including sleep, play, and work. This is quite different from other parts of the Marine Corps; for example, the infantry during peacetime generally live either on or off base near where they are stationed. Marines typically live with their families (i.e. spouse and children) outside of the military;¹⁰ therefore, while they are still involved in the military as a community of practice, they are not functioning within a total institution.

However, both the Drill Instructor School and Recruit Training are clear examples, within the larger institution of the Marine Corps, of total institutions. Total institutions are defined as having four basic characteristics. First, every aspect of a member of a total institution’s life occurs in the same place and under the supervision of a single authority. For Drill Instructor School, the DI students, who are basically experiencing Boot Camp all over again as part of their training to become Drill Instructors, attend classes, physically train, eat, and study together in the same location. The one exception to this characterization for DI students is that they do not sleep in barracks together, but rather they go away (to living quarters either on or off-base) for the night to return early the next day. For actual Drill Instructors who are serving in Recruit Training, absolutely every part of daily life is conducted in the same place. They work, sleep, and eat in the

¹⁰ Although being in a military family should still be considered partially institutionalized. For example,

squad bay¹¹ and live with their recruits twenty-four hours a day, seven days a week, for the twelve weeks of Recruit Training. To combat the stress, illness, and the sheer exhaustion of this routine, they do rotate every third or fourth night off to go home and be with their families.

The second characteristic of total institutions is that “each phase of the member’s daily activity is carried on in the immediate company of a large batch of others, all of whom are treated alike and required to do the same thing together” (Goffman 1962: 6). This characteristic applies to both DI School and Recruit Training; in DI School, the class of thirty or so students doing the same thing are parallel to the recruits in Recruit Training. This is because the DI students, like the recruits in Boot Camp, all function as a unit that is headed by a group of authority figures—for the former, the DI School Instructors, the latter, the Drill Instructors themselves. Drill Instructors operate independently of the recruits; however, at least one Drill Instructor is present during nearly every minute of their daily routine. One Drill Instructor reported that it is important that a recruit never see a DI eating, sleeping, or drinking¹². This gives DIs the appearance of never needing any maintenance—that they are powerful as a matter of their very nature.

The third characteristic of total institutions is that “all phases of the day’s activities are tightly scheduled, with one activity leading at a prearranged time into the next, the whole sequence of activities being imposed from above by a system of explicit

many military wives consider themselves to be part of the military in their own right.

¹¹ The squad bay is the living quarters of the recruits. The Drill Instructors have an office, called a duty hut, where they have a desk, a bed, and other amenities for their work.

¹² Drill Instructors do sleep in the duty hut, but they do this on rotation. Every night, one DI stays in the duty hut, which has a bed. She or he does not go to sleep until the recruits, who sleep in the squad bay,

formal rulings and a body of officials” (Goffman 1962: 6). The typical schedule for both DI School and Recruit Training are very similar, since the former is preparation for life in the latter. The typical day of both DI School and Recruit Training involves getting up at 5 a.m. and following a strict plan of training activities throughout the entire day. These plans have been designed and approved by higher up officials and have a tendency to be the same for generation after generation of trainees. For example, it is possible to look at the schedule of the eighty-eight days of Recruit Training and see what recruits will be learning on any given day at any given time within that cycle. The same is true for Drill Instructor School.

The last characteristic of a total institution is that “the various enforced activities are brought together into a single rational plan purportedly designed to fulfill the official aims of the institution” (Goffman 1962: 6). In the case of the Marine Corps as a whole, the purported plan of Recruit Training is to provide members for a large part of the national defense of the United States. For the Drill Instructor School, a sub-institution of the Marine Corps, the ultimate goal is to train individuals to be successful in turning civilians who volunteer to become Marines into what is called the “basically trained Marine.” For Recruit Training, the Drill Instructors, having gone through DI School, are responsible for carrying out this training, which is expressed in the Drill Instructor Creed:

have gone to sleep, and she or he wakes up before the recruits do the next morning. The other DIs go home for the night. The next night another DI stays in the duty hut.

DRILL INSTRUCTOR CREED

These recruits are entrusted to my care. I will train them to the best of my ability. I will develop them into smartly disciplined, physically fit, basically trained Marines, thoroughly indoctrinated in love of Corps and Country. I will demand of them, and demonstrate by my own example, the highest standards of personal conduct, morality, and professional skill (www.mcrdpi.usmc.mil).

The above creed is evidence of the devotion that Drill Instructors have towards their job of training new recruits to become Marines. The job of Drill Instructor is a highly honored occupation, and it is the job of the Drill Instructor to demonstrate through his or her actions what it means to be a Marine.

2.5 Language use between Drill Instructors and recruits

One of the most important institutionalized aspects of the military, particularly Recruit Training, is the prescribed language use that marks the relationship between people of different status. As Goffman (1962) notes in his research on total institutions, it is common that “social distance is typically great and often formally prescribed. Even talk across the boundaries may be conducted in a special tone of voice....” (7-8). Within the Marine Corps, Drill Instructors at Recruit Training hold a position of power that is unlike the general authority present in the rest of the fleet. DIs hold complete authority over their recruits during those recruits’ socialization into the Marine Corps, and this authority and power is marked in specific prescribed ways. For example, recruits are not allowed to look their Drill Instructors directly in the eyes, an act referred to as “eye-balling,” and neither recruits nor Drill Instructors ever smile. Recruits must speak to their Drill Instructors using only third person references to both themselves and their Drill

Instructors. The following interaction between a Senior Drill Instructor (SDI) and a recruit (R) shows the use of third person pronouns by a recruit (Hicks Kennard 1999).

Example of address between DI and recruit¹³:

- 01 SDI: What Moore?
 02 R: Recruit Moore requests to know if she can speak
 03 with Senior Drill Instructor Staff Sergeant Mason (.)
 04 when she has time ma'am.
 05 SDI: What if I tell you I'm gonna go home Moore?
 (1.5)
 06 What if I tell you I'm leaving you for tonight- I'm runnin
 07 away. (2.3) Would that suffice?
 08 R: No ma'am.
 09 SDI: You need to talk to me right now, Moore?
 10 R: If at all possible, yes ma'am.
 11 SDI: Go ahead and stand by the duty hut.
 12 R: Aye ma'am.

In line 02, the recruit, who is requesting a meeting with the Senior Drill Instructor, uses the third person to refer to herself, Recruit Moore; in line 03, she uses the third person to refer to the SDI referring to both her title and rank, Senior Drill Instructor Staff Sergeant Mason. However, the SDI is free to use first person pronouns in lines 05 and 06, and the second person to address the recruit, as seen in lines 06 and 09.

The purpose of this pronoun usage is twofold. First, the use of third person by recruits to refer to both self and others removes any overt identity as an individual, which is a crucial idea in the socialization of members of the Marine Corps. Membership to the group is now more important than identity of the individual. Second, this pronoun usage serves to limit the linguistic resources of those that are in a subordinate position, giving

¹³ All names of participants have been changed.

those in power freedom to use those resources, thus marking a clear difference in social power.

However, with this level of authority come many limitations for the protection of the recruits. Recruit Training is not a place for abuse, either physical or mental, and Drill Instructors must follow guidelines set forth by the Commanding General. For example, a DI is not allowed to use profanity, refer to recruits by offensive, racist, or otherwise derogatory names (e.g. “fatso,” “pig,” “dog”), and DIs are never to physically touch a recruit except for the purpose of fixing a uniform or correcting a drill movement (e.g. the position of attention). In other words, while there is a large amount of authority in the hands of DIs, this authority is not ever a license for abuse.

In earlier works on speech communities, Gumperz (1982) defined the speech community as a group of speakers who share rules and norms for the use of language usually on the basis of location and/or population (Hymes, 1972; Gumperz, 1982). While the Marine Corps, and the various sub-groups within the Marine Corps, do share many rules and norms for language use, the dynamics within the institution are much more complicated than just operating within a particular location or dealing with a particular population. First, the location of a particular sub-group within the Marine Corps typically consists of different populations from other sub-groups, mainly based on occupation. For example, the norms and rules of interaction for pilots in the air wing are notably different from the norms and rules of interaction of a machine-gun squad in an artillery unit. So we must first tease apart those characteristics, those norms, rules and ideologies, that all Marines share, and then we must look at the particular sub-groups in

question in this research, the Drill Instructor School and Recruit Training, where graduates of DI School go on to work as Drill Instructors.

CHAPTER 3

METHODOLOGY

3.1 Introduction

In this chapter I describe how the data were recorded and acoustically analyzed for this study; I then report the results in Chapter 4. After obtaining permission from the Public Affairs Office of the Marine Corps Recruit Training Depot at Parris Island, South Carolina, I traveled to the base in August 2003 to observe and record students attending Drill Instructor School. Parris Island is the location of both the Drill Instructor School and Recruit Training for the eastern half of the United States, with San Diego housing both entities for the western half of the United States. However, because of the small number of women in the Marine Corps, all female Drill Instructor School candidates and female recruits go to Parris Island for training. As discussed in Chapter 2, both male and female Drill Instructor students attend DI School together in the same class and are taught by both male and female Drill Instructor Instructors.

While at the DI School, I isolated two training events that were comparable to two different speech styles often used by Drill Instructors during Recruit Training: the teachback, which is a memorized set of instructions that is delivered in the Command Voice, discussed in Chapter 1, and the lockerbox discussion, which is a short lesson given to actual Boot Camp recruits on concepts like personal conduct, honesty, and integrity. These two speech styles closely parallel two types of speech styles used by actual Drill Instructors. The teachback style, because of its loud and direct delivery, is similar to the speech used in giving recruits orders, corrections, and instructions. The

lockerbox discussion, with its more academic quality, is similar to the type of speech that Drill Instructors might use when giving lectures or discussions on military history, personal hygiene, weapon maintenance, or other types of academic lessons that recruits are taught in Boot Camp. The lockerbox discussions, unlike the teachbacks, involve question and answer periods from the listeners, who raise their hands and are called upon by the Drill Instructor student giving the lesson. While the nature of the lockerbox discussion is less formal on the part of the Drill Instructor student that is talking, the recruits must still respond with the prescribed forms of address described in Chapter 2, i.e. the use of the third person to refer to one's self and one's addressee. These two types of speech styles were selected as representative examples of DI speech, which will be compared with samples of non-DI speech from reading sample and interview data.

The organization of this chapter is as follows. I will first discuss the recruitment of participants for the study in Section 3.2, followed by a detailed description and justification of the two Drill Instructor speech styles in Section 3.3. Accompanying the description of the two DI speech styles is a description of how I elicited the two samples of non-Drill Instructor speech styles for comparison: the interview and the reading sample. Section 3.4 provides a description of the equipment used to collect the speech samples, and Section 3.5 gives descriptions of the recording environments in which each of the four speech styles were recorded. This is followed by a detailed description of the acoustic measurements in Section 3.6.

3.2 Participants

Participants in the study were recruited from a class of DI students at the Drill Instructor School. Therefore all were already members of the United States Marine Corps. As there were only three females in the United States training to become Drill Instructors at the time of this study, the number of males was matched to the number of females. Thus, the number of participants totaled six—three females and three males. The male participants were selected based on their availability on the first day of recording. The three males who completed their teachback evaluation first (this was not based on merit) that morning were given the opportunity to participate in the study. While the variability of the subjects in terms of ethnicity, language background, and other sociological factors is not desirable, there were only three females in the country training at the time. It is a fortunate coincidence that the males that came available to participate matched the females for ethnicity. At the time of the data collection, the participants had been in their DI School training program for approximately one month.

The participants were between the ages of twenty-two and thirty-four, all were non-smokers, and all were high school graduates. Subjects M1 and F2 (M for male; F for female) additionally had some college credits, and F3 had completed a college degree. All subjects were monolingual native speakers of English, with Subjects M2 and F2 having passive understanding of Spanish as well. All subjects held the rank of Sergeant, with the exception of Subjects F1 and M1, who were both Staff Sergeants¹⁴.

¹⁴ A Staff Sergeant is one rank above Sergeant. For a full list of ranks in the Marine Corps, see Chapter 2.

The following table gives other relevant demographic information for each participant that may have an impact on their way of speaking. All of this information was reported on by the participants during the interview. For the categories ‘ethnicity’ and ‘socioeconomic’ class, subjects were asked how they would classify themselves. Therefore, this information is representative of how the subjects see, or choose to see, themselves, and may not be representative of fact. The participants are labeled as follows—female speakers: F1, F2, and F3; male speakers: M1, M2, and M3.

	gender	ethnicity	socioeconomic class	place of origin	height	weight (in lbs.)
F1	female	European American	middle class	Michigan, small town	5’ 6”	124
F2	female	Hispanic American	working class/middle class	Texas, metropolitan area	5’ 6”	138
F3	female	African American	working class	South Carolina, small town	5’ 7.5”	118
M1	male	African American	working class	South Carolina, small town	5’ 9”	148
M2	male	Hispanic American	middle class	Upstate New York, rural area	6’ 1”	180
M3	male	European American	working class	Florida, small town	5’ 9”	160

Table 3-1: Demographic information of participants

3.3 Description of speech styles

In the following sections the four different speech styles that were recorded at Drill Instructor School are described in detail. The first two speech styles, the teachback

and the lockerbox discussion, are comparable to the speech styles that actual Drill Instructors use as they train recruits in Marine Corps Recruit Training. The second two speech styles, the interview and the reading sample, were recorded to obtain samples of the subjects' speech when they were not acting in the capacity of Drill Instructor student. These will serve as the basis of comparison for each speaker. In the following sections, each speech style is described in detail, followed by a description of the conditions in which each style was recorded.

3.3.1 *Teachback*

A teachback is a recitation of a memorized script, used only for training purposes, of a task that a DI School student will need to be able to teach to a recruit during Recruit Training. The script is not actually used in Recruit Training *verbatim*, but the memorization of such scripts during DI School serves to make the breakdown of a particular task second-nature to the future DI. The memorization of the teachback serves as a basis for evaluation by DI School Instructors at various times in the Drill Instructor student's time in DI school. The teachback that was used in this study is called the "Position of Attention," which, as its name suggests, is a demonstration of how to hold the body in the position of attention, with the head held up, the body erect, and the arms held tightly at the sides of the body. The Position of Attention is the required military person's response to the presence of a superior, so it must become second-nature to recruits very early in their training.

This particular teachback was chosen because of its relatively short length, as well as the fact that it is one of the few teachbacks that does not involve rifle-handling, which

would increase the level of background noise substantially. During teachback evaluations, DI students deliver the teachback facing their evaluator at a twenty-pace distance, and they must deliver the script *verbatim*, in the Command Voice. Their performance is evaluated along the following dimensions: format, execution in cadence¹⁵, command presence/bearing, Command Voice, and confidence/enthusiasm. The script for the Position of Attention teachback is included in the Appendix. Portions of the script are given in capital letters in italics, meaning that they are direct commands, such as “*FALL IN!*” These sequences are spoken more loudly with a prescribed pitch contour, which is described by DI Instructors as occurring without “rise or inflection of the voice.” Linguistically, this means that the main stress and pitch peak is on the first syllable, with a sharp drop in the pitch curve. Each teachback used in DI School is approximately 2-5 minutes long. The Position of Attention teachback is approximately two minutes long. Due to the relatively short length of this speech sample and the need for a large number of tokens, vowels from the louder portions that are labeled in italics were included in the data as well.

3.3.2 *Lockerbox Discussion*

The second speech style recorded was the lockerbox discussion. The term ‘lockerbox’ refers to a makeshift podium that Drill Instructors use for academic lectures on topics ranging from military history to personal conduct. The podium is comprised of several of the recruits’ footlockers, or locked boxes in which recruits keep their personal

¹⁵ Cadence deals with a DI’s ability to have good timing in leading a body of recruits, e.g. the rhythm they use. This also refers to the “left, left, left, right, left” kinds of instructions DIs give their recruits as they

belongings. Before DIs (or in this case the DI students) give this type of lecture, they will have the recruits stack several footlockers on top of each other at the front of the room. This speech style is comparable to that of a professor giving a lecture in front of a class.

During lockerbox discussions, Drill Instructors speak in such a way that their voices carry in the room and can be heard by the 40-80 recruits that are seated on the floor in front of the podium; however, this speech style is not as loud as the teachback. Unlike the teachback style, DI students are not specifically instructed or coached on how to speak for lockerbox discussions. Therefore, this speech style is more reflective of an individual DI student's teaching style. Some DI students spoke more formally than others. For example, F3 used a more formal style of lecture, marked by her referral to her lockerbox discussion as a "period of instruction," whereas M1 began with the phrase "I'm here to talk to you about..." F2 used colloquialisms such as "you know what I'm saying?" which gave her lecture a less formal impression as well.

3.3.3 *Participant-Investigator interview*

The fourth speech style recorded was an interview between the investigator and each participant (see the Appendix for a complete list of questions). The participants discussed their personal backgrounds, their family lives (e.g. 'What was your family like when you were growing up?'), their military experiences (e.g. 'Why did you decide to become a Drill Instructor?'), and their opinions on issues about men and women in the

military. The interview took place in a private lounge area inside the Drill Instructor School and typically lasted half an hour.

3.3.4 *Reading Sample*

The reading sample was given at the end of the interview (see the Appendix for the reading sample script). Subjects were recorded reading a sample of youth-oriented literature to elicit a non-authoritative voice. I chose a modified chapter of *The Wizard of Oz*'s "The Emerald City of Oz" as a gender-neutral, familiar reading that contained a large number of non-high vowels that would be measured for duration and pitch¹⁶. The chapter describes the main characters' arrival to the Emerald City, and the content mainly focuses on the description of what the characters see when they arrive at the palace in the Emerald City. The chapter was modified from its original form by removing all character dialogue, as well as several references to the green soldier escort who welcomes the characters to the palace, replacing "soldier" with "host." With these modifications, this chapter was an excellent means of eliciting a speech style that was distinct from "military" speech. Because of the descriptive nature of the story, which is aimed at adolescents and not young children, combined with the instruction to read it aloud in a relaxed voice, speakers did not use a "parentese" type of speech style. The readings do not sound child-directed.

¹⁶ Originally, voice quality measurements were planned, which would have required use of non-high vowels. Due to experimental problems, these measurements were not carried out.

3.3.5 *Summary of the speech styles*

Four different speech styles were recorded for this study. The teachback speech style is comparable to the high amplitude speech that is used during activities like Close Order Drill, and for the purposes of this study, most closely approximates the speech that actual DIs would use in disciplinary speech acts or other types of instruction that would be used to get recruits to react with a sense of urgency. The lockerbox discussion speech style is representative of the type of speech DIs use when giving academic lectures to groups of recruits in the squad bay. The reading sample was recorded to attain a controlled sample of each participant's voice reading non-military literature as one means of comparison with their military speech styles. The interview speech style was recorded to obtain an approximation of how the DI students speak in a conversational one-on-one situation, when not functioning as DIs.

As mentioned in Chapter 2, Drill Instructor School (and Recruit Training for that matter) is a "total institution," meaning that nearly every aspect of each member's life is embedded in a regimented structure. Even "normal" speech for the participants is still heavily influenced by military culture, as seen in the use of self-correcting statements like "as you were," which is the military way of acknowledging a speech error or the need to restart an utterance. All subjects used this self-correction at least once during recording, but not every subject used it in all four speech styles. This self-correction occurred at least once in the teachback, the lockerbox discussion, and the reading sample by one or more subjects. However, no subjects used "as you were" during the interview, even when they made a speech error that warranted a restart. While a sample of the subjects at home with their families during the holidays would have likely been better in terms of

what is most informal, the lack of overt self-correction using “as you were” in the interview suggests that this speech style closely approximates the subjects’ normal speaking style for conversation with someone who is not a close acquaintance. Further, the presence of the self-correction in the reading sample and the absence of it in the interview speech style suggest that these two non-DI speech styles differ in terms of formality.

3.4 Equipment used for data collection

The recordings were made using three types of devices. The participants wore a Countryman Isomax lapel microphone attached to a portable TCD-D8 DAT recorder that was kept in the trouser side pocket, or when a pocket was not available and the subjects were speaking while standing in one place, was placed on a flat surface. The lapel microphone was powered by a Phantom PH-1A power supply that was attached to the subject’s belt at the small of his or her back. As a back-up recording, data was also recorded with an Audio-technica AT4073a shotgun microphone (a highly directional microphone) mounted on an Audio-technica AT8410a shock-absorber, which was connected to a second portable TCD-D100 DAT recorder. However, these recordings are not used in the analysis presented here because the recordings from the lapel microphone were clear and analyzable. Lastly, all sessions were video recorded with a Canon XL1 digital video recorder. While the video data from these recordings was not used in the present study, they will be used for future analysis of non-verbal communication, as well as for determining when subjects were facing forward toward the lapel microphone for studies of voice quality and amplitude.

3.5 Description of the recordings

In each style, the subjects were recorded via the three devices described above. All six participants were recorded in each speech style during the course of one week. During all recordings except the lockerbox discussion, the subjects were wearing camouflage “blouses¹⁷,” which are long-sleeved camouflage jacket-like shirts, with their sleeves rolled up. The camouflage trousers have large side pockets where the portable DAT recorder was placed, and the location and size of this pocket safely held the recorder, yet gave the participant freedom of movement. The fact that all participants wore the same clothing, fitted to their particular body types, provided a fairly consistent means of attaching the lapel microphone to each speaker, as the lapels are creased in the same spot and are approximately the same distance from the chin when standing at the Position of Attention.

The lapel microphone was threaded between the camouflage blouse and the undershirt. The phantom power supply for the microphone was attached to the belt just above the pocket near the lower back. The lapel microphone was attached at the crease of the lapel approximately 5 inches from the chin (measured before each recording from the chin to the crease while the subject stood at attention). The back-up recording equipment and the video camera were located at specific distances from where the subjects stood, depending on the recording situation. However, as this data is not used in the present study, I will not describe the details of their locations.

¹⁷ The term ‘blouse’ is a term used by the Marine Corps to refer to the shirt of a uniform for both males and females.

3.5.1 Recording of the teachback

After the participants had completed their morning evaluation for the teachback they were currently working on, they performed the Position of Attention teachback for me in the same manner that they would if they were being evaluated by their DI School instructors. The Position of Attention teachback that was recorded for this study was not the same teachback as the one they were being tested that morning, but one that the students had been tested on in the weeks prior to the data collection. The reason for this was that the current teachbacks being evaluated involved weapons-handling, and the additional noise and movement from the rifle (unloaded) would have confounded an already difficult recording situation.

The most suitable acoustic environment for the recording of the teachback was outside of the Drill Instructor School (it was either too noisy inside the school, or there were bad acoustic conditions, e.g. echo, in the areas that were quiet during the times that the recordings took place). The outdoor area selected was located away from the noise of the teachback evaluations in progress on the other side of the school. The participants walked twenty paces away from the video recording equipment, and they proceeded to execute their teachback as they would for their instructors. The only people present during the teachback recording were the participant and the researcher. This recording situation provided a close simulation of the setting in which DI students take their teachback examinations.

3.5.2 *Recording of the lockerbox discussion*

The lockerbox discussion recording took place in a squad bay (living quarters) of actual female recruits in the Medical Reconditioning Platoon, or MRP, where recruits are placed temporarily if they are injured during training. All six participants gave their presentations one after another to the same group of female recruits¹⁸. This presentation was an opportunity for the DI school students to give a lecture, which they had practiced the day before in a “guided discussion” with each other (similar to a practice talk), to actual recruits. The topic for the lockerbox discussion was different for each speaker and ranged from handling personal problems to dealing with theft to reporting spousal abuse. Each speaker had approximately ten minutes to speak, and during the speaker’s turn, there were opportunities for the recruits to both respond to the DI student’s questions and ask additional questions related to the topic. The purpose of these discussions is to provide the recruits, many of whom are approximately eighteen years old and away from home for the first time, with coping skills for various stressful situations they may encounter either in Boot Camp or in the fleet.

In the squad bay near the duty hut (recall that the duty hut is the DI office located in the center of the squad bay) on the floor area between the rows of bunks, approximately 30 female recruits were seated on the floor in front of the footlocker podium where the speaker stood. I was standing at the back of the room, approximately 50 feet from the speaker, with the shotgun microphone and the video camera. Each

¹⁸ While it is generally the case that male DIs teach male recruits and female DIs teach female recruits, I have seen male DIs come to give talks to female recruits in the female squad bays. However, female DIs do not give talks in male squad bays. The fact that the male DI students are giving a lecture to female recruits is not the norm for male DIs, but it is also not unheard of.

speaker was instructed on how to attach the lapel microphone, so that I did not have to intrude in the space and be a distraction to the activity going on.

3.5.3 Recording of the participant-investigator interview

For the interview recording, the participant and I were given a private lounge area within the DI School building where there were sofas and chairs. The participants came to do the interview after they had completed their morning teachback evaluations, and they viewed it as an opportunity to relax for a few minutes away from their rigorous schedule. The participant was seated on the sofa, and I sat across a coffee table from the participant in a chair. The atmosphere was fairly casual, and each session lasted approximately half an hour. During the recording, the subjects were wired with the lapel microphone, and the shotgun microphone, used as a back-up recording, was placed at the far end of the coffee table with the microphone aimed towards their mouth. The video camera was placed near the refrigerator¹⁹ across the room.

3.5.4 Recording of the reading sample

The reading sample was recorded at the end of the interview. The recording equipment was set up in exactly the same configuration as for the interview, described above. The participant was instructed to read the text, given to them on a typed sheet of paper on a clipboard, in a relaxed, pleasant reading voice. They were informed that their reading ability was not being evaluated, and that I was only interested in their voice as

¹⁹ There was a low “hum” produced by the refrigerator that may have been picked up by the video recorder. However, the intention of the video camera was to gather visual data, so this was not a concern.

they read in the requested manner. The only difference between this recording and the interview recording is that the subjects' heads were tilted down slightly to look at the clipboard, and this brought their mouths closer to the lapel microphone.

3.6 Acoustic measurements

The data collected was redigitized on an Alesis ML-9600 high-resolution master disk recorder and burned to CD, after which the data was analyzed acoustically using Praat (Boersma & Weenik 2001). Vowel duration, syllable peak pitch, mean discourse pitch, standard deviation of pitch, pitch range, and speaking rate were measured, which is discussed in detail below. For each of the six speakers in each of the four speech styles, measurements were taken on the first 200 non-high stressed vowels in the recordings, with the exception of the teachback, which only contained approximately 120 non-high stressed vowels. Non-high vowels were originally selected because of the intention to measure voice quality, which is most easily measured with a greater distance between the fundamental frequency and F1. Additionally, non-high vowels typically have a lower intrinsic pitch than high vowels²⁰, a longer intrinsic duration, and have a higher intrinsic intensity than high vowels (Mobius 2003). Because the acoustic measurements in this section include pitch and duration, it was desirable to control for these intrinsic differences.

Stressed vowels were selected because non-stressed vowels are often reduced in fast speech and would not be measurable for either duration or pitch. Vowels were

²⁰ This is also true of back vowels, but given the limited amount of data and other restrictions on it, all non-high vowels were included.

considered to be stress-bearing if they bore lexical stress and the vowel quality could be identified when the recorded vowel was played in isolation, i.e. the vowel was taken out of the connected speech in which it was recorded. Vowels whose qualities were not identifiable in isolation were considered to be reduced vowels and were not measured. The vowels of stressed function words, where a function word was stressed for emphasis, as in “You need to keep your head AND body erect” were included.

This project explores the speech style as a phonetic whole, rather than particular utterances within each speech style. In order to eliminate local prosodic effects, a large number of data points were taken within each speech style. In other words, the decision to include many vowels as they occur in each type of utterance was made to avoid an effect of one particular type of utterance. The goal was to obtain an overall measure of the average vowel duration, peak pitch, pitch range, standard deviation of pitch, and speaking rate for each speaker in each speech style. The effects of speech style on pitch were anticipated to be so great that they would be measurable despite any noise in the data that could be attributed to variation in intonation. This will be shown in Chapter 4 to be the case.

3.6.1 Vowel Duration

For each vowel selected for measurement, the duration was measured using Praat (Boersma & Weenik 2001). In general, onset and offset of F2 were considered to mark the beginning and end of a particular vowel. This was more salient in cases where onsets and offsets were stop consonants or fricatives. Coda consonants that had clear boundaries were not included in the duration of the vowel, i.e. duration measurements

were not nucleic, but simply vocalic. In cases where a coda consonant was not clearly articulated but still present, or the consonant and the vowel merged (as in a rhotic vowel or a nasalized vowel), then the duration measurement included the entire nucleus of the syllable.

The following figures show examples of duration measurements. Each figure contains the waveform of the vowel, a spectrogram of the vowel, and a text grid showing duration measurements and boundaries between the consonants and vowels in the word in which the vowel occurred. All of the samples given below come from the same female speaker in the interview speech style. For the purposes of demonstrating how the measurements were taken, the interview style was selected because the recordings were generally not clipped in the higher intensity ranges like the teachback, the lockerbox, and the reading sample were²¹. In Figure 3-1, the word ‘father’ shows an example of clear fricative consonant boundaries.

²¹ Recall that some recordings were “clipped” in the higher intensity ranges, which contributed to voice quality not being investigated as previously planned. The interview data was least affected by this issue.

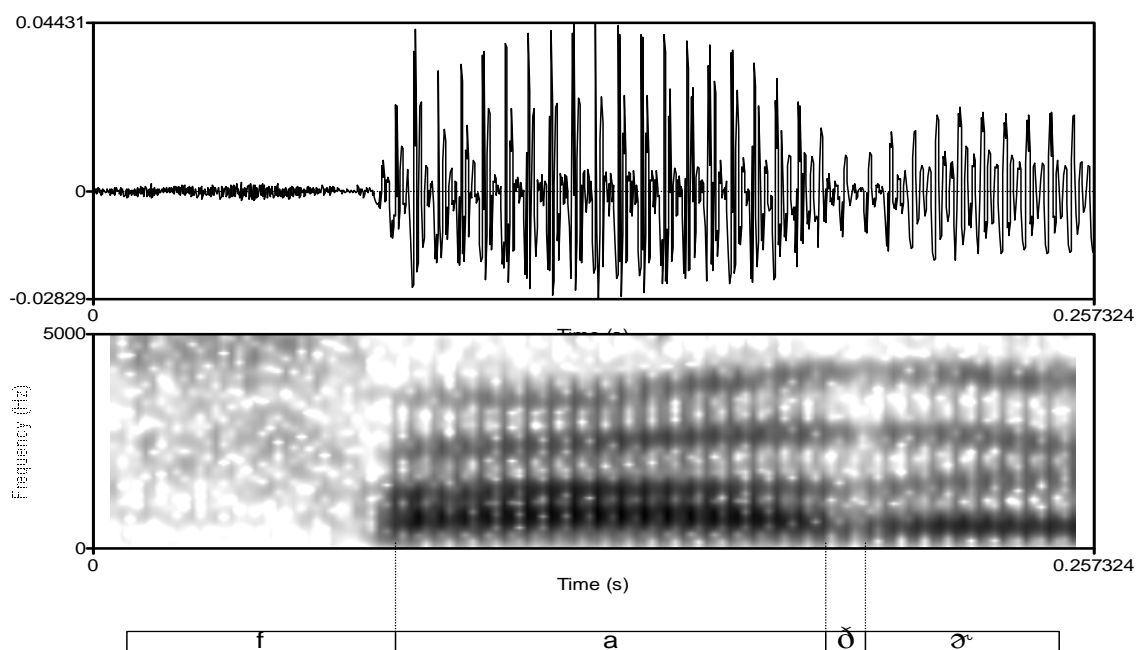


Figure 3-1: Spectrogram and duration measurement for the vowel [a] in 'father'

In Figure 3-1, the onset of the vowel [a] is clearly marked using the onset of F2, which in this case coincides with the onset of F1. The end of the vowel, where the beginning of the fricative consonant is realized as an approximant, is indicated with the offset (or weakening, in this case) of F2.

Figure 3-2 shows the word 'mom' as an example of a duration measurement for a vowel that occurs between two sonorant consonants. The duration is marked at the onset of F2, where there is a clear increase in the intensity of the spectrogram and a change in the frequency distribution or energy of the waveform. The end of the vowel is marked using the offset of F2, where the second [m] consonant begins.

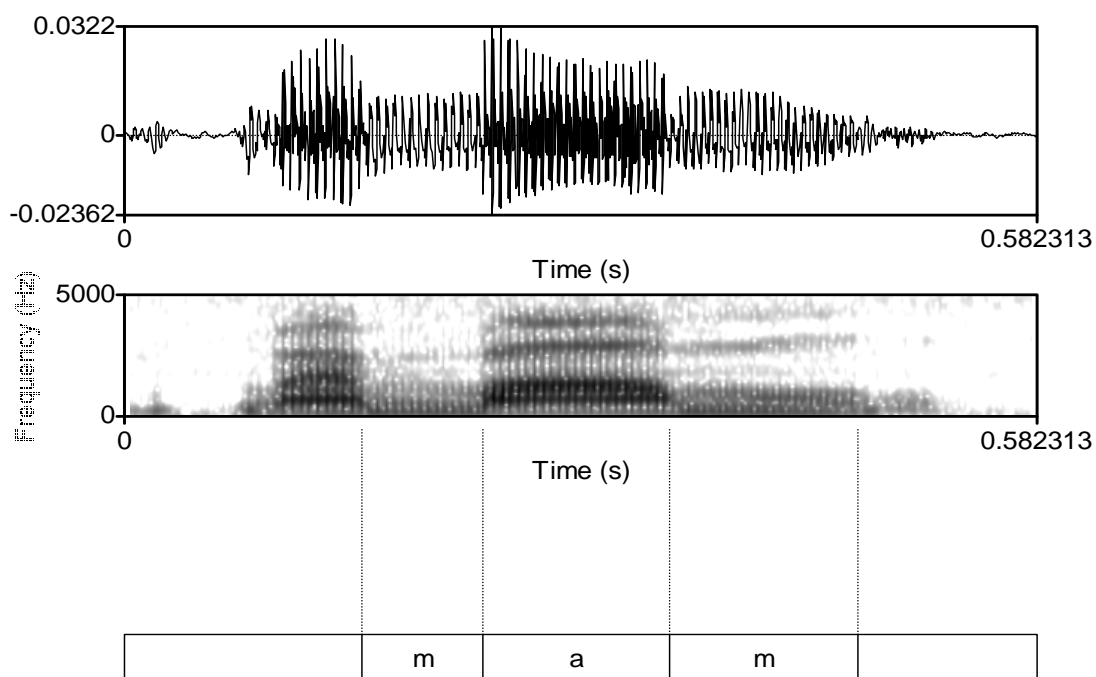


Figure 3-2: Spectrogram and duration measurement for the vowel [a] in 'mom'

Figure 3-3 shows an example of the duration measurements for the diphthong [əɪ] in the word 'right', spoken in a Michigan English speaker. This token also includes creaky voice. For sonorant onset consonants like [r], the beginning of the vowel was considered to be at the onset of F2, as shown in the figure below:

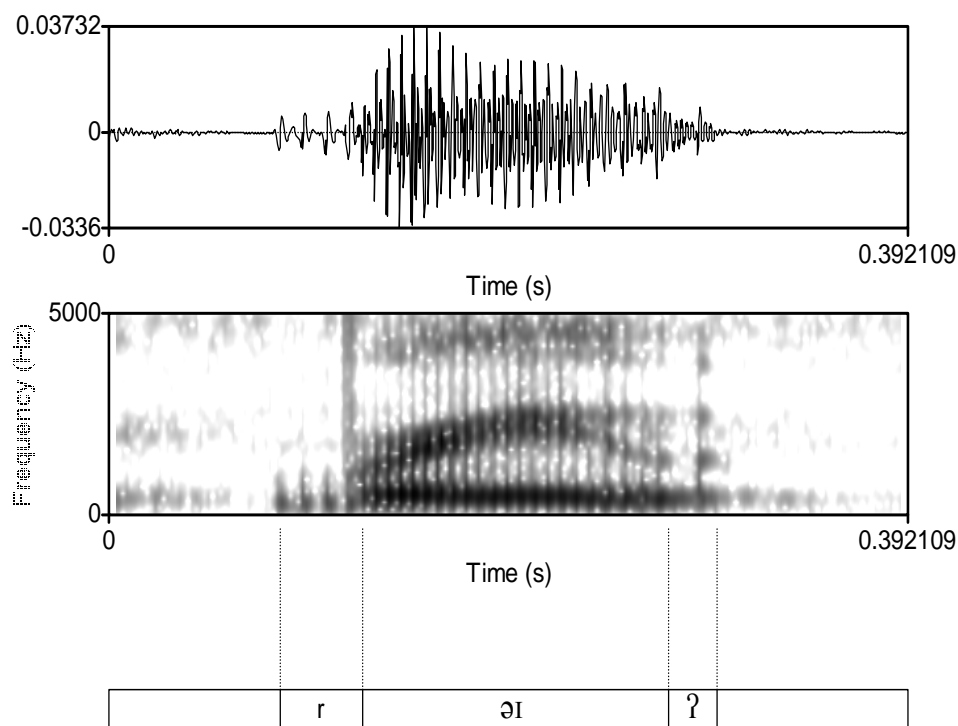


Figure 3-3: Spectrogram and duration measurement for the word 'right'

Two issues emerge with the above example. First, the measurement of the onset [r] is taken at the onset of F2 rather than by another method, such as marking the duration halfway through the transition of F3. This was done as a way to be consistent in all measurements for all speakers in all speech styles. Because of the nature of the teachback recordings, where the speech was of such high amplitude that portions of the waveform were clipped, by using the onset of F2 for sonorant onsets, I was able to be consistent with duration measurements. Second, this example shows a change in voice quality from modal to creaky voice, which occurred often in the data for this study. According to Gordon (2001), creaky voice “is characterized by irregularly spaced glottal

pulses and reduced acoustic intensity relative to modal voice” (164). This particular change in voice quality is due to the word-final glottal stop. The creaky portion of vowels was included in the duration measurements, but pitch measurements were not made on creaky portions, which is discussed in Section 3.6.2. Below is a closer view of the onset of creaky voice in the waveform for the word ‘right’ above.

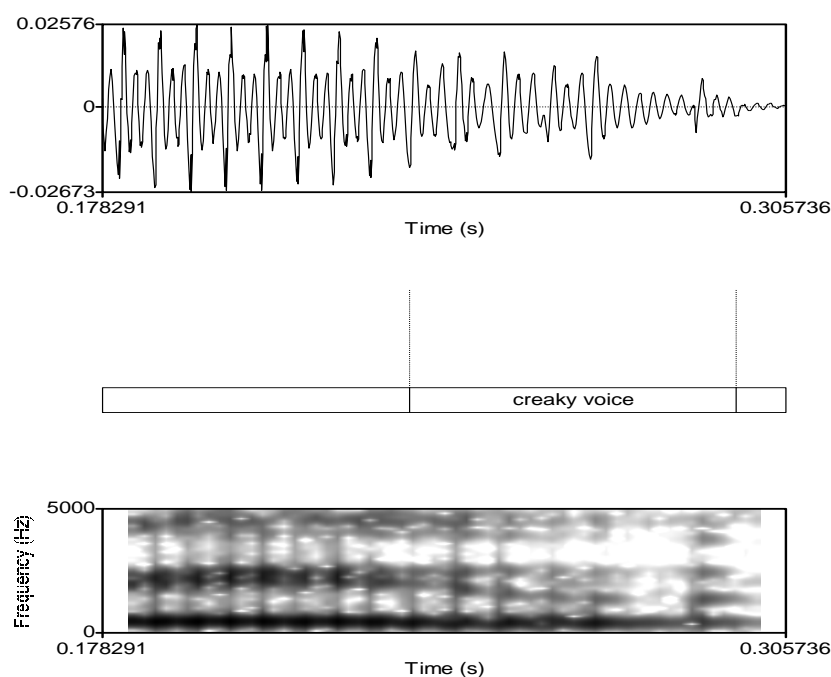


Figure 3-4: A closer view of onset of creaky voice in the word ‘right’

Figure 3-5 shows an example where there is a rhotacized vowel followed by a coda consonant, as in the word ‘hard’. In these cases, the duration of the entire sonorant portion of the nucleus was considered to be the vowel duration. Therefore, the duration measurement ended with the stop consonant [d]. The following spectrogram illustrates this.

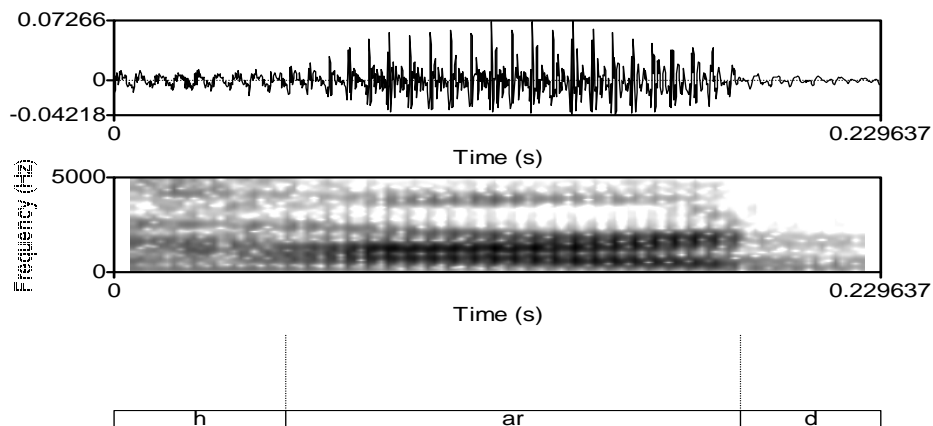


Figure 3-5: Spectrogram and duration measurements for nucleus of 'hard'

Lastly, Figure 3-6 shows an example of a vowel-final word to demonstrate where the end of a vowel in this position was marked for duration. The waveform, spectrogram, and transcription for the phrase 'ya know' show an example of a word-final vowel [o] and its off-glide.

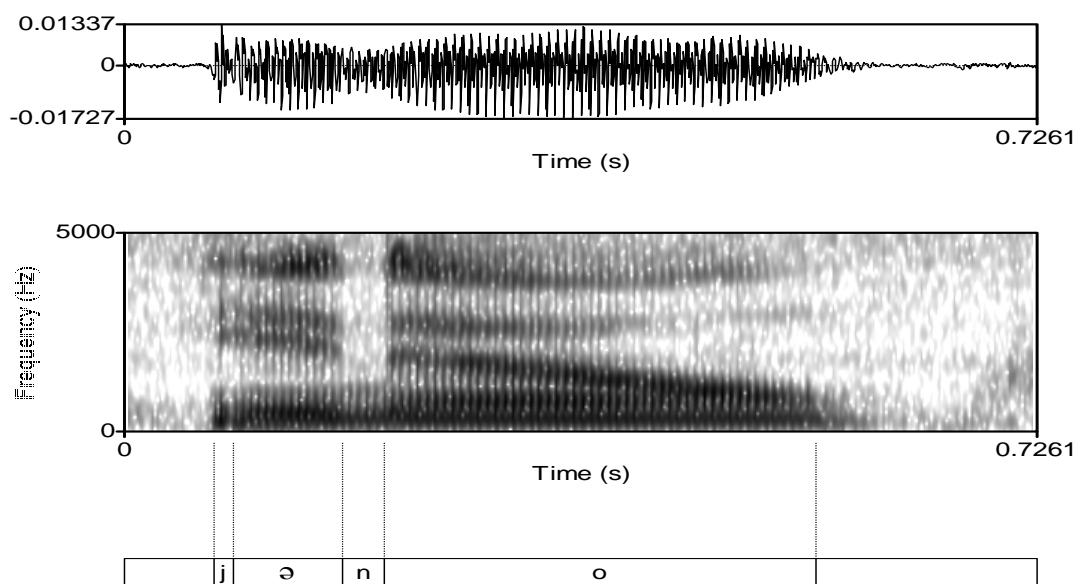


Figure 3-6: Waveform, spectrogram, and duration measurements for vowel-final in 'ya know'

Below the waveform for the same vowel [o] in the word 'know' above is given again in Figure 3-7, this time zoomed in on the final portion of the vowel and the off-glide. In order to ensure accuracy for vowel duration measurements for each speaker in each speech style, for cases where the vowel was word-final, the point where the final duration marker was placed was dependent not only on the offset of F2, but also on the point at which the waveform changed from the regular periodicity of the vowel and off-glide to an irregular pattern.

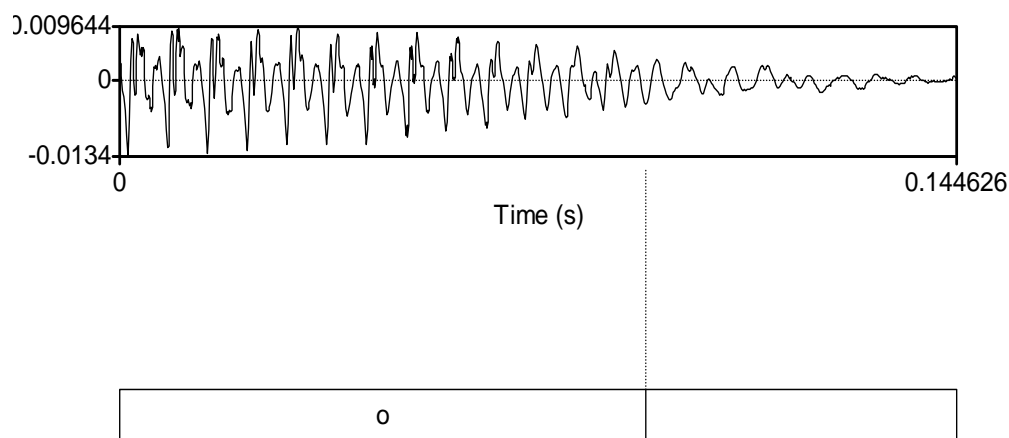


Figure 3-7: Location of final duration marker in vowel-final words

In the above figure, the dashed line indicates the final duration mark for the vowel [o]. The endpoint of the vowel was marked where there was a change in the waveform from regular periodicity, seen to the left of the marker, to an irregular pattern, seen to the right of the marker. This was done to ensure that duration measurements were consistent in this environment, where there was no consonant boundary to mark the end of a vowel.

3.6.2 Peak Pitch

A vowel's peak pitch was considered to be the highest point in the pitch contour within the duration boundaries of a given vowel. In cases where there was no significant rise or fall in the contour, the peak pitch was marked at the highest value near the midpoint of the vowel. Because this part of the analysis was done at the vowel level and not on larger portions of discourse, there was very little rise or fall in the pitch contour of an individual vowel. Any microprosodic influences on a vowel's pitch contour, such as

neighboring voiced consonants like [d] or [v], which cause a slight drop in the pitch contour, were taken into account when selecting the peak pitch of the vowel. In cases where consonants caused a change in the vowel's pitch contour, the vowel's peak pitch was measured farther away from the consonant in question. In cases of pitch tracker errors, usually caused by movement of the microphone or background noise, these pitch points were removed from the pitch track, and peak pitch measures were taken in a different portion of the vowel.

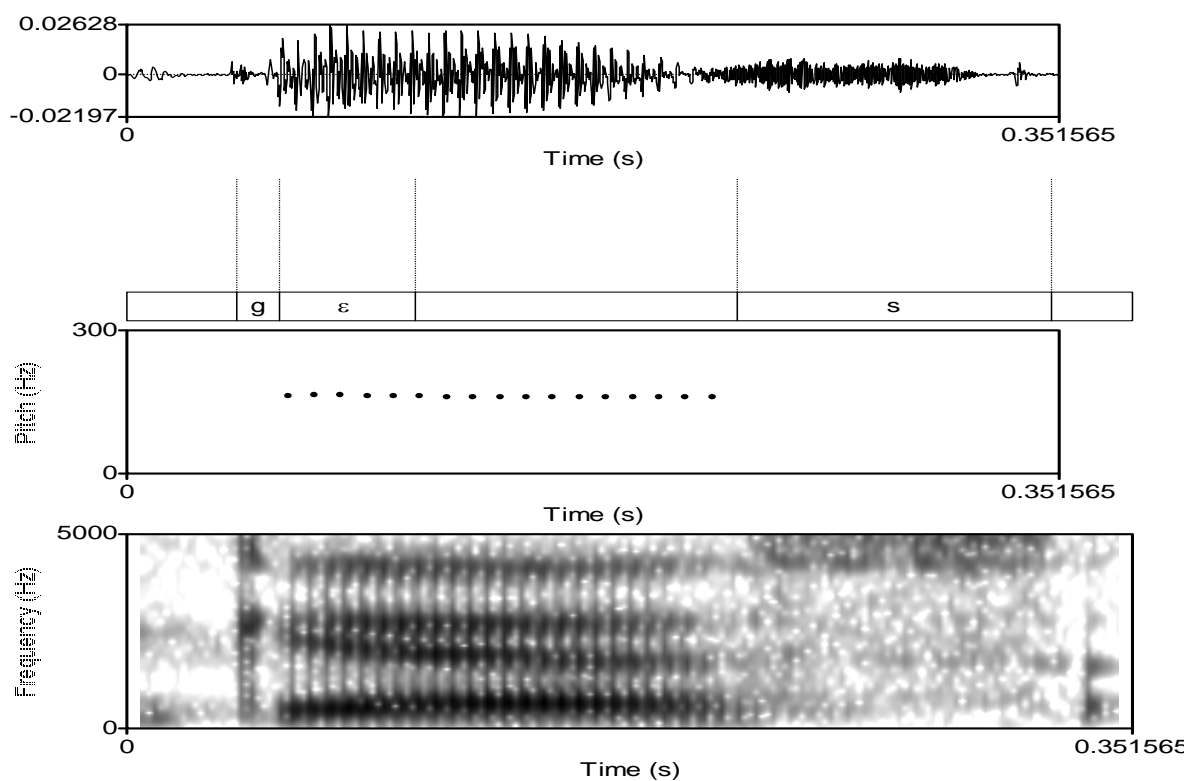


Figure 3-8: Peak pitch of vowel with a flat pitch contour in 'guess'

In the above figure, the peak pitch, marked by the third line from the left in the textbox, is taken at the highest value in the contour near the midpoint of the vowel.

For diphthongs, peak pitch was measured during middle of the non-high portion of the diphthong. This was done in order to be consistent with the decision to measure non-high vowels, and to control for inherent differences in pitch between high vowels and non-high vowels. Figure 3-9 below shows the pitch measurement taken in the middle of the first portion of the diphthong [ai].

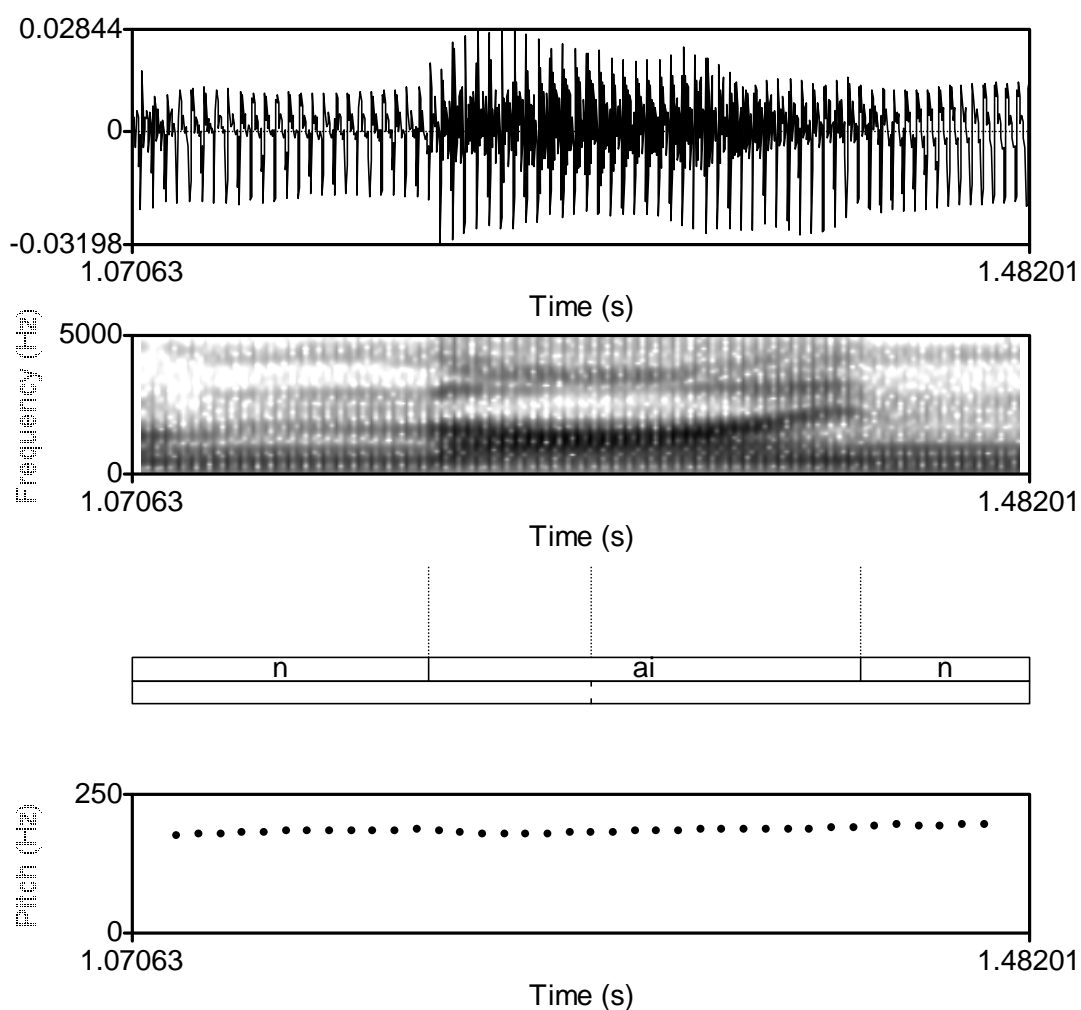


Figure 3-9: Pitch measurement taken in a diphthong vowel [ai] in the word 'nine'

In vowels that included portions of creaky voice, peak pitch was marked at the last point in the contour before the onset or the offset of the creak for those vowels. If there was a rise in the pitch contour of a vowel that contained creaky voice, the peak pitch was taken at the highest point in the contour. However, as described in Section 3.6.1 above, the entire vowel, including the creaky portion, was included in duration measurements.

Figure 3-10 below includes an example of the vowel [o] produced with creaky voice in the word 'close'. The peak pitch measurement was taken at the last point (84 Hz) in the contour before the period became too irregular to measure. For vowels like these, the frequency was examined closely in the waveform to ensure accuracy of the pitch tracker. I included in my overall calculations only those measurements that accurately reflected the periodical frequency of the waveform. Any vowel for which I could not obtain an accurate measure of pitch was discarded from the data.

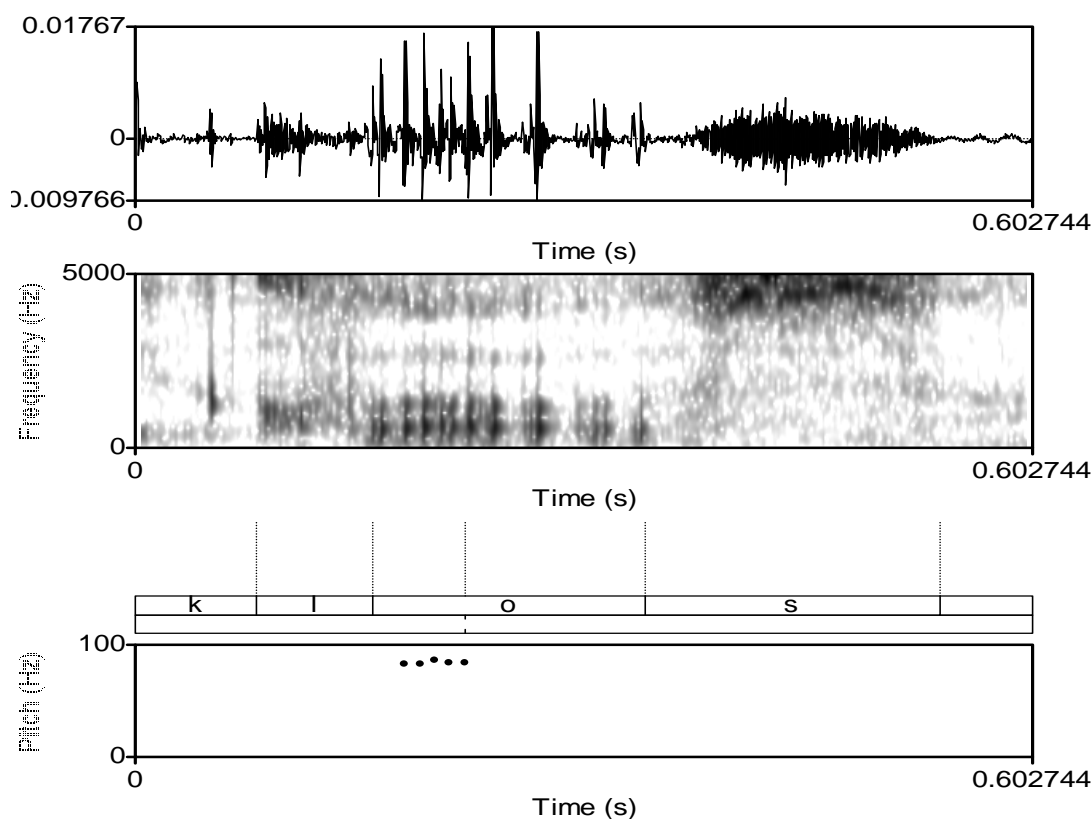


Figure 3-10: Spectrogram, duration markers, and pitch track for partially creaky vowel

3.6.3 Discourse mean pitch and pitch range

While the duration and peak pitch measurements were taken on isolated vowels in each speech style for each speaker, it was also important to obtain a measurement of how a speaker's pitch might change across the discourse in a particular speech style. In particular, is the amount of variation in pitch in a particular speech style part of how a speaker expresses that speech style? Do some speakers use a more monotone type of intonation, while others use wider ranges in pitch? In order to investigate this, I divided the teachback, lockerbox, and reading sample recordings into approximate thirty-second

segments totaling approximately three minutes for each style. The initial thirty seconds of each speech style were not used in order to allow for the speaker to acclimate to that particular style of speaking. For each thirty-second segment, the pitch track was manually examined and pitch points were removed that were not reflective of the linguistically meaningful aspects of pitch. I considered the pitch influence of high frequency consonants such as fricatives to be within the normal range for all speakers, unless it was accompanied by an errant pitch well outside of the normal range. These errant pitch points were removed. The standard deviation was calculated for F0 values of each thirty-second segment, and then averaged over the breath group. The standard deviation of pitch was used as a measurement of how much a particular speaker varied their pitch for all speech styles.

For the interview speech style, I was not able to divide the discourse into thirty-second segments, as both the speaker and I were taking turns, and often the speaker's utterances did not reach thirty seconds in length. I characterized an interview utterance as analyzable for discourse pitch range based on the following criteria: 1) their utterance had to be four or more words in length, 2) utterances longer than four words were divided into breath groupings, i.e. the division of longer segments was based on natural breaths of the speaker, and 3) all re-starts, long pauses, overlaps with the interviewer, and delayed starts beginning with 'um' or 'uh' or drag offs at the end of utterances (e.g. "you know, so...") were excluded, as I wanted these segments to be comparable to the other speech styles, which contain continuous speech. Once these segments were identified, pitch

range was measured in the same manner as the other three speech styles, with errant pitch pulses manually removed from the pitch tracks.

3.6.4 *Speaking rate*

Speaking rate measurements were obtained via syllable counts from breath groups within the same speech sequences used for the pitch range calculations. For each breath group, the number of “target” syllables was counted, i.e. as if every syllable in the discourse sequence was pronounced via careful articulation. By target syllable, I refer to the full, unreduced form of an utterance, regardless of whether or not a surface syllable was present in the output. By counting target syllables, a more accurate assessment of speaking rate could be obtained, as this measure captured the effect of reduction in the number of syllables in order to achieve a more rapid speaking rate. This reduction occurred most frequently in the teachback speech style. For example, in the utterance, *The next movement I will explain and demonstrate is the position of attention*, speakers who contract *I will*, which is the target utterance, to *I’ll*, will have one less syllable for that utterance than speakers who do not contract.

For the interview speech style, where the participant and I alternated speaking turns, the same criteria for what qualifies as an utterance in that speech style that were given in Section 3.6.2 apply for the calculation of speaking rate. The speaking rate was then calculated by dividing the length of time for a particular breath group by the number of target syllables that occur in that breath group. The results of average number of target syllables per breath group in each speech style are reported.

CHAPTER 4

RESULTS

4.1 Introduction

As described in Chapter 3, six speakers (three female; three male) were recorded in four speech styles, the teachback, the lockerbox discussion, the interview, and the reading sample. Measurements were taken on individual vowels and on larger thirty-second portions of discourse in each speech style. Two measurements were taken on individual vowels, including vowel duration and peak pitch, and four measurements were taken on thirty-second segments of the discourse, including mean pitch, standard deviation of pitch, pitch range, and speaking rate. The results are reported first on the measures of individual vowels, and then on the measures taken on the thirty-second discourse segments. After the report of both individual vowel measurements and the measurements on the larger discourse segments, the chapter concludes with a summary of the results.

Given the small number of participants in this study, separate ANOVAs were used for each speaker. Tokens produced by each speaker were either individual vowels, as in the case of vowel duration; or longer portions of discourse, as in the case of pitch range measurements calculated over thirty-second segments of speech. These tokens served as the unit for individual data points within each speaker's ANOVA. Speaking rate was calculated based on the average number of syllables that occurred within a breath group, extracted out of the thirty-second segments of speech used for the discourse pitch measurements, for each speaker in each speech style.

Because of the fact that there were not the same numbers of analyzable vowels for each speaker in each condition, the actual number of items used in the analysis varies from speaker to speaker. In the teachback speech style, for example, the entire speech act lasted approximately two minutes. Therefore, there were a limited number of vowels to analyze for that particular speech style. Further, while the teachback script was the same for each speaker, some speakers either were more accurate with the script or had more analyzable vowels than others due to either recording quality or decipherability within rapid connected speech. In other speech styles, more than 200 vowels were analyzed from within a particular portion of discourse. In those cases, I included all vowels analyzed, even if the total number was slightly above 200. Table 4-1 below gives the number of items analyzed for syllable peak pitch and vowel duration for each participant in each condition. Results reported throughout this chapter are labeled as follows: female speakers: F1, F2, and F3; male speakers: M1, M2, and M3.

Subject	Teachback	Lockerbox	Reading Sample	Interview	Total
F1	144	189	198	200	731
F2	110	201	198	201	710
F3	120	201	201	201	723
M1	110	198	201	201	710
M2	118	201	203	201	723
M3	97	201	201	201	700

Table 4-1: Number of items for each participant for each syllable level measurement

4.2 Overall effect of speech style

This section reports the main effects of the study described in Chapter 3. First, the results of the vowel level measurements of duration and syllable peak pitch are given.

This is followed by a report on the discourse related measurements, measured on thirty-second discourse segments, including overall mean pitch, standard deviation of pitch, pitch range, and speaking rate. For each dependent variable, the overall effect of speech style is reported first, followed by the results of planned comparisons between speech styles. All independent variables were treated as between-subjects factors because the same words (or vowels) did not appear in each condition. All possible pairwise comparisons were performed between the four different speech styles using Dunnett's T3 correction for familywise error, which is based on the assumption of unequal variance in the data.

The reason for testing all pairwise comparisons is that differences between each pair of speech styles provide interesting information. In the case of the two DI speech styles, the teachback and the lockerbox discussion, it was important to see if the dependent variables played a role in the significant difference found in the main effects of the overall ANOVA. While these two speech styles are considered to be authoritative DI speech styles for the purpose of this study, they differ in the kind of authority they convey. The teachback is more of a commanding, directive speech style, whereas the lockerbox discussion is the DI version of an academic lecture. Therefore, it is important to explore not only the acoustic similarities between these two speech styles as DI speech, but also to explore how they differ as registers of DI speech.

Similarly, because there are two non-authoritative, non-DI speech styles that are used as a basis for comparison to the DI speech styles, it is important to investigate whether or not there is any difference between them. While the interview speech style

tended to be a more relaxed conversational style, the reading sample tended to be treated by the participants as a more formal activity. Recall from Chapter 3 that while all participants self-corrected with the military-style “as you were” in the reading sample, no participant did this during the interview. This suggests that although these two speech styles are considered to be non-authoritative, they may differ in levels of formality. Each DI speech style was compared to each non-DI speech style as a means of clarifying whether or not the dependent variables measured were contributing to a speaker’s distinction between authoritative and non-authoritative speech.

4.2.1 *Results for vowel duration*

There was a significant overall effect of speech style on vowel duration for all subjects except one male speaker (M2): F1: $F(3,727) = 6.49, p < .001$; F2: $F(3, 706) = 18.48, p < .001$; F3: $F(3, 719) = 5.93, p < .01$; M1: $F(3, 706) = 18.67, p < .001$; M2: $F(3, 719) = 2.12, p > .09$; M3: $F(3,696) = 30.40, p < .001$. All speakers except M2 varied their vowel duration as part of how they realized differing speech styles. Figure 4-1 below shows the vowel duration results for each speaker in all four speech styles (IN represents the interview speech style, RS represents the reading sample, LB represents the lockerbox discussion, and TB represents the teachback). The leftmost set of graphs represents vowel duration for the female speakers (from top to bottom: F1, F2, and F3), and the rightmost set of graphs represents the male speakers (from top to bottom: M1, M2, and M3).

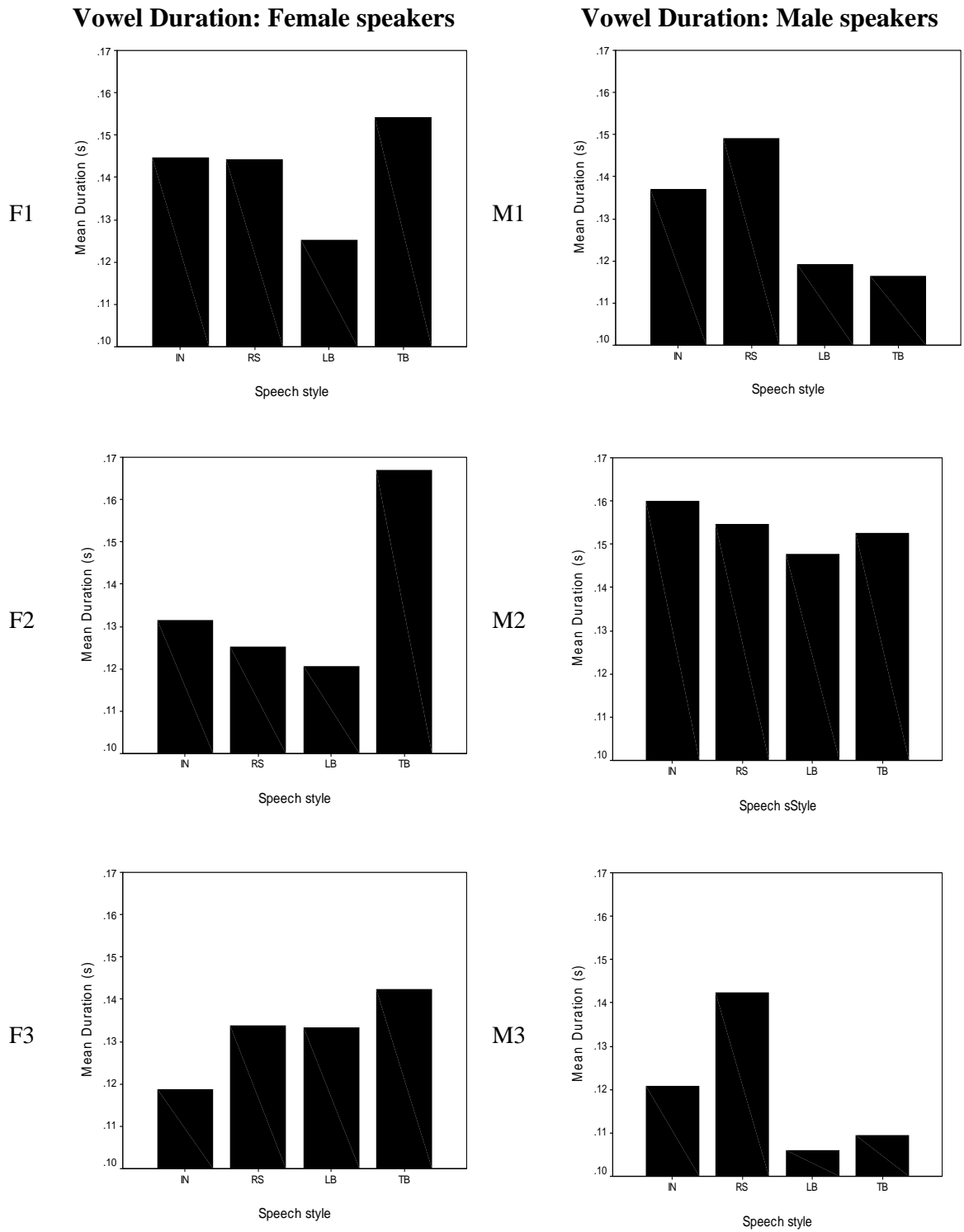


Figure 4-1: Vowel duration in all speech styles for female and male speakers; all participants had a significant effect of speech style on vowel duration except M2.

For all three female speakers, the speech style with the longest vowel duration was the teachback. For F1 and F2, the lockerbox style had the shortest vowel duration, and the interview and reading sample styles had intermediate vowel durations. F3's shortest vowel duration was in the interview speech style, with the lockerbox and reading sample styles intermediate in duration and comparable to each other.

Pairwise comparisons for each female subject were performed to investigate which speech styles were significantly different from each other on the basis of duration. F1's lockerbox speech style contained significantly shorter vowels than the other three speech styles, which did not significantly vary from each other with respect to vowel duration. For F2, the teachback vowel duration was significantly longer than the other three speech styles, which did not significantly differ from each other on the basis of vowel duration. For F3, the vowel duration in the interview speech style was shortest, with the other three speech styles not differing significantly from one another on the basis of vowel duration.

Table 4-2 below illustrates the relationship between the vowel lengths of the four speech styles for each female speaker, arranged from longest vowel duration (the teachback) to shortest vowel duration (which varies for each speaker but excludes the teachback). The symbol >> represents a statistically significant separation:

F1	Teachback, Reading Sample, Interview >> Lockerbox
F2	Teachback >> Reading Sample, Interview, Lockerbox
F3	Teachback, Reading Sample, Lockerbox >> Interview

Table 4-2: Groupings of statistically significant differences in vowel duration for females

For the male speakers, a different pattern emerges for pairwise comparisons. While the duration of one particular speech style was not consistently longest or shortest across all subjects, the interview and reading speech styles always had the longest two vowel durations, whereas the lockerbox and teachback always had the shortest two vowel durations. In Table 4-3 below, the vowel durations in each speech style for each male speaker is given, again arranged from longest vowel duration to shortest vowel duration.

M1	Reading Sample, Interview >> Teachback, Lockerbox
M2	Interview, Reading Sample, Teachback, Lockerbox
M3	Reading Sample >> Interview >> Lockerbox, Teachback

Table 4-3: Groupings of statistically significant differences in vowel duration for males

Table 4-4 gives the results of the pairwise comparisons performed for each possible pair of speech styles for each speaker. First the three female participants are given, followed by the three male participants. The four speech styles are listed on both the x-axis and the y-axis so that each cell represents a possible combination of two speech styles.

<i>Female 1</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .03	--	--	--
<u>RS</u>	p = 1.00	p < .01	--	--
<u>TB</u>	p > .7	p < .001	p > .5	--
<i>Female 2</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .2	--	--	--
<u>RS</u>	p > .8	p > .9	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
<i>Female 3</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .05	--	--	--
<u>RS</u>	p < .01	p = 1.00	--	--
<u>TB</u>	p < .01	p > .6	p > .5	--
<i>Male 1</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p > .08	p < .001	--	--
<u>TB</u>	p < .01	p > .9	p < .001	--
<i>Male 2</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .1	--	--	--
<u>RS</u>	p > .8	p > .5	--	--
<u>TB</u>	p > .7	p > .9	p > .9	--
<i>Male 3</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .01	--	--	--
<u>RS</u>	p < .001	p < .001	--	--
<u>TB</u>	p > .1	p > .9	p < .001	--

Table 4-4: Pairwise comparisons for all six speakers in all four speech styles for vowel duration. Statistically significant results are located in white cells; gray cells represent results that were not significant.

4.2.2 Results for syllable peak pitch

Syllable peak pitch was measured at the highest pitch point within a vowel and was used to obtain a measure of a speaker's global, or overall, average pitch within a particular speech style. Pitch was measured in Mels because it reflects the perception of

pitch more accurately than Hertz. The main effect of syllable peak pitch was significant for all participants: F1: $F(3, 727) = 1963.97, p < .001$; F2: $F(3, 706) = 2929.34, p < .001$; F3: $F(3, 719) = 2181.23, p < .001$; M1: $F(3, 706) = 3239.99, p < .001$; M2: $F(3, 719) = 2816.85, p < .001$; M3: $F(3, 696) = 622.21, p < .001$. All speakers varied their syllable peak pitch as part of how they realized the four different speech styles. Further, all speakers except F2 exhibited the same pattern for peak pitch variation, from highest to lowest peak pitch: teachback, lockerbox, reading sample, and interview. For F2, the interview speech style had a significantly higher syllable peak pitch than the reading sample. Figure 4-2 below illustrates this pattern:

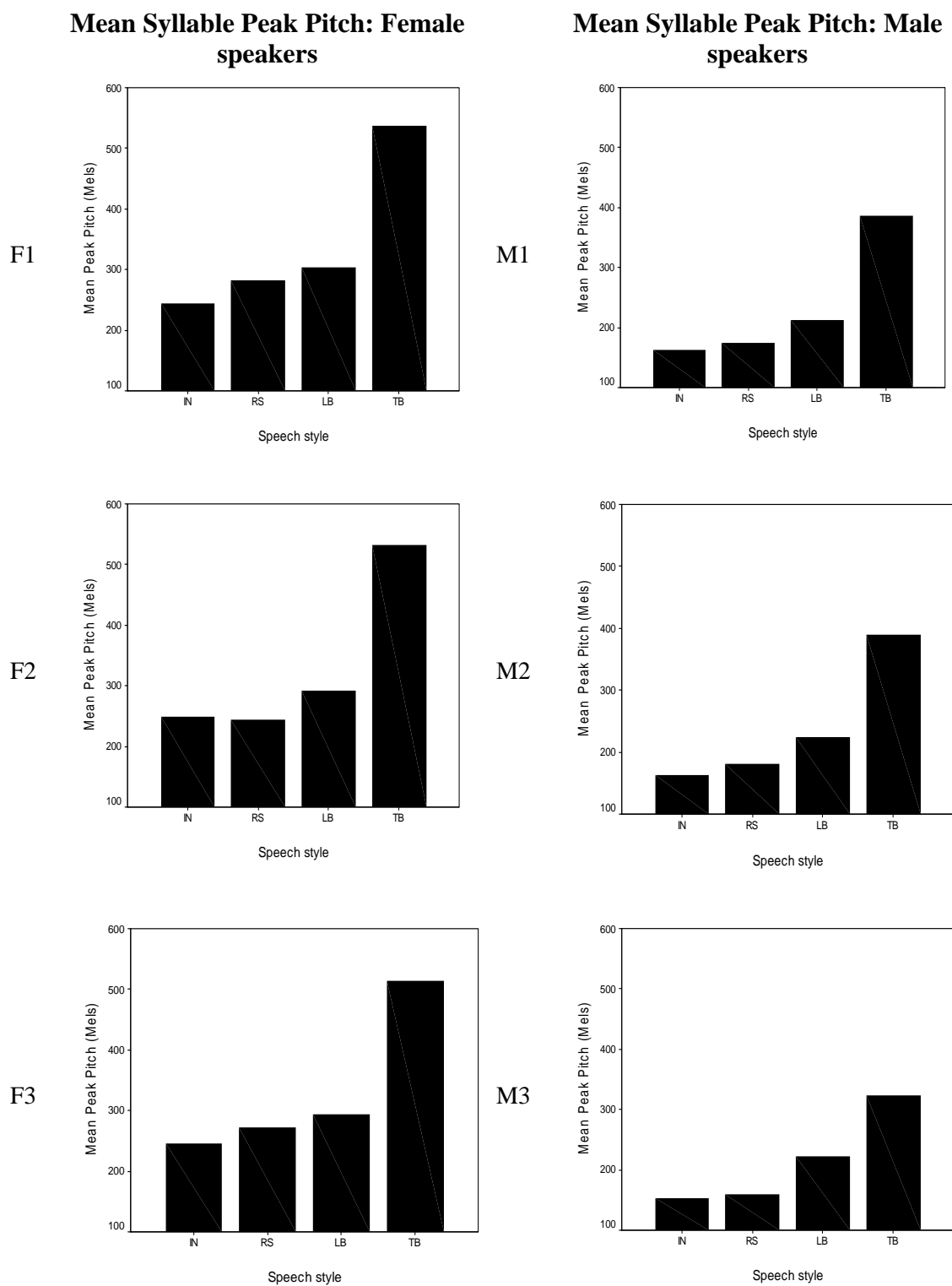


Figure 4-2: Syllable peak pitch in all speech styles, in Mels, for female and male speakers

Pairwise comparisons were significant for all possible pairs of speech styles for all speakers. Table 4-5 below illustrates this pattern, from highest syllable pitch to lowest syllable pitch, for all speech styles for the female speakers. Table 4-6 gives the results for the male speakers.

F1	Teachback >> Lockerbox >> Reading Sample >> Interview
F2	Teachback >> Lockerbox >> Interview >> Reading Sample
F3	Teachback >> Lockerbox >> Reading Sample >> Interview

Table 4-5: Groupings of statistically significant differences in syllable pitch for females

M1	Teachback >> Lockerbox >> Reading Sample >> Interview
M2	Teachback >> Lockerbox >> Reading Sample >> Interview
M3	Teachback >> Lockerbox >> Reading Sample >> Interview

Table 4-6: Groupings of statistically significant differences in syllable pitch for males

All pairwise comparisons were significant for each speaker in each speech style at $p < .001$ using Dunnett's T3 correction for familywise error with the exception of reading sample vs. interview for speaker F1, which was significant at $p < .02$, and the reading sample vs. interview for speaker M3, which was significant at $p < .01$.

4.2.3 Results for mean discourse pitch

Discourse pitch measurements were taken on thirty-second segments of continuous speech in each speech style. For the interview style, where there were both turn-taking and overlapping speech, segments of continuous speech were measured for

mean discourse pitch in breath groups of four words or more in length. For discourse level pitch, there was a significant main effect on mean pitch for all participants: F1: $F(3, 42) = 325.37, p < .001$; F2: $F(3,42) = 853.91, p < .001$; F3: $F(3, 41) = 262.16, p < .001$; M1: $F(3, 42) = 289.02, p < .001$; M2: $F(3, 37) = 1719.13, p < .001$; M3: $F(3, 37) = 125.69, p < .001$. All speakers varied their pitch as part of how they realized the four different speech styles over the span of thirty-second portions of discourse. All participants showed the same pattern of differences in mean discourse pitch with respect to speech style that they did for syllable peak pitch. For all speakers except F2, this pattern, from highest peak pitch to lowest was: teachback, lockerbox, reading sample, and interview. F2's mean discourse pitch, like her syllable peak pitch, was, from highest to lowest: teachback, lockerbox, interview, and reading sample. Figure 4-3 below illustrates the pattern of mean discourse pitch for all speakers in all speech styles:

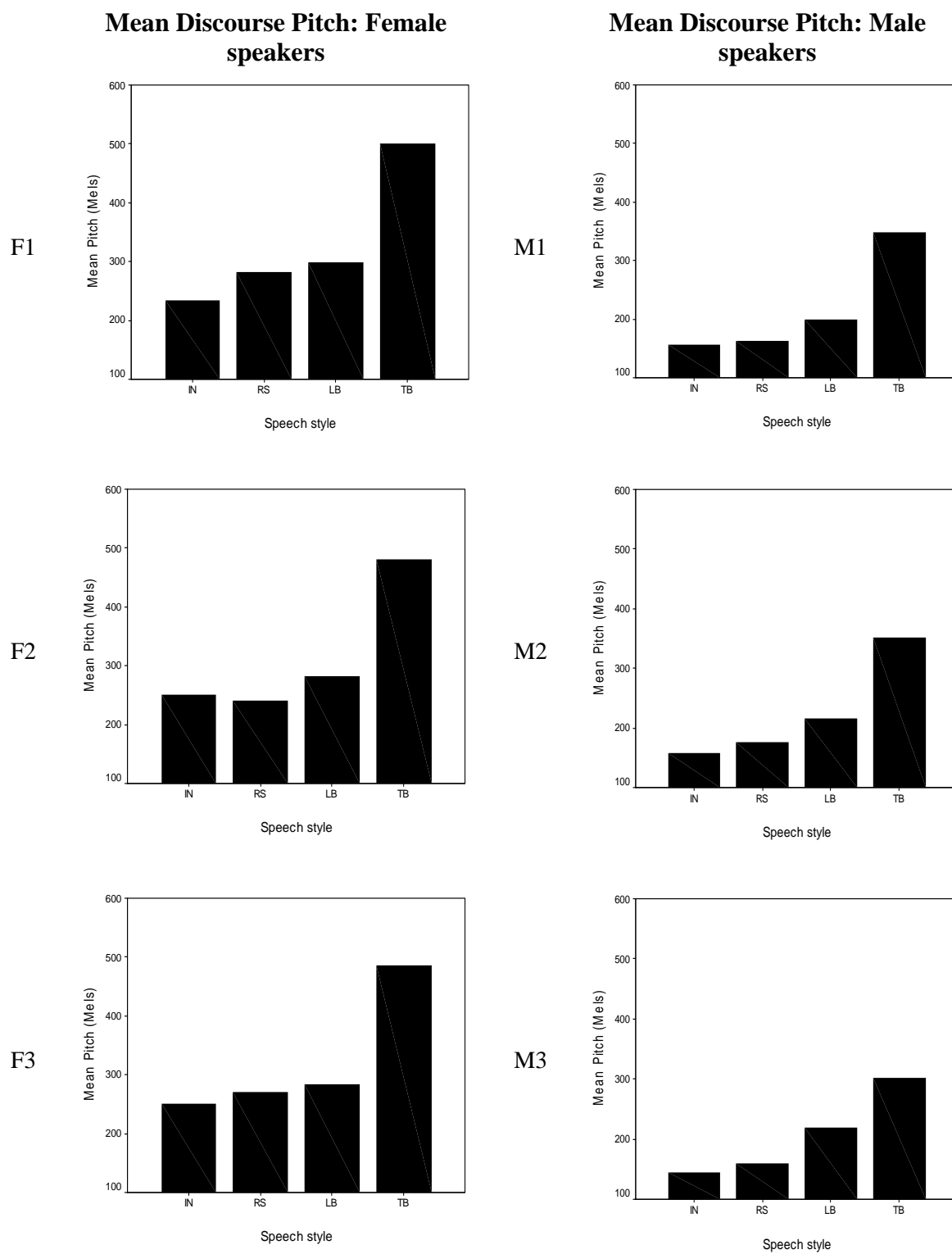


Figure 4-3: Mean discourse pitch in all speech styles, in Mels, for female and male speakers

All pairwise comparisons were significant for F1, F2, M2, and M3. For these speakers, mean pitch varied significantly in larger sections of discourse for each speech style. However, for F3, the reading sample and lockerbox speech styles were not significantly different from one another on the basis of mean discourse pitch; for M1, the reading sample and interview were not significantly different from each other on the basis of mean discourse pitch. Tables 4-7 and 4-8 below illustrate, from highest pitch to lowest, the mean discourse pitch pattern for all speech styles for female and male speakers respectively.

F1	Teachback >> Lockerbox >> Reading Sample>> Interview
F2	Teachback >> Lockerbox >> Interview >> Reading Sample
F3	Teachback >> Lockerbox, Reading Sample >> Interview

Table 4-7: Groupings of statistically significant differences in mean discourse pitch for females

M1	Teachback >> Lockerbox >> Reading Sample, Interview
M2	Teachback >> Lockerbox >> Reading Sample >> Interview
M3	Teachback >> Lockerbox >> Reading Sample >> Interview

Table 4-8: Groupings of statistically significant differences in mean discourse pitch for males

Table 4-9 gives the results of the pairwise comparisons performed for each possible pair of speech styles for each speaker. Again, the three female subjects are given first, followed by the three males. The four speech styles are listed on both the x-

axis and the y-axis so that each cell represents a possible combination of two speech styles.

<i>Female 1</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p < .001	p < .03	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
<i>Female 2</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p < .01	p < .001	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
<i>Female 3</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .01	--	--	--
<u>RS</u>	p < .01	p > .4	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
<i>Male 1</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p > .09	p < .001	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
<i>Male 2</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p < .001	p < .001	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
<i>Male 3</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p < .01	p < .001	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--

Table 4-9: Pairwise comparisons for all six speakers in all four speech styles for mean discourse pitch.

4.2.4 Results for standard deviation of pitch

The standard deviation of pitch was calculated for thirty-second segments of continuous speech and then averaged over the number of thirty-second segments for each

speaker in each speech style. The standard deviation of pitch was used as a measurement of how much a particular speaker varied their pitch in each style of speech. There was a significant main effect on standard deviation of pitch for all subjects: F1: $F(3, 42) = 96.89, p < .001$; F2: $F(3,42) = 164.19, p < .001$; F3: $F(3, 41) = 60.94, p < .001$; M1: $F(3, 42) = 200.61, p < .001$; M2: $F(3, 37) = 115.78, p < .001$; M3: $F(3, 37) = 35.88, p < .001$. For all speakers, the mean amount of variation in pitch was involved in the realization of the four speech styles. Like both the mean syllable peak pitch and the mean discourse pitch, participants exhibited the same pattern of standard deviation of pitch with respect to speech style that they did for mean syllable peak pitch and mean discourse pitch, starting from highest amount of variability of pitch to the lowest: teachback, lockerbox, reading sample, and interview. Again, this pattern, like the other two pitch measurements, was slightly different for F2, where her ranking from highest amount of variability to lowest was: teachback, lockerbox, interview, and reading sample. For all speakers there was considerably more variation of pitch for the teachback and to some extent the lockerbox speech styles than for the reading sample and the interview, which were more moderated with respect to pitch variation. Figure 4-4 below shows this pattern:

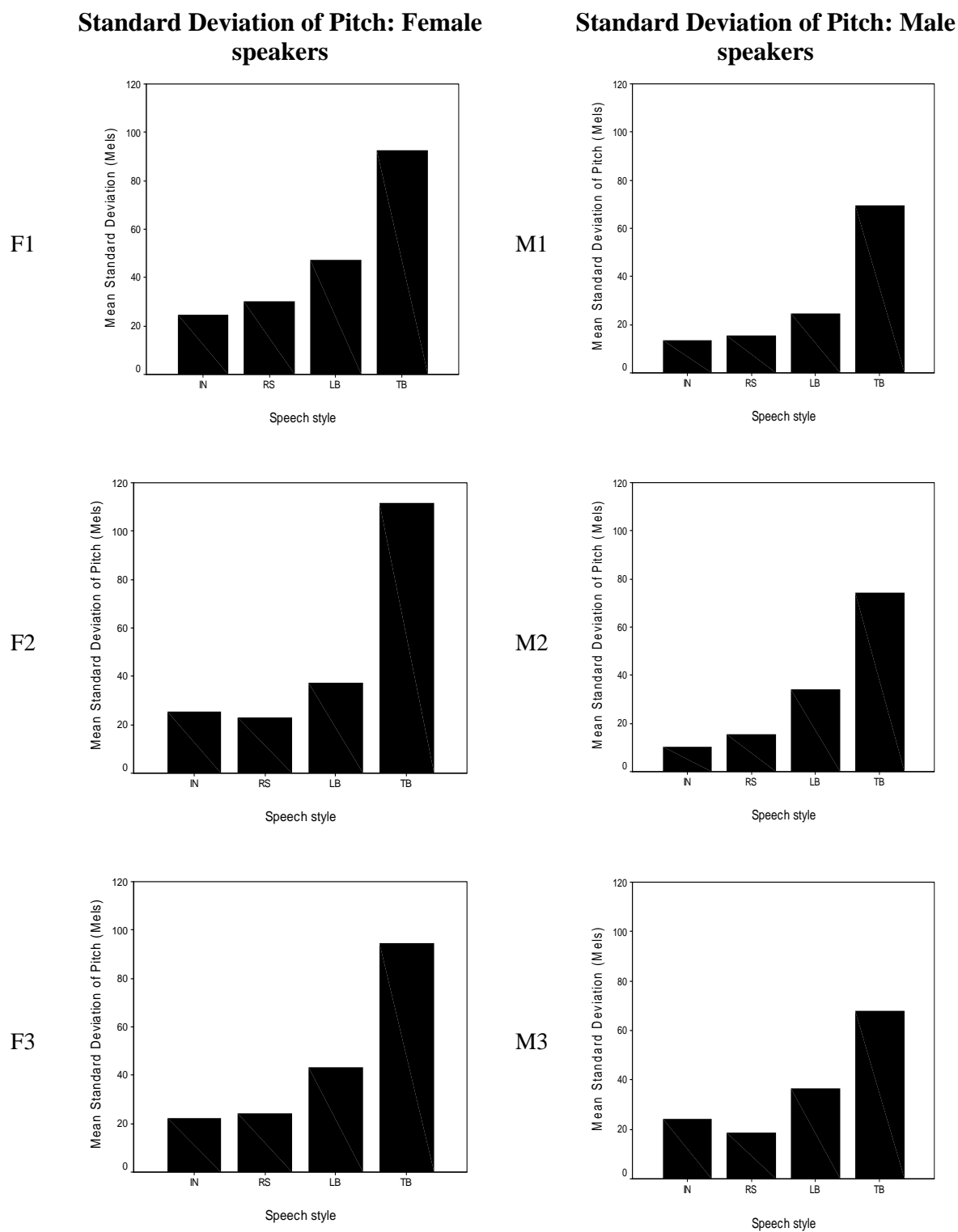


Figure 4-4: Standard deviation of pitch in all speech styles, in Mels, for female and male speakers

All pairwise comparisons were significant for M2. For this speaker, the standard deviation of pitch varied significantly in larger sections of discourse for each speech style. However, for F1, F2, F3, and M1, there was no significant difference in the standard deviation of pitch for the reading sample and the interview. For M3, there was no significant difference between the teachback and lockerbox speech styles and also no significant difference for the interview and reading sample speech styles. Table 4-10 illustrates the relationship between speech styles with respect to standard deviation of pitch, from highest standard deviation of pitch to lowest, for the female speakers. Table 4-11 shows the same information for the male speakers.

F1	Teachback >> Lockerbox >> Reading Sample, Interview
F2	Teachback >> Lockerbox >> Interview, Reading Sample
F3	Teachback >> Lockerbox >> Reading Sample, Interview

Table 4-10: Groupings of statistically significant differences in mean standard deviation of pitch for females

M1	Teachback >> Lockerbox >> Reading Sample, Interview
M2	Teachback >> Lockerbox >> Reading Sample >> Interview
M3	Teachback, Lockerbox >> Interview, Reading Sample

Table 4-11: Groupings of statistically significant differences in mean standard deviation of pitch for males

Table 4-12 gives the results of the pairwise comparisons performed for each possible pair of speech styles for each speaker. Again, the three female subjects are given first, followed by the three males. The four speech styles are listed on both the x-

axis and the y-axis so that each cell represents a possible combination of two speech styles.

Female 1	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p > .1	p < .01	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
Female 2	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .01	--	--	--
<u>RS</u>	p > .3	p < .001	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
Female 3	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .01	--	--	--
<u>RS</u>	p > .9	p < .02	--	--
<u>TB</u>	p < .01	p < .02	p < .01	--
Male 1	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p > .2	p < .001	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
Male 2	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p < .001	p < .001	--	--
<u>TB</u>	p < .001	p < .01	p < .01	--
Male 3	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .01	--	--	--
<u>RS</u>	p > .1	p < .001	--	--
<u>TB</u>	p < .02	p > .05	p < .02	--

Table 4-12: Pairwise comparisons for all six speakers in all four speech styles for mean standard deviation of pitch.

4.2.5 Results for range of pitch

For the third discourse level measure, the mean minimum and mean maximum pitch were calculated for each speaker in each style. Unlike the standard deviation of

pitch reported above, which measures the amount of pitch variability across each thirty-second segment of discourse, the mean minimum and mean maximum pitch represents the average of the single lowest and highest pitches in the contours found in each thirty-second segment. This measure was taken in order to investigate the range of each speaker's pitch in each speech style, but it does not account for how often those low and high points are reached, which is what the standard deviation of pitch measures. In this section, both the minimum and maximum pitches are reported separately, followed by a summary that provides the range for each speaker.

4.2.5.1 Results for minimum pitch

There was a significant main effect on minimum pitch for all subjects: F1: $F(3, 42) = 10.48, p < .001$; F2: $F(3, 42) = 4.62, p < .01$; F3: $F(3, 41) = 5.60, p < .01$; M1: $F(3, 42) = 8.50, p < .001$; M2: $F(3, 37) = 5.06, p < .01$; M3: $F(3, 37) = 20.23, p < .001$. For all speakers, the mean minimum pitch was different for each of the four speech styles. Figure 4-5 below illustrates this pattern:

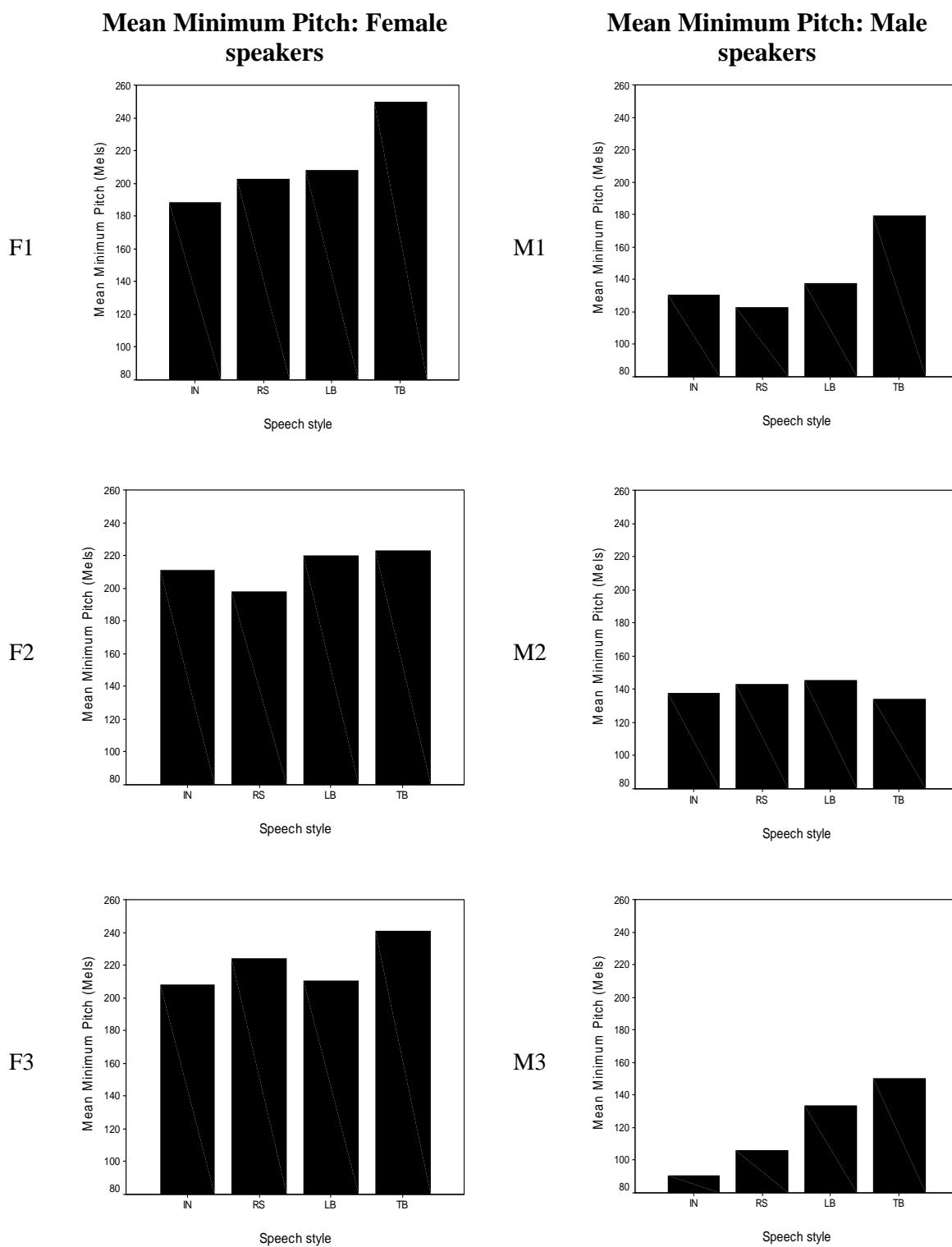


Figure 4-5: Minimum pitch in all speech styles, in Mels, for female and male speakers

All speakers had the highest minimum pitch in the teachback speech style except M2, who had the highest minimum pitch in the lockerbox speech style. For all speakers except F3 and M2, the second highest minimum pitch is in the lockerbox discussion. This pattern is consistent to the pattern seen for the other measures of pitch described above. However, for F3, while the teachback was the highest minimum pitch, the second highest pitch was the reading sample, followed by the lockerbox and the interview. For M2, who had a completely different pattern for minimum pitch, the lockerbox speech style had the highest minimum pitch, followed by the reading sample and interview, with the teachback having the lowest minimum pitch. However, the pairwise comparisons for M2 showed that none of the four speech styles differed from each other on the basis of minimum pitch.

Not all pairwise comparisons were significant for any subject. The following tables illustrate, from highest minimum pitch to lowest minimum pitch, the pattern for all speech styles for both female and male subjects.

F1	Teachback >> Lockerbox, Reading Sample, Interview
F2	Teachback, Lockerbox >> Interview >> Reading Sample
F3	Reading Sample (Teachback >> Lockerbox, Interview)

Table 4-13: Groupings of statistically significant differences in mean minimum pitch for females; >> indicates a significant difference for a pairwise comparison; in rows with two levels, the speech styles in the top level are significantly different from all speech styles in the bottom level; parentheses group together all speech styles that are significantly different from the speech style outside of the parentheses

M1	Teachback , Lockerbox >> Interview >> Reading Sample
M2	Lockerbox, Reading Sample, Interview, Teachback
M3	Teachback, Lockerbox >> Reading Sample, Interview

Table 4-14: Groupings of statistically significant differences in mean minimum pitch for males

The following table gives the results of the pairwise comparisons done for each possible pair of speech styles for each speaker. Again, the three female subjects are given first, followed by the three males. The four speech styles are listed on both the x-axis and the y-axis so that each cell represents a possible combination of two speech styles.

Female 1	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .2	--	--	--
<u>RS</u>	p > .3	p > .9	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
Female 2	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .1	--	--	--
<u>RS</u>	p < .03	p < .001	--	--
<u>TB</u>	p > .8	p = 1.0	p > .2	--
Female 3	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .9	--	--	--
<u>RS</u>	p > .1	p > .2	--	--
<u>TB</u>	p < .01	p < .02	p > .2	
Male 1	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .1	--	--	--
<u>RS</u>	p < .02	p < .01	--	--
<u>TB</u>	p > .2	p > .3	p > .1	--
Male 2	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--

<u>LB</u>	p > .1	--	--	--
<u>RS</u>	p > .05	p > .9	--	--
<u>TB</u>	p > .8	p > .1	p > .1	--
Male 3	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p > .1	p < .02	--	--
<u>TB</u>	p < .01	p > .6	p < .03	--

Table 4-15: Pairwise comparisons for all six speakers in all four speech styles for minimum pitch.

4.2.5.2 Results for maximum pitch

There was a significant main effect on maximum pitch for all subjects: F1: $F(3, 42) = 10.48, p < .001$; F2: $F(3, 42) = 361.16, p < .001$; F3: $F(3, 41) = 102.27, p < .001$; M1: $F(3, 42) = 497.28, p < .001$; M2: $F(3, 37) = 1, p < .001$; M3: $F(3, 37) = 96.34, p < .001$. For all speakers, the mean maximum pitch played a role in the difference of the four different speech styles. All speakers except F2 showed the same pattern for maximum pitch, with the teachback style having the highest maximum pitch, followed by lockerbox, reading sample, and interview. For F2, the interview speech style had a higher mean maximum pitch than the reading sample, which also occurred in all other pitch related measures for this speaker. While this is a discourse-related measurement, taken over the course of thirty-second segments of speech, the pattern of maximum pitch is consistent with the measurements of individual syllable peak pitch for all subjects, where the same pattern emerged. Figure 4-6 below illustrates the pattern for mean maximum pitch:

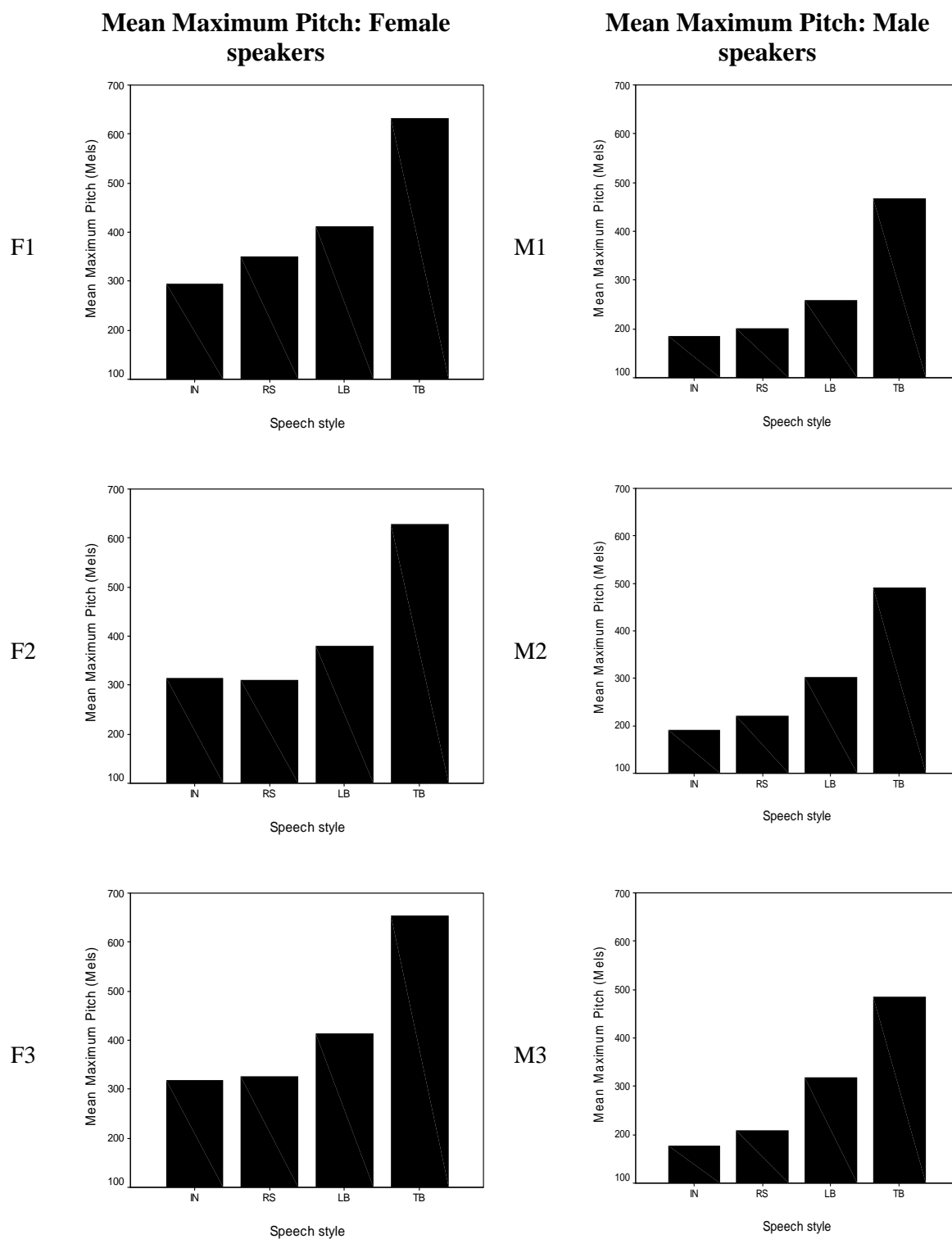


Figure 4-6: Maximum pitch in all speech styles, in Mels, for female and male speakers

All pairwise comparisons were significant for F1 and all three male subjects. For F2 and F3, all comparisons were significant except for the reading sample and the interview, which were not significantly different from one another on the basis of maximum pitch. This result is slightly different from the measure of syllable peak pitch, where all pairs of speech styles were significantly different from each other. The following tables illustrate, from highest maximum pitch to lowest maximum pitch, the pattern for all speech styles for both female and male subjects.

F1	Teachback >> Lockerbox >> Reading Sample >> Interview
F2	Teachback >> Lockerbox >> Interview, Reading Sample
F3	Teachback >> Lockerbox >> Interview, Reading Sample

Table 4-16: Groupings of statistically significant differences in mean maximum pitch for females

M1	Teachback >> Lockerbox >> Interview >> Reading Sample
M2	Teachback >> Lockerbox >> Interview >> Reading Sample
M3	Teachback >> Lockerbox >> Interview >> Reading Sample

Table 4-17: Groupings of statistically significant differences in mean maximum pitch for males

The following table gives the results of the pairwise comparisons performed for each possible pair of speech styles for each speaker.

Female 1	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p < .001	p < .01	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
Female 2	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p > .9	p < .001	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
Female 3	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p > .9	p < .01	--	--
<u>TB</u>	p < .001	p < .001	p < .01	--
Male 1	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p < .01	p < .001	--	--
<u>TB</u>	p < .001	p < .001	p < .001	--
Male 2	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p < .001	p < .001	--	--
<u>TB</u>	p < .001	p < .01	p < .001	--
Male 3	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p < .01	p < .001	--	--
<u>TB</u>	p < .01	p < .03	p < .01	--

Table 4-18: Pairwise comparisons for all six speakers in all four speech styles for maximum pitch.

The following graphs illustrate the full pitch range for both female and male speakers, including both mean minimum and mean maximum pitch in Mels:

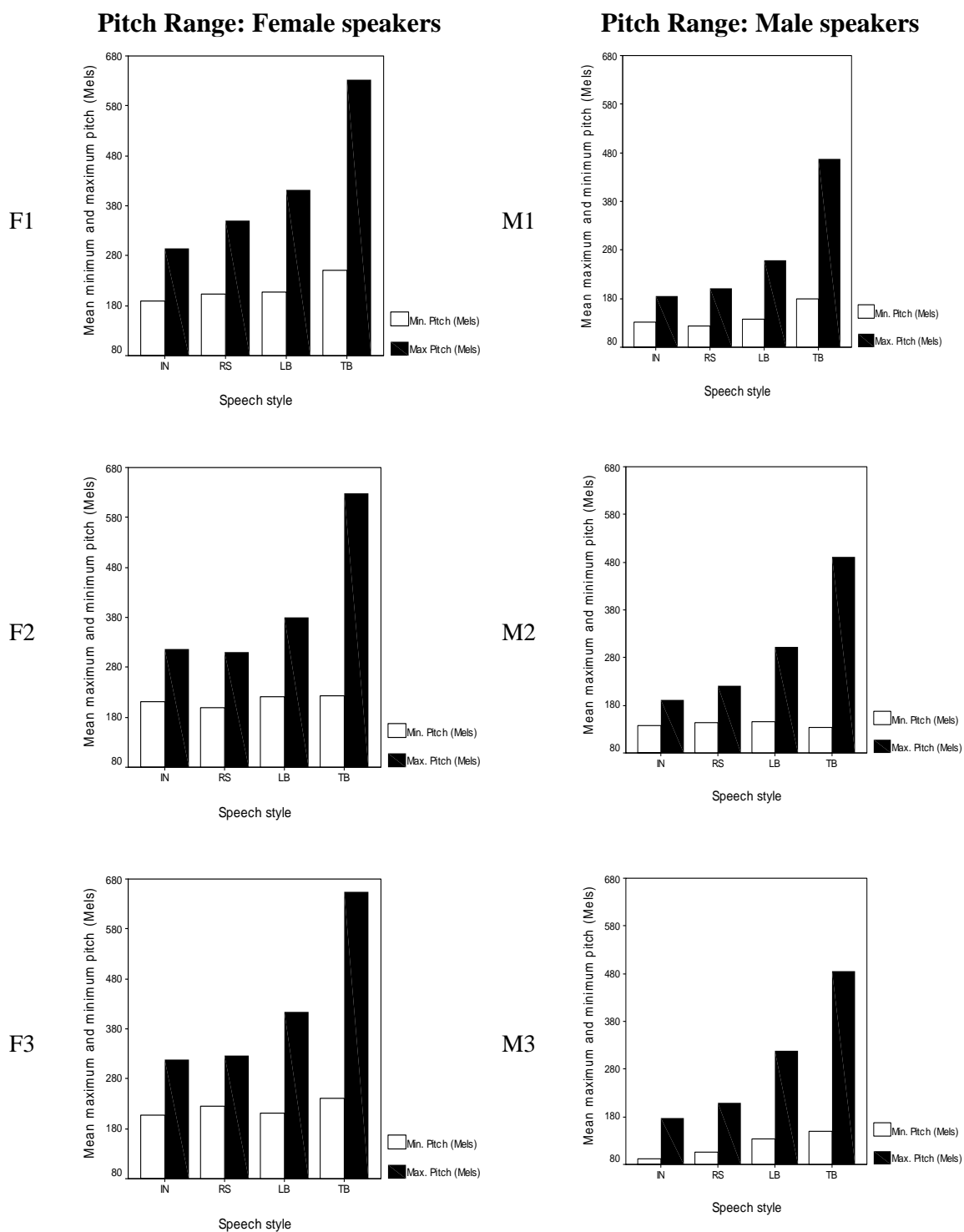


Figure 4-7: Mean minimum and maximum pitch in each speech style, in Mels, for female and male speakers

4.2.6 *Results for speaking rate*

The results for speaking rate were calculated as the average number of syllables per breath group in the four different speech styles. The analyzed speech for each speaker is composed of a collection of breath groups that totaled approximately one minute of continuous speech in each speech style. For the teachback, which lasted approximately two minutes, some speakers had less than one minute of continuous speech available. This was in part due to the drill movements that the speakers executed during the recitation, i.e. when the participants demonstrated the movements for commands like “Fall out!,” they walked one way, and “Fall in!,” they returned to their original position. Some of the participants took longer than others to make these movements; thus, their recording time was slightly longer. However, the goal was to obtain an approximate rate of speech for each speaker in each speech style to be used in conjunction with other units of timing, like vowel duration. A higher average number of syllables per second indicates a faster speaking rate; a lower average indicates a slower rate of speech.

There was a significant overall effect of speech style on speaking rate for all participants except one female speaker (F2): F1: $F(3,119) = 5.84, p < .001$; F2: $F(3,112) = 1.46, p > .2$; F3: $F(3, 108) = 4.13, p < .01$; M1: $F(3, 162) = 18.77, p < .001$; M2: $F(3, 116) = 13.26, p < .001$; M3: $F(3,120) = 10.47, p < .001$. All speakers except F2 varied their speaking rate as part of how they realized different speech styles. The following graphs illustrate the speaking rate results for each speaker in all four speech styles.

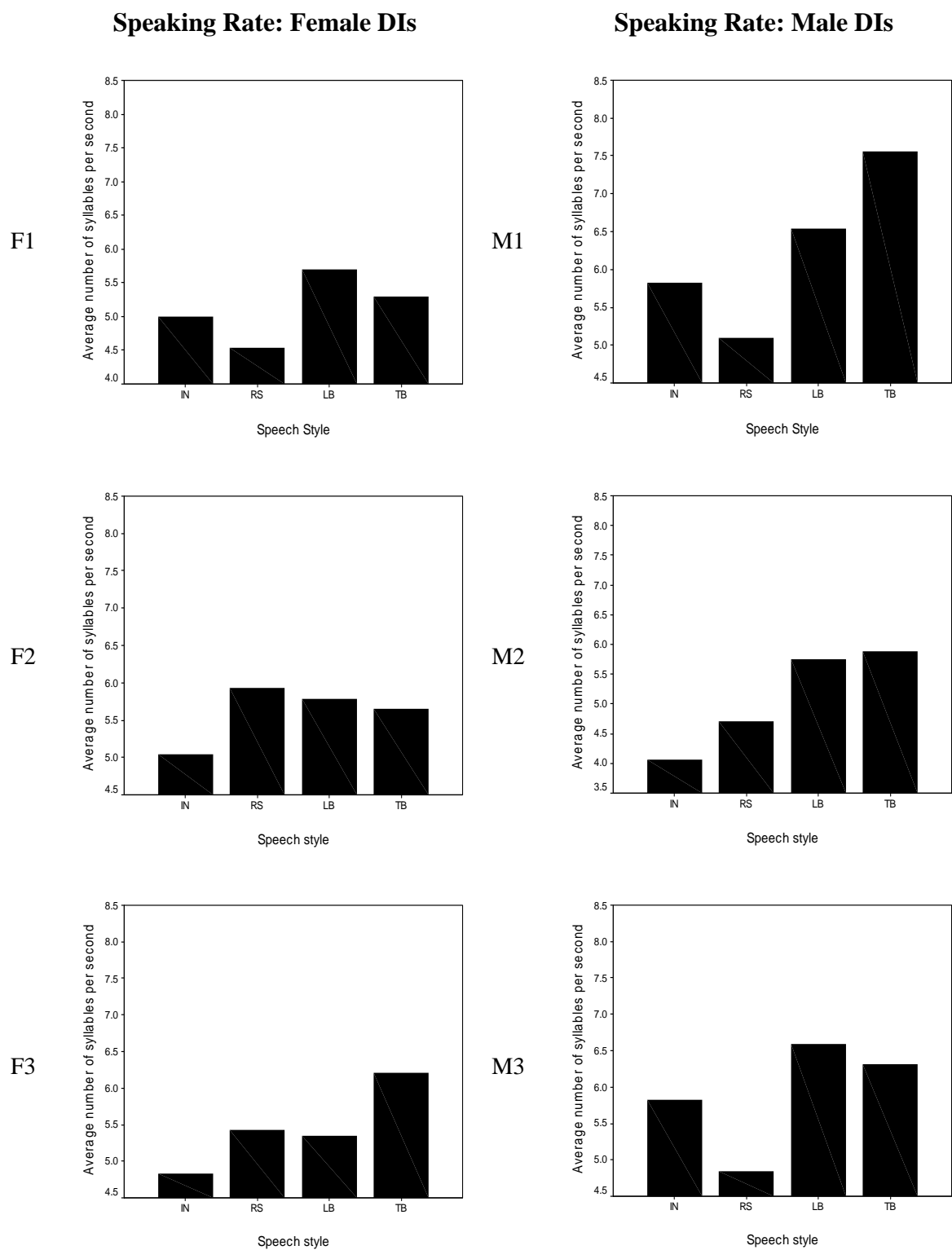


Figure 4-8: Speaking rate in all speech styles for female and male speakers; all participants had a significant effect on speaking rate except F2.

Pairwise comparisons for each participant were performed to investigate which speech styles were significantly different from each other on the basis of speaking rate. The results for all female speakers in each speech style are reported below in Table 4.19, and the results for male speakers are reported in Table 4.20. Among the females, F1's reading sample was not significantly slower than the interview speech style, but it was significantly slower than both the teachback and the lockerbox speech styles, which did not significantly vary from each other with respect to speaking rate. For F2, the slowest speaking rate was the interview, followed by the teachback and lockerbox, with the reading sample as the fastest speech style. However, none of these differences in speaking rate for F2 was significant. For F3, the interview speech style was significantly slower than the lockerbox, reading sample, and teachback styles, which did not differ from each other significantly based on speaking rate.

The following table illustrates the relationship between the speaking rate of the four speech styles for each female speaker, arranged from slowest to fastest speaking rate.

The symbol >> represents a statistically significant difference:

F1	(Reading Sample >>), Interview, (Teachback, Lockerbox)
F2	Interview, Teachback, Lockerbox, Reading Sample
F3	Interview >> (Lockerbox, Reading Sample, Teachback)

Table 4-19: Groupings of statistically significant differences in speaking rate for females. For F1, Reading Sample is significantly different from Teachback and Lockerbox, but not the Interview.

Pairwise comparisons for the male speakers revealed that the teachback and the lockerbox speech styles had the fastest two speaking rates, and the interview and the reading sample had the slowest speaking rates. For M1, the slowest speech style was the reading sample, which did not differ significantly from the interview speech style. The reading sample speech was significantly slower than both the locker box discussion and teachback, which did not differ significantly from each other. For M2, the interview was the slowest speech style, which was significantly slower than the reading sample. The reading sample was in turn significantly slower than both the lockerbox discussion and teachback, which were not significantly different from each other in terms of speaking rate. For M3, the reading sample was significantly slower than the interview, teachback, and lockerbox styles, which were not significantly different from each other. In the following table, the speaking rate of each speech style for each male speaker is given, again arranged from slowest to fastest speaking rate.

M1	Reading Sample, Interview ²² >> Lockerbox, Teachback
M2	Interview >> Reading Sample >> Lockerbox, Teachback
M3	Reading Sample >> Interview, Teachback, Lockerbox

Table 4-20: Groupings of statistically significant differences in speaking rate for males

The following table gives the results of the pairwise comparisons performed for each possible pair of speech styles for each speaker. First the three female participants are given, followed by the three male participants. The four speech styles are listed on

both the x-axis and the y-axis so that each cell represents a possible combination of two speech styles.

<i>Female 1</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .2	--	--	--
<u>RS</u>	p > .5	p < .001	--	--
<u>TB</u>	p > .9	p > .6	p < .03	--
<i>Female 2</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .2	--	--	--
<u>RS</u>	p > .1	p > .9	--	--
<u>TB</u>	p > .4	p > .9	p > .9	--
<i>Female 3</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .7	--	--	--
<u>RS</u>	p > .5	p = 1	--	--
<u>TB</u>	p < .04	p > .2	p > .2	--
<i>Male 1</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .4	--	--	--
<u>RS</u>	p > .2	p < .001	--	--
<u>TB</u>	p < .01	p > .05	p < .001	--
<i>Male 2</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p < .001	--	--	--
<u>RS</u>	p < .01	p < .01	--	--
<u>TB</u>	p < .001	p > .9	p < .01	--
<i>Male 3</i>	<u>IN</u>	<u>LB</u>	<u>RS</u>	<u>TB</u>
<u>IN</u>	--	--	--	--
<u>LB</u>	p > .1	--	--	--
<u>RS</u>	p < .01	p < .001	--	--
<u>TB</u>	p > .7	p > .9	p < .01	--

Table 4-21: Pairwise comparisons for all six speakers in all four speech styles for speaking rate.

²² The interview and lockerbox speech styles for M1 were not significantly different in terms of speaking rate, but the interview speech style was significantly different from the teachback speech style.

4.3 Summary of results

In this chapter, the results of six different acoustic measurements were reported for four different speech styles used by six speakers. Two of the measurements, vowel duration and syllable peak pitch, were taken on approximately 200 stressed, non-high vowels in each speech style for each speaker. The other four measures, mean discourse pitch; standard deviation of pitch; pitch range, and speaking rate, were averaged over thirty-second segments of continuous speech in each speech style for each speaker. In order to understand the bigger picture of what these statistics might mean, it is useful to consider the results in terms of measures of timing, including vowel duration and speaking rate, and measures of pitch, which include syllable peak pitch, mean discourse pitch, standard deviation of pitch, and pitch range. I now turn to a brief summary of these measures in terms of measures of timing and measures of pitch.

The two measures of timing, vowel duration and speaking rate, were used to explore what female Drill Instructors reported as “directness” in the sound of their authoritative speech, as well as the sense of urgency that is characteristic of the Drill Instructor Command Voice, as described in Chapter 1. For vowel duration, all three female speakers had the longest vowel duration in the teachback speech style, followed by the reading sample, with either the interview or the lockerbox style as the speech style with the shortest vowels. For F1, the teachback, reading sample, and interview speech style had significantly longer vowel durations than the lockerbox speech style. For F2, the teachback had significantly longer vowels than the reading sample, interview, and lockerbox speech styles. For F3, the teachback, reading sample, and lockerbox speech styles had significantly longer vowels than the interview. While there was not a

consistent pattern for females between authoritative and non-authoritative speech styles, the teachback speech style, which is the most authoritative DI speech style, contained the longest average vowel durations for all three female speakers.

For speaking rate, no consistent pattern emerged for the female speakers. For F1, the reading sample was significantly slower than the teachback and lockerbox speech styles, but the reading sample and interview speech style did not differ from each other significantly in terms of speaking rate. While it might appear that there was a distinction for this speaker between authoritative and non-authoritative speech with respect to speaking rate (i.e. authoritative speech being faster than non-authoritative speech), F1's interview speech style did not differ significantly from the teachback and lockerbox speech styles in terms of speaking rate. For F2, there was no significant difference in speaking rate for any pair of speech styles, but the interview speech style was slowest, followed by the teachback, the lockerbox, and the reading sample, which was the fastest speech style for this speaker. For F3, the interview speech style was significantly slower than the other three speech styles, which did not differ from each other significantly, again yielding no consistent pattern of significant difference for speech styles based on speaking rate.

It appears then, that for the female speakers, vowel duration played a role in how the most authoritative DI speech style, the teachback, was realized, but that the other DI speech style, the lockerbox, did not share this characteristic and patterned instead with the two non-authoritative speech styles with respect to vowel duration. Interestingly, the vowel duration results did not pattern with speaking rate. Because longer vowels

typically cause slower speaking rates, by virtue of the fact that it takes more time to produce them, one would expect the teachback style, with its longer vowels for all female speakers, to be the slowest speech style. However, this was not the case for any of the female speakers. This is an unanticipated result that will be discussed in Chapter 5.

For the males, the measures of timing revealed a different pattern than for the females. For the males, the longest vowel duration occurred in either the reading sample or the interview speech style, with the shortest vowel durations occurring in either the teachback or the lockerbox. For M1, the reading sample and interview speech styles contained significantly longer vowels than the lockerbox and teachback. For M2, while there was no significant difference between the four speech styles, the interview speech style contained the longest vowels, followed by the reading sample, the teachback, and the lockerbox speech styles. For M3, the reading sample contained significantly longer vowels than the interview, which had significantly longer vowels than either the lockerbox or teachback, which did not differ from each other in terms of vowel duration. Thus, the general pattern for the male speakers is that the DI speech styles contained the shortest average vowel lengths, and the non-DI speech contained the longest average vowel length.

Comparisons of speaking rates for the male speakers revealed that, like the pattern found in measurements of vowel duration, the teachback and the lockerbox speech styles had the fastest two speaking rates, as well as the shortest average vowel durations, and the interview and the reading sample, with the longest vowel durations, had the slowest speaking rates. For the male speakers, faster speech contained shorter vowels; slower

speech contained longer vowels. The two DI speech styles, the teachback and the lockerbox, were faster, in terms of syllable count per second than the non-DI speech styles, the reading sample and the interview.

For the measures of pitch, females and males exhibited the same pattern with respect to speech style. For all participants, syllable peak pitch, measured on individual vowels, differed significantly based on speech style, with the teachback having the highest average syllable peak pitch, followed by the lockerbox, reading sample, and interview speech style, which had the lowest syllable peak pitch. The only exception to this was that for F2, whose interview speech style was significantly higher than the reading sample, which had the lowest average syllable peak pitch.

For average discourse pitch, which was measured on thirty-second segments of discourse, all participants had the highest mean discourse pitch for the teachback speech style, which differed significantly from the lockerbox, which had the next highest mean discourse pitch, with the exception of M3, whose teachback and lockerbox did not differ significantly based on mean discourse pitch. For all participants except F2, the third highest mean discourse pitch was the reading sample, followed by the interview speech style, with the lowest mean discourse pitch. For F2, the interview was significantly higher in discourse pitch than the reading sample. For F1, M1, and M3, while the average pitch was higher in the reading sample than the interview speech style, these two speech styles did not differ significantly from each other based on mean discourse pitch. For F3, while the lockerbox had a higher mean discourse pitch, it did not differ significantly from the reading sample.

For standard deviation of pitch, which calculated the amount of variation from the mean pitch in the discourse segments, the general pattern of variability of pitch was that the teachback had the highest amount of variability, followed by the lockerbox and reading sample, with the interview having the least amount of variability with respect to standard deviation of pitch. For F1, F3, and M1, there was no significant difference between the reading sample and interview speech styles. For F2, like the pattern found in her syllable peak pitch and mean discourse pitch, the interview speech style had a higher amount of variability of pitch than the reading sample, although this difference was not significant. For M2, while the pattern of variability of pitch was the same, with the teachback with the highest standard deviation of pitch, followed by the lockerbox, the reading sample, and the interview, all four speech styles were significantly different from each other based on standard deviation of pitch. For M3, the pattern of two main groupings is seen again, with the teachback and lockerbox speech styles as the highest two standard deviations of pitch, which differed significantly from the reading sample and interview speech styles, which had the lowest standard deviations of pitch.

For minimum discourse pitch, no clear pattern emerged for all of the participants. All speakers except M2 had their highest minimum pitch in the teachback speech style. For F1, the teachback had a significantly higher minimum pitch than the lockerbox, reading sample, and interview, which did not differ significantly from each other based on minimum pitch. For F2, the teachback, lockerbox, and interview had significantly higher maximum pitch than the reading sample, but they did not differ significantly from each other based on minimum pitch. For F3, the teachback, which had the highest

minimum pitch, was significantly higher than the lockerbox, but was not significantly higher in minimum pitch than the reading sample, and the lockerbox and interview speech styles had the lowest minimum pitch, but they did not differ significantly from each other based on minimum pitch. For M1, the teachback, lockerbox, and interview speech style had a significantly higher minimum pitch than the reading sample, which had the lowest minimum pitch. For M2, the highest minimum pitch was in the lockerbox, followed by the reading sample, the interview, and the teachback with the lowest minimum pitch. However, for this speaker, no speech style was significantly different from the others based on minimum pitch. For M3, the same two groupings that resulted in the other pitch measures emerged again—the teachback and lockerbox had the highest minimum pitch, even though they did not differ from each other significantly, and the reading sample and interview speech styles had the lowest minimum pitch but did not differ from each other significantly based on minimum pitch.

For maximum discourse pitch, a clear pattern emerged for most participants, where all four speech styles differed significantly based on maximum pitch. The highest maximum pitch for all speakers was in the teachback speech style, followed by the lockerbox, the reading sample, and the interview. Like the other measures of pitch, F2 differed from the others in that her interview speech style had a higher maximum pitch than her reading sample. However, this difference was not significant. For F3, while the reading sample had a higher average maximum pitch than the interview, these two speech styles did not differ significantly from one another based on maximum pitch.

With respect to pitch range, both female and male speakers had the largest pitch range in the teachback, followed by the lockerbox, reading sample, and interview speech styles. There was a larger difference in mean pitch values between women and men in the maximum mean pitch measures than in the minimum mean pitch measures, which indicates that the pitch range for women is higher than the pitch range for men.

In sum, the pitch measurements on the four different speech styles exhibited the same pattern for females and males with, in general, the authoritative DI-speech styles having both higher average pitch and variability of pitch than the non-authoritative speech styles. However, there was a difference between females and males for the measures of timing. For females, the longest vowel duration was in the most authoritative speech style, the teachback, whereas for males, the most authoritative speech had the shortest vowel duration. Vowel duration appears to play a different role in the use of authority for women than for men. However, although the vowel duration was longest in the teachback speech style for female speakers, the teachback was not the slowest speech style with respect to speaking rate. These results are discussed in Chapter 5.

CHAPTER 5

DISCUSSION

5.1 Introduction

The purpose of this study was to investigate, during the training of future Drill Instructors, what kinds of acoustic characteristics were being emphasized in the DI students' training of the Command Voice and to see if female and male DI students, who are trained together at the Drill Instructor School, were using the same kinds of phonetic features in authoritative and non-authoritative speech styles. Four speech styles were isolated for six speakers—three female and three male. The teachback and the lockerbox discussion were selected as representative of two different kinds of DI speech, and these authoritative speech styles were compared with an interview and a reading sample, which represented non-DI, non-authoritative speech. The acoustic measurements that were selected as possible acoustic features of authority were based on both male and female Drill Instructors' descriptions of the Command Voice. While male DIs emphasized loudness and speed, female DIs focused on “directness.”

The characteristics of speed and “directness” were analyzed as measures of timing, including vowel duration and speaking rate. While no measure of amplitude could be directly obtained in the naturally occurring speech that was recorded because of equipment problems, the measures of pitch, including mean pitch, standard deviation of pitch, and range of pitch were analyzed, as these are characteristics associated with gendered voices and may also be indirectly related to amplitude.

5.2 Research questions addressed

This study was designed to answer the following questions. First, what are the acoustic features unique to female DI students' voices in authoritative speech styles? Are there significant differences between the features of authoritative and non-authoritative speech for female DI students? Secondly, what are the acoustic features unique to authoritative speech for male DI students? Are there differences between the acoustic features of male DI students' authoritative speech and non-authoritative speech? Third, if there are specific features of authoritative and non-authoritative speech unique to female and male DI students, are those differences present in the same contexts for males and females, or do they pattern differently? Do female and male DI students do similar things with their voices to convey authority, or do they convey authority differently? If there is in fact a difference in the acoustic properties of male and female DI speech, why are those differences present?

As reported in Chapter 4, female DI students appear to use vowel duration in their most authoritative speech style differently from male DI students. For females, vowel duration was longest in authoritative speech; for males, vowel duration was shortest. However, this difference does not appear to be linked to speaking rate, where longer vowels should result in slower speech. With respect to pitch measures, however, females and males appear to be using the same patterns of mean pitch, standard deviation of pitch, and pitch range, contrary to what has been previously reported in the literature on gender and pitch. In sections 5.2.1 and 5.2.2 below, I briefly summarize the results of the measures of timing and the measures of pitch respectively, discussing some possible reasons for both the similarities and differences.

In Section 5.3, I turn to research differences in how female and male DIs view their recruits and their relationship with those recruits that might in part explain the results of the present study, particular the result for vowel duration. Section 5.4 provides a discussion of the possible implications of the results in this study, particularly for females in positions of command outside of the sex-segregated environment of Boot Camp. Section 5.5 provides a brief overview of sociophonetic perception issues within the field of language and gender, with particular attention paid to how such perception issues apply to female DIs' negotiation of their status in the Marine Corps in positions of authority. In Section 5.6, the sociobiological, sociopsychological, and sociopolitical perspectives of language and gender are discussed within the context of the current study. Section 5.7 provides directions for future research, followed by concluding remarks on what the present study has contributed to the relatively recent area of sociophonetic research and the field of language and gender in general.

5.2.1 The results of the measures of timing

Because of the importance of the “sense of urgency,” or the Drill Instructors’ belief that the way a DI speaks directly affects the speed and accuracy of their recruits’ reactions to orders, measures of timing in speech are particularly relevant. As discussed in Chapter 1, while the male DIs interviewed focused on speed and amplitude in the use of the Command Voice as the best way to obtain a fast and accurate recruit response, female DIs emphasized the importance of being “direct.” I hypothesized that what the females were describing as “directness” could be related to speaking rate and speaking clarity, i.e. enunciation within this fast speaking style. Therefore, both vowel duration, a

possible measure of enunciation, and speaking rate, a measure of the speed associated with the “sense of urgency,” are both means of investigating these differing, yet related, implementations of the Command Voice.

Vowel duration was manipulated as part of the realization of the four different speech styles for all speakers; however, the pattern that emerged was different between men and women. For the men, the longest vowels occurred in the non-authoritative interview and reading sample speech styles, and the shortest vowels occurred in the authoritative teachback and lockerbox discussion speech styles. For male speakers, vowel duration was consistently shorter in authoritative speech as compared to non-authoritative speech. For females, the longest vowels consistently occurred in the teachback speech style; however, the other speech styles patterned differently for each speaker. For one female, the lockerbox had shorter vowels than the other speech styles. For another female, the teachback had longer vowels than the other three speech styles. For the last female, the interview had shorter vowels than the other three speech styles. With respect to vowel duration, the two DI speech styles, the teachback and the lockerbox discussion, patterned together for the males, but females differentiated them.

In addition to vowel duration as a measure of timing, speaking rates were calculated for each speaker in each speech style. One would anticipate that the speech styles with the longest vowel durations would have a slower speaking rate than speech styles with shorter vowel durations. For the males, the authoritative speech styles were faster in terms of syllables per second than the non-authoritative speech styles, resulting in a pattern consistent with this prediction. For females, while there was no clear pattern

in speaking rate, the teachback did not have the slowest speaking rate, contrary to the above prediction. This result is important, considering the value placed by both females and males on the “sense of urgency” of voice needed to get recruits to react to their orders in a “smartly manner.” Presumably slower speech will elicit a slower response from recruits, which would not bode well for the “command presence” of female DIs. However, based on the results presented here, this is not the case.

While certain aspects of pitch differences between women and men could at least partly be explained through differences in the vocal apparatus for males and females, there is no biological basis for differences in vowel duration between women and men. This is arguably something that women and men are manipulating for sociological reasons. While research on gender differences in vowel duration across various speech styles remains an under-explored area, research on vowel duration has been done on mothers’ speech towards their children. It was found that in reading tasks, mothers’ content words contained significantly longer vowels in child-directed speech than in adult-directed speech (Bernstein Ratner 1986, Morgan 1986).

Hypothesizing that this difference in vowel duration could in part explain why content words emerge before function words during language acquisition, Swanson, Leonard, & Gandour (1992) compared content words in two phrasal positions for child-directed speech and adult-directed speech in mothers’ read speech. They found that vowel duration in phrase-final content words was 26.5 ms longer in child-directed speech than in adult-directed speech, and that vowel duration in non-phrase final content words was 14.7 ms. longer in child-directed speech than adult directed speech. There was no

significant difference for function words (Swanson *et al.* 1992; Swanson & Leonard 1994).

According to the literature on auditory discrimination in adults, the Just Noticeable Difference (JND) level for duration is between 10 and 40 ms (Klatt & Cooper, 1975; Lehiste, 1970). Swanson *et al.* (1992) claimed that the durational differences found in mothers' child-directed speech for content words, (14.7 ms and 26.5 msec for phrase-nonfinal and phrase-final, respectively) were probably beyond the JND level for speech, whereas the 3.9 ms increase found for function words were no doubt below the JND level. They argued that this difference in vowel duration could be contributing to children's acquisition of content words before function words, i.e. that vowel duration assists in the perception of the adult speech by children.

There are three issues here to consider. First, there is evidence that females in general may be oriented towards their audience in ways that differ from the ways that males do. This has been demonstrated in several measures of discourse, for example the directives used by female and male doctors in West (1980, 1990), as well as in the use of inclusive pronouns 'you' and 'we' as discussed in Hirschman (1974), among others. This difference in orientation was also explored with respect to pitch use among females, as in the work of Lewis (2002), though that study did not compare pitch use by males between male and female speakers. It may be that female Marines, in positions of power, are oriented towards their audience, i.e. their recruits, in ways that male Marines are not, which will be discussed further in Section 5.3. It is possible that, like the speech of mothers towards young children, which was clearly marked with longer vowel durations

in content words, female Marines are using vowel duration as part of the importance of being understood by those listening to them. Secondly, returning to the notion of the limitation of the phonetic resources available to female speakers in such a prescribed style of speech, vowel duration is one phonetic dimension available for manipulation by females that might not cause negative perceptions about their authority or their character, the way manipulation of amplitude or pitch differences could.

Lastly, it would be a great mistake to equate the speech of female DIs and mothers as using the same phonetic cues for the same sociobiological reasons that many would like to attribute to them, i.e. that women are “naturally” maternal towards their recruits. While the phonetic feature that is used is the same and the orientation of the perception of “other” is somewhat parallel, there is nothing about a female DI that is motherly. Any claim along this line would be overly simplistic and inaccurate. This is a point I return to below in the discussion of the difference between the view of female and male DIs towards authority and towards the relationship they have towards their recruits.

What remains in question is that if women are using longer vowels in authoritative speech, and yet their speaking rate does not appear to be slower as a result of this, where are they making up the time? It is possible that the duration of female DIs’ consonants are shorter in authoritative speech than males’ consonants. This is a topic I address in my discussion of future research in Section 5.7.

5.2.2 *The results of the measures of pitch*

While the measures of timing described above were used to investigate the reported difference between the values of male DIs' Command Voice as being "fast" and female DIs' Command Voice as being "direct," measures of pitch on various levels were taken to address one of the more salient and commonly studied phonetic differences between male and female voices. Unlike the results of the measures of timing above, where women and men used vowel length differently between authoritative and non-authoritative speech, there was no interaction between speech style and pitch, resulting in similar pitch patterns for both the women and men.

Two measures were taken to assess the overall average pitch of each speaker in each speech style. The first measure was based on the peak pitch of individual vowels, and the second measure was based on the mean pitch of thirty-second portions of discourse. Both measures indicated that female and male speakers manipulated their average pitch as part the realization of the four different speech styles analyzed, and further, that females and males use pitch in similar ways. For all female and male speakers, the teachback speech style had the highest mean pitch, followed by the lockerbox discussion speech style, the reading sample, and the interview. Therefore, the two authoritative DI speech styles had the highest average pitches, and the two non-authoritative non-DI speech styles had the lowest average pitches for both male and female speakers.

As noted in Chapter 1, the reported average pitch for women and men in normal speech is 220 Hz and 130 Hz, respectively (Peterson & Barney 1952), or approximately 308 Mels for females and 192 Mels for males (Stevens & Volkman 1940). By

comparison, for the females in this study, the average pitch in Mels for each speech style was approximately 250 Mels for the interview, 275 Mels for the reading sample, 300 Mels for the lockerbox, and above 500 Mels for the teachback; for males, the average pitch in Mels for each speech style was 150 Mels for the interview, 175 Mels for the reading sample, 225 Mels for the lockerbox, and 375 Mels for the teachback. For both females and males, the average pitch used in the authoritative speech styles, specifically the teachback, was far above the average pitch found in normal conversation. This result is surprising, and will be further explored in Section 5.5 below on issues of perception. However, it may be that the difference in pitch between authoritative speech and non-authoritative speech for both female and male DI students can be likely attributed to the need for higher amplitude, as the loudest speech style, the teachback, was the speech style with the highest amplitude by its nature as an exercise in yelling commands.

The lockerbox discussion, which was significantly lower in average pitch than the teachback, was delivered as a lecture to a group of recruits in a classroom-like setting, and therefore presumably contained higher than average amplitude as well, though direct measures of amplitude were not taken. However, what is important with the result on average pitch in this study is that it does not appear that either females or males avoided the use of higher pitch in the authoritative speech as Drill Instructors. Yet, the overall pitch in the teachback, for example, is approximately 150 Mels higher for females than for males.

With respect to variability of pitch, two measures were calculated: average standard deviation of pitch in thirty-second portions of discourse and pitch range within

thirty-second portions of discourse. For both female and male speakers, the standard deviation of pitch, that is, how much the average pitch changed over time in each speech style, was significantly different for each speech style for each speaker. Again, the pattern for both females and males was similar: the largest amount of variation of pitch occurred in the two DI-speech styles, with the teachback speech style containing the largest amount of variability, followed by the lockerbox discussion speech style. While these two speech styles differed significantly in terms of standard deviation of pitch for all speakers, the two non-DI speech styles were not significantly different from each other on the basis of standard deviation of pitch for most speakers. For both women and men in these contexts, the variability was much more moderated.

The second measure of variation of pitch measured the range of pitch over thirty-second discourse segments. Unlike the measure of standard deviation, where the amount of variability was measured, this measure provides the average minimum and average maximum pitch a speaker uses in each speech style. The average maximum pitch for all speakers was significantly different for all speech styles for both females and males, with the teachback speech style having the highest average maximum pitch, followed by the lockerbox discussion, and either the interview or reading sample with the lowest average maximum pitch. Like the results from the other measurements of pitch above, females and males appear to be using pitch in the same way, and highest pitches are occurring in the authoritative DI speech styles.

Within the pitch range measurements, while the maximum pitch patterned similarly for all speakers, both male and female, the average minimum pitch for females

and males was different. The general pattern for the males was that like the maximum pitch patterns, the highest average minimum pitch occurred in the teachback and lockerbox discussion, with the two lowest average minimum pitches in the interview and reading sample. The one exception to this was that M2, who had the highest maximum pitches in the authoritative speech styles, also had the lowest average minimum pitches in the authoritative speech styles, giving him the largest range of pitch of all of the speakers.

For all of the females, the teachback speech style had the highest minimum pitch. However, there was no clear pattern in the difference in minimum pitch for the other three speech styles. This suggests that there might be some sort of interaction between pitch and amplitude for the females; presumably the louder speech styles, the teachback and the lockerbox would have the highest minimum pitches. While this pattern did emerge, the difference between the authoritative speech styles and non-authoritative speech styles was not always significant. In one case the lockerbox was not significantly different from the reading sample and the interview. In another case, the reading sample had the highest minimum and was not significantly different from the teachback, and the lockerbox speech style did not differ significantly from the interview.

Given the results of the effect of the gender and the status of the interlocutor found by Lewis (2002), it may be that my female gender, or my interviewer status, could have affected the pitch of the female speakers, at least with respect to minimum pitch. Further, the fact that the lockerbox audience was composed of female recruits may have also influenced the pitch of the female DI students. While the pattern was similar to the

males in part, the differences noted here, accompanied by these possible influences of interlocutor and audience, warrant further inquiry.

However, the pitch range in the teachback speech style, which due to the small number of subjects in this study was not calculated with sex as a factor, varied from 400-435 Mels for females and 300-365 Mels for males. It appears that female speakers did use a larger pitch range in the teachback than the males, though both male and female speakers had their highest pitch range in the authoritative speech styles, which contradicts previous findings on male speech as discussed in Chapter 1. In the next section on perception issues, it will be shown that these results contradict social expectations and social values placed on qualities of authoritative voices.

5.3 The different perspectives of female and male DIs toward their recruits

In previous work with female Drill Instructors (Hicks Kennard 1999), it became clear that at least from their perspective, female DIs have a different relationship with their recruits than males DIs do. While I was not able to directly compare female DIs' perspectives with data from male DIs at that time, female DIs do in fact interact with male DIs during their time off, they socialize in the same circles, and some male and female DIs are married to each other or are dating. The females I talked to reported that the relationship between Drill Instructor and recruit is a common topic of conversation with their male peers, and that there are noticeable differences in the ways female and male DIs view the relationship.

One difference in the way that the female and male Drill Instructors interviewed in 1997 viewed their recruits involves the level of discipline they felt was required to

obtain the desired development of their recruits during training. For example, when asked if she felt that female and male Drill Instructors train their recruits differently, one female stated:

Yes, um, the men are a lot harsher...But you know, we don't feel that it's necessary to train our recruits like that. You know, we don't feel that we have to ...holler and scream at them to get them to produce the same product, you know, the same outcome, the same result. We don't hafta yell at our recruits like that to have the same results. As a matter of fact females are more disciplined than the males are as far as obedience to orders.

In the above comment, the female DI made the claim that female recruits are easier to train because they are more disciplined and obedient. The “hollering and screaming” that the male DIs are notorious for is not necessary, or at least not necessary to the same extent, in the female squad bay. This comment of course led to the question of why they thought that this reported difference in the need to “holler and yell” was there for the males and not for the females. She responded with this:

Females are stubborn, but males are more stubborn because you feel like their manhood and egos are at bay. So you figure if you talk to a female, a female is more or less more conducive to learning what you're saying to em whereas males, you know, they it's a ego thing, that they're competing with their Drill Instructors in a ego term, whereas females are not.

Because of these reported differences in how women train their recruits versus how men do, especially with respect to this level of “harshness” described above, one possible interpretation of this is that female DIs are easier on their recruits than the males are. However, in response to this possibility, another female DI stated:

I wouldn't say that. I just think that females, um, tend not to be so uh so much of a hardass...We're very intense on our recruits, and on each other as far as discipline and responding to orders. In fact I think we're harder on each other than the males. I just think um...females do it a different way than the males. Males are much more 'take-it-out-in-the-backyard-and-brawl-it-out-type-people' than females.

She further offered that women who enter the Marine Corps are starting off their new career from a very different, and sometimes negative, position relative to their male peers. She stated that many women who enter the military do so to escape some sort of abuse and see the military as a way out, as a positive step towards a new life. Because of this high incidence of abuse, she felt that these women are starting off having already been "beaten down;" however, she did not feel that female DIs are at all easier on their recruits in terms of the necessary intensity needed for effective training. In essence, female DIs need to bring their recruits up a level, particularly in terms of confidence, whereas many male DIs must take their male recruits "down a notch or two." With respect to why female DIs respond to female recruits differently in terms of this male "in your face" training style, she stated:

You have to (have a different strategy) because of the fact that like eighty-five percent of the women that come into the Marine Corps have had some type of abuse. You're dealing with a lot of baggage that comes along with these recruits. And you have to deal with them on a different level. Yeah, you can yell and scream, you can holler, you can do your little dance, but you also have to remember that there's a human being there. And sometimes that's really hard for us to remember.

When asked whether or not this difference between the training styles of male and female recruits has anything to do with the idea that women are more emotional than men and therefore must be treated differently, a common stereotype that women face not only in the military, but in American society in general, she answered:

Well, I don't know, maybe not more emotional, but they are treated ((meaning have been treated prior to joining the military)) as they are more emotional. And then there's that stereotype that's automatically beat into their head "You are more emotional because you are a woman."

The evidence above suggests that female Drill Instructors can and must take on a more mentor-like role with their recruits. However, this is not viewed as a negative issue by either the women in command or their superiors, but rather it is viewed as part of what is different about men and women in general. Women tend to view the authority and command that is necessary for training recruits as a matter of practicality, as demonstrated by their beliefs that female recruits come into their training already easier to discipline without all of the unnecessary "performance" of the male DIs. Female DIs suggested that the extra displays of prowess and aggression are not necessary; therefore, they do not need to, nor want to, use them. This parallels the findings of McElhinney (1993), where female police officers value the practical, rational approach to their job that they take over the physical displays of force and aggression often used by male police officers.

However, as motivated earlier in Chapter 1 with respect to the use of amplitude as a "macho" characteristic that male DIs highly value, and in light of the above statement that for males "it's a ego thing, that they're competing with their Drill Instructors in a ego term, whereas females are not," there is evidence to suggest that male DIs do things with their voices to enhance their appearance as powerful over their recruits. This evidence comes from two sources, which I will discuss briefly.

First, a unique voice quality, referred to as the Frog Voice, is a stylized way of speaking adopted by some male Drill Instructors. Based on a very small sample of data I collected, it appears that the Frog Voice may be an example of vocal fry, which is a voice quality that is composed of a train of discrete, low-frequency, glottal pulses produced by the larynx (Hollien & Wendahl 1968). According to a survey of the literature on vocal fry, the average frequencies of vibration range from 20 to 70 Hz with a mean of 50 Hz (Blomgren, Chen, Ng, & Gilbert 1998). Perceptually, vocal fry has been described as similar to the sound of “popping corn,” where each individual vibration of the vocal folds can be heard distinctly (Colton & Casper 1996).

The Frog Voice is interesting for its unique acoustic properties, the various positions that male DIs take on its use, and female DIs’ rejection of its use. The Frog Voice is typically used by Drill Instructors who take on the more disciplinary role within a platoon, although the sample provided in this research came from a Senior Drill Instructor who reported that he uses it in whichever DI role he is assigned. When I asked why some DIs choose to adopt the Frog Voice, the male Drill Instructors I spoke with reported that they like the way it sounds—that it sounds “unique,” “intimidating,” and “powerful.”

However, the use of the Frog Voice within the male DI community is not accepted by some male DIs and not allowed by some Commands. One argument for this is that male DIs are being discouraged from this voice quality as an unnecessary display of aggression. Another more interesting argument given by many male DIs that I spoke with is that it is viewed as a “cop-out” from being loud, or as a means of saving one’s

voice from the brutality that comes with the highly valued amplitude that is so embedded in the masculinized values of the male Command Voice. A “true” DI loses his voice from yelling all of the time, and the use of the Frog Voice is viewed as a means of escaping that part of the job. When I asked female DIs about the use of the Frog Voice, they reported that they are not “allowed to use it.” However, they made it very clear that they would not use it even if they were allowed to because it is an unnecessary display of power or aggression, which does not fit with their view of being practical and direct with their recruits. The Frog Voice is not a linguistic resource that they take seriously; in fact, when asked about the Frog Voice during a casual conversation that I had with several female DIs, their initial reaction was to laugh and roll their eyes.

In addition to the use of the Frog Voice by some male DIs as a means of displaying power that differs from the direct, practical approach to authority of the female DIs, anecdotal evidence from a casual conversation with male DIs during a follow-up visit to Parris Island sheds light on another possible means of male displays of authority. Based on the repeated emphasis of amplitude and speed as important characteristics of DI speech and the possibility that such characteristics might make their orders difficult to understand, I asked the male DIs how concerned they were about their recruits’ ability to understand the orders that they give them. One male told me that it is not uncommon for a male DI to go out into the squad bay and “bark an unintelligible bunch of orders” only to go back into the duty hut and peek through the blinds as the confusion between the recruits unfolds.

It is important to note here that this is not a form of hazing and should not be viewed as any form of abuse. The recruits were not punished for their inability to follow such nonsensical orders. Rather, these male DIs in this conversation view this as a tactic to remind the recruits that it is their job to always be on guard, and that it is their job to do the understanding. Like the use of the Frog Voice, this type of tactic is not used by the females, but rather is looked upon as “unnecessary” and “impractical.” I am by no means suggesting that this is what all male DIs do, but rather that it serves as additional evidence that some male DIs do things with language to mark their authority over their recruits in ways that female DIs do not.

The vowel duration difference found in the present study is likely another result of the influence of addressee on women’s speech and the audience-oriented stance that women adopt in general, as discussed by Lewis (2002), among others. Further, the use of vowel duration of female DI students may parallel the focus on clarity of speaking noted in studies on mothers in child-directed speech as discussed above. Vowel duration may be an acoustic characteristic of female authoritative speech and reflect female DIs’ goal of being clear, direct, and efficient in terms of the orders that they give to their recruits while speaking with “command.”

Additionally, the idea that female DIs take a recruit-oriented stance while male DIs take a DI-centered stance in their authoritative positions may also be related to the concept of females’ mentorship and camaraderie as minorities within the larger institution of the Marine Corps. In other words, vowel duration differences as acoustic markers of clarity may reflect their community oriented behavior. In her research on the

narratives of women in the Air Force, Disler²³ (2005) found that while the masculine military culture is perpetuated through the discourse of both males and females, males use discourse strategies that reflect constructions of masculinity, while females' strategies focus on assisting newer members of the institution in becoming full members. Her work focused on narratives of events told by male and female pilots, and she found that discourse patterns for women focus on the community, while the narratives told by men focus on contest. However, it is not simply the case that females are community-oriented and males are not, or that females do not acknowledge and value the hierarchical nature of institutions like the military in the same way that males do. Disler argued that "while men in the military view the military hierarchy as the means through which they achieve military solidarity, women, who are also dedicated to and value the military hierarchy, do not approach military solidarity via that hierarchy. Instead they use ritual styles of talk that are typical of women" (Disler 2005).

One last difference in the perspectives of female and male DIs towards recruits is their view, and society's view as well, of the final product, when the recruits graduate from Boot Camp and are officially Marines. Both male and female DIs take great pride and can become very emotional about the transition of their recruits from being "undisciplined" civilians to Marines who are "squared away" in terms of discipline, hygiene, and professional conduct. The two male DI instructors I interviewed in 1997 equated graduation from Boot Camp as a rite of passage into manhood for male Marines. However, there is no equivalent transition into womanhood for female Marines. This is

²³ Lt. Colonel Disler is an assistant professor at the United States Air Force Academy and an active duty

probably due to the fact that becoming a Marine is not a culturally expected path for a female in American society. Instead, their graduation is viewed as a professional transition. When asked about this idea of the rite of passage, a female DI stated:

(For a man), he made it; he's a man now. Whereas for our young ladies, they more or less have embarked upon a stepping stone for a career...I don't think it has quite the same impact as far as the manhood thing that it does for a young man, but it is quite a professional accomplishment for these young ladies.

Given that when a male graduates from Boot Camp, he is considered a "man," when asked what a female would be considered when she graduates from Boot Camp, she responded:

They're Marines (laughs), they're Marines, new Marines...it's really an amazing, professional transformation of these young ladies.

5.4 Possible implications of the results for females in command

In interviews with female and male Drill Instructors, it is clear that female DIs are aware of the perceptual grey area in which they operate. They must constantly negotiate how they are perceived by their male and female superiors, their male and female peers, and male and female recruits. One female DI stated that she became a DI specifically to challenge the image of women in the Marine Corps as being masculine. When asked if she felt that women who become Marines have to act masculine, she stated:

That's why I'm here. Cuz I tell my female recruits 'Don't ever ever compromise your femininity or your womanhood for the title because, me being a Marine, hey, my hair's combed just the same, I paint my nails, I I my hygiene is just as neat and it's, there's no difference. I tell 'em never to compromise because male Marines will look at you in a different way and they will stereotype you in a certain way. They'll stereotype you as you're a ugly dog Marine tryin' to be a man, or they'll stereotype you as a lady. They will respect you more as a female Marine who acts like a lady. They will respect you more (Hicks Kennard 1999).

The above quote reveals several important issues. First, females face being labeled as one of two things: “a ugly dog tryin’ to be a man” or a “lady.” The use of the term ‘lady’ above is interesting for several reasons. First, ‘lady’ is a term in middle-class American society that is often associated with women who are delicate or in need of help and protection. Lakoff (1975)²⁴ pointed out that ‘lady,’ as a euphemism for ‘woman,’ “recalls the age of chivalry” (24). Second, Lakoff claimed that the term ‘lady’ is reserved for labels that associate women with either demeaning tasks (e.g. woman doctor vs. cleaning lady) or trivial matters (*Ladies Lib) (Lakoff 1975: 24-25). However, the term ‘lady’ in the case of female Marines is useful for avoiding sexual connotations in an environment where sexual harassment is possible and for avoiding the “butch” lesbian stereotype. Further, as stated by the DI above, the image of ‘lady’ commands respect from men, and this is why female Marines adopt this term (Hicks Kennard 1999). In this case, women as Drill Instructors who are very much involved in serious matters use the term ‘lady’ to negotiate the fine line between what is too masculine and what is too feminine.

However, male Marines do not refer to female Marines as “Lady Marines.” The term that male Marines use to refer to women in the Marine Corps very strictly falls within the sociobiological framework of gender, where gender is seen as being based simply on sex differences. Male Marines refer to women in the Marine Corps simply as “females” or “female Marines.” What is important in the statement from the female DI

²⁴ It is important to note that many researchers on language and gender find Lakoff’s analysis problematic. However, it provides a clear contrast between the expectations of women’s and men’s gender roles in 1975 and now. It is relevant to my analysis for precisely this reason, as my focus is on how women use language in positions of power, clearly the opposite of Lakoff’s focus in 1975.

above is that the word ‘lady’ is used within the female Marine Corps community as representative of how female DIs want to be seen by their male peers. This desire to maintain a feminine appearance, supported by her reference to her nails and her hygiene as being feminine, is a common theme in female DIs descriptions of themselves. These physical markers of gendered behavior take precedence where the actions and activities that women engage in run counter to traditional gender expectations, a theme also found in Williams (1989).

In light of the differing values males and females have of the Command Voice, as well as the differences in the ways that male and female Marines view their recruits, it would not be surprising if problems in integrated training within Boot Camp, like the integrated training set-ups in other branches of the United States military, did in fact arise. One male DI that I interviewed, who was the Drill Master (the person in charge of teaching DI students the Command Voice in DI School) at the time of the interview (Hicks 1997), focused on the differences in pitch and amplitude that are “naturally” ascribed to men and women: men are louder and deeper in pitch, whereas women are less loud and use higher pitch when giving commands. He stated:

I think that personally, if if a female was training me with a if I was a recruit and uh a female uh with a high pitched voice or whatever, personally I would feel I I don’t know if I would respond with the same sense of urgency as I would to a male’s voice simply because it’s uh I think it’s a stronger voice and uh because I’m a male uh u that would be normal for me. Uh, but I think in the in the way that we’re set up here, I don’t think it affects it, affects um them in a negative way in training.

The above statement implies that it is simply the properties of the voice that elicit a particular response from the recruit, having little to do with whose voice the commands

are coming from. Importantly, he emphasized that this difference in the use of physical characteristics of the voice should not impact the effectiveness of training recruits, since male DIs train male recruits and female DIs train female recruits. However, this segregation is a temporary situation: the question that remains is what problems, if any, occur in the Fleet, where male and female Marines work together, particularly when a female is a male's superior. Will differences in the way females and males convey authority be perceived differently by members of the opposite sex? Evidence from research on the effects of social information on the perception of language suggests that this might be the case. This issue is explored in the next section.

5.5 Perception issues

Many gender and language scholars have called for the abandonment of the use of strictly categorized gender roles by researchers, (Bergvall, Bing, & Freed 1996, Ehrlich 2003, Gal 1992, among many others), motivating instead the investigation of gender and language from the speaker's perspective—not from categories imposed upon them by the analyst. However, because of the military's rigid view of biological sex as gender, such static categories must be considered when looking at gender performance within such a community. Further, much research has shown that the perception of speakers is affected by social expectations from listeners. For example, Rubin (1992) found that the same native speaker of English was perceived as having an accent by undergraduate students when her voice was paired with a picture of an Asian woman and without an accent when her voice was paired with a picture of a Caucasian woman. On comprehension tests based on the speaker's lecture materials, students performed significantly worse when the

voice was associated with the picture of the Asian woman than they did when the voice was associated with the Caucasian woman.

Social expectations of listeners do affect perception; therefore, it is in fact important to consider social categorizations like gender from the perspective of the perceiver. According to Eckert & McConnell-Ginet (2003), “Our perception of sound segments is hardly mechanical. We adjust readily to voices of different people and to different accents...we do not adjust simply to what we hear, but what we expect to hear” (Eckert & McConnell-Ginet: 62). It is not that the gender categories are necessarily “real,” but that they are viewed as “real”—from the perspective of others.

While phonetic features like pitch are at least partly based on differences in the physiology of men and women, there is evidence that pitch can be and is manipulated for sociological reasons. Two main methods of pitch manipulation of one’s voice include either an alteration in the tenseness of the musculature within and surrounding the larynx, or a manipulation of breath pressure—why pitch tends to go up with an increase in amplitude. Importantly, in spite of all of the variation in pitch changes that can and do occur within discourse, e.g. different intonation patterns used for questions, statements, and pitch influences in stress, listeners are still extremely good at assessing the overall *average* pitch of a speaker’s voice (Graddol 1983; Graddol & Swann 1989).

In categorical perception experiments based on the perception of the phonemes [s] and [ʃ], the perceptual boundary between the two phonemes was perceived differently when the sounds were accompanied by pictures of speakers with prototypical masculine or feminine faces (Strand 1999; Strand & Johnson 1996). Subjects were randomly

presented manipulations of the acoustic signal of the word ‘sod’ with the initial consonant ranging from /s/ to /ʃ/. Subjects were asked to report whether they heard the word ‘sod’ or ‘shod’. The researchers found that subjects perceived the boundary between [s] and [ʃ] differently depending on whether the picture that accompanied the speech sample was feminine or masculine, presumably because women produce [s] at a slightly higher frequency than men do. When the perceived speaker was female, the boundary between the phonemes was slightly higher than when the perceived speaker was male. In other words, “what sounded like ‘shod’ in the mouth of a man sounded like ‘sod’ in the mouth of a woman (Eckert & McConnell-Ginet 2003: 62).

While the above studies demonstrate that listeners must be projecting what they expect to hear onto what they perceive based on influences from social categories like ethnicity, in the case of Rubin (1992) and gender, in the case of Strand & Johnson (1999), many studies have also demonstrated that there are social values placed on certain acoustic features, particularly those related to properties of gendered voices. For example, in their review of sociopsychological explanations of characteristics of authoritative voices, Graddol & Swann noted that voices with higher pitches are perceived as less confident than voices with lower pitches (Brown *et al.* 1973, cited in Graddol & Swann 1989: 32), and that higher pitched voices were perceived as less truthful and generally less ‘potent’ (Apple *et al.* 1979, cited in Graddol & Swann 1989: 32).

More recent work has demonstrated similar effects. Van Bezooijen (1995) tested reactions to women’s voices to explore the idea that culturally-motivated differences in pitch reflect gender-role expectations. In this study, reading samples of both Dutch and

Japanese women's voices were manipulated to produce three different samples—the original sample, a sample with a higher pitch than the original, and a sample with a lower pitch than the original. Both male and female listeners of both cultures rated the lower pitch versions higher than the higher pitch versions for the characteristics *tall*, *strong*, *independent*, and *arrogant*, and higher pitch versions were rated higher for the characteristics *short*, *weak*, *dependent*, and *modest*.

Coleman found that people rate “masculinity” and “femininity” on a scale, and that people made their decisions mainly through the influence of the pitch of the speaker's voice (Coleman 1976, cited in Graddol & Swann 1989: 32-33). By examining ideas about gender, in this case the use of pitch, on a continuum rather than as a categorical perception, Coleman inadvertently set up a situation in which any rating that was perceived as high in masculinity must be necessarily low in femininity, which is a problematic assumption for women in the military, who not only take on a multitude of different roles ranging from disciplinarian to mentor, but must do it in a historically masculine environment and occupation.

While the finding on differing use of vowel duration between female and male DI speech was an unanticipated difference between authoritative and non-authoritative speech, the results of the overall higher and more variable pitch patterns for male DIs is surprising, especially in light of the social judgments on perception given above. In fact, a civilian journalist who conducted a participant-observation research piece on the voice of the Marine Corps Drill Instructor found that pitch of voice in his attempts at DI speech was precisely the feature that was posed a problem. In order to gain a clear

understanding of what DIs must do with their voices to project “command,” Liu (2005) worked with a male DI to learn how to call Close Order Drill, the DI speech style similar to the teachback in the present study. Liu described the DI Command Voice as, “...huge, booming, unambiguously clear. He blasts at operatic volume, without any obvious effort” (Liu 2005: 2).

After some practice, Liu attempted to call Close Order Drill to a willing group of Marines, and he found that his own voice was, “like a pocket version of his (meaning the DI who was coaching him). Plenty of spirit, but pitifully little volume” (Liu 2005: 2-3). The advice given to him by the DI surprised him—he needed to *raise* his pitch substantially, where he had been “trying to deepen (his) voice, to project what (he) thought was a more masculine sound.” The DI explained that the higher pitch is necessary to project the voice in order to be understood—that the higher tone carries more effectively (Liu 2005: 2-3).

Two issues arise from Liu’s investigation. First, this male DI appears to be aware of the need for higher pitch in calling out Close Order Drill (recall that Close Order Drill is used to call commands out to Marines in formation). His awareness of the use of a higher pitch conflicts with ideas of lower pitch reported to be valuable characteristics of DI speech by both male and female DIs previous research on DI speech (Hicks Kennard 1999). This implies that there may be a mismatch between the acoustic reality of the DI voice and what DIs think they should be doing, in terms of social values of acoustic characteristics. Or it may be the case that speaking with “command” and the use of the Command Voice in Close Order Drill are viewed as different types of command that call

for different acoustic features. This could explain the difference between the DIs who reported to me that clarity was the responsibility of the recruit and the emphasis on clarity discussed in the DI in Liu's investigation. Perhaps during Close Order Drill clarity is viewed as the responsibility of the male DI, but in the squad bay, the ability to understand is the responsibility of the recruits.

Secondly, it may be that listeners perceive pitch differently depending on the speech act in which the pitch is used, or that other acoustic characteristics like voice quality and amplitude counteract or contribute to high pitch being perceived as authoritative, counter to results like those of Van Bezooijen (1995). Perhaps a shouted high pitch might not sound feminine because shouting is not associated with femininity. Further, a new question arises: given the positive social values associated with low pitch and the negative social values associated with high pitch found in research in non-military environments, how is the higher pitch of DI authoritative speech perceived by both female and male recruits? Clearly the result of higher pitch in authoritative speech styles for both males and females in this study warrants further inquiry.

More recent work on the psychology of gender uses separate masculinity and femininity scales. Hence a person can be simultaneously 'aggressive' (judged to be a masculine trait) and 'affectionate' (seen to be more socially desirable in a woman). A person who possesses both masculine and feminine traits is referred to as androgynous (Graddol & Swann 1989: 32-33). However, because of the sociobiological nature of the division of labor in occupations like the military, women and men are seen as more "naturally" suited for certain divisions of labor, i.e. women are viewed as not suitable for

combat for reasons ranging from physical strength and endurance to emotional stamina and stability. This sociobiological approach to gender is compounded by the fact that there are certain social stigmas that may be attached to being “androgynous,” i.e. potentially labeled as not quite feminine and not quite masculine. Female Marines are left in a position where they are walking the line between valued qualities of masculinity, like aggression, without being perceived as too masculine, which could lead to judgments about their sexuality, or at least a failure to be respected as a ‘lady.’

5.6 Different perspectives on language and gender

The present study has addressed the issue of language and gender, via phonetic cues, from a sociobiological perspective, a sociopsychological perspective, and a sociopolitical perspective. As discussed in Chapter 1, the idea that women and men are fundamentally different and suitable for different types of occupations is a premise upon which institutions like the military are based. Such sociobiological approaches to gender inevitably shape the way that women and men can interact, and are expected to interact, within the institution. One way that this ideology of gender surfaces in the Marine Corps is in the structure of how female and male recruits are trained—in a sex-segregated system that is based on the assumption that females are better at training females and males are better at training males through “separate but equal” facilities. It is not the goal or the purpose of the present research to question the validity of this arrangement, but rather to investigate the ways that women and men use their voices within this arrangement to convey authority.

Sociopsychologically, research on language and gender has shown that listeners' perceptions of people's voices not only vary according to social expectations of categories like gender, but that both negative judgments and inaccurate stereotypes result from such misperceptions. There are two main results from this study that challenge the sociopsychological perspective of gender. First, while it appears that female and male DIs are doing very similar things with pitch in authoritative versus non-authoritative speech, some of the results found here contradict what has been taken as fact for male and female voices. In particular, male DIs (at least those that do not use the Frog Voice) employ their highest pitch, previously noted as being valued as non-authoritative, in authoritative speech, as do females. Second, both males and females utilize more pitch variation in authoritative speech, with more moderated variation of pitch in non-authoritative speech. High standard deviation of pitch is often associated with the more dynamic intonation patterns used by females; however, DI speech shows that this variation is more related to speech style, and possibly amplitude, than to a static category like gender.

Finally, from a sociopolitical perspective, it is often viewed that because vocal qualities of males are valued more highly than vocal qualities of females, that females must make some sort of compromise, as "the vocal attributes which signal authority and competence, for example, conflict with those that signal desirable features of femininity and female sexuality" (Graddol & Swan, 1989: 38). This may in fact be the case for women in the military, on one level, particularly if there is some sort of perceptual ceiling

on how high pitch can go before it is perceived as “shrill.”²⁵ However, the female DI students in this study appear to be tapping into a different phonetic cue, vowel duration, as part of how they are manipulating their voices in authoritative speech styles. This is arguably related to the orientation of females to the community of female Marines, found not only in my research, but also in the military research of Disler (2005). This is not a compromise in ways of speaking, but a result of a difference in perspectives, goals, and orientations.

5.7 Directions for future research

According to Gal (1992), the future of language and gender research relies on the unification of two kinds of research that necessarily complement each other--variationist sociolinguistics (Trudgill 1983, Labov 1972, Eckert & McConnell-Ginet, 1992, 2003, among many others) and symbolic or cultural studies (Borker 1980, Keenan 1974; among many others). In combination with these approaches, the move to investigating language within communities of practice will help tease apart the need to, on the one hand, abandon static categories like “masculine” and “feminine,” while at the same time account for the perception of those same categories as being real parts of institutions that feed into stereotypes of people in different occupations, using different speech styles in different speech events and activities (e.g. Eckert & McConnell-Ginet 1992, Goodwin 1990; McElhinney 1994).

²⁵The idea of the perceptual ceiling was addressed by advisors to Margaret Thatcher, who through vocal training in an effort to sound more authoritative was able to adopt a pitch on average 46 Hz lower, which actually resulted in an increase in her approval ratings. (Atkinson 1984: 133).

According to the extensive research of Eckert & McConnell-Ginet (2003) on linguistic change within social networks, the leaders of social change are not women in general, but certain “iconic” women. Women in the military, like women in the police force, are on the forefront of linguistic change, in the process of changing the perception of what it means to be both authoritative and feminine. This study has provided information about both similarities, in terms of pitch patterns, and differences, or perhaps innovations, in terms of vowel duration, between female and male Drill Instructor students who are training together to work as Drill Instructors that train in sex-segregated facilities. The results presented here lead to many more research questions.

First, while the present study has focused on acoustic characteristics reported to be important to the concept of “command” by both male and female DIs, other acoustic characteristics, namely amplitude and voice quality, that may not be as salient to speakers’ ideas of what they are doing with their voices must be explored to fully understand how the results of this study fit into the findings of other research on sociophonetics of gender.

Second, given the differing orientations of male and female DIs towards their recruits along with the explanation that the difference in vowel duration between women and men is a result of this different orientation, a study on whether this vowel duration difference is found in Drill Instructor-recruit interaction in Boot Camp is necessary, as well as perceptual studies on the effects of vowel duration and its possible relationship to comprehension. Also, because it does not appear, at least from the data in this study, the females’ use of longer vowels in authoritative speech slowed down the speaking rate of

the teachback, an investigation of where they are making up the time is crucial. Likewise, if the males' vowel duration was shorter in authoritative speech but did not result in significantly faster speech, are there differences between consonant durations between males and females?

Third, it will be essential to study female Drill Instructors and male Drill Instructors as they train new Marine Corps recruits in Boot Camp. While the DI students were trained in the same way, it is possible, and in fact likely, that female and male DIs adopt new and different strategies for recruit training in terms of how they use their voice. For example, in a follow-up visit to Boot Camp, I was able to record one of the male speakers from the study reported in this dissertation in his second cycle as a Drill Instructor. As the lowest ranked DI and therefore principle disciplinarian, the Third Hat, he had adopted the use of the Frog Voice, described in Section 5.3 above, as part of his individual DI style as a powerful style that appealed to him, resulting in a categorical shift in how he conveys authority from when he was a DI student.

Fourth, and related to the above question, is whether the same individual utilizes the same phonetic features regardless of DI role they take on, be it the Third Hat, the Heavy A, or the Senior Drill Instructor, or if each role is realized with different phonetic features. This has been shown to be the case in the use of pronouns by female DIs. It was found that the lower ranked DIs use only exclusive pronouns to overtly mark the authority between DI and recruit, while higher ranked DIs, whose authority is much more assumed, are free to use inclusive pronouns to incorporate female recruits into the community of women in the Marine Corps (Hicks Kennard 2001).

Fifth, the Marine Corps is the only branch of the military that still maintains the “separate but equal” recruit training system. However, this segregation is temporary, as all Marines, upon graduation from Boot Camp, enter into the Fleet, where they often interact with superiors of both sexes. What challenges do they face in the integrated settings that they find themselves in? Is it advantageous to train recruits in segregated training facilities rather than integrated ones? According to Williams (1989), segregated training, while having advantages over integrated programs in terms of a reduction or even avoidance of sexual harassment problems and sexual misconduct between recruits, found that after going through sex-segregated Boot Camp, many women “feel as though they’ve been ‘thrown to the wolves’ when, after completing training, they arrive at their first duty station. Their experience in basic training does not prepare them for a work environment in which they may be the only female” (Williams 1989: 60).

Finally, other branches of the United States military have sex-integrated training, like the Army and the Air Force. What are the linguistic strategies used by females training males or males training females? Do recruits of the opposite sex of their instructors react to or perceive their instructors differently based on language use or gender stereotypes?

This study has uncovered several unique findings for the field of language and gender and sociophonetic research. First, while there has been some research on women in non-traditional roles, very little sociophonetic research has been done on women in those environments. It was found that female DI students manipulate vowel duration in authoritative speech in different ways than male DI students do. This is an addition to the

relatively understudied phonetic cues that are available for social manipulation—while pitch has been widely studied both in terms of production and perception, vowel duration has not. It was also found that like the women in this study, the men had both higher pitch and more variable pitch patterns in the authoritative speech styles, suggesting that what has previously been viewed as a gendered phenomenon might be more related to speech style.

These results support what has been claimed by many gender scholars—that we must move beyond “such static oppositions as difference and dominance (Gal 1992: 153; di Leonardo 1987; Scott 1988). Yet while we must be aware of the risks of interpreting gendered behavior as occurring in binary opposition to one another, we must also take into account that, while people behave in unique and variable ways, the perception of people may be influenced by ideas about such binary oppositions that people accept as fact within a particular community. Further, we must continue to look at social variables like gender in relation to how they fit into larger contexts, particularly at an institutional level and not just according to how they are used by people as individuals.

APPENDIX

Script for the Position of Attention teachback:

The next movement I will explain and demonstrate is the Position of Attention. The purpose for this movement is the basic military position from which most other drill movements are executed. This movement has no counts. However, there are seven steps in describing the Position of Attention. This movement is executed when halted, at any position of rest, or while marching at Route Step or At Ease. The commands for this movement are ATTENTION and FALL IN. Attention is preceded by the preparatory command that is designated by the size of the unit such as squad, platoon, or company. For the purpose of my demonstration I will use Squad. FALL IN is a combined command given without rise or inflection of the voice. The commands will sound like this: SQUAD, ATTENTION!! FALL IN!! Assume you are halted at AT EASE, and you receive the command SQUAD, ATTENTION!! On the command of execution, smartly bring your left heel against your right. Turn your feet out equally to form an angle of 45 degrees. Keep the heels on the same line and touching. Your legs remain straight, but not stiff at the knees. Keep the hips and shoulders level and the chest lifted. The arms should hang naturally, thumbs along the trouser seams, palms facing inward toward the legs, and fingers joined in their natural curl. Keep the head and body erect. Look straight ahead. Keep the mouth closed and the chin pulled in slightly. Stand still and do not talk. On the command, FALL IN, you will assume your position in ranks at the Position of Attention. I will now execute this movement in cadence. AT EASE. SQUAD, ATTENTION!! FALL OUT!! FALL IN!! Are there any questions?

Interview Questions:

Personal background:

1. Where are you from? Hometown? Is that a big city or a small town?
2. How old are you?
3. What is your height? Weight?
4. Do you smoke?
5. What ethnicity would you describe yourself as?
6. What is the language you grew up speaking with your parents? Do you speak any other languages?
7. What would you describe as the socioeconomic class you grew up in? Middle class, lower middle class, etc?
8. At what level did you complete your formal education? High school, some college?
9. What was your family like growing up? Family size, siblings, birth order, military generations?
10. How did everyone get along?
11. What was your father's role in the family?

12. What was your mother's role in the family?
13. What were you like as a kid? What were your hobbies? What childhood games do you most remember?
14. Do you have any children? How many?
15. Who were your authority figures in your life growing up? Any one more so than another? What did they do to make that apparent?
16. What were you like in high school? Who did you hang out with?
17. What types of leadership experience have you had? Any prior to the Marine Corps?

Military background:

1. How long have you been in the Marine Corps?
2. What was your prior MOS to becoming a Drill Instructor?
3. Why did you decide to join the military?
4. What had you done before you joined, and what were you doing at the time you joined?
5. Why did you choose the Marine Corps?
6. Why did you choose to become a Drill Instructor?
7. What do you think are some common civilian misperceptions about men/women in the military? Any stereotypes?
8. What, in your opinion, can civilians do to support people in the military?
9. Are women being trained for combat roles? What is your opinion on women taking combat roles in the Marine Corps?
10. Do you think that women and men are held to different standards in the Marine Corps? In other branches of the military?
11. What do you like most about being in the military? In the Marine Corps? As a Drill Instructor (or candidate)?
12. What do you remember about your own Drill Instructors from when you went through Recruit Training?
13. What qualities of a Drill Instructor do you think are most important? Why?
14. What qualities of your former Drill Instructors will you/do you strive to emulate? What qualities, if any, will you/do you try to avoid or tone down?
15. What do you think is the most important quality that you need to instill in your recruits?

Reading Sample:

I chose a modified chapter of *The Wizard of Oz*'s "The Emerald City of Oz"

(modified to remove character dialogue with a change in references from the "green soldier" to "host") as a gender-neutral, familiar, mainly descriptive reading. The reading

sample was given at the end of the interview. Before I gave them the reading sample, I gave them the following instructions:

“Ok, now I want you to read this passage (it’s from the Wizard of Oz) out loud in a normal, relaxed pleasant voice. This is just for me to use, and it has nothing to do with your reading ability nor are you being evaluated in any way. Please feel free to ask me questions now or when you are done.”

Even with their eyes protected by green spectacles, Dorothy and her friends were at first dazzled by the brilliancy of the wonderful city. The streets were lined with beautiful houses all made out of green marble and studded everywhere with sparkling emeralds. They walked on a sidewalk made out of the same green marble, and where the blocks were joined together were rows of closely set emeralds, glittering in the brightness of the sun. The windowpanes were made out of green glass. Even the sky above the city had a green tint, and the rays of the sun were green. They passed through the palace gates and were led into a big room with a green carpet and fancy green furniture set with emeralds. When they were seated, they were told politely to make themselves comfortable. They had to wait a long time before their host returned.

The host blew upon a green whistle, and at once a young child, all dressed in green, entered the room. The child, who had green hair and green eyes, would be showing Dorothy to the room she would be staying in. Dorothy said goodbye to all her friends, took her dog Toto in her arms, and followed the green child through seven passages and up three flights of stairs until they came to a room at the front of the palace. It was the nicest room in the world, with a soft comfortable bed that had sheets of green silk and a green velvet blanket. All of the walls were painted green, and even the knobs on the closet doors were green. There was a tiny fountain in the middle of the room that shot a spray of green water into the air, all to fall back into a carved green marble basin. Tall green flowers stood in large vases against the walls, and there was a shelf with a row of little green books. When Dorothy had time to open these books, she found them full of strange green pictures that made her laugh. They were very funny.

All of Dorothy’s friends were led to their rooms as well. Each room was very pleasant. Of course this pleasantness was wasted on the Scarecrow; for when he found himself alone in his room he stood in one spot, just within the doorway, to wait until morning. It would not do him any good to lie down, and he could not close his eyes. So he remained all night staring at a spider that was weaving its web in a corner of the room, just as if it were not one of the most wonderful rooms in the world.

The Tinman lay down on his bed out of habit, for he remembered when he was a person made of flesh. Not being able to sleep, he passed the night moving his joints up and down to make sure they kept in good working order. The Lion would have preferred a bed of dried leaves in the forest, and he did not like being shut up in a room. But he had too much sense to let this worry him. He sprang upon the bed and rolled himself up in a ball like a dog and was asleep within a few minutes.

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