THE EFFECT OF ATTITUDE AND SPEAKING TASKS ON HERITAGE SPANISH SPEAKERS' PRODUCTION OF RHYTHM, LEXICAL STRESS AND SPEECH RATE

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ABSTRACT

THE EFFECT OF ATTITUDE AND SPEAKING TASKS ON HERITAGE SPANISH SPEAKERS' PRODUCTION OF RHYTHM, LEXICAL STRESS AND SPEECH RATE

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This dissertation examines heritage language learners of Spanish enrolled in university Spanish courses, focusing on their strategic use of suprasegmental speech features in two speaking tasks. The research investigates attitudes' influence on heritage language learners' speech production in different task types. Participants engaged in two Spanish spoken registers, completing attitude surveys alongside speech tasks. The analysis of heritage language learners' attitudes and speech patterns across different speaking tasks reveals pivotal implications.

Firstly, task types significantly influence attitudes, with private, conversational settings eliciting higher confidence and more positive language attitudes compared to public, monologic tasks. This suggests a need for diversified pedagogical approaches, emphasizing personalized conversational tasks while integrating scaffolded monologic tasks to build up learners' confidence in public speaking situations. Additionally, the study highlights the complex relationship between language use and attitude stability, indicating that less frequent engagement with the heritage language may lead to more varied attitudes among learners.

This research underscores the influence of task types on speech patterns, emphasizing the adaptability of heritage speakers in addressing linguistic demands based on situational characteristics like familiarity and anxiety. It also highlights the importance of task diversity in shaping positive language attitudes among heritage language learners. Based on these findings, it

is proposed here that there is a need for pedagogical strategies that accommodate varying task types to enhance language proficiency while acknowledging the influence of language background on attitude stability. Finally, this project sheds light on the intricate relationship between attitudes, speech patterns, and task types, and subsequently calls for the inclusion of task effect in evaluating proficiency and designing effective language instruction for heritage language learners.

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CHAPTER 1: Introduction

1.1. Statement of the Problem

Over the last 30 years heritage language speakers have received an increased amount of attention (Kim, 2020). The increase in research done on heritage language users is motivated by the fact that this type of language user is increasingly found taking courses taught on their heritage language (Torres et al, 2018) which has led researchers to question whether or not traditional language courses meet the needs of heritage language speakers. For example, Beaudrie and Ducar (2005) found that Spanish heritage speakers study Spanish as a heritage language in order to prepare themselves for professional positions which require the use of Spanish. As a part of that same study, they found that traditional Spanish language classes are not prepared to help heritage speakers reach that goal. This is not unexpected considering the fact that heritage speakers bring with them varied levels of language proficiency that make them different from traditional second language learners in terms of their instructional needs (Beaudrie, 2012). As such, the present study defines heritage language speakers as individuals whose first language is not their dominant language (Benmamoun et al, 2013, p. 6). This definition is used in this study to identify and recruit students who are enrolled in Spanish language courses, making them heritage language learners.

In addition to addressing the gap between traditional language pedagogy and heritage learner needs, heritage language research is often motivated by the developmental insights these types of speakers offer to those who study language acquisition (Torres, 2018; Nagano, 2015). Heritage speakers are language users who have experienced interruption in the acquisition of their first language (Montrul, 2016) and, as such, provide synchronic snapshots of stages of

language development. Several studies have analyzed different linguistic features produced and perceived by heritage speakers while using language background (e.g. length of exposure, age of arrival, age of acquisition and frequency of use) (e.g. Mazzaro et al, 2016; Robles-Puente, 2019; Au et al, 2008; Yeni-Komshian et al, 2000) as a means of explaining linguistic variance by developmental stages.

It is proposed here that this field of research can further explain its findings by accounting for a defining feature of this type of speaker: heritage speakers face conflicting social expectations regarding the identities they construct through language (Boon & Polinsky, 2015; Taguchi, 2018; Val et al, 2010). Previous research shows that these speakers simultaneously value their (typically minoritized) heritage language while recognizing that it lacks social capital compared to the majority language (Kircher & Kutlu, 2022; Kutlu & Kircher, 2021; Val et al, 2010). So, as speakers of a minority language and a majority language, heritage speakers must choose, to some extent, how they want to sound and, subsequently, be perceived (Giles & Harwood, 1987). In recognition of the social complexities faced by heritage language speakers, Chang (2020, p. 602) proposes that the field of heritage language research should seek to bridge the gap between heritage language production and language attitudes. As such, this project aims to add to the existing literature by expanding the field's perspective on heritage language performance by testing for variation in spoken features of heritage language learners and their attitudes across different tasks and aspects of their language background such as age of acquisition and frequency of use.

In order to do so, this dissertation takes steps towards connecting what we understand regarding heritage language production to their attitudes towards their heritage language. This is done by using qualitative and quantitative methods to test whether heritage language speakers

choose to vary certain features of their spoken language and that those choices are socially motivated. Specifically, this study tests with quantitative and quality methods whether or not heritage speakers of Spanish are strategic in their production of suprasegmental speech features as their attitudes vary in different situational characteristics of speaking tasks. Quantitative methods are used to show differences in attitudes and speech patterns across tasks and qualitative analysis is used to explain how the individual participants' attitudes and speech patterns vary by task type and differences in their language background.

In an effort to test whether or not heritage speakers are strategic in their production of suprasegmental speech features, it is proposed here that (i) variation in targeted speech features must be found and (ii) that variation must be accounted for by systematically controlling the speaking task, and (iii) speakers' attitudes towards their language production within those situations must be measured. This will allow for a comparison of variation of speech features and attitudes across speaking tasks and individual participants' age of acquisition and frequency of use.

Among the studies done on this demographic, researchers have undertaken the tasks of determining (a) what adult heritage speakers know about the phonological system of their heritage language and (b) what patterns are found in the spoken production of their heritage language phonological system (Chang, 2020, p. 581). Overall, studies have shown that heritage language speakers are likely to produce their heritage phonological system more like a second language (L2) learner when compared to both L2 speakers and monolingual speakers but that their perceptive abilities are more like that of a monolingual speaker across segmental and suprasegmental speech features (Chang, 2020; Kim, 2020).

This is, however, not to suggest that heritage speakers are easily mistaken for second

language speakers when producing their heritage language. Studies have shown that, in terms of holistic accent ratings, heritage speakers have clear advantages over their L2 speaker counterparts (Au et al, 2002; Knightly et al, 2003). What these results do suggest is that heritage language speakers' are difficult to categorize within a dichotomy between L2 and monolingual speakers. Research findings increasingly show that a continuum between L2 and monolingual speakers is a much more appropriate way to explain heritage speakers than a simple dichotomy.

One line of research that perhaps helps to explain variation found in heritage language learner (HLL) phonological production is that which looks at phonological variation across speaking tasks. Colantoni et al (2015) found that heritage speakers of Spanish vacillated between English- and Spanish-like prosodic tendencies between scripted and unscripted tasks. These findings, along with others (e.g., Crowther et al, 2015; Derwing et al, 2004) suggest that the situational characteristics of a speaking event affect the phonological features that speakers employ.

Regarding non-linguistic characteristics of a given situation, Social Identity Theory (SIT) (Harwood, 2020) suggests that the attitudes people have towards social group memberships have an effect on intergroup behavior and communication. SIT (i) proposes that people place values on memberships in different social groups and (ii) posits that those values are made manifest in the way people act (e.g. communicate) within those memberships. Said another way, individuals construct social identities through language (Giles & Harwood, 1997).

Ethnolinguistic Identity Theory (EIT) is an extension of SIT (Harwood, 2020) and claims that the way one speaks affects the way they are perceived by others and the identities they construct for themselves. As an example of this, work done by Rubin et al (2016) on linguistic stereotyping has shown that certain accents or varieties of speech can cause listeners to form

negative or positive evaluations of a speaker. Giles and Harwood (1997, p. 110) reinforce this by stating that the way an individual sounds can trigger "a wealth of social meanings".

Heritage language speakers, as speakers of low-prestige and high-prestige languages, have to choose whether to maintain or sacrifice their heritage language during social interactions. EIT proposes that individuals will strategically emphasize (or de-emphasize) their accent, dialect, or language as a means of constructing a social identity depending on the situation (Giles & Johnson, 1987, p. 3). Previous research shows that phonological features are affected by the type of speaking task (e.g., Colatoni et al, 2015). This leads to the question, what situational characteristics influence the linguistic choices a heritage speaker makes in any given situation?

Register research is a systematic approach to describing any given situation by its characteristics and by the linguistic features that are common and functionally important to it (Biber & Conrad, 2019). According to Egbert and Mahlberg (2020, p. 72), the term register refers to a variety of text. In describing any given register it is necessary to analyze the situational characteristics of its use and the linguistic characteristics that are appropriate or expected within that situation. Register will be discussed in greater detail later in an effort to show that register methods can be used for a principled approach for the design of speaking tasks.

It is proposed in this study that research concerned with heritage language speakers would benefit from considering the possibility that heritage speakers' language production is affected by task type and attitude. If these two variables are affecting heritage speech, then including them in heritage language research can allow, to some extent, the field to account for previously unaccounted for variance. Said another way, analysis of heritage language that

considers speaking task and attitude should be able to shed more light on the "when" and the "why" behind variation in spoken production of heritage language speakers.

The research done on the spoken production of heritage speakers has analyzed segmental and suprasegmental features (Chang, 2021; Kim, 2021). The research done on segmental features has provided clear evidence that heritage speaker segmental features such as voice onset timing (VOT), formants, production and quality of vowels and consonants has been found to consistently approximate native speaker norms across heritage languages (Chang, 2021, pp. 587-588) and that these features are explained by factors such a gender, age, and age of onset of majority language to name a few (Chang, 2021, p. 588). Overall, there appears to be no evidence that segmental features vary within the same speaker. Because research on segmental features of heritage Spanish speakers suggest that they are quite stable and unlikely to vary within the same speaker across different contexts, segmental features were not investigated in this study.

At the same time, some work that has been done on suprasegmentals includes features such as lexical stress (e.g. Kim 2014; Kim, 2019; Kim, 2020), rhythm (e.g. Robles-Puente, 2014; Robles-Puente, 2019), tone production (e.g. Chang & Yao, 2016; Chang & Yao, 2019), intonation (e.g. Colantoni et al, 2016; Rao, 2016) and speech rate (e.g. Schoonmaker-Gates, 2012). Of these suprasegmental features, it is proposed that this dissertation should analyze rhythm, lexical stress and speech rate for variation across attitude and register given the fact that previous research has shown that these features are either expected to be different between the two languages (e.g. English and Spanish) or they have been shown to be predictive of ratings of nativeness or in-group belonging. Beyond that, the researcher has selected these three suprasegmental features because each of them is used to measure segment duration in one way or

another. In sum, these features are linguistically related (e.g. representative of segment duration), allow for contrast between Spanish and English and are proven to affect listener judgment.

Task type has been selected for this dissertation for two reasons: first, previous studies have shown that phonological features do vary across task type (e.g., Colantoni et al, 2015; Derwing et al, 2004) and, second, by using speaking tasks for eliciting speech the researcher was able to systematically account for the situational characteristics in which any variation in speech features was found. Important to note, the researcher used descriptions of real-world registers to design speaking tasks.

Finally, language attitudes will be measured in this research because past studies have shown that heritage speakers develop complex attitudes towards their heritage languages and their self-perception which in turn affect language development (He, 2004; Leeman, 2015; Wong & Xiao-Desai, 2010). Additionally, the qualitative work of researchers such as Kutlu and Kircher (2021) suggests that heritage speakers of Spanish vary their attitudes towards their heritage language depending on social situation. The present study hypothesizes that language attitude will affect speech production as it has language development. Said another way, the researcher proposes that heritage Spanish speakers' attitudes will vary depending on the speaking task and that variation in attitude will affect the way they sound.

To summarize, existing research on heritage language speakers provides evidence of two important aspects: first, the comprehensive range of language abilities exhibited by these speakers, often predicted by task type and their language background factors such as age of acquisition and frequency of use (as evidenced in studies by Kim (2011), Robles-Puente (2019), Lunde (2015), Yeni-Komshian et al. (2000), among others). Secondly, heritage language speakers develop intricate attitudes and sentiments towards their heritage languages, an

observation prevalent in studies by Wong & Xiao-Desai (2010), Kutlu & Kircher (2021), and Xiao-Dessai (2019). Building on this literature, this study posits that heritage language learners are expected to adapt their speech patterns due to identity-related insecurities and variations in tasks. Therefore, the variables under investigation here encompass specific suprasegmental speech features, task types, and heritage language learners' attitudes towards their language ability and identity, all extensively discussed in subsequent chapters. This study aims to contribute valuable insights to the field of heritage language research by exploring how these aspects interplay in shaping spoken language among heritage language users.

1.2. Significance of the Study

Heritage language learners (HLL) are increasingly found in college language courses (Beaudrie, 2012). Their language and cultural experiences make them different from a traditional L2 student. In the case of Spanish heritage learners (SHL), the population has increased as the Spanish speaking immigrant population has reached over 62 million (U.S. Census Bureau, 2020) and is projected to reach over 128 million by the year 2060 here in the United States (Torres et al, 2018).

In an effort to adapt to their new host country, these immigrants learn English while their home language is used in fewer settings and inevitably suffers from attrition. Children of these immigrants reach adulthood with linguistic dominance in the societal language and have varying degrees of proficiency in their home language. These individuals often feel the desire to reconnect with their home language and sign up for Spanish language classes in college (Torres et al, 2018). However, research shows that these courses are typically not designed to address the linguistic needs of HLL (Beaudrie et al, 2014; Bowles et al, 2014). The proposed study will

address this gap between HLL pedagogical needs and traditional language pedagogy by investigating the influence that attitude and speaking task have on speech production of HLL.

The results of this study have the potential to influence the design of speaking tasks found in curriculum for Spanish as a heritage language. As an example, as results show that speaking tasks typical to a classroom environment (e.g., academic presentations, dialogue with a peer, etc.) are conducive to negative attitudes which subsequently have an adverse effect on speech production (i.e., it becomes less target-like), then future classes can justify avoiding or restructuring those speaking tasks to foster target-like production.

Beyond affecting the curriculum for Spanish as a heritage language, this study has the ability to describe the targeted registers by the production of rhythm, lexical stress, and speech rate. Previous research on register has mainly focused on describing registers by grammatical features (e.g., word classes, phrasal elements, verbs, and clause types) (see, e.g., Biber et al, 2006). Knowledge of registers has been very useful. For example, it has been used to develop descriptive grammar (e.g., Biber et al, 1999) as well as inform the topic of developmental stages of learners (e.g., Biber et al, 2021). In this dissertation, the results from the speech analysis are aligned with the speaking tasks which are designed to reflect real-world registers.

Beyond the motivations already discussed, other implications and contributions of this project are that (1) this research illuminates the relationship between speaking task and language attitude, (2) research on heritage language speakers must consider the influence that speaking tasks have on language production and (3) future research should consider that heritage speakers may vary their spoken production in response to their language attitudes.

1.3. Definition of Terms

This section provides definitions of important terms used throughout this dissertation.

Register: A variety of text described by its situational characteristics, commonly occurring linguistic features and the functional association between the linguistic features and the situational characteristics. For this study, register is used as a template for designing speaking tasks.

Speaking Task: A classroom task designed to elicit spoken language and reflect a spoken academic register. Speaking task or task is used throughout this dissertation to refer to the elicited speech acts found in language classrooms as well as the two register-based, spoken tasks used for data collection in this study.

Heritage Language Learners (HLL): Learners of a language which was the learners' home language but is not their dominant language. This is used throughout the dissertation to refer to the participants of this research.

Heritage Language Speaker (HLS): Speakers of a language which was the learners' home language but is not their dominant language. Different from HLL in that these are users of a heritage language but are not currently studying their heritage language in a setting of formal instruction.

(Language) Attitude: The thoughts or feelings an individual has towards the language(s) they speak. This is used in this project to refer to the attitudes and perceptions that participants had towards their own language ability and identity as a speaker of Spanish.

Self-perception: a reflection of the attitudes that an individual has towards their language(s).

Suprasegmental Speech Features: Phonological constructs that extend beyond more than one phonological segment. This term is used in this study to refer to speech rate, rhythm and four components of lexical stress: duration of syllables found in atonic-tonic-atonic sequences, intensity (measured in decibels), pitch height (measured in hertz) and vowel quality (holistic listener rating).

Rhythm: The auditory impression that is made by the variation in duration of different segments of spoken language. For this study, rhythm or rhythm measurement refers to the standard deviation of syllable duration.

Lexical Stress: The emphasis placed on a syllable through suprasegmental cues and the variation in segmental quality. In this study, lexical stress refers to the duration of syllables found in atonic-tonic-atonic sequences, max intensity (measured in decibels), max pitch height (measured in hertz) and vowel quality (holistic listener rating).

Speech Rate: A measure of the rate at which one produces syllables over time. In this study, speech rate was measured by automated syllabification software, the total number of syllables was divided by the length of the speech files (measured in seconds).

1.4. Outline of the Dissertation

The following sections include: a literature review, research questions, the method, references, and appendices. The literature review starts with a broad discussion of heritage language speakers that narrows down to heritage Spanish speakers and the topic of attitudes and self-perceptions of heritage speakers. Then, the author discusses speaking tasks and registers in an effort to operationalize them and show their relevance to the proposed study. This is followed by a review on the research that has been done on the speech of HLL with a focus on

phonological variation across speaking tasks and the speech features of interest to this study. The literature review is followed by the research questions for this dissertation and the method. The method section includes sub-sections devoted to explaining the participants, the instruments, procedures, analysis and a summary of the overall research design. The analyses used to answer the research questions are described in the penultimate section and, finally, the last sections include a discussion of the statistical results and offers a conclusion to this study.

CHAPTER 2: Literature Review

This chapter includes background information on heritage language speakers. It discusses the variety of criteria used to define this type of speaker. After a broad approach to the topic, it narrows its focus to heritage speakers of Spanish. Then, this chapter goes into detail about the complexities surrounding heritage language identity and attitudes. This is followed by an explanation of register research and its implications for speaking task design. This chapter also includes sections dedicated to the speech features of interest of this dissertation, namely, rhythm, lexical stress and speech rate. Finally, it concludes by presenting the research questions that guide the study.

2.1. Heritage Language Learners

In current research on speakers of heritage languages, there does not exist a generally accepted definition for this type of speaker (Rao & Ronquest, 2016; Xiao-Desai, 2019). This is made manifest in the discontinuity found in the labels given to this type of speaker which range from native speakers to bilingual speakers to home-background speakers and others (Valdés, 2001; Xiao-Desai & Wong, 2017). Previous studies have focused on criteria such as ethnic background (e.g., Fishman, 2014; Valdés, 2001), language proficiency and parents' dominant language (e.g., Carreira & Kagan, 2011; Polinsky & Kagan, 2007) to operationalize their definition of a heritage language speaker.

For example, Valdés (2001, p. 38) proposes that it is the personal and historical connection to a language that matters when defining a HLL because heritage language instruction is largely focused on promoting the acquisition and retention of non-English languages that are important to minority groups. In contrast, Polinsky and Kagan (2007) suggest that it is the language proficiency which a heritage speaker brings to the classroom that sets it

apart from L2 students because they obviously have different instructional needs than a traditional L2 student.

For this study, the goal is to rely on a combination of these previously used criteria while also remaining focused on why this type of speaker merits a classification apart from either monolinguals or traditional second language learners. Previous research shows that, for language teachers, the term *heritage language learner* is highly important as it denotes a student who is expected to have a different level of linguistic (Polinsky & Kagan, 2007) and cultural (e.g., Valdés, 2001) proficiency than a traditional second language (L2) student which means they have different instructional needs than L2 students.

Previous research has shown that heritage language learners consistently outperform L2 students in their perception of the heritage language (Ronquest, 2012) due to early-age exposure (e.g., Chang & Yao, 2016, Kim, 2020; Oh et al, 2003). However, studies also show that heritage language learners are not as consistent in their productive abilities as they are in their perceptive abilities (e.g., Campbell & Rosenthal, 2000; Hurtado & Vega, 2004). Kim (2020, p. 234) maintains that this is likely due to the fact that it is common for heritage speakers in the U.S. to hear their heritage language more than speak it.

Peyton et al (2001, p. 35) suggest that those who research heritage languages for instructional purposes need to keep in mind that these individuals affect language classrooms due to their mixed proficiencies and, therefore, the most appropriate definition of a heritage language learner is someone who has been raised in a home where English was not the primary language and, as a result, they can speak or at least understand to some extent the home language while being dominant in English.

In an attempt to triangulate this language and cultural background, it is proposed here that a heritage speaker can be operationally defined by age of exposure, imbalance in language proficiency (i.e., English > Spanish) and familial ties. It is suggested here that these three criteria combined are needed to accurately identify an individual as a heritage speaker as only meeting some of the criteria could result in the recruitment of individuals outside of the target demographic. For example, if someone only said that they were better at English than Spanish then that could easily be an L2 Spanish speaker. Or, if someone said they were exposed to Spanish before English then they could be a late L2 English learner. Or perhaps an individual can claim that their primary caregiver was a dominant Spanish speaker but that does not necessarily mean that English is their dominant language. As such, the participants of this study have to confirm that they (1) were raised by (a) Spanish speaker(s), (2) have been exposed to Spanish before English and (3) are as or more proficient in English than Spanish.

2.1.1. Heritage Speakers of Spanish

This study is, more specifically, focused on sampling from and generalizing findings to individuals who speak Spanish as a heritage language, rather than investigating multiple heritage languages. As mentioned previously, heritage Spanish speakers are a growing demographic in the United States and represent the largest minority group found within the country (Torres et al, 2018; U.S. Census Bureau, 2020). This has resulted in an increase in heritage Spanish speakers enrolling in Spanish language courses in college which are typically designed to address the needs of traditional second language (L2) learners (Beaudrie et al, 2014) and not heritage language learners. For these reasons, the researcher proposes that Spanish heritage speakers should be the target demographic for this study.

2.2. Heritage Speakers' Language Self-perception

This section has three goals: the first is to illustrate how heritage language speakers are very likely to develop complex perception of self in regard to their heritage language given the fact that, by definition, their home language is a minority language that does not enjoy the same level of social prestige that their dominant language does. In other words, the language in which they establish and often maintain interpersonal relationships (e.g., the relationship between a child and a parent) is not considered to be as important as their socially dominant language (in this case, English) in many contexts (Boon & Polinsky, 2015). Second, this section seeks to explain how the inherent complexity of heritage-language attitudes can be expected to influence spoken production depending on the situation. Third, this section explains the rationale for the targeted attitude variables and operationalizes them.

In response to the complex nature of heritage speaker identity here in the U.S. (de la Rosa Prada, 2018; Leeman, 2015; Val & Vinogradova, 2010), multiple studies have been conducted to better understand the self-perception that these speakers have of their identity as speakers of a heritage language (e.g., Carreira & Kagan, 2011; Kircher & Kutlu, 2022; Kutlu & Kircher, 2021). According to Prada et al (2020), heritage language speakers often run into a narrative concerning their own linguistic abilities that describes them as deficient speakers. Directly related to that, research has shown that it is common for Spanish heritage speakers to experience "linguistic shaming" in Spanish language classrooms (Carreira & Beeman, 2014). Kircher and Kutlu (2022) extend this by showing that monolingual speakers of Spanish consistently describe heritage Spanish speakers as linguistically deficient which, in monolinguals' opinions, also puts into question the cultural identity of heritage speakers. This inevitably contributes to the construction of one's self-perception in regard to language identity and ability.

Kutlu and Kircher (2021) conducted a study where they collected data from Twitter in an effort to understand how Spanish speakers in the U.S. view themselves as speakers of a minority language. Their results showed that Spanish speakers in the U.S. experienced feelings of solidarity with Spanish communities that they valued. Also, the same participants expressed feelings of lacking social prestige as Spanish speakers when compared to English. Kutlu and Kircher (2021) suggest that their findings show that the participants developed a self-perceived identity as Spanish speakers which they valued in certain contexts.

In a study done by Carreira and Kagan (2011), the results from a national heritage language survey are reported. In their study, Carreira and Kagan explain the results of the survey which was conducted across different heritage languages (a total of 22) and geographic regions in the United States. In this survey, participants were asked to reflect on their attitudes towards their heritage language. The majority of respondents (85%) claimed that their heritage language was an important part of their identity. Also, the majority of the respondents claimed they believed their heritage language was useful or a valuable skill (p. 47). Also, some of those same respondents expressed that they sometimes felt embarrassed (30%) about their heritage language and that it made school more difficult (~19%). Again, this is another example of how a speaker of a heritage language can experience mixed or complex feelings towards their heritage language.

Both of these studies show that heritage speakers have a mental perception of themselves in regard to their language ability and identity. Based on the results from Kutlu and Kircher (2021) and Carreira and Kagan (2011), the researcher designed two attitude constructs to measure HLL attitudes: attitude about one's language ability and attitude about one's language

identity. Each of these constructs has five items that were given to the participants in a survey (see Appendix for full instrument).

Construct 1 (Language Ability) is operationalized as the participants' confidence in their Spanish language proficiency and their perception of self as a native speaker of Spanish. The items for the first construct include statements such as, *I was confident in my Spanish speaking abilities during the task,* and *I sounded like a native speaker of Spanish during the task.* Construct 2 is intended to measure participants' perception of identity as a Spanish speaker. The items for this construct include statements such as, *the way I sounded when I was speaking Spanish during the task is a part of my identity,* and *I defined myself as a Spanish speaker during the task.*

The items for Construct 1 focus on the individual's speaking performance during the tasks. These items assess the speaker's self-assessment of their language skills and whether they aimed to sound like a native speaker. The items for Construct 1 are related to the speaker's linguistic competence and subjective evaluation of their performance.

The items for Construct 2 (Language Identity) are operationalized as the speaker's sense of identity and belonging. The items are designed to reflect the speaker's self-identification as a Spanish speaker and their connection to Spanish speaking communities. These items also try to connect the speaker's identity to the way they sounded during the task. Ultimately, Construct 2 attempts to measure the speaker's personal connection to their heritage language as a part of their identity.

As has been discussed to this point, attitudes held by heritage Spanish speakers are complex given that Spanish is a minority language in the United States. These attitudes can affect how successful (or unsuccessful) the language acquisition of heritage language learners is

(Boon & Polinsky, 2015, p. 9). In a study done by Au and Ho (2005) they found that children were more likely to acquire their heritage language if their family had a positive attitude towards the heritage language and culture. Said another way, if the family valued the heritage language and culture then, so did the children. This study indirectly shows that heritage language learners perceive how others view their heritage language and that that affects their attitudes towards the heritage language. It is suggested here that this is evidence that attitudes toward a heritage language can affect one's productive and perceptive abilities in that same language (see also, Duprey-Almeyda, 2009; Mu, 2015).

One of the main goals of this study is to determine whether or not this influence of attitude on language development extends to the production of certain suprasegmental speech features (rhythm, lexical stress and speech rate) across different speaking tasks. More specifically, this study seeks to determine whether these suprasegmental speech features can be predicted by variation in self-perception and attitudes. This inquiry is driven by the relationship between complex heritage language attitudes and the construction of identity through language use.

Researchers agree that identity is constantly negotiated through language and that what we say and how we say it communicates who we are (Block, 2009; Norton, 2013; Peirce, 1995; Taguchi, 2018; Leeman, 2015; Wong et al, 2010; Val et al, 2010). This process of creating identity through language is consistently reiterated as speakers navigate different social contexts (Val et al, 2010). Because of this, speakers have the need to construct their identity in many different ways in order to meet the perceived needs or expectations defined by any given social context. This phenomenon becomes more complex for heritage language learners because of their need to navigate different languages and their accompanying social differences (Xiao-

Desai, 2018, p. 466). HLL have this added complexity of navigating social contexts within two (at least) different language systems on top of one of those languages being a minority language (Montrul, 2011, p. 156; Valdés, 2005, p. 411; Val et al, 2010).

2.3. Speaking Tasks and Registers

Registers are real-world texts that can be described by the situational characteristics and the common linguistic features found therein (Egbert and Mahlberg, 2020, p. 72). Biber and Conrad (2019) explain that register is a variety of text that is defined by (i) the situation of use (e.g., having a conversation while sitting next to someone on a plane), (ii) the pervasive linguistic features used (e.g., more *wh* questions in conversation than in presentations), and (iii) the functional association between those pervasive linguistic features and the situation. Many studies have been conducted to create linguistic descriptions of situations through the perspective of registers (e.g., Sanchez-Muñoz, 2007; Biber et al, 2006; Biber 2014).

For example, Biber et al (2006) analyzed over 140 linguistic features across spoken and written texts in Spanish. As a result, they were able to describe various registers such as political interviews, news broadcasts, business telephone conversions, face-to-face conversations, academic articles, fiction, and many more by the description of a given situation, the linguistic features common to that situation and the function between the situation and the language used. For instance, their analysis revealed that face-to-face conversations had linguistic features such as references to both speakers and a variety of *cu* questions (e.g., *cual, cuando, cuanto*) all of which facilitated interaction which is what the situation required. The face-to-face register contrasts with written, informational registers such as academic prose which relied heavily on the

use of dense information delivered through a high frequency of nouns and a lack of interaction between the author and the reader.

These findings are not unexpected considering that a face-to-face conversation is a situation where interaction is expected and certain linguistic features are used frequently to accomplish that. On the other hand, academic prose is not expected to be interactive, rather the purpose is to share information and a lack of interactive linguistic functions is expected along with a high density of information.

In a study done on the register differences of heritage Spanish speakers, Sanchez-Muñoz (2007) compared the oral production of heritage Spanish speakers and L2 speakers of Spanish across different registers. This study was carried out with the intention of showing that heritage speakers of Spanish, although typically less proficient than monolinguals, show variation in oral performance and that variation can be described by register differences. In this study, the researcher looked for lexicogrammatical variations. She found that heritage speakers of Spanish did vary their spoken production across two different registers: casual conversation and class presentations. For example, they used the word *como* ('like') more in the conversation register than in the presentation register (p.139). She also found that segmental quality varied between the two registers. For example, heritage speakers would reduce *para* to *pa* in casual conversation.

These findings suggest that heritage speakers are aware of different register expectations and that they vary their lexicon and certain speech features according to the register. One other study worth mentioning here is that of Colantoni et al (2016). In this study they compare the intonation of declaratives of heritage speakers of Spanish with Spanish-English bilinguals who are dominant in Spanish. For their study they had both groups of participants produce either a

read-aloud script or a semi-structured narrative. They found that the heritage speakers deviated from the Spanish dominant bilinguals in the scripted task but not in the less-controlled task. Specifically, the heritage speakers produced more intonational phrases with rising tones per utterance than the Spanish-dominant speakers did (p. 19). The heritage speaker participants experienced some type of adverse conditions (e.g., anxiety) in reading the scripted task but not in the unscripted task and subsequently performed differently from the first task to the second. They concluded that the deviation from native norms observed across the two task types was due to the nature of the tasks. The increase in rising intonation during the scripted task is interpreted here as evidence of lack of confidence in the heritage participants language ability and does not reflect a reliance on the intonational patterns of their dominant language (i.e., English)

It is important to note that, in their study, Colantoni et al (2016), manipulated the situational characteristics of the two tasks which resulted in tasks that reflected real-world registers. The observed effect on the production of the heritage language participants reinforces the importance of accounting for the effect task type can have on spoken language.

In contrast to registers, speaking tasks are elicited language events that are inauthentic given that they are planned and controlled to some extent or another (Foster & Skehan, 1996). However, while speaking tasks are contrived communicative situations, Foster and Skehan (1996, p. 300) also state that "tasks… have some sort of real-world relationship" meaning that they are modeled after real-world communicative scenarios. Speaking tasks are used in instructional settings and are considered useful because they allow for the control of the situation and for the targeting of specific linguistic features (Skehan, 1996).

Crawford and Zhang (2021) also argue that register analysis should be used for designing instructional, communicative tasks. They specifically propose that register analysis should be

used as a framework for Task-based Language Teaching (TBLT). They propose that the benefit of doing so enables the identification of a wider range of linguistic and non-linguistic factors that are common to TBLT and that it allows for functional interpretation of task performance. This study does not include TBLT theory and practice, however the benefits they argue naturally apply to the tasks of this study. Specifically, using the description of registers to design speaking tasks for this study enables the researcher to functionally interpret participant performance.

In comparing register with speaking tasks, the register perspective readily allows for the analysis of language production in an authentic, communicative situation (Biber & Conrad, 2019) while speaking tasks allow one to plan a communicative situation to facilitate the practice of some targeted feature (Skehan, 1996). Those who aim to use register analysis methods to describe speaking tasks face the practical impossibility of trying to balance authenticity with control for desired situations. This is the problem that the present study faces: how to control for continuity across communicative situations, which allows for comparison of data across participants, and ensuring that the linguistic features are what would be expected in the same real-world situation.

However, rather than trying to reconcile the differences between these two constructs, it is proposed here that register research can be used as a framework to select and design speaking tasks in an effort to make speaking tasks more closely reflect real-world language use. In other words, register, for this study, is used as a means of justifying task selection and design. The descriptions of registers that exist because of register research (e.g., Biber et al, 2006) are used to design speaking tasks for this study in an effort to make speaking tasks more authentic in terms of the situational characteristics.

Below, Table 1 shows a framework designed by Biber and Conrad (2019, p. 40) for describing the situational characteristics of a register. This framework was developed by Biber and Conrad by compiling different descriptions of situational characteristics found in different register studies. They explain that, as shown below, it is necessary to describe in detail the participants, how they relate to each other, what is the mode of communication that they use, the setting of their communication, their purpose and topic. Biber and Conrad (2019, p. 44) posit that the use of this framework will allow for a thorough interpretation of linguistic patterns as they relate to situational characteristics.

Figure 1

Framework for the Analysis of Situational Characteristics of Registers

1. Participants
    a. Addressor (i.e., speaker)
        i. Single/plural
        ii. Social characteristics: age, education, etc.
    b. Addressee
        i. single/ plural/un-enumerated
        ii. self/other
    c. Are there onlookers?
2. Relations among participants
    a. Interactiveness
    b. Social roles: relative status or power
    c. Personal relationships (e.g., friends, colleagues, strangers)
    d. Shared knowledge: personal and specialist

3. Channel
    a. Mode: speech/writing/signing
    b. Specific medium: permanent/transient
4. Production circumstances: real time/planned/scripted/revised and edited
5. Setting
    a. Time and place shared by the participants?
    b. Place of communication
        i. private/public
        ii. Specific setting
    c. Time: contemporary, historical time period
6. Communicative purposes
    a. General purposes: narrate/report, describe, exposit/inform/explain, persuade, how-to/procedural, entertain, edify, reveal self
    b. Specific purposes (e.g., summarize information from numerous sources, describe methods, present new research findings, teach moral through personal story)
    c. Factuality: factual, opinion, speculative, imaginative
    d. Expression of stance: epistemic, attitudinal, no overt stance
7. Topic
    a. General topic "domain: e.g., domestic, daily activities, business/workplace, science, education/academic, government/legal/politics, religion, sports, art/entertainment, etc.
    b. Specific topic

c. Social status of person being referred to

The framework shown in Table 1 is used in the proposed study to analyze the situational characteristics of the speaking tasks used for this study.

2.3.1. *Target Registers*

The proposed dissertation will include data which represents language spoken in registers that would be common to language classrooms. Some work has been done to document the registers that a student might encounter while attending university (e.g. Biber, 2006). In his study, Biber analyzed the expression of stance in two spoken and two written registers. This corpus listed registers that a student could expect to encounter such as classroom teaching, office hours and study groups (Biber, 2006, p. 100). All of these registers include teacher interaction. In fact, most of the research done on registers that university students are likely to encounter either focuses on written production of students or dialogue with teachers (e.g. Biber et al, 2021; Biber 2006; Biber & Barbieri, 2007).

The researcher had two main goals when designing speaking tasks for this dissertation: first, that the speaking tasks followed a principled description of a register and, second, that the speaking tasks reflect a real-world register. To meet the first goal, the researcher used a slightly adapted version (i.e. some subcategories were left out to simplify) of the framework designed by Biber and Conrad (2019) for the analysis of situational characteristics. This framework allows for a detailed description of a given register and is used in this study to highlight the differences between the two tasks.

In an effort to meet the second goal, the researcher designed two speaking tasks that reflect spoken registers described in Biber et al (2006): face-to-face conversations and presentations (e.g., political speeches, news broadcasts, sports broadcasts). As shown in Table 2 below, there are two registers which were used for this research. The first is a casual conversation with the researcher. The second is a presentation to the class which covered an academic topic (e.g., a report on the cultural aspects of a Spanish-speaking country). The figure below offers a description of the situational characteristics of the targeted registers.

Figure 2

Speaking Tasks that Reflect Classroom Registers

Situational Characteristics	*Task 1 - Presentation*	*Task 2 - Conversation*
Participants		
Speaker	HLL	HLL
Interlocutor	None	Researcher
Relations among participants		
Interactiveness	No interaction, presentational	Highly interactive, question and answer structure
Social Roles	Relatively same social status	Social imbalance between HLL and researcher
Personal Relationships	classmates	interviewer - interviewee
Channel		
Mode	Spoken	Spoken
Medium	Transient, synchronous	Transient, synchronous
Production Circumstances	Real time, unscripted, planned	Real time, unscripted, unplanned
Setting		

Time and Place	Classroom, during class time, space and time shared	Outside classroom, during class time, space and time shared
Private/Public	Public	Private
Communicative Purposes		
Purpose	Present findings, inform, summarize information	Converse, share information
Factuality	Factual	Opinion, imaginative
Topic	Spanish speaking country of interest	Family, hobbies, school,

To summarize these last two sections which have discussed register and heritage language attitude, register is the summation of a situation and the linguistic forms and functions expected and produced in that situation. Situation, therefore, affects language production. Attitude results from the beliefs or expectations one may have within and toward any given communicative situation. Therefore, attitude also affects language production. The implication is that perhaps a register can also be described by the associated attitudes one may have towards a situation.

Virtually all the research being done on heritage language speech attempts to identify either attrition or incomplete acquisition as the cause of any divergence from native speaker norms that are observed in heritage language speech (Rao & Kuder, 2016). Another way of putting it would be that research on heritage languages seeks to determine (a) which language system shows dominance (i.e., does the English phonological system overpower the Spanish phonological system or vice versa) and (b) how we explain the findings of our research. In response to this, it is the aim of this research to explore the effect that task type and attitude have on suprasegmental speech features of heritage Spanish speakers.

2.4. Phonological Characteristics of Spanish and English

This section gives an overview of the phonological features of Spanish, with a focus on how they compare to English. As stated previously, research on segmental features of heritage Spanish speakers suggest that they are quite stable and unlikely to vary within the same speaker across different contexts (Chang, 2021, p. 588). For this reason, segmental features were not investigated in this study. Instead, a variety of suprasegmental features were included in this study. Namely, rhythm, speech rate, and four components of lexical stress. This section provides an overview of intonation, lexical stress, rhythm, and speech rate. Overall, it is shown that Spanish and English have both differences and similarities at the suprasegmental level.

Intonation in Spanish has been studied in various research projects for decades (e.g., Beckman *et al*, 2002; Graham, 1978; Hualde, 2002; Face, 2003). Intonation, or tone choices, in Spanish are used for many of the same purposes as they are in English such as using a rising tone at the end of a question or using high tone levels for emphatic expressions (Farías, 2013, p. 1065). Another similarity is that both languages utilize four different tone levels (Chela-Flores & Chela-Flores, 2003).

The differences between English and Spanish intonation systems then is found in the extent to which they use, or do not use, intonation for the same purpose. For example, emphasis in English relies on the placement and production of stress and pitch changes to a greater extent than Spanish. While Spanish can utilize both of those suprasegmental cues to place emphasis (though not as drastically as English does), it also relies on the order and addition of new words to create emphasis (Farías, 2013, p. 1067). As an example, in the phrase *me gustan las manzanas* (Eng. I like apples), a typical strategy to create emphasis for L1 Spanish speakers would be to

add the words *a mí me gustan las manzanas mucho* (Eng. I really like apples a lot). This level of emphasis could be created in English solely through the production of increased intensity and high pitch on the word 'like' (e.g., I LIKE apples) and not in Spanish.

Overall, intonation in Spanish has both similarities and differences to English. More salient differences in intonation are found between English and Spanish in the ways speakers employ pitch to create emphasis. For this reason, this aspect of intonation (i.e., pitch) is included in this study as a means to detect variation between the two languages (i.e., Spanish and English) that the participants of this study speak.

The use of pitch to create emphasis has been studied in previous research that has explored how HLLs produce lexical stress (e.g., Elias et al, 2017; Ronquest, 2013; Kim, 2020). Lexical stress has been defined as the use of suprasegmental cues to emphasize syllables that carry meaning (Kim, 2020, p. 234). The accurate, or inaccurate, placement of lexical stress in Spanish is highly important because of the high frequency of minimal pairs found within the same lexical categories. Verbs in Spanish commonly have minimal pairs that depend on accurate lexical stress. For example, the verb *hablar* has the forms *hable*/*hablé* (Eng. a command to speak/I spoke) which differ in sound only by the placement of lexical stress.

Lexical stress in Spanish is created by increased pitch height, increased intensity, and extended duration of the stressed syllable (Ladefoged, 2001). Multiple studies have shown that duration is more consistently relied on to create lexical stress than the other two features (Kim, 2020, p. 234). In contrast, English relies primarily on reducing the vowels surrounding the stressed syllable. As a result, the syllable that is being stressed has higher pitch, higher intensity, and a longer duration than the syllables that precede and follow it (Ortega-Llebaria, 2013). The differences described here suggest that Spanish-English bilinguals have two methods available to

them to create lexical stress: either through the deliberate increase in pitch, intensity and duration or the reduction of syllables in atonic-tonic-atonic sequences. This study analyzes instances of lexical stress that heritage language speakers produce in order to explain variation between the two phonological systems with attitude data.

Rhythm is a suprasegmental speech feature which has been featured in Spanish heritage language research (e.g., Robles-Puente, 2014; Robles-Puentes, 2019). Rhythm is a timing measurement that represents the variation of the duration of different segments of speech (Nespor et al, 2011). Rhythm in language is relatively a well-studied topic. Research from authors such as Liberman and Prince (1977), Ramus et al (1999), and Nespor et al (2011) (among others) have shown rhythmic differences which are consistent enough to allow the categorization of languages according to their rhythm. Of particular interest to this research are the rhythmic classifications of English and Spanish.

Rhythm in English is characterized by the variation between stressed and unstressed syllables or segments. Stressed syllables and segments in English will have a longer duration than unstressed syllables and segments which are often reduced in duration or some other feature of speech such intensity. As such, English is considered a stress-timed language which is a contrast to Spanish. Spanish is considered to be a syllable-timed language which means that the duration of syllables is expected to vary less across speech than they do in English. Because this feature is expected to be different between English and Spanish, the analysis of rhythm in heritage speakers of Spanish can be reasonably explained by either dominance in English or phonetic interference across the two phonological systems. For this reason, the present study analyzes the rhythm of HLLs with the goal of explaining any fluctuation between English rhythm and Spanish rhythm with attitude data and/or task type.

Finally, the last phonological feature that this section discusses is speech rate. Speech rate for this study is the mean number of syllables produced per second and is calculated by the amount of syllables produced over time speaking (Kormos & Denes, 2004). No studies offer conclusive evidence that speech in Spanish is either faster or slower than that of English. Few studies compare speech rates from these two languages. One example comes from De Johnson et al (1979) in which native speakers of English and Spanish completed a timed (80 second) speaking task. For the task they retold a narrative that had been explained to them previously. The results showed that the Spanish speakers had a faster speaking rate but that the English speakers used more words. To the best of the researcher's knowledge, these findings have not been replicated. The present study includes speech rate because of the fact that multiple studies have shown that it is a consistent predictor of foreign-accentedness (e.g., Derwing & Rossiter, 2003; Munro & Derwing, 1998; Munro & Derwing, 2001; Kang et al, 2010; Trofimovich & Baker, 2006). In other words, speech rate is included in this study because this study aims to measure heritage language learners' perception of language identity compared to the production of suprasegmentals that affect the construction of language identity. This study also includes spoken data from Spanish dominant speakers in order to provide a reference point for the measurements of these speech features taken from the HLL participants.

2.5. Phonological Variation across Speaking Tasks

Phonological variation across speaking tasks has received a lot of attention in the past and has shown that task type can, to some extent, account for variation in phonological production (e.g., Colantoni et al, 2015; Derwing et al, 2004; Dickerson, 1975; Ejzenberg, 2000; Labov, 1966; Tarone, 1983). Crowther et al (2015) posit that one reason phonological variation across

speaking tasks has received so much attention is due to the role phonology plays in pronunciation (e.g., Isaacs et al, 2015) and accentedness (e.g., Crowther et al, 2015; Trofimovich & Isaacs, 2012; Saito et al, 2016).

The topics of pronunciation and accentedness have received a lot of attention over the last three decades as research has shown that accented yet comprehensible speech is a much more realistic goal for L2 instruction than nativelike pronunciation (Munro & Derwing, 1999; Munro & Derwing; 1995; Derwing & Munro, 1997). As researchers have worked to tease apart the components of comprehensible speech, speaking tasks have been used to explain variation in phonological production (Crowther et al, 2015). In their own words, Crowther et al (2015, p. 81) state that speaking tasks "are a systematic source of variance in L2 speaker performance that could affect scoring outcomes". The systematicity and importance of speaking tasks highlight their usefulness and importance as a variable in research on phonological variation.

Evidence of this comes from Crowther et al (2015). In their study, 60 participants from different L1 backgrounds (e.g., French, Hindi, Farsi, Chinese) completed five speaking tasks. The data was analyzed for variance in comprehensibility ratings across two tasks: The IELTS long turn task and the TOEFL iBT integrated task. They found that in the IELTS long turn task, comprehensibility was associated solely with segmentals, word stress, rhythm and speech rate. On the other hand, the TOEFL iBT task higher comprehensibility ratings were affected by phonological and grammatical features as well as lexicon. The researchers suggest that their results show comprehensibility is affected by phonological features and phonological features are affected by task.

These findings are similar to those from a study done by Derwing et al (2004). In their study they found that fluency measures and prosody were more target-like in monologues and

dialogues than in picture description tasks and that these measurements of phonological features correlated with comprehensibility scores. Specifically, of the phonological features included the fluency measures (i.e., speech rate, mean length of run, number, and duration of pauses) correlated most strongly with comprehensibility ratings. It is important to note the main difference between the picture description task and the monologue that were used is that, for the monologue, the participants were able to select one of their own memories to recount rather than being tasked with recounting a story portrayed to them through images. This is perhaps why phonological features from the monologue were more similar to the dialogue than the picture description task.

Task effects on phonological production is also found in a study done by Colantoni et al (2015). For their study, Colantoni et al (2015) measured the prosody of eight heritage language learners across two speaking tasks: a scripted read aloud task and an unscripted narration where the participants had to recount a familiar story. They hypothesized that the tasks would affect the participants' prosody. Specifically, they predicted that in the scripted task the heritage language learners would show more English-like prosody and more Spanish-like prosody in the unscripted task. This expectation came from the fact that the heritage language learners had had training in reading English but not Spanish and therefore the mode of the task would activate the participants' English phonological system more so than in the spontaneous speaking task.

Their results showed that the heritage language learner participants used more English-like prosody during the scripted task than in the unscripted task. Like the study done by Crowther et al (2015), the results from this study show that task type affects phonological production. Colantoni et al (2015) suggest that the variation they observed is likely due to the change in mode between the two tasks. In other words, because the heritage language learners

had received formal instruction in reading English and not Spanish then, when they performed the reading task, they had more experience producing the English phonological system in that type of situation than the Spanish Phonological system. This points to the reasonable possibility that one reason task type matters is because of the similarities to and/or differences from a speaker's language background.

Tarone (1983, p. 151) suggests that differences in phonological production across tasks is explained, to some extent, by the amount of attention a speaker pays to their speech and that the more attention they pay to their speech the less systematic or regular it will be. For example, if a task is cognitively demanding then the phonological features the L2 learner produces will be expected to vary from whatever their norm is.

This is perhaps demonstrated in Taguchi (2007) who used a pragmatic approach to explore the effect that tasks have on speech production and compared the oral performance of L2 speakers and native speakers across the same tasks. The two tasks for this study were designed to present the participants with interlocutors of high and low power differences, social distances and degrees of imposition. The results showed that the L2 participants had a significantly faster speech rate in the task that presented the lowest power difference, social distance and degree of imposition while little difference was found in native speaker performance across the two tasks. In this study, the native speaker participants showed stability in their speech rate across the two tasks while the L2 speakers did not. It is likely that the L2 participants paid more attention to their speech in the task that presented them with a higher power difference, social distance and degree of imposition and therefore their speech production became less reflective of their actual competence. This points to the need to account for task effects on phonological production especially in high stakes settings.

Various studies show that speaking tasks affect phonological production (e.g., Colantoni et al, 2015; Crowther et al, 2015; Derwing et al, 2004). Of the phonological features possible, fluency has consistently been shown to be affected by task type. Especially those tasks which require that L2 participants pay more attention to their speech.

2.6. Speech Research on Heritage Speakers

This section is aimed at synthesizing relevant research on the speech of HLL. The topic of heritage language speakers has attracted the attention of many researchers who work to understand the extent to which these types of language learners vary from traditional L2 students (Kim, 2020). Several studies have shown that this type of learner is simultaneously similar to and different from both monolinguals and L2 speakers depending on the linguistic ability being measured (Beaudrie et al, 2014). In regards to research done on the spoken production of HLL, recent research has included analysis of segmental and, to a lesser extent, suprasegmental speech features.

Suprasegmental speech features are phonological structures beyond the segmental level (e.g. vocalic and consonantal segments) (Henriksen, 2014, p. 166). This definition includes features such as stress, pitch, rhythm, voice quality and speech rate. Suprasegmental features have become increasingly important to linguistic research as studies have shown that these features are important to understanding phenomena such as interlanguage development (Henriksen, 2014) and accentedness (Munro & Derwing, 1995; Munro & Derwing, 1998).

In spite of all the research being done on the topic of HLL and the widely accepted importance of suprasegmental speech, these features are relatively understudied in heritage speakers, especially when compared to segmental features (Rao & Kuder, 2016; Kim, 2019;

Chang, 2021; Chang & Yao, 2016). In response to this, Chang (2021, p. 597) posits that the lack of research done on heritage speakers' suprasegmental production inhibits heritage language researchers from understanding when and to what degree suprasegmental features of heritage speakers pattern differently from either L2 or monolingual speakers. More research is needed on this topic in order to describe differences between HLL and L2 suprasegmental speech features.

The research that has been conducted on suprasegmental speech features of HLLs follows the trend of other areas in that it compares HLL to L2 speakers and/or monolinguals. Also, it is not uncommon for research on suprasegmentals to include a measurement on both productive and perceptive abilities. Studies that include both perceptive and productive abilities are able, to some extent, to demonstrate how the language background affects (or not) language proficiency.

For example, Kim (2019) conducted a study in which they analyzed Spanish heritage speakers' perception and production of lexical stress. They compared the heritage language participants data to Spanish monolinguals and L2 English-Spanish learners. The results showed that the heritage language participants had perception abilities on par with Spanish monolinguals but that their production of lexical stress was more comparable to the L2 English-Spanish learners. Kim suggests that, based on their findings, early-age exposure to a language benefits perceptive abilities but does not necessarily result in monolingual-like production. One interpretation of these findings is that, just because an individual can hear a sound does not necessarily mean they can produce that same sound. However, that interpretation may be too narrow-minded as it does not allow for the possibility that HLL can perceive and produce targeted sounds but, in regards to production, they choose not to.

Like Kim's (2019) study on lexical stress, many studies have suggested that L1 and L2 phonological systems are not independent of each other (e.g., Grosjean, 2010; Elias et al, 2017;

Chang & Yao, 2016). Rather, bilinguals experience phonetic interference or even phonetic transfer. Kim (2019) points out that studies conducted on traditional L2 learner data have typically looked at L1 to L2 transfer given that the L1 is typically the language in which a bilingual speaker shows dominance. However, heritage speakers typically experience a shift from dominance in their L1 to dominance in their L2 at an early age (Kim, 2019, p. 2). Again, Kim's (2019) results indicate that dominance in the L2 does result in phonetic interference from the L2 to the L1 suggesting that the order in which languages are acquired is trumped by linguistic proficiency. In other words, phonetic interference does not necessarily occur exclusively from the L1 to the L2, rather from the dominant language to the other language(s).

Elias et al (2017) adopt a specific definition of the term *interference* as it relates to phonetics: "ephemera intrusions of the other language" (p. 3) as they use it in describing the results from their study. It is important to note that they distinguish it from *transfer* (defined as, "permanent, or relatively permanent, traces of one language on the other", p. 3). In their study they analyzed the potential effects that code switching events might have on vowel production. They found that vowels in Spanish which were close to code switching events (i.e. Spanish to English and back to Spanish) took on more English-like qualities. They suggest the effect that code switching has on vowel production observed in their study is explained by a short-lived overlap in the production of two different phonological systems rather than a fixed dominance of one system over another. In short, Elias et al suggest that this is evidence that heritage language speakers are able to "maintain the phonological systems from both of their languages" (p. 2).

The distinction between *interference* and *transfer* is important because, in the case of interference, it allows for the possibility that heritage speakers are able to recognize the differences between the two languages and control them. The ability to recognize the differences

is at least supported by the perception studies previously mentioned. And, while previous research has shown heritage speakers performing more like L2 speakers than monolinguals (or target language dominant speakers), other speaker perception research has shown that categorizing heritage speakers based on the way they sound is quite difficult.

In their study, Chang & Yao (2016) measured tone production as well as perception ratings of heritage, native and L2 speakers of Mandarin. First, they found that heritage speakers more closely approximated the tone production of native speakers than L2 speakers did. Second, they found that heritage speakers were the most difficult to classify demographically in the perception experiment. In fact, the listeners (native, L2 speakers and heritage speakers) had the most trouble guessing where the heritage speakers were from and the heritage participants' tone production was more like the native speakers' than the L2 speakers' tone production was.

Regarding the suprasegmental production that seems to land somewhere between L2 and monolingual speaker, Kim (2019, p. 4) claims, along with others (e.g., Flege, 1999, Grosjean, 2010) that "it is impossible to control two languages exactly the same way as two monolinguals." However, this claim appears to ignore the fact that the so-called "control" that monolinguals have over their phonetic system could never be tested as they, by definition, do not have access to a different phonetic system. In other words, the researcher questions whether we could call it "control" when referring to a monolingual's phonetic ability when there really is no other option available to them.

As stated previously, research on spoken heritage language is focused on determining how closely *do* heritage speakers approximate either L2 or monolingual speech rather than asking how closely *can* and under what conditions *would* heritage speakers approximate L2 or monolingual speech. The first approach seems to take for granted that what a speaker produces

represents their productive ability. It is proposed here that this is too-narrow of a view and that, given the variation that is observed in heritage language production of speech, other factors such as register (i.e. situational characteristic, commonly occurring linguistic features and the functional association between those two) and attitude towards heritage language should be considered, in addition to comparing HLL speech to Spanish-dominant speaker, to help understand heritage speakers. Finally, in a review of current research on heritage language speech, Chang (2021) also posits that perhaps a dichotomous approach to interpreting heritage spoken data is not comprehensive enough. Rather, he suggests that:

> "An observed divergence of heritage speakers from monolingual native speaker norms, which can often appear to reflect a passive interference of the majority language, may not be passive at all, but rather sociolinguistically motivated, under control, and deployed strategically as a flexible resource for constructing one's social identity and signaling group membership." (p. 602)

In summary, research conducted on the speech of heritage languages compares heritage data to monolingual and/or L2 data. This is undertaken in an effort to show that heritage speakers are either like L2 speakers because of a lack of language exposure or they are like monolingual speakers because they have had sufficient exposure to their heritage language (e.g., Au et al, 2003). Results from this line of research are still relatively inconclusive as far as we try to determine whether heritage speakers are more like L2 or monolingual speakers. It is proposed here that research on heritage speech should consider the possibility that heritage speakers can be strategic (as Chang suggests) in their production of suprasegmental features.

2.7. The Effect Suprasegmental Features Have on Self-perception

In a study done by Sung (2016), 18 L2 English speakers were interviewed about their self-perceptions, desired identities and accent preferences. The majority of the participants (13 out of 18) expressed their preference for a native-like English accent because they believed it helped them create a self-image which they associated with positive social attributes such as language prestige and status. In other words, the self-perception of these participants, regarding their English accent, is explained by the attitude they had towards a native-like English accent. Additionally, the same participants expressed a preference for an English-like accent because they believed others would see them as highly proficient L2 English speakers. These interviews show that participants believe accent is related to self-perception because it functions as evidence of their desired self-image.

The findings of Sung (2016) are consistent with other similar studies done on the relationship between accent and self-perception (e.g., Scales et al, 2006; Sung, 2014; Sung, 2013). For example, Kung and Wang (2018) use questionnaires and interviews to explore L2 English learners' perception on accent choices. Their findings were consistent with previous studies (e.g., Jenkins, 2007) in that a majority (25 out 33) of the participants expressed a desire to speak with a native-like accent of English. Three themes emerged from their data to help explain why a native-like accent was preferred: first, participants believed that accent was important to accurate production. In other words, they would view themselves as proficient speakers if they had a native-like accent. Second, participants believed that if they spoke with a native-like accent they would perceive themselves as being like popular figures from the target culture (e.g.,

celebrities). Third, they believed that they would have better opportunities to create and maintain social connections with a native-like accent.

Similar results come from a study done by Boonsuk and Fang (2022) in which a majority of their participants (six out of nine) expressed dissatisfaction with their accent because it was nonnative-like. Specifically, they expressed feelings of embarrassment because they believed their accent portrayed them as incompetent speakers of English. These studies illustrate the importance that L2 speakers give to accent in connection with their perception of self. Sung (2016, p. 56) adds to this and highlights that accent is one of the most quickly recognized characteristics of spoken language.

According to Lippi-Green (1997, p. 42) accent consists of both segmental and suprasegmental features. Evidence of this comes from several studies that tease apart accent and show how important suprasegmental speech features are to accentedness (e.g., Derwing & Munro, 2001; Derwing & Rossiter, 2003; Kang, 2012; Kang, 2010; Kang et al, 2010; Kormos & Denes, 2004). Field (2005) made an effort to show that improvement in accent is dependent on suprasegmental features. They found that manipulating the lexical stress in recordings affected the extent to which listeners were able to understand. These findings highlight the important role that suprasegmentals play in speech perception.

Further evidence of this comes from Derwing and Munro (2001) who collected speech recordings of native and nonnative speakers of English in order to test the effect that speech rate has on listener perception. Native and nonnative speakers rated those recordings and the results showed that native listeners preferred a slower rate for nonnative speakers. These findings suggest that the suprasegmental feature of speech rate affects listener perception. In a broader-scale study of suprasegmental speech features, Kang et al (2010, p. 561) used multiple regression

to show the relationship between "suprasegmental features of accentedness and subjective assessments on nonnative speaker oral proficiency and comprehensibility". The analysis showed that the 29 suprasegmental features measured in their study accounted for 50% of the variance in listener ratings.

In summary, L2 speakers have been shown to connect their image of self with the way they sound, or their accent (e.g., Sung 2016). Accent is used in identity construction by both the listener (Kang, 2010) and the speaker (Kung & Wang, 2018). Additionally, accent is a complex structure made up of segmental and suprasegmental features (Lippi-Green, 1997). Of those, research has shown that suprasegmental features are consistently important to accent perception (Kang et al, 2010) and L2 pronunciation improvement (Derwing & Rossiter, 2003). The following sections highlight three different suprasegmental features and propose that they be included in this study.

2.7.1. *Rhythm*

As stated before, rhythm is a suprasegmental speech feature which has been featured in Spanish heritage language research (e.g., Robles-Puente, 2014; Robles-Puentes, 2019). Rhythm is a timing measurement that represents the variation of the duration of different segments of speech (Nespor et al, 2011). Rhythm in language is relatively a well-studied topic. For example, Robles-Puente (2019) carried out a study in which he compared speech samples from monolingual speakers of English and Spanish as well as Spanish-English bilinguals with varied linguistic backgrounds (e.g., Mexicans who had immigrated as children, Mexicans who had immigrated as adults and children born in the U.S. to Mexican immigrants).

The study done by Robles-Puente (2019) is discussed here for two reasons: first, the methods he used to measure rhythm and, second, to show current research on heritage Spanish speakers' rhythm.

Robles-Puente used two different methods to measure rhythm in his study. The first method is the normalized Pairwise Variability Index which divides the absolute value of the difference in duration of two successive intervals by the average duration of the pair. This method was developed by Low et al (2000). The second method (see Dellwoet al, 2007) steps away from measuring vowels or intervocalic intervals and instead measures the duration of voiced and voiceless ratios in the acoustic signal. Dellwo et al (2007) argue that a higher voiceless ratio would be characteristic of a stress-timed language and a lower voiceless ratio would be characteristic of a syllable-timed language. As stated previously, Robles-Puente used both methods to measure rhythm in spoken language from monolingual English speakers, adult early age Spanish-English bilinguals (Mexicans who immigrated as children), Spanish-English bilinguals who were born in L.A. County, monolingual Spanish speakers, and adult late bilinguals (Mexicans who immigrated as adults).

Both methods of measuring rhythm were applied to the data. Monolingual speakers of English showed high voiceless to voiced ratios as well as high nPVI scores (i.e., more variability in vowel duration). Monolingual Spanish speakers showed low voiceless to voiced ratio (i.e., their speech stream was more voiced than voiceless) and less variability in vowel duration (lower nPVI score). The experimental groups all showed variation in both of these methods that was best predicted by age of acquisition. In other words, the early they began learning English the more their spoken language patterned like the English control group in rhythm. In contrast, the

older they were when they began learning English the more the rhythm of their spoken language patterned like the Spanish control group.

The results from this study are interesting for at least two reasons. The first, Robles-Puente's use of two different methods for measuring rhythm appears to show that they both align with what is already known about rhythm in English and Spanish. Additionally, the consistent results of both methods suggest that rhythm is stable enough in its definition to be measured or analyzed in different ways. Based on this, it is suggested here that rhythm could be measured in perhaps a more simple way: the standard deviation of syllable lengths from an individual would show relatively more or less variation compared to another.

Finally, Robles-Puente found that language experience was a predictor of rhythm patterning. This means that participants with longer exposure to English spoken produced more stress-timed language and those with less exposure to English had more syllable-timed language.

These results suggest that language proficiency determines rhythmic patterns. As stated previously, this feature of speech is proven to be different between the two languages and therefore lends itself naturally to being a dependent variable in trying to better understand English-Spanish HLL speech.

2.7.2. *Lexical Stress*

Another suprasegmental feature of spoken language that has been shown to be different between Spanish and English is that of lexical stress. Lexical stress is used in both English and Spanish though there are key distinctions in how and why it is used. For example, lexical stress is primarily created by suprasegmental cues in Spanish with the increase of intensity, higher pitch and longer duration of a stressed syllable (Kim, 2020, p. 234). While speakers of English

also utilize these suprasegmental cues, lexical stress in English is also controlled by vowel reduction in neighboring atonic syllables. Speakers of English will reduce vowels in atonic syllables in order to create emphasis in a tonic syllable (Ronquest, 2013). For example, Field (2005) carried out a study of lexical stress in English in which participants were asked to transcribe recordings that had been manipulated to alter the suprasegmental cues and vowel quality of instances of lexical stress. The results showed that the recordings were least intelligible for native and non-native participants when suprasegmental features were misaligned and vowel quality was lessened.

A key difference in the realization of lexical stress in Spanish and English is that Spanish speakers typically do not reduce vowels to the same extent English speakers do (Kim, 2020; Ronquest, 2013). The definition of vowel reduction adopted for this study comes from the review provided by Ronquest (2011) who claims that vowel reduction is made manifest in three ways: shortened duration, centralization and quality reduction.

Another important difference to mention here is that, in some cases, lexical stress in Spanish has a higher functional load than in English (*hable*/*hablé* vs. *CONsult*/*conSULT*) (Kim, 2020, p. 234). In this example it can be seen that the difference in lexical stress between *hablé* and *hable* affects the meaning of the verb in terms of agent and tense, whereas the example given in English shows how the placement of the stress changes the noun to verb.

There are a handful of studies which have investigated the production and/or perception of lexical stress of Spanish heritage speakers (Kim, 2015; Ronquest, 2016; Elias et al, 2017; Kim, 2020; Ronquest, 2013). This is not surprising considering the fact that suprasegmental features are relatively understudied in heritage language research. Of these studies conducted on lexical stress, two (Ronquest, 2016; Elias et al, 2017) found that heritage Spanish speakers

created lexical stress using both suprasegmental features and vowel reduction. The manipulation of these speech features would be expected in a monolingual English speaker but not in a monolingual Spanish speaker.

In their study, Elias et al (2017) used scripted narration tasks to elicit code switching events. Their goal was to isolate instances of lexical stress in Spanish that were either preceded or immediately followed by a switch from one language to the other (i.e., Spanish to English or English to Spanish). Their data analysis consisted of manually marking the first 20 vowels that followed a code-switching event. These were then coded for features such as lexical stress (measured with pitch height, intensity, and duration), vowel phoneme, and the space from the production of the vowel to the code switch (Elias et al, 2017, p. 7). They found that instances of lexical stress near code switching events were more likely to include vowel reduction in nearby atonic syllables.

In Kim (2015), their study included a perception task and a production task. In the perception task the participants had to distinguish between minimal pairs (e.g., *paso*/*pasó*) and they performed like their Spanish monolingual counterparts. In the production task the participants had to produce minimal pairs and did not perform like their monolingual counterparts.

In both of these studies, the heritage participants used lexical stress with English-like qualities which would not be expected in a monolingual Spanish speakers' production of lexical stress. However, the perception experiment conducted by Kim (2015) suggests that heritage Spanish speakers are able to perceive lexical stress like a monolingual speaker. Kim posits that because of the high functional load that lexical stress carries in Spanish, Spanish speakers are

sensitive to suprasegmental information when processing speech. This perhaps explains why their perceptive abilities are more like that of a monolingual.

2.7.3. *Target Features of Lexical Stress*

Lexical stress has been chosen for this study because of the contrast it offers between English and Spanish. The research that has been conducted on HLL production has used either scripted speech tasks or semi structured speech tasks. All of which have been designed to target certain words (e.g., Ronquest, 2013) or vowels in tonic positions (e.g., Elias et al, 2017). The research has consistently shown that heritage speakers of Spanish will use vowel reduction more like a dominant speaker of English would (Kim, 2020). The present study will approximate the methods used in previous research with the goal of explaining the variation of lexical stress with differences in attitude and speaking task.

In an effort to follow previous methods used, the researcher has decided to collect semi-structured speech samples, code for the first 20 tonic syllables (i.e., meaning-carrying syllables) within each speech sample, measure the pitch height, duration and intensity of tonic syllables and evaluate atonic vowels which occur next to tonic syllables for shortened duration, centralization and quality reduction.

In sum, lexical stress exists in Spanish and English. However, it is realized in different ways in these two languages. The most notable difference is the reduction of vowels which is expected to be found in spoken English and not Spanish. So far, studies have shown that heritage speakers tend to include vowel reduction when they produce lexical stress in Spanish (Elias et al, 2017; Kim, 2020; Ronquest, 2013). The proposed study aims to test whether their production of lexical stress can vary depending on the task and attitudes of HLL.

2.7.4. *Speech Rate*

The final speech feature selected for this study is speech rate. Previous research has considered speech rate as a predictor variable of accentedness ratings in English (e.g., Derwing & Rossiter, 2003; Munro & Derwing, 1998; Munro & Derwing, 2001; Kang et al, 2010; Trofimovich & Baker, 2006). Munro and Derwing (1998) find evidence that speech rate affects listener perception of accent. In their study, native English speakers listened to sound files read by nonnative English speakers at a normal speech rate as well as a half speed. They found that the slowed speech was rated as more accented than the normal nonnative speech rate. This suggests that speech rate is taken into account when listeners make decisions about accent.

Kang et al (2010) found that speech rate, among other features, was a reliable predictor of oral comprehensibility. In their study, Kang et al (2010) used an automated process to extract 29 speech variables. They first performed a hierarchical cluster analysis in an effort to reduce the number of predictor variables that would later be used in a regression model. Speech rate (referred to as syllables per second in their study) clustered with features such as articulation rate, phonation time ratio, number of prominent syllables per run and mid-falling tone choices. This cluster of variables was labeled *Suprasegmental Fluency* and was one of the largest contributors to their overall finding of an R^2 value of 0.50 in their regression model. Kang (2013) was a similar study in which it was found that fluency accounted for 26.7% of the variance explaining speech features. These are more examples of research showing that speech rate is consistently important in speech judgment.

Perhaps one of the most relevant studies to this research proposal (because it experiments with ratings on speech in Spanish), is the study conducted by Schoonmaker-Gates (2012). In her

study, she measured the extent to which slowed speech rate affected native and nonnative listener ratings on foreign-accentedness in Spanish. She found that nonnative listeners perceived modified lower rates of speech to be more accented than unmodified rates of speech. In fact, the audio stimuli for her research included samples that were modified to be 10% slower and 25% slower. The 10% slower samples were rated as more foreign-accented than the unmodified samples and the 25% slower samples were rated as more foreign-accented than the 10% slower samples. In other words, the slower the speech rate, the more they were perceived as foreign accented by the nonnative listeners. Native listeners also rated the 25% slowed speech as more foreign-accented than the unmodified speech. Like the studies done by Munro and Derwing (1998; 2001), the results from this give evidence that speech rate affects listener judgment.

Finally, in a study done by Trofimovich and Baker (2006), they used data taken from participants with different lengths of L2 experience (3 months, 3 years, and 10 years). They collected spoken samples from their participants which were used for acoustic analysis and listener judgments. They found that, overall, suprasegmentals contributed to foreign accentedness and that pause duration and speech rate were more likely to do so than other suprasegmentals. While various studies have shown that suprasegmentals affect listener judgments on accentedness, this study suggests that some are more likely to do so than others and speech is one of those few.

Because speech rate has been shown to correlate with foreign-accentedness ratings, comprehensibility ratings and is more likely to do so than other suprasegmentals, it is one of the speech features that will be analyzed in the proposed study. Speech rate is a simple measurement: number of syllables / total duration (measured in seconds for this study). Speech

rate shows how much sound a speaker produces (including filled pauses such as 'hmm', etc.) within the total duration of a given speaking task.

In sum, it is suggested here that rhythm, lexical stress and speech rate are features that, if speech is strategic, would be used by speakers of English who are also heritage speakers of Spanish as these three features are either expected to be different between the two languages (e.g. Robles-Puente, 2014; Robles-Puente, 2019; Kim, 2015; Kim, 2020) or, in the case of speech rate, they have been shown to be predictive of ratings of nativeness (e.g. Kang et al, 2010; Munro & Derwing, 1998; Munro & Derwing, 2001; Schoonmaker-Gates, 2012).

2.8. Research Questions

To this point, the research has argued that research on heritage language production has been too narrow in the possible explanations it offers for interpreting findings. In support of this, the researcher has discussed the concepts of speaking tasks and language attitude as viable predictors of language production. Specifically, rhythm and lexical stress are expected to be different between Spanish and English so, any deviation from one norm to another is potentially evidence of a speaker trying to sound (or not sound) a certain way. And, speech rate, having been shown to affect listener's perception of accentedness, could also be used by speakers to mark in-groupness. As such, the research questions for the proposed dissertation are:

1. To what extent do heritage language learner attitudes towards their language ability and language identity vary across conversation and classroom presentation tasks?

2. To what extent do heritage language learners' rhythm, lexical stress, and speech rate approximate Spanish-dominant speaker speech and vary across conversation and classroom presentation tasks?
3. To what extent do heritage language learner attitudes towards their language ability and language identity correlate with the production of their rhythm, lexical stress and speech rate?
4. How do individuals' attitudes towards their language ability, language identity, and speech features vary across the conversation task, classroom presentation tasks, age of exposure and frequency of use?

CHAPTER 3: Method

This section presents an outline of the Method chapter. First, there is an overview of the research design which is then followed by sections describing the different aspects of the methods used. The first section after the overview describes the target population and the process for recruiting participants. Next, the researcher describes the process for data collection which includes an explanation of the classroom visits, instruments, collection of targeted variables. This is followed by an explanation of the statistical methods used and summary of the research design.

3.1. Overview of the Research Design

To address the research questions of this study, the researcher recruited HLL students (N = 38) from Spanish language courses at Northern Arizona University. These classes were accessed through connections made with current instructors of those courses and the researcher visited those classes in-person to recruit participants and collect spoken data through two speaking tasks. Recruitment took place during the Fall of 2022.

The data collected for this study consisted of speech files, biographical information and attitude surveys. The analysis of speech features was carried out through PRAAT software (Boersma & Weenink, 2010). The researcher used automated and manual processes to code the targeted speech features and the data collected from the biographical and attitude surveys. The researcher enlisted one other person to code ~15% of the spoken data in order to generate an inter-rater reliability score for the target speech features. The other coder was a PhD student who had complete Master's level coursework in Spanish. The attitude surveys were delivered via Qualtrics.

Finally, the researcher used descriptive statistics and paired samples *t*-tests to answer the first and second research questions. The third research question was addressed using correlations.

3.2. Recruitment of Participants

3.2.1. Heritage Language Learners of Spanish

The target population for this study was adult heritage speakers of Spanish who are currently enrolled or could potentially enroll in a Spanish language course because they are a demographic which continues to increase and with it the call to meet its pedagogical needs (Beaudrie et al, 2014). Recruitment for this dissertation took place during the Fall semester of 2022 at Northern Arizona University in Flagstaff.

For recruitment at Northern Arizona University (NAU), the researcher visited six Spanish language courses. Three of these courses were Spanish as a heritage language classes which meant that all of the students enrolled had been classified as a heritage Spanish speaker. 40 participants were recruited, two of which were not included in the analysis due to not meeting the HLL definition for this study. The three heritage language classes were of the level 300 and the three traditional language courses were of the level 200.

The language proficiency for these participants was controlled for by recruiting from classes that were at least fourth-semester Spanish language courses. This allowed for mixed proficiencies among the participants which is an expectation among heritage language learners (Peyton et al, 2001), and the minimum proficiency was high enough that participants were still able to complete the speaking tasks and finally, the maximum was low enough to exclude any speaker who does not fit the criteria of greater proficiency in English than Spanish described operationalization for this study of heritage language learner for.

3.2.2. Spanish Dominant Speakers Baseline

Spanish-dominant speakers were included in this study in order to compare to the speech of the heritage language learners. Three Spanish-dominant speakers were recruited from the classes where the heritage Spanish speakers were recruited. Two were female and one male. One female (age 18) was a foreign exchange student from Venezuela and the male participant (age 18) was a foreign exchange student from Argentina. The other female (age 19) was native to Peru and had moved to the United States as a young adult.

These speakers were recruited from the same Spanish courses as the heritage language speaker participants. This allowed for the collection of their data under the same conditions as the other participants for this study. This process is detailed in the following section.

3.3. Data Collection

Data collection occurred in real time and in person. This consisted of participants completing a biographical survey, participating in two speaking tasks and completing two attitude surveys.

Both of the speaking tasks were recorded for audio only. For all of the audio recordings the researcher used a digital recording device that has a maximum audio bit of 64Kbps with a mono channel. This resolution of audio quality had been tested by the researcher in the pilot study and it yielded sufficient quality recordings for the analysis of suprasegmental features. These recordings were initially stored in MPEG-4 format and then were converted to WAV with AVS Audio Converter for analysis in PRAAT software. AVS Audio Converter was also used to clean up the background noise in a few of the audio files using the noise reduction feature. This

process for data collection yielded two speech files for each participant as well as corresponding answers to the attitudes they had during the speaking tasks.

3.3.1. *Procedures during Classroom Visits*

Each classroom visit followed the procedures outlined in what follows to ensure consistency for each participant. At the start of the classroom visit the researcher explained that the tasks would occur as a natural part of their class that day. The researcher then explained that if they chose to participate in the study, they would fill out a short biographical survey, sign an informed consent form, they would be recorded during the tasks and that their recordings would be used for the proposed study. All students who wished to participate were then provided with an informed consent form and a biographical survey which then filled out.

After introducing the study and collecting informed consent forms and biographical surveys, the researcher led the class in the first speaking task which was an academic presentation (see description of situational characteristics in Table 3). For this task, the students were instructed to prepare a short presentation on a Spanish speaking country of their choice. They were given up to ten minutes to prepare their presentation and they were allowed to use any means available to them (e.g., smart phones, laptops, tablets, etc.) to collect information for their presentation. The presentation was oral, did not include any visual aids, and was given in front of the whole class (~18 students). The presenters included their name, country population and name of the country, five historical facts about the country, and an explanation as to why they chose that country. Each participant was given 1-2 minutes to present. The participants were physically located at the front of the class during their presentation as was the audio recorder. The

researcher presented all instructions for the task orally and displayed the instructions on the whiteboard in the class throughout the task.

Immediately after each participant finished presenting, the researcher provided them with the attitude survey that asked them to reflect on their self-perceived language identity and ability during their presentation. This survey was accessed digitally with a QR code that was displayed on the whiteboard and the researcher also had physical copies available for any student who was unable to access the digital version although none were needed. Students completed this survey before moving on to the second speaking task which was a one-on-one conversation with the researcher.

After completing the presentations and the attitude survey, the researcher explained to the class that the next speaking task was a one-on-one conversation with the researcher outside of class (nearby in the hallway) (see description of situational characteristics in Table 3). Prior to the start of class, the researcher set up two chairs for the conversations. The researcher explained that each participant would be invited one at a time to have short conversation and that this task was designed to help them practice speaking about topics found in their coursework (e.g., family, hobbies, and classes). At that point, the researcher turned the class back over to the instructor and commenced the one-on-one conversations.

To ensure continuity in participant experience, the researcher used the same preplanned questions and was the only interviewer. The conversation task was designed to be informal and included questions like, what is your name? Where are you from? Do you have a best friend, what are they like? (see Appendix A for full list). The researcher used a digital sound recorder and recorded each interview as its own file. At the end of each interview the researcher asked the

participants to complete the attitude survey again but reflect on their attitudes from the conversation task. The interviews lasted 3-4 minutes (including the survey).

3.4. Instruments

This project required three different instruments for data collection: the attitude survey used to measure self perception of language ability and language identity (see Appendix B), a biographical survey (see Appendix C) and a classroom presentation to guide participants through the speaking tasks.

3.4.1. Attitude Survey

In an effort to collect data on heritage language speakers' attitudes towards their heritage language, the researcher designed a 10-item survey which asked the participants to reflect on their attitudes towards their heritage language they experienced during the speaking tasks. The items were designed to represent two constructs (five items per construct, see Table 4 below) which were intended to represent how the participants viewed themselves in terms of linguistic ability and language identity. The decision to include these two constructs was motivated by the results of previous research done on the attitudes of heritage language speakers (e.g., Carreira & Kagan, 2011; Kutlu & Kircher, 2021) as well as research done on the effect accentedness has on self-perception (e.g., Scales et al, 2006; Sung, 2016).

Regarding the two constructs representing self perception of identity and ability, both Kutlu and Kircher (2021) and Carreria and Kagan (2011) showed evidence that minority language users manifested what Kutlu and Kircher (2021, p. 3) referred to as "self-concept" in regard to their membership in a social group defined by its language. This means that these

speakers had a mental perception of themselves and a corresponding belief in terms of how that self-assigned identity affected their minority-language-group membership.

Sung (2016) found that the self-perception of their participants, regarding their English accent, was explained by the attitude they had towards a native-like English accent. Their participants expressed a preference for an English-like accent because they believed others would see them as highly proficient L2 English speakers. These interviews show that participants believe accent is related to self-perception because it functions as evidence of their desired self-image.

As such, the two constructs shown in Table 1 are designed to reflect participants' attitudes and self-perceptions in regard to their language ability and language identity.

Table 1

Attitude and Self-perception Constructs

Self-perception of Language Ability	Self-perception of Language Identity
I don't make mistakes when I speak Spanish	*I define myself as a Spanish speaker.*
I speak Spanish very well.	*I belong to Spanish speaking communities because I speak Spanish.*
I sound like a native speaker of Spanish.	*The way I sound when I speak Spanish is a part of my identity.*
I am confident in my Spanish speaking abilities.	*I want to sound like someone who only speaks Spanish.*
I am fluent in Spanish.	*I know I sound like a native Spanish speaker.*

The first construct represents participants' perception of their heritage language ability and is measured with items such as, "*I make mistakes when I speak Spanish"*, and "*I am confident in my Spanish speaking abilities*". This construct includes a total of five items. The second construct is designed to represent the participants' perception of their language identity. It

has five items which include statements such as, "*I define myself as a Spanish speaker"*, and "*I belong to Spanish speaking communities because I speak Spanish*". For all of the items in this attitude battery, participants were asked to indicate on a scale of 1 to 4 (1 = completely disagree and 4 = completely agree) the extent to which they agree or disagree with the statements.

The first iteration of these items was used in the pilot study for this dissertation. Initially, the researcher designed questions that were intended to reflect these constructs but had no intention of grouping the items as representative of the constructs. Rather, the researcher explored the possibility that the responses to the items could be summed up to show either an overall negative or positive view of Spanish as a heritage language. However, data analysis, or rather the attempted interpretation thereof, immediately showed that these items could not reasonably be grouped as one construct of language attitude. In the following chapter, the researcher explains the decision and process for combining the different items shown above into two constructs.

3.4.2. *Biographical Survey*

The second instrument needed for this study is a biographical survey (see Figure 4) which served to filter out any participants who did not meet the inclusion criteria. As stated previously, the inclusion criteria for this study are any adult speaker of Spanish as a heritage language that is enrolled in a Spanish language course at university. As the recruitment process took place in Spanish language courses, it was necessary to make sure each participant could be considered a Spanish heritage speaker according to the definition adopted for this study (i.e., an individual whose first language is Spanish and their dominant language is English) (Benmamoun et al,

2013, p. 6). To make sure of this, the researcher had the participants complete the biographical survey.

Figure 3

Biographical Survey

Name_____

SPA class time_____:_____

1. What's your gender?
2. Do you consider yourself a heritage Spanish speaker?
3. Were you raised in a home where Spanish was spoken?
    a. If so, who in your family speaks Spanish?
        i. Do they speak English or Spanish more?
4. As a baby, were you exposed to Spanish before English?
    a. At what age were you exposed to Spanish (If it was your home language you can put "0")
    b. At what age were you exposed to English (If it was your home language you can put "0")
5. How often do you speak Spanish?
    a. Never
    b. Not often
    c. Often
    d. Almost Always
6. How often do you hear Spanish?
    a. Never
    b. Not often

c. Often

d. Almost Always

This instrument was used to decide which participants in the proposed study met the criteria for HLL for this study. In order for a participant to be classified as a HLL for the purposes of this study, they had to provide enough evidence to suggest that Spanish was their first language or tied for first (e.g., both English and Spanish were heard/spoken at home since birth). This is a narrow definition of heritage language learners with a focus on linguistic and cultural backgrounds which have been shown to make this type of learner different from traditional L2 learners (e.g., Peyton et al, 2001; Valdés, 2001).

The results of the biographical survey revealed that all participants indicated that they were exposed either to Spanish first or simultaneously with English. The reported ages of exposure to English ranged from 0 to 10 years old with an average of 4 years old. Also, it was found that all had at least one family member whom they spoke Spanish with, except for one participant whose nanny was the person who spoke Spanish with them. Finally, 21 respondents mentioned speaking Spanish often, while 6 reported not doing so often, and 11 stated they almost always speak it. In terms of hearing Spanish, 22 participants reported hearing it often, 2 reported not often, and 14 stated they almost always hear it.

3.4.3. *Process for Collecting Data: Speaking Tasks*

The third instrument designed for this study is a visual presentation which was used to guide participants through each of the speaking tasks as well as the attitude surveys that immediately followed (see Appendix for full presentation). The presentation commenced with a

QR code that directed participants to the biographical survey. All of the participants filled out the biographical survey using their computers or phones. The researcher had printed copies of the biographical surveys as well as the attitude surveys for anyone who needed or wanted to use a physical copy instead of a digital one. None of the participants opted for the physical copies.

This was followed by instructions for the first speaking task. For this, the researcher projected the instructions for the presentation task and explained them verbally. Immediately after, the researcher set a timer and told the participants that when they heard the timer go off, it was time to start the task and the researcher would call on participants in a random order to take their turn presenting. All six of the classes visited by the researcher indicated that they finished preparing for their presentation before the allotted 10 minutes. Once all participants had indicated that they finished preparing for the presentation, the researcher called on them individually to stand at the front of the classroom and give their presentation.

Each presentation was followed by a short applause and then the researcher called the next participant until all had gone. The researcher then gave 2-3 minutes for participants to fill out the attitude survey before calling them individually to step out of the classroom where the researcher had set up chairs before the start of the class visit for the conversation task. The researcher would start the recording device before asking the first question (what's your name?). After working the questions with each participant, the researcher would stop the recording and ask the participants to fill out the attitude survey before returning to class. This was done to ensure the survey was completed.

Just like with the biographical survey, the participants accessed the attitude survey via QR code. The items for each of the attitude surveys are the same, however different QR codes

were used to separate the answers by speaking task. The attitude and biographical surveys were created using Qualtrics. Data preparation is explained in the following section.

3.5. Rhythm, Lexical Stress and Speech Rate Analysis

The data collection process yielded two sets of speech files and corresponding results from the attitude survey for each participant (N = 38). In order to address the research questions of the proposed study, the speech files underwent phonological analysis to obtain a rhythm measurement, syllable duration, peak intensity, max pitch height, and a listener rating of vowel quality to evaluate the production of lexical stress, and a measurement of speech rate for each of the participants. These processes are described in the following sections.

3.5.1. *Analysis of Rhythm*

There are multiple methods which linguists have used to measure rhythm in language (Robles-Puente, 2019). Most notable among them are the Pairwise Variability Index (PVI), developed by Ling et al (2000) and the method developed by Ramus et al (1999). Ramus et al (1999; Ramus et al, 2002) propose that the proportion of vocalic intervals, the standard deviation of vocalic intervals over the duration of a sentence, and the standard deviation of consonantal intervals over the duration of a sentence together serve as a reliable way to explain the rhythm of a given language considering that rhythm represents variation of duration of different segments. While Ramus et al (1999) proposed that these three measurements together help to classify languages by rhythm, their results showed that the standard deviation of vowel duration corroborated previous rhythm classifications of language (e.g., English was classified as stress-timed and Spanish was classified as syllable-timed).

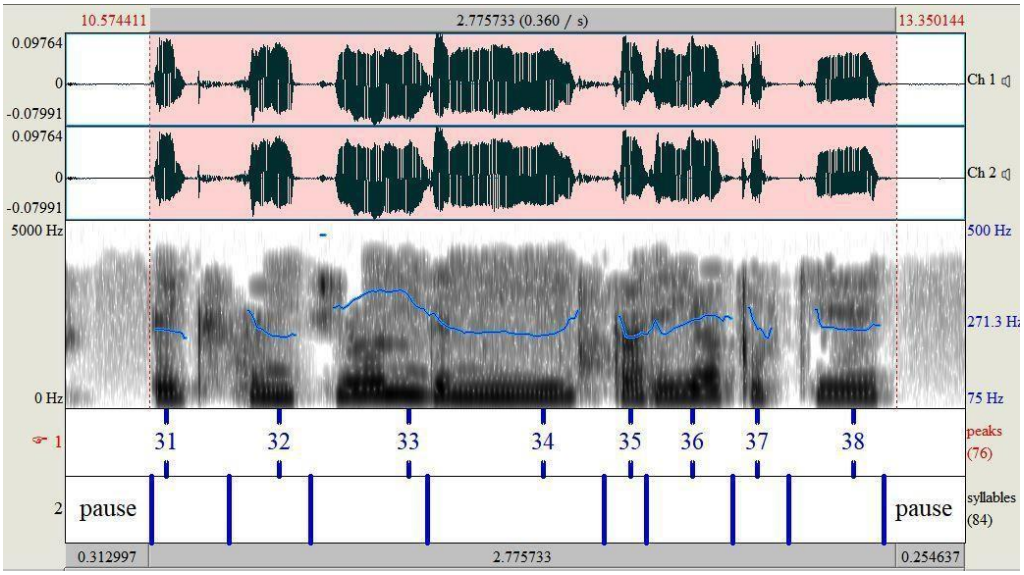
The PVI proposed by Ling et al, and further developed by Grabe and Low (2002), attempts to account for variation in vowel duration and quality as a way to explain differences in linguistic rhythm between languages. Robles-Puente (2019) used both of these methods in analyzing bilingual English-Spanish spoken data and found results to be consistent across the two approaches. He found that results from the two methods consistently agreed in the classifications made to determine whether the speech data was either more syllable-timed or stress-timed. This is not surprising as both ultimately consider variation in duration of segments to comprise rhythm in language.

Considering the consistency found in the rhythm classification of languages based solely on the variability in vowel duration (Grabe & Low, 2002; Ramus et al, 1999; Robles-puente, 2019), rhythm was measured in this study by the standard deviation of syllable duration. As Spanish is considered to be a syllable-timed language (Ramus et al, 1999), it was expected that syllable duration would be stable across tonic and atonic syllables which would be manifest in small standard deviations of syllable duration measurements.

The researcher used PRAAT (Boersma & Weenink, 2010) and a Python script to aid in the linguistic analysis. First, the researcher used a script developed for PRAAT to segment, measure and count syllables (de Jong & Wempe, 2009). As shown in Figure 5, the script developed by de Jong and Wempe (2009) generates sound waveforms (highlighted in pink) as well as pitch contours (drawn in blue). These are then used to determine syllable boundaries, length and count.

Figure 4

Automated Syllable Identification and Measurement



These measurements were collected for each of the sound files. The PRAAT script also generates a .txt file with these measurements. The researcher used a Python script to read in the measurements and calculate the standard deviations for syllable duration for each participant. Because the process for syllabification and subsequent rhythm calculation was automated the researcher did not use another coder for inter-coder reliability.

After calculating the standard deviation of syllable duration (i.e. rhythm score) rhythm for each participant, the researcher checked for normal distribution and generated descriptive statistics which are shown in Table 2 below. To check for normal distribution, the researcher ran a Shapiro-Wilk test of normality which had a *p* value of 0.02 suggesting that the data was not normally distributed. The researcher also examined the histograms and *Q-Q* plots for the rhythm measurement from both speaking tasks. The histogram from the conversation task showed a positive skew with a rise in the middle and the rhythm measurements from the presentation task showed a clear positive skew. The *Q-Q* plot from the conversation task showed some deviation and the *Q-Q* plot for the presentation task showed a lot of deviation.

Table 2

Descriptive Statistics for Rhythm

Variable	Min-Max	Mean	Standard Deviation
Rhythm - Conversation	0.1-0.18	0.130	0.021
Rhythm - Presentation	0.1-0.23	0.119	0.030

As shown in Table 2 above, the mean for rhythm is greater in the conversation than in the presentation. This means that, on average, participants had less varied rhythm during the presentation than the conversation. The standard deviation of rhythm is lower in the conversation than in the presentation.

3.5.2. *Analysis of Lexical Stress*

The coding for lexical stress followed a similar procedure with some added manual coding done by the researcher. The researcher enlisted and trained one other manual coder who coded ~15% of the data. The researcher used the measurements assigned to the same files by himself and the other coder to calculate an inter-rater reliability score for vowel quality ratings. A comparison of the same ratings for the same files showed that the researcher and the coder had 90% agreement in categorizing the vowels as either reduced or not.

To measure the production of lexical stress of the participants, the researcher used PRAAT to extract the pitch height, duration (measured in milliseconds) and intensity (measured by Hz) found within the stressed syllable. Both the researcher and the other coder performed holistic listener ratings on the vowel quality of tonic-atonic-tonic syllable. The holistic rating

consisted of listening for any form of vowel reduction and was coded as ‘0’ if there was vowel reduction and ‘1’ if vowel quality was maintained.

The consideration of these aspects of lexical stress production is guided by research done previously on the production of lexical stress in Spanish heritage speakers (Kim, 2015; Kim 2020). Lexical stress in monolingual Spanish speakers has shown to be realized with the prosodic cues of heightened pitch, increased intensity and duration and, unlike English, an absence of vowel reduction.

In an effort to follow previous methods used (e.g. Elias et al, 2017; Ronquest, 2013; Kim, 2020), the researcher collected semi-structured speech samples and coded for the first 20 tonic syllables found in multi-syllabic words within each speech sample. The researcher used PRAAT software to segment, measure and evaluate atonic-tonic-atonic vowel sequences for duration, intensity, pitch height and vowel quality.

After collecting measurements for syllable duration, pitch height and intensity and listener ratings for vowel quality in the manner described above, the researcher checked each of these measurements for normal distribution in both speaking tasks and generated descriptive statistics. The descriptive statistics are shown in Tables 3-6 below. The researcher used the Shapiro-Wilks test in addition to examining histograms and *Q-Q* plots to check for normality. The Shapiro-Wilk tests of the variables from the presentation task suggested that only intensity had normal distribution ($p = 0.12$).

Examination of the histograms and *Q-Q* plots revealed that intensity showed a satisfactory bell curve. Additionally, the distribution of syllable duration also appeared to be fairly normal in the histogram and *Q-Q* plot. The histogram for vowel quality had somewhat of a

negative skew that did start to taper off towards the end. The histogram of pitch height in the presentation task had multiple peaks with the highest being in the middle.

This process was repeated for the same variables taken from the conversation task. The results from the Shapiro-Wilk tests suggested that intensity had a normal distribution ($p = 0.31$) as well as syllable duration ($p = 0.14$). The histograms revealed that vowel quality from the conversation task had slight negative skew, intensity had a satisfactory bell curve, syllable duration had a normal distribution with some slight positive skew, and pitch height had two peaks with normal distribution around both.

Table 3 below shows descriptive statistics for intensity in both speaking tasks. Intensity had a higher max in the presentation than in the conversation. There was a higher mean intensity during the presentation than the conversation and the standard deviation was greater in the presentation than in the conversation.

Table 3

Descriptive Statistics for Lexical Stress: Intensity

Variable	Min-Max	Mean	Standard Deviation
Intensity - Conversation	54.23-83.72	67.26	5.02
Intensity - Presentation	54.84-121.58	72.77	6.42

Table 4 below shows descriptive statistics for syllable duration. Both the minimum and maximum were greater in the presentation than in the conversation. The mean syllable duration

was also higher in the presentation than in the conversation. The standard deviation for syllable duration was the same in the two speaking tasks.

Table 4

Descriptive Statistics for Lexical Stress: Syllable Duration

Variable	Min-Max	Mean	Standard Deviation
Duration - Conversation	0.03-0.75	0.17	0.08
Duration - Presentation	0.05-0.79	0.18	0.08

Table 5 below shows descriptive statistics for pitch height in both speaking tasks. Pitch height had a greater range in the conversation than in the presentation. The mean pitch height was higher in the presentation than in the conversation and the standard deviation for pitch was greater in the conversation than in the presentation.

Table 5

Descriptive Statistics for Lexical Stress: Pitch Height

Variable	Min-Max	Mean	Standard Deviation
Pitch Height - Conversation	50.82-492.19	196.9	73.39
Pitch Height - Presentation	70.49-493.54	204.82	68.84

Table 6 below shows descriptive statistics for vowel quality in the two speaking tasks. Vowel quality had a higher minimum in the conversation than in the presentation. The mean vowel quality was higher in the presentation than in the conversation. Finally, the standard deviation of vowel quality ratings was greater in the presentation than in the conversation.

Table 6

Descriptive Statistics for Lexical Stress: Vowel Quality

Variable	Min-Max	Mean	Standard Deviation
Vowel Quality - Conversation	8-15	12.08	2.15
Vowel Quality - Presentation	7-15	12.63	2.16

3.5.3. *Analysis of Speech Rate*

The third and final linguistic feature which was measured is the speech rate of each participant. Speech rate was calculated as the number of syllables/total duration (measured in seconds) (Korms & Denes, 2004). The researcher calculated this using the PRAAT script previously described and it was an entirely automated process. For this, the researcher installed the PRAAT Vocal Toolkit (de Jong & Wempe, 2009) and used the "Mark Regions by Syllables" function that this adds to PRAAT. This function marks syllables by intensity and generates a textgrid file. The researcher used the python textgrid library to read the textgrids generated in PRAAT, create data frames using the pandas library and then calculate the speech rate for each

of the participants. The measurement of speech rate followed the calculation (total number of syllables divided by the length of the speech file in seconds) used by previous research which has shown that this measure of speech rate affects fluency and accentedness ratings (e.g. Kang et al, 2010; Kormos & Denes, 2004; Trofimovich & Baker, 2006).

After calculating the speech rate for each participant following the process described above, the researcher checked for normal distribution and generated descriptive statistics. To check for normality the researcher used a Shapiro-Wilks test (p value = 0.56) as well as examined histograms and *Q-Q* plots for speech rate from both of the speaking tasks which showed a normal distribution. Table 7 below reports descriptive statistics for speech rate. The minimum and maximum were higher in the conversation task than in the presentation task. The mean speech rate was higher in the conversation task than in the presentation task. Finally, the standard deviation was smaller in the conversation task than in the presentation task.

Table 7

Descriptive Statistics for Speech Rate

Variable	Min-Max	Mean	Standard Deviation
Speech Rate - Conversation	3.08-5.26	4.34	0.45
Speech Rate - Presentation	2.27-4.56	3.57	0.50

3.6. Variables of the Study

The data collection and coding processes resulted in 8 variables for both speaking tasks (see Table 8): language ability, language identity, vowel quality, intensity, pitch height, syllable duration, speech rate and rhythm. Additionally, the two speaking tasks represent registers which were used as independent variables for the first two research questions.

Table 8

Variables of the Study

Variable	*Operationalization*	*Scale/Unit*	*Means of Analysis*
Rhythm	Standard deviation of the duration of syllables	milliseconds	PRAAT Software
Lexical Stress - Pitch Height	Max fundamental frequency within a syllable	Hertz	PRAAT Software
Lexical Stress - Intensity	Peak decibels within a syllable	Decibels	PRAAT Software
Lexical Stress - Syllable Duration	Length of syllable	Measured in milliseconds	PRAAT Software
Lexical Stress - Vowel Quality	Absence of vowel reduction	Scale of 0-3 (0 = English-like, 3 = Spanish-like)	PRAAT Software Manual Coding
Speech Rate	Number of syllables/total duration of speech	Seconds	PRAAT Software
Self-perception of Language Ability	Self-reported attitude towards language ability	Scale of 1-4 (1 = completely disagree, 4 = completely agree)	Qualtrics
Self-perception of Language Identity	Self-reported attitude towards language identity	Scale of 1-4 (1 = completely disagree, 4 = completely agree)	Qualtrics

Speaking Tasks	Task 1 - Speaking designed to represent the real-word scenario of academic presentations Task - 2 Speaking designed to represent the real-word scenario of face-to-face conversations	None	Biber and Conrad (2019) Framework for analysis of situation

3.7. Summary of Research Design and Methods for Analysis

For this project it is proposed that adult heritage speakers of Spanish who are enrolled in a Spanish language course at university are representative of the target population. The researcher recruited from this demographic at NAU via classroom visits during Fall 2022. During these classroom visits the researcher led participants in two different speaking tasks which were designed to represent two different spoken registers of Spanish. Additionally, the participants completed attitude surveys.

The collected speech data was analyzed using both automated and manual techniques to acquire measurements of rhythm, lexical stress and speech rate. These measurements, along with the scores from the attitude surveys were used to (a) describe heritage Spanish speakers' production of these speech features and (b) to perform statistical analyses that show differences in speech features and attitudes across speaking tasks and any possible predictive relationships between attitudes and speech production.

To answer research questions 1 and 2, the researcher used paired samples *t*-tests to tests for differences in attitudes and speech patterns across task types. For the 3rd research question, the researcher generated correlation matrices to explore the relationship between attitude and speech patterns across task type. Finally, for the 4th research question the researcher employs

qualitative analysis to find out how individuals' attitudes and speech patterns vary across tasks and language background.

Chapter 4: Analysis and Results

This chapter is organized by order of the research questions:

1. To what extent do heritage language learner attitudes towards their language ability and language identity vary across conversation and classroom presentation tasks?
2. To what extent do heritage language learners' rhythm, lexical stress, and speech rate approximate Spanish-dominant speaker speech and vary across conversation and classroom presentation tasks?
3. To what extent do heritage language learner attitudes towards their language ability and language identity correlate with the production of their rhythm, lexical stress and speech rate?
4. How do individuals' attitudes towards their language ability, language identity, and speech features vary across the conversation task, classroom presentation tasks, age of exposure and frequency of use?

First, the researcher explored the variation of heritage language learner attitudes across tasks. This is done through descriptive statistics, a paired samples *t*-test, and a description of the individual participants' survey responses. This is followed by a section dedicated to testing for variation in speech across tasks. This follows the same pattern as the first section by offering descriptive statistics and paired samples *t*-tests for the speech features. This section also includes a comparison of heritage language learner speech features to baseline speakers. The final section

of this chapter addresses the third research question. This section includes correlation matrices that show the relationship between attitudes and speech features collected from both speaking tasks.

4.1. Attitude Variation across Tasks (Research Question #1)

The first step taken to answer the first research question (i.e., to what extent do heritage language learner attitudes vary across speaking tasks?) was to calculate descriptive statistics for each of the attitude constructs across both speaking tasks. Table 9 below shows the mean, mode, median and standard deviation for the five items in the first attitude construct in both the conversation and the presentation speaking tasks. The Language Ability construct is intended to measure participants' confidence in their Spanish language proficiency and their perception of self as a native speaker of Spanish. The items for the first construct include statements such as, *I was confident in my Spanish speaking abilities during the task*, and, *I sounded like a native speaker of Spanish during the task* (Table 9 below shows all of the items). The items for Language Ability focus on the individual's speaking performance during the tasks. These items assess the speaker's self-assessment of their language skills and whether they aimed to sound like a native speaker. The items for Language Ability are related to the speaker's linguistic competence and subjective evaluation of their performance.

Table 9

Descriptive Statistics for Language Ability

Item	Task	Mean	Mode	Median	Standard Deviation

I made mistakes when I was speaking Spanish during the conversation/the presentation	Conversation	2.61	3	3	1.08
	Presentation	2.84	3	3	0.97
I spoke Spanish very well during the conversation/the presentation	Conversation	3.34	4	3.5	0.75
	Presentation	3.05	3	3	0.73
I sounded like a native speaker of Spanish during the conversation/the presentation	Conversation	3.26	4	4	0.86
	Presentation	3.11	3	3	0.83
I was confident in my Spanish speaking abilities during the conversation/the presentation	Conversation	3.42	4	4	0.76
	Presentation	3.13	4	3	0.94
I spoke Spanish fluently during the conversation/the presentation	Conversation	3.37	4	4	0.79
	Presentation	3.21	4	3	0.81

Note:1 = completely disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = completely agree

The median and mode in Table 9 show little to no variation in the self-reported attitudes and beliefs of the participants across speaking tasks: the mode and median both show scores between 3 and 4 . This reveals that attitudes and beliefs about one's language ability tend to be positive across both tasks. However, it is important to note that the first item is worded in such a way that a higher score does not reflect a more positive self-view of language ability, rather it shows that a participant felt they made more mistakes when speaking.

The mean scores in Table 9 gives a finer detailed view which allows us to see a small change in attitudes between the two speaking tasks. Across items 2-5, the mean scores were higher in the conversation speaking task than in the presentation task. Mean scores from the first item were lower in the conversation than in the presentation. Overall, participants reported feeling more confident in their language ability in the conversation than in the presentation.

Table 10 below shows the means, modes, medians and standard deviations for the second construct (Language Identity). Language Identity is intended to measure participants' perception of identity as a Spanish speaker. The items for this construct include statements such as, *the way I sounded when I was speaking Spanish during the task is a part of my identity,* and, *I defined myself as a Spanish speaker during the task*. The items for Language Identity focus on the speaker's sense of identity and belonging. The items are designed to reflect the speaker's self-identification as a Spanish speaker and their connection to Spanish speaking communities. These items also try to connect the speaker's identity to the way they sounded during the task. Ultimately, Language Identity attempts to measure the speaker's personal connection to their heritage language as a part of their identity.

The same pattern was found for the second attitude construct. In Table 10 below, it can be seen that both the median and the mode are at least a 3 out of 4 with the majority of the five

items showing the highest possibility of 4 for both statistics. The mean scores for the second construct show the same trend as what was seen in the first construct: participants reported more positive attitudes in the conversation than in the presentation.

Table 10

Descriptive Statistics for Language Identity

Item	task	Mean	Mode	Median	Standard Deviation
I defined myself as Spanish speaker during the conversation/the presentation	Conversation	3.32	4	4	0.96
	Presentation	3	4	3	1.41
I felt like I belong to Spanish speaking communities because I spoke Spanish during the conversation/the presentation	Conversation	3.42	4	4	0.72
	Presentation	3	4	3	1.41
The way I sounded when I was speaking Spanish during the conversation/the presentation is a part of my identity	Conversation	3.42	4	4	0.68

	Presentation	3.25	4	4	1.5
It was important to me to sound like a native speaker of Spanish during the conversation/the presentation	Conversation	3.21	4	3	0.91
	Presentation	3	4	3	1.41
I know I sounded like a native speaker of Spanish during the conversation/the presentation	Conversation	3.26	4	3.5	0.83
	Presentation	3	4	3	1.41

The next step taken to answer the first research question of this study was to test for differences in the language ability and language identity constructs between the two tasks. The researcher performed Shapiro-Wilk tests of normality on the responses to the attitude surveys in an effort to determine whether or not parametric tests would be appropriate for the dataset. The *p* values for all items across the two speaking tasks were less than 0.01 suggesting a deviation from normality. The researcher generated histograms to visualize the distribution of the 10 survey items from both tasks. The histograms showed an uneven distribution and which corroborated the results from the Shapiro-Wilk tests.

In an effort to represent the survey data with a normal distribution, the researcher decided to explore the viability of using the average from the responses for each of the items. The ten items total were originally designed to represent two constructs (five survey items each): perception of language ability and perception of language identity.

Before averaging the scores for the individual items, the researcher calculated Cronbach's alpha to determine the internal consistency of the items meant to represent the underlying constructs. The items for the first construct had an alpha score of 0.90, 95% CI [0.84, .094]. The items for the second construct had an alpha score of 0.85, 95% CI [0.75, 0.91]. Based on these alpha scores for internal consistency, the researcher decided to average the scores for all items and treat the underlying constructs as composite variables. The composite variables were then tested for normal distribution using a Shapiro-Wilk test and the Language Ability construct was non-significant ($p = 0.11$ while the Language Identity construct was significant ($p = 0.02$). The researcher also examined histograms for the distribution of the two composite variables which showed a more satisfactory distribution.

With the assumption of normality met, the researcher performed a Student *t*-test to test for differences between speaking tasks in the two attitude constructs. When interpreting the effect sizes (Cohen's *d*) for this study, the researcher relied on the meta-analytic work of Plonsky and Oswald (2014) which suggests that Cohen's *d* should be interpreted as 0.40 = small effect, 0.70 = medium effect, and 1.00 = large effect. Additionally, the researcher chose an alpha of 0.05 to determine statistical significance. As can be seen in Table 11 below, the first attitude construct was not significant, $t(37) = 1.88$, $p = .07$. Cohen's *d* revealed a small effect size of 0.31.

Table 11

Student T-Test for the Attitude Constructs between Speaking Tasks

					95% CI for Cohen's *d*	
Construct	*t*	df	*p*	Cohen's *d*	Lower	Upper

Construct 1 - Language ability	1.88	37	0.07	0.31	-0.02	0.63
Construct 2 - Language Identity	2.83	37	0.01	0.46	0.12	0.79

The second attitude construct was significant, $t(37) = 2.83$, $p = .01$. Cohen's *d* revealed a moderate effect size of 0.46. The researcher interprets this to mean that a small difference exists between the scores for this construct. Overall, the researcher interprets the results in Table 11 to mean that HLL participants had more positive attitudes about their language identity during the conversation task than presentation task.

4.2. Variation in Speech Features across Tasks (Research Question #2)

4.2.1 Rhythm across tasks

The first step taken to answer the second research question was to compare the descriptive statistics of the baseline speakers to the heritage language learners'. Table 12 below shows the baseline speakers had a smaller range in their minimum and maximum rhythm measurements compared to the HLL participants. The researcher included the descriptive statistics for both groups of speakers in the same tables to facilitate side-by-side comparison of speech patterns. The baseline speakers ($N = 3$) had a lower rhythm mean score than the HLL participants ($N = 38$) in both tasks. A lower rhythm score means that there was less variation in the baseline speakers' syllable duration. A small amount of variation in syllable duration is expected in a syllable-timed language like Spanish. The mean scores in Table 12 show that baseline speakers had a smaller mean score than the HLL participants ($0.11 < 0.13$) and,

therefore, less variation in the duration of their syllables. The standard deviation for rhythm was the same for the baseline and HLL participants in the conversation task. The baseline speakers had a higher standard deviation in the presentation task than the HLL participants.

Table 12

Descriptive Statistics for Rhythm of Baseline Spanish Speakers

Variable	Min-Max	Mean	Standard Deviation
Baseline Rhythm - Conversation	0.09-0.13	0.11	0.02
HLL Rhythm - Conversation	0.1-0.18	0.13	0.02
Baseline Rhythm - Presentation	0.06-0.13	0.10	0.04
HLL Rhythm - Presentation	0.1-0.23	0.12	0.03

As shown in the Method chapter, the data for rhythm was not normally distributed according to a Shapiro-Wilks test of normality. Examining the histograms showed that in the presentation task the data had satisfactory distribution. The researcher performed a Student *t*-test to test for differences between speaking tasks in the rhythm measurement. As can be seen in Table 13 below, the rhythm measurement was significant, $t(37) = 2.06$, $p = .05$. Cohen's *d* revealed a small effect size of 0.33. The results of this test reveal that HLL participants had more

variation in the duration of their syllables (i.e. less syllable timed rhythm) during the conversation than during the presentation.

Table 13

Paired Samples t-Tests for Rhythm between Tasks

					95% CI for Cohen's *d*	
Variable	*t*	df	*p*	Cohen's *d*	Lower	Upper
Rhythm	2.06	37	0.05	0.33	0.01	0.66

4.2.2. *Lexical Stress across Tasks*

This study also included measurements of intensity, syllable duration, pitch height and vowel quality for instances of lexical stress produced by the HLL participants. Table 14 shows the minimum and maximum, mean and standard deviation of intensity for the baseline speakers and the HLL participants across both tasks. The baseline speakers had a smaller range of intensity than the HLL participants in the conversation and presentation tasks. The baseline speakers had greater mean intensity than the HLL participants in both tasks. The baseline speakers had greater standard deviation of intensity in the conversation task and a smaller standard deviation in the presentation task.

Table 14

Comparison of the Descriptive Statistics of Intensity of Baseline Speakers to HLL participants

Variable	Min-Max	Mean	Standard Deviation

Baseline Intensity - Conversation	55.45-79.44	69.85	5.68
HLL Intensity - Conversation	54.23-83.72	67.26	5.02
Baseline Intensity - Presentation	62.68-81.47	73.14	4.26
HLL Intensity - Presentation	54.84-121.58	72.77	6.42

Table 15 shows the minimum and maximum, mean and standard deviation of syllable duration for the baseline speakers and the HLL participants across both tasks. The baseline speakers had a smaller range of syllable duration in the conversation and the presentation task than the HLL participants. The baseline speakers had a larger mean syllable duration than the HLL participants in both tasks. Finally, the baseline speakers had smaller standard deviations in syllable duration than the HLL participants in both tasks.

Table 15

Comparison of the Descriptive Statistics of Syllable Duration of Baseline Speakers to HLL participants

Variable	Min-Max	Mean	Standard Deviation
Baseline Duration - Conversation	0.06-0.54	0.20	0.02

HLL Duration - Conversation	0.03-0.75	0.17	0.08
Baseline Duration - Presentation	0.08-0.64	0.20	0.04
HLL Duration - Presentation	0.05-0.79	0.18	0.08

Table 16 shows the minimum and maximum, mean and standard deviation of pitch height for the baseline speakers and the HLL participants across both tasks. The baseline speakers had a smaller range of pitch height than the HLL participants in both tasks. Additionally, the baseline speakers had a smaller mean pitch height than the HLL participants in both tasks. Finally, the baseline speakers had smaller standard deviations of pitch height than the HLL participants in both tasks.

Table 16

Comparison of the Descriptive Statistics of Pitch Height of Baseline Speakers to HLL participants

Variable	Min-Max	Mean	Standard Deviation
Baseline Pitch Height - Conversation	96.16-448.15	182.67	85.81
HLL Pitch Height - Conversation	50.82-492.19	196.9	73.39

Baseline Pitch Height - Presentation	127.02-354.61	199.93	49.24
HLL Pitch Height - Presentation	70.49-493.54	204.82	68.84

Table 17 shows descriptives for vowel quality ratings. It is important to note that vowel quality for this study is not a measurement of formants, rather it is a listener rating of vowel quality produced in instances of lexical stress. As can be seen below, listener ratings of vowel quality were consistent across task type meaning that listeners did not perceive any variation in the way participants' produced vowels in atonic-tonic-atonic sequences.

Table 17

Descriptive Statistics of Vowel Quality Ratings for HLL Participants

Variable	Min-Max	Mean	Standard Deviation
Vowel Quality - Conversation	8-15	12.08	2.14
Vowel Quality - Presentation	7-15	12.63	2.16

In addition to the stability in vowel quality ratings across task types, the descriptive statistics of HLL participants' intensity, duration, and pitch height do not show much change across either task. This stability is reflected in the *t*-test performed for three of the four variables (shown in Table 21 below). As can be seen in Table 18, intensity was significant, $t(37) = -6.04$, p

< 0.05. Cohen's *d* revealed a large effect size of -0.98. The researcher interprets this to mean that a small difference exists between the intensity measurements across tasks.

Table 18

Paired Samples T-Tests for Components of Lexical Stress Across Tasks

					95% CI for Cohen's *p*	
Variable	*t*	df	*p*	Cohen's *p*	Lower	Upper
Vowel Quality	-1.09	37	0.28	-0.18	-0.5	0.15
Intensity	-6.04	37	<.05	-0.98	-1.36	-0.59
Duration	-1.41	37	0.17	-0.23	-0.55	0.1
Pitch Height	-0.91	37	0.37	-0.15	-0.47	0.17

4.2.3. *Speech Rate across Tasks*

Speech rate was calculated as syllables per second. Table 19 shows the minimum, maximum, mean and standard deviation of both the HLL participants and the baseline speakers. In the conversation task, the baseline speakers had lower minimum and maximum speech rates than the HLL participants. The baseline speakers had a lower mean speech rate than the HLL participants in the conversation task and a greater standard deviation than the HLL participants. For the presentation task, the HLL participants had a lower minimum speech rate than the

baseline speakers but a higher maximum, revealing a greater range in speech rate during the presentation task. The baseline speakers had a larger mean speech rate than the HLL participants and a smaller standard deviation in the presentation.

The HLL participants' mean speech rate is greater in the conversation than in the presentation. This means that, on average, HLL participants produced more syllables over the duration of their speaking time during the conversation than the presentation. The HLL participants' standard deviation scores of speech rate are lower in the conversation than in the presentation.

Table 19

Comparison of Speech Rate Descriptives of Baseline Speakers to HLL participants

Variable	Min-Max	Mean	Standard Deviation
Baseline Speech Rate - Conversation	2.89-3.9	3.23	0.58
HLL Speech Rate - Conversation	3.08-5.26	4.34	0.45
Baseline Speech Rate - Presentation	3.54-4.12	3.82	0.29
HLL Speech Rate - Presentation	2.27-4.56	3.57	0.50

For the next step, the researcher performed a Student *t*-test to test for differences between speaking tasks in HLL participants' speech rate. As can be seen in Table 20 below, speech rate was significant, $t(37) = 9.49$, $p < .05$. Cohen's *d* revealed a large effect size of 1.54.

Table 20

Paired Samples t-Tests for Speech Rate between Tasks

					95% CI for Cohen's *d*	
Variable	*t*	df	*p*	Cohen's *d*	Lower	Upper
Speech Rate	9.49	37	<.001	1.54	1.06	2.01

In response to the second research question of this project, the results from the statistical analyses suggest that rhythm, intensity and speech rate changed between speaking tasks and that this difference is statistically significant. In contrast, the four components of lexical stress (vowel quality, intensity, duration and pitch height) show almost no difference between the tasks.

4.3. Relationship between Speech Features and Attitude Constructs (Research Question #3)

The third research question for this study explores the relationship between the attitudes of the heritage language learners and the production of the targeted speech features through correlation. To answer this question, the researcher generated correlation matrices to test for a relationship between each of the targeted speech features and the two language attitude constructs. In what follows, the researcher reports the correlations that had a Pearson's *r* value of at least .2. It is important to note that only three of these correlations met the alpha level of 0.05. First the researcher presents the results from the conversation task and then the presentation task.

Three correlations were found that had a *p*-value of 0.05 or smaller. Figure 4 below shows a significant, negative small correlation between rhythm and attitude towards language identity, $r(36) = -.27$, $p = 0.02$. Figure 6 shows that during the conversation task, the participants' rhythm scores decreased (meaning they had more syllable-timed rhythm) as attitudes towards language identity increased.

Figure 5

Conversation Task: Correlation between Rhythm and Attitude towards Language Identity

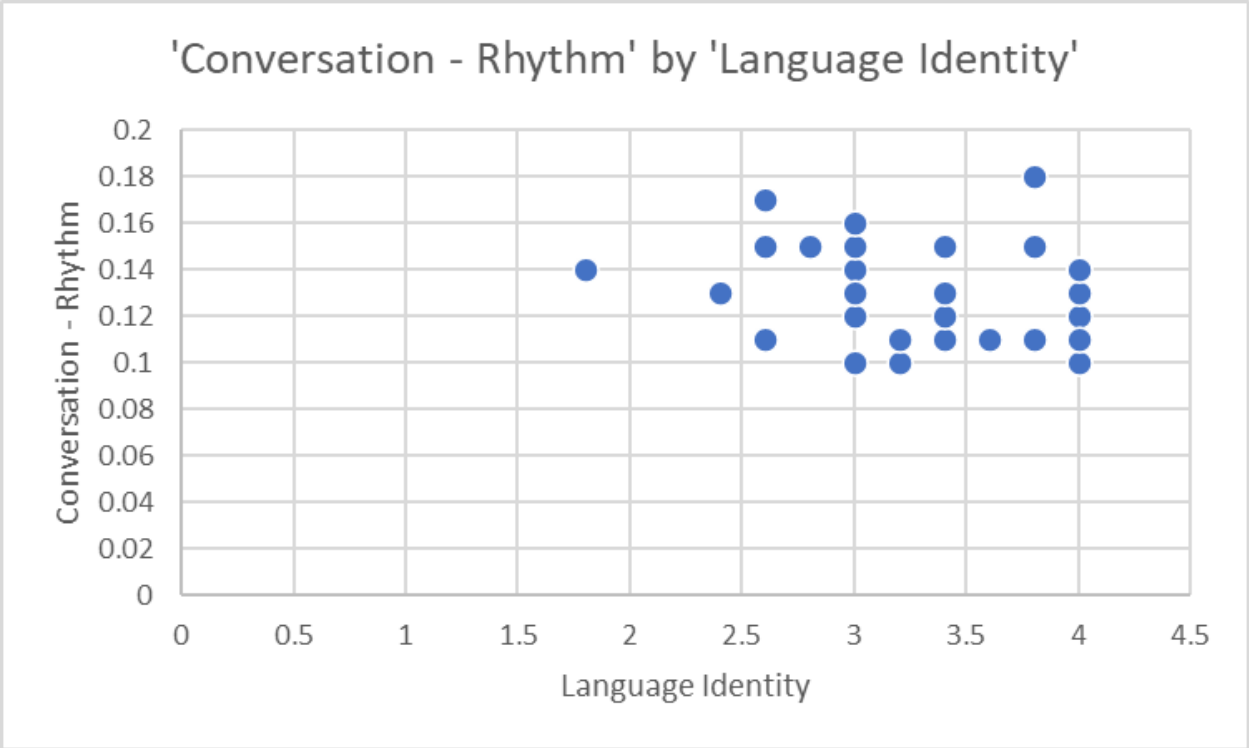


Figure 7 below shows the relationship between speech rate and HLL attitude towards language ability during the conversation task. The researcher found a large, positive correlation between HLL speech rate and attitude towards language ability, $r(36) = .31$, $p < 0.05$. Figure 5 shows that, during the conversation task, participants' speech rate increased as attitudes towards their language ability increased.

Figure 6

Conversation Task: Correlation between Speech Rate and Attitude towards Language Ability

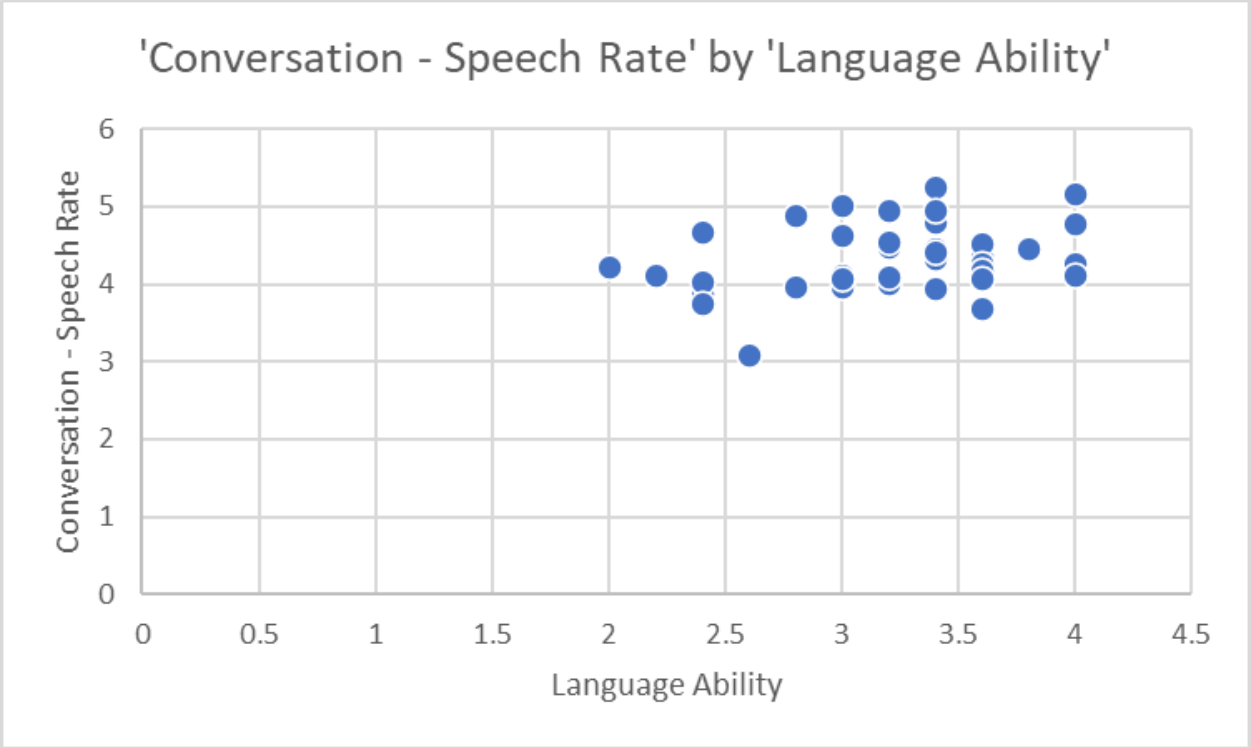


Figure 8 below shows the relationship between speech rate and HLL attitude towards language identity during the conversation task. The researcher found a moderate, positive correlation between HLL speech rate and attitude towards language ability, $r(36) = .38$, $p < 0.05$. Figure 8 shows that, during the conversation task, participants' speech rate increased as attitudes towards their language ability increased.

Figure 7

Conversation Task: Correlation between Speech Rate and Attitude towards Language identity

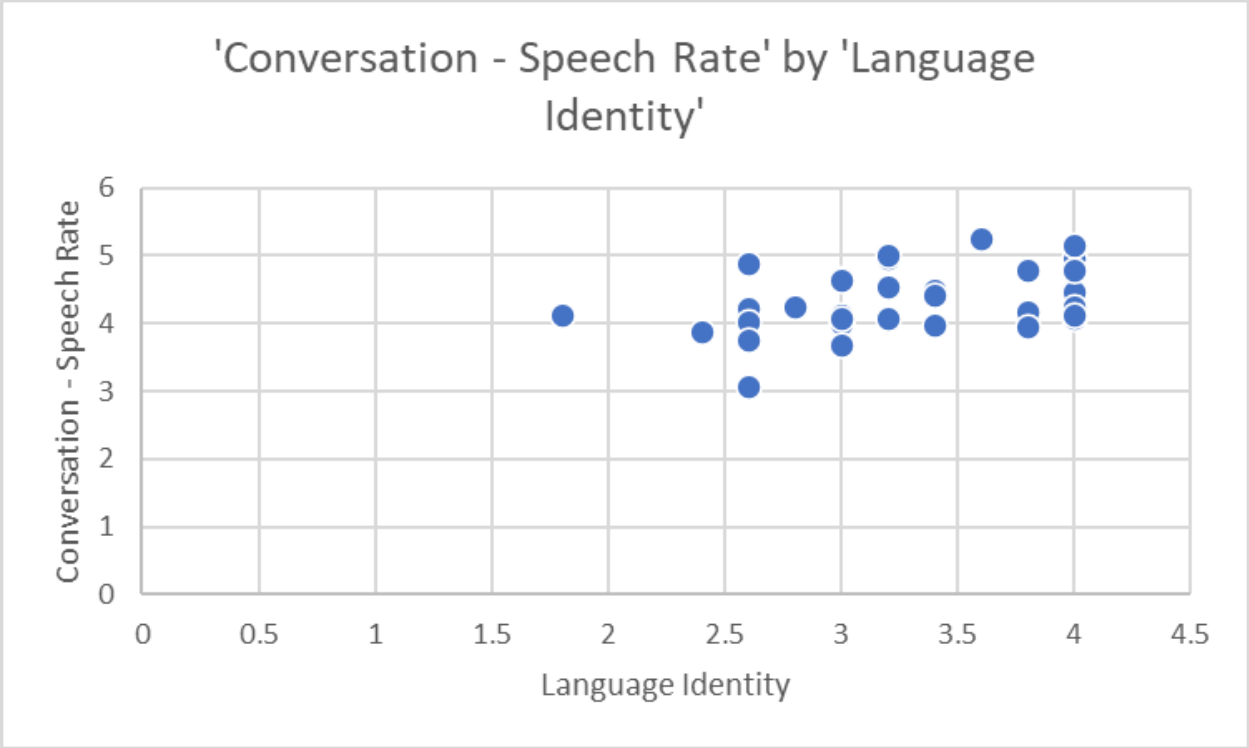


Figure 9 below shows the relationship between rhythm and HLL attitude towards language ability during the conversation task. The researcher found a small, negative correlation between HLL rhythm and attitude towards language ability, $r(36) = -.26$, $p > 0.05$. Figure 9 shows that, during the conversation task, participants' rhythm decreased (i.e., became more syllable timed) as attitudes towards their language ability increased.

Figure 8

Conversation Task: Correlation between Rhythm and Attitude towards Language Ability

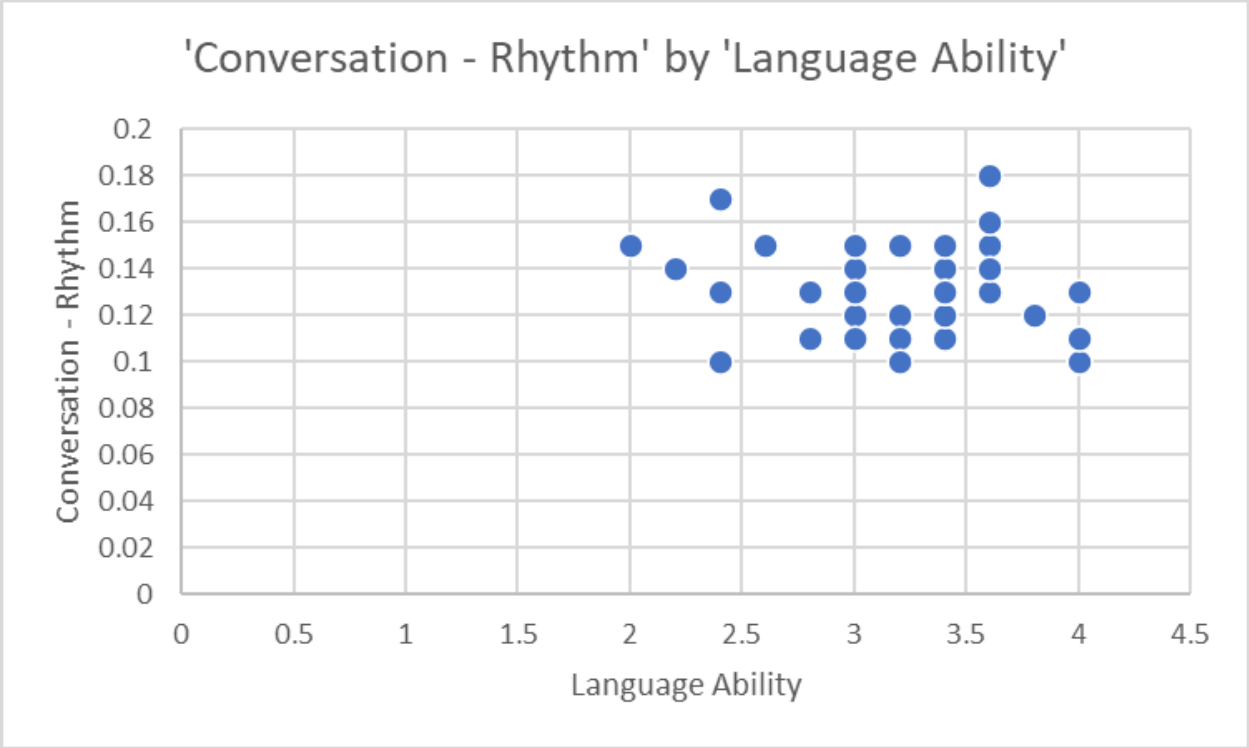


Figure 10 below shows the relationship between syllable duration in instances of lexical stress and HLL attitude towards language ability during the conversation task. The researcher found a small, negative correlation between HLL duration in instances of lexical stress and attitude towards language ability, $r(36) = -.32$, $p > 0.05$. Figure 10 shows that, during the conversation task, participants' syllable duration in instances of lexical stress decreased as attitudes towards their language ability increased.

Figure 9

Conversation Task: Correlations between Syllable Duration in Instances of Lexical Stress and Attitude towards Language Ability

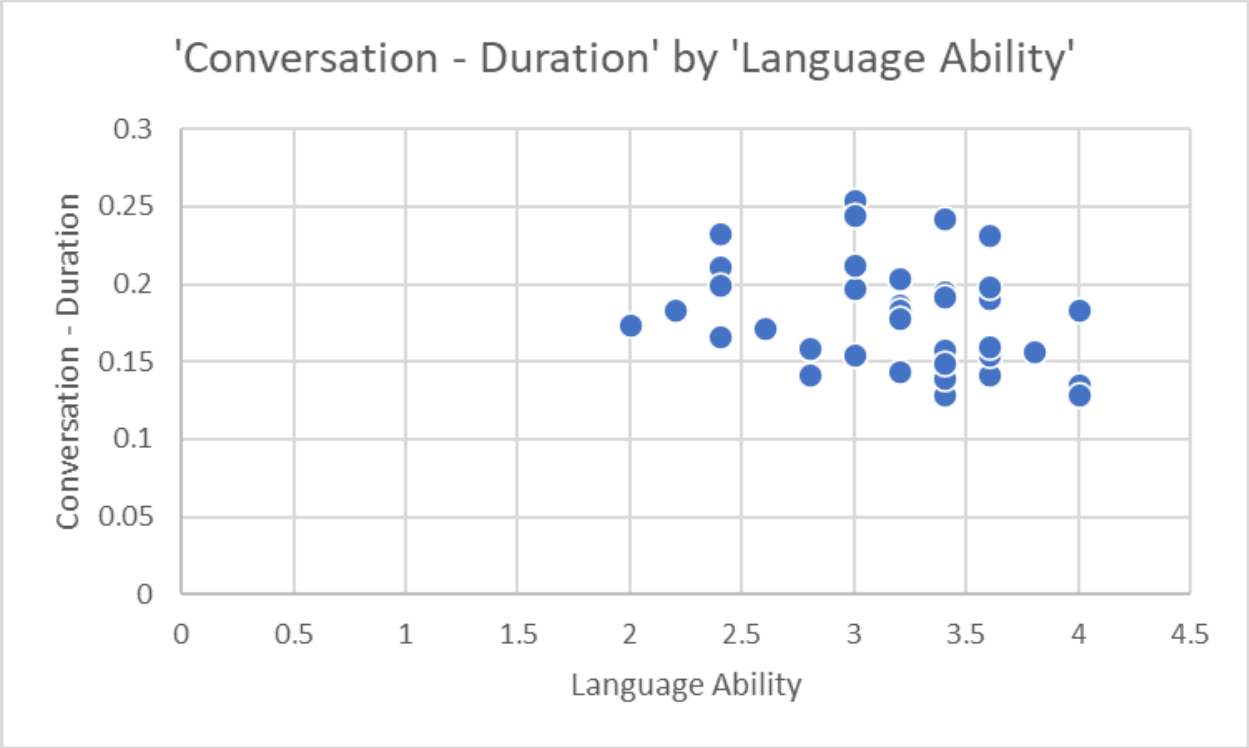


Figure 11 below shows the relationship between speech rate and HLL attitude towards language identity during the presentation task. The researcher found a small, positive correlation between HLL speech rate and attitude towards language ability, $r(36) = .23$, $p > 0.05$. Figure 11 shows that, during the presentation task, participants' speech rate increased as attitudes towards their language identity increased.

Figure 10

Presentation Task: Correlation between Speech Rate and Attitude towards Language Identity

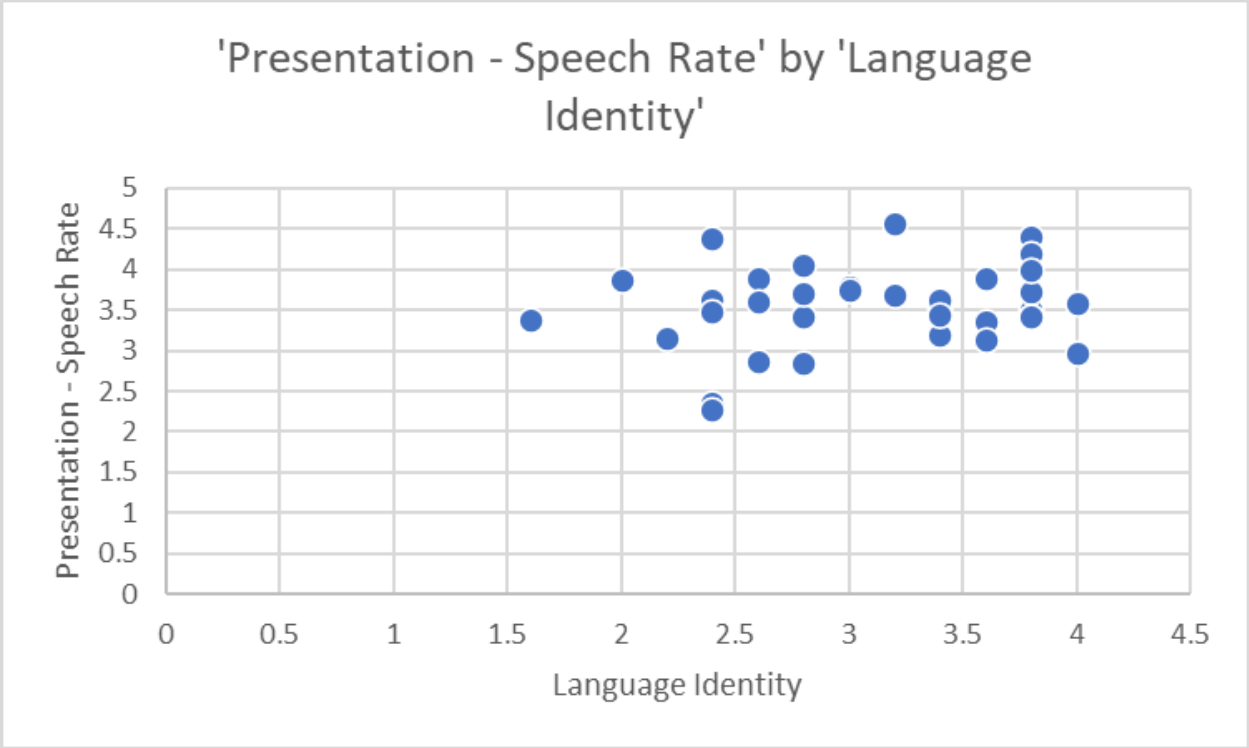


Figure 12 below shows the relationship between syllable duration in instances of lexical stress and HLL attitude towards language ability during the presentation task. The researcher found a small, negative correlation between HLL speech rate and attitude towards language ability, $r(36) = -.26$, $p > 0.05$. Figure 12 shows that, during the presentation task, participants' syllable duration in instances of lexical stress decreased as attitudes towards their language ability increased.

Figure 11

Presentation Task: Correlation between Syllable Duration in Instances of Lexical Stress and Attitude towards Language Ability

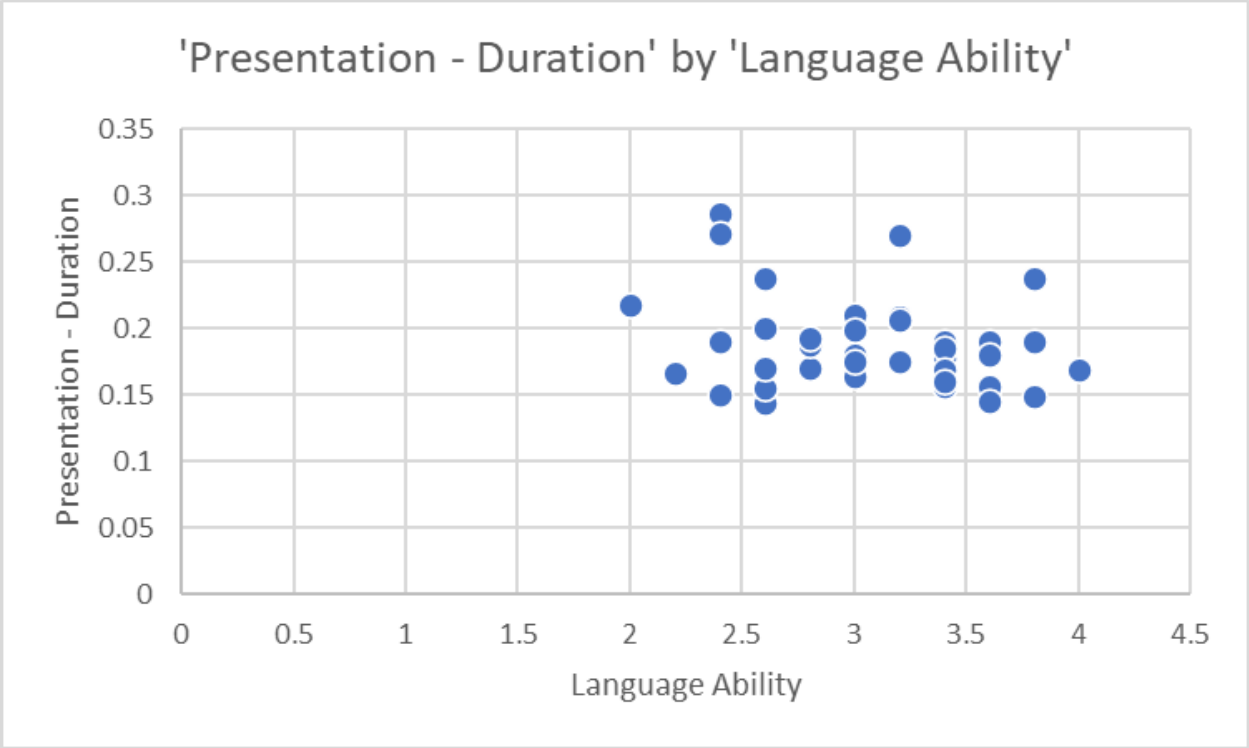
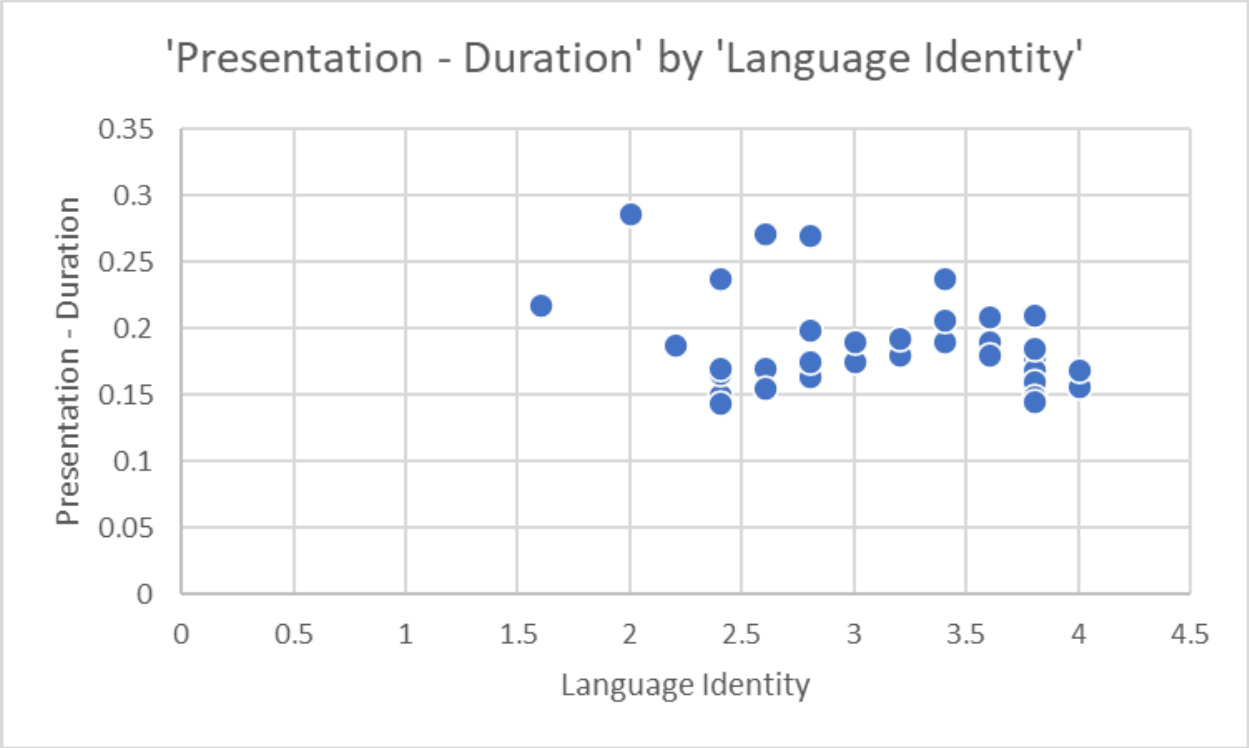


Figure 13 below shows the relationship between syllable duration in instances of lexical stress and HLL attitude towards language ability during the presentation task. The researcher found a small, negative correlation between HLL speech rate and attitude towards language ability, $r(36) = -.34$, $p > 0.05$. Figure 13 shows that, during the presentation task, participants' syllable duration in instances of lexical stress decreased as attitudes towards their language identity increased.

Figure 12

Presentation Task: Correlation between Syllable Duration in Instances of Lexical Stress and Attitude towards Language Identity



The analysis undertaken to understand relationships between speech features and attitude constructs showed that the data indicate in these 8 correlations that, as attitudes towards language ability or identity improve, certain speech aspects change. In both presentation and conversation tasks, when participants felt more positive about their language ability, their speech rate tended to increase. Additionally, during conversation tasks, as attitudes towards language identity became more positive, participants tended to adopt a more syllable-timed rhythm.

4.4. Individuals' Attitudes and Speech Features across Tasks and Language Background (Research Question #4)

The difference found in attitude constructs was further explored by the researcher through a qualitative analysis of individual participants' responses. While collecting and organizing the data, the researcher noticed that some participants showed little to no change in their responses to

the survey questions while others seemed to show a great difference in their self-reported attitudes between the speaking tasks. In an effort to better understand and visualize this observed phenomenon, the researcher generated bar graphs to compare survey responses for individual participants (see Appendix F for full list of bar graphs and mean scores of speech features).

In the graphs that follow two bars are depicted. The red bar shows attitudes during the conversation task and the blue bar shows attitudes during the presentation task. The four options on the attitude scale are: 1 = completely disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = completely agree.

The analysis of individuals' responses revealed that 13 participants (~35%) made only one to two different (out of ten possible) selections in their attitude surveys after completing the two speaking tasks and one participant made the exact same selections in the attitude survey after completing both speaking tasks.

For example, Figure 14 below shows that the participant made two different selections (on items 1 and 7: *I made mistakes when I was speaking Spanish during the conversation/the presentation,* and, *I felt like I belong to Spanish speaking communities because I spoke Spanish during the conversation/the presentation.* Respectively) in the attitude survey. This is interpreted to mean that very little changed in participant #29's attitude towards their language identity and language ability across tasks.

Figure 13

Participant #29 - Attitude Surveys Results from Both Speaking Tasks

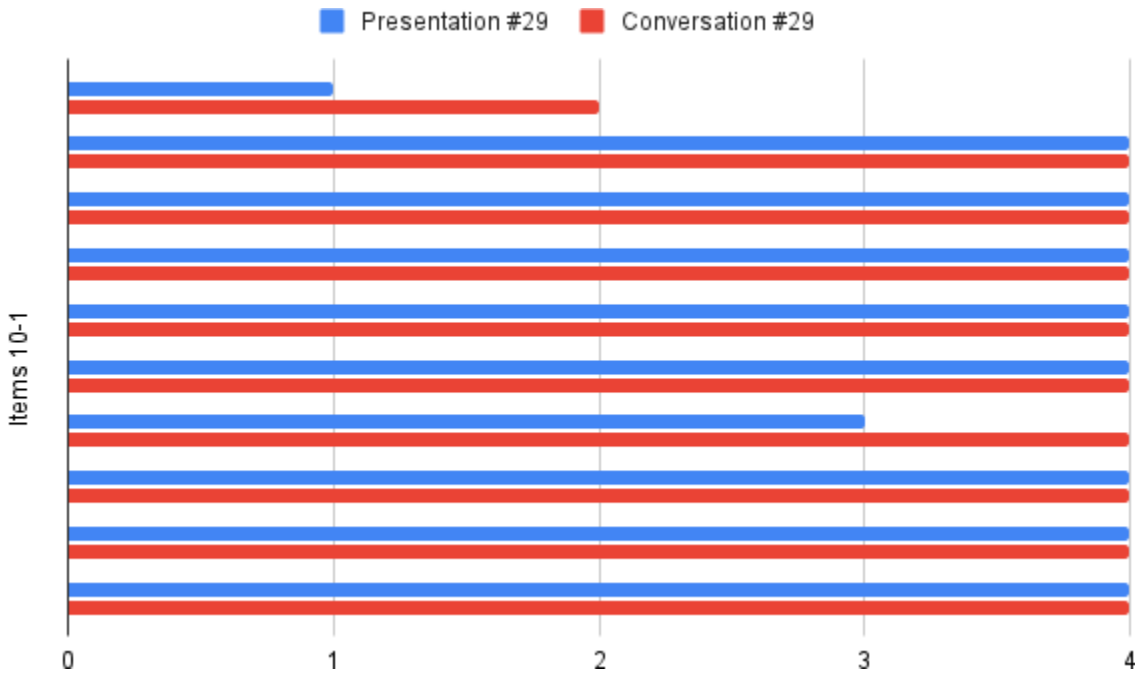


Figure 14 shows that participant #29 changed only one (out of ten possible) of their responses to the attitude survey between the conversation task (red line) and the presentation task (blue line). The researcher interprets this as meaning that the participants' attitudes towards their language ability and language identity were stable across the two speaking tasks.

In an effort to describe how individuals' attitudes and speech features change across task, the researcher also included Table 21 below which shows participant #29's mean scores for the speech features included in this study (Appendix F for list). It can be seen that the average of these speech features does not show very much change between the two tasks.

Table 21

Mean Scores of Speech Features for HLL Participant #29

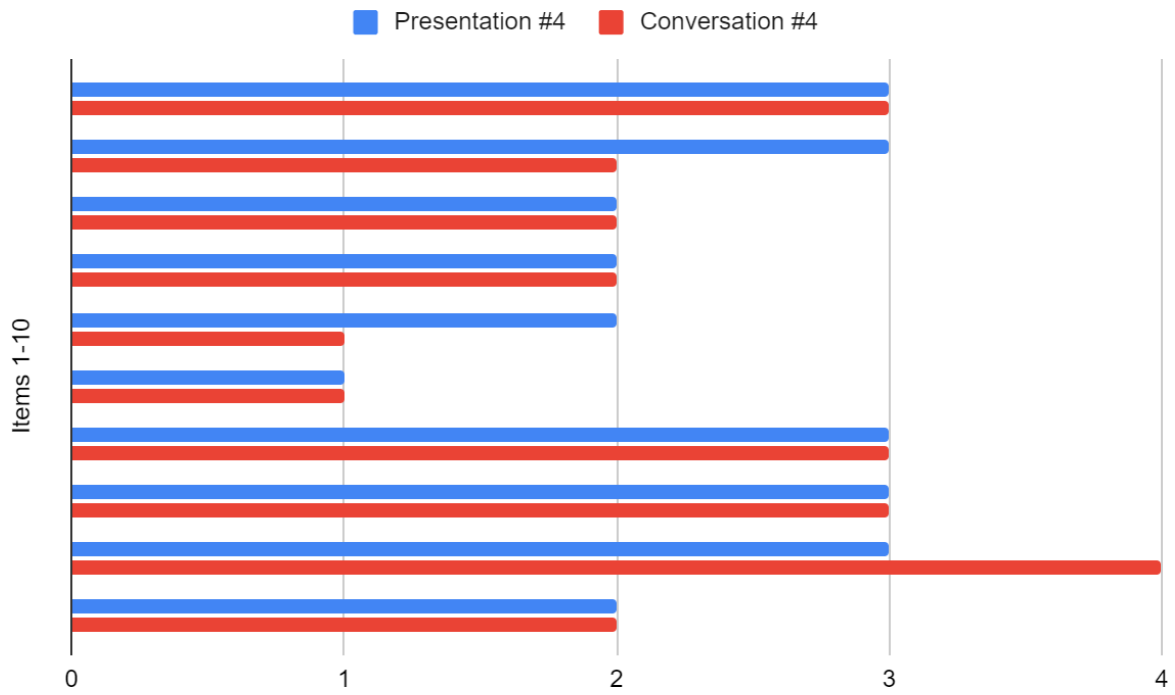
Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.14	66.42	0.23	122.24	4.07

Presentation	0.12	71.98	0.16	121.86	3.73

In contrast to the 35% of participants who made two or less different choices in the attitude surveys between the speaking tasks, approximately 30% (11) participants made between three and four different (out of ten possible) selections in their attitude surveys after completing the speaking tasks. Figures 15 and 16, below are examples of these individual's responses. Figure 15 below shows that participant #4 made three different selections on the attitude survey between the two speaking tasks. Specifically, items 2 (*I spoke Spanish very well during the task*), 5 (*I spoke Spanish fluently during the task*) and 9 (*It was important to me to sound like a native speaker of Spanish during the task*).

Figure 14

Participant #4 - Attitude Surveys Results from Both Speaking Tasks



It is important to keep in mind that the responses that cross the values of 2 and 3 represent opposing attitudes (i.e., 2 = somewhat disagree, 3 = somewhat agree). Therefore, the difference shown in Figure 15, item 2 suggests that participant #4 somewhat agreed with the statement: *I spoke Spanish very well during the task*, during the presentation task but disagreed with that same statement during the conversation.

Table 22 shows the mean scores for the speech features included in this study. The averages for rhythm, syllable duration and speech rate measurements show little difference between the two tasks. Pitch height and intensity show that there is a difference of approximately 25 hertz and six decibels (respectively) in averages between the tasks.

Table 22

Mean Scores of Speech Features for HLL Participant #4

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.15	67.06	0.17	182.22	4.22
Presentation	0.10	73.02	0.15	209.39	4.39

Figure 16 shows that participant #12 made 3 different selections in the attitude survey between the two tasks: items 4 (*I was confident in my Spanish speaking abilities during the task),* 6 (*I defined myself as Spanish speaker during the task)* and 9 (*It was important to me to sound like a native speaker of Spanish during the task*). Items 4 and 9 did not change from agree to disagree, however item 6 changed from completely agree in the conversation to completely disagree in the presentation. This item belongs to Language Identity and is intended to reflect one's perception of belonging to a Spanish speaking community. The survey results indicate that

the participant felt that they did identify as a Spanish speaker during the conversation task but not during the presentation task.

Figure 15

Participant #12 - Attitude Surveys Results from Both Speaking Tasks

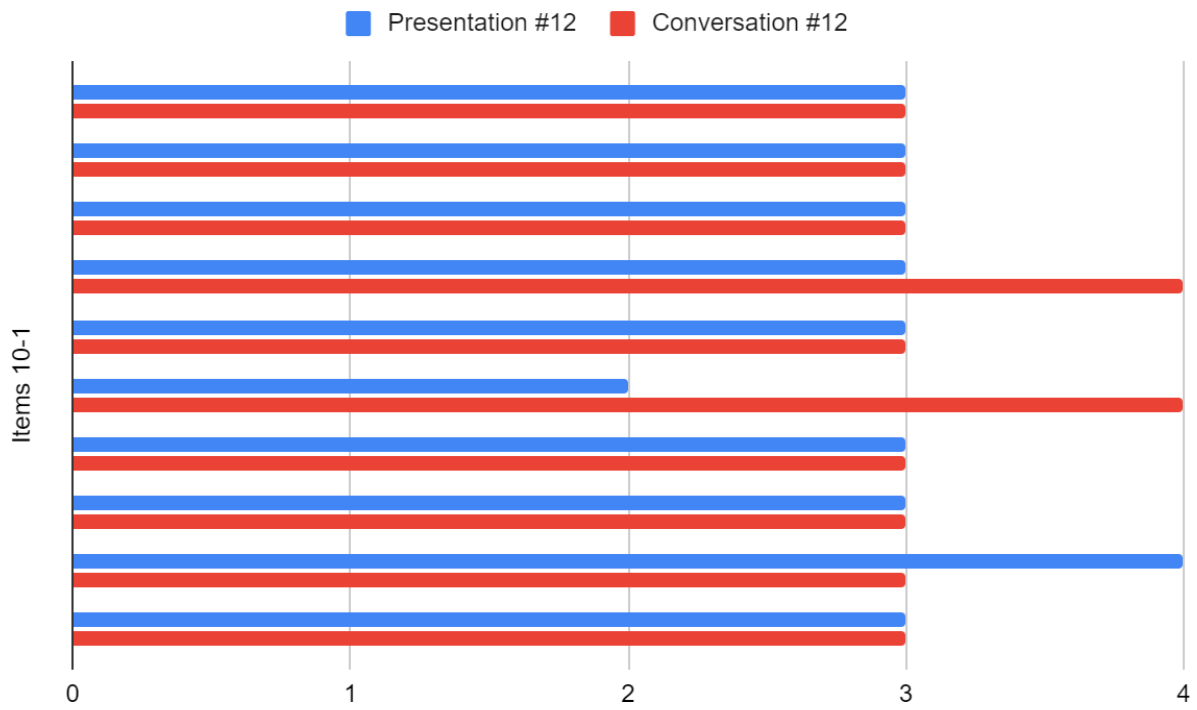


Table 23 shows the mean scores for the speech features of participant #12. The most notable differences are found in the speech rate and intensity. The speech rate of participant 12 changes from ~4 syllables per second (on average) in the presentation to ~5 syllables per second. Also, the average intensity used during the presentation decreases by ~10 decibels.

Table 23

Mean Scores of Speech Features for HLL Participant #12

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.11	69.79	0.14	216.78	4.96

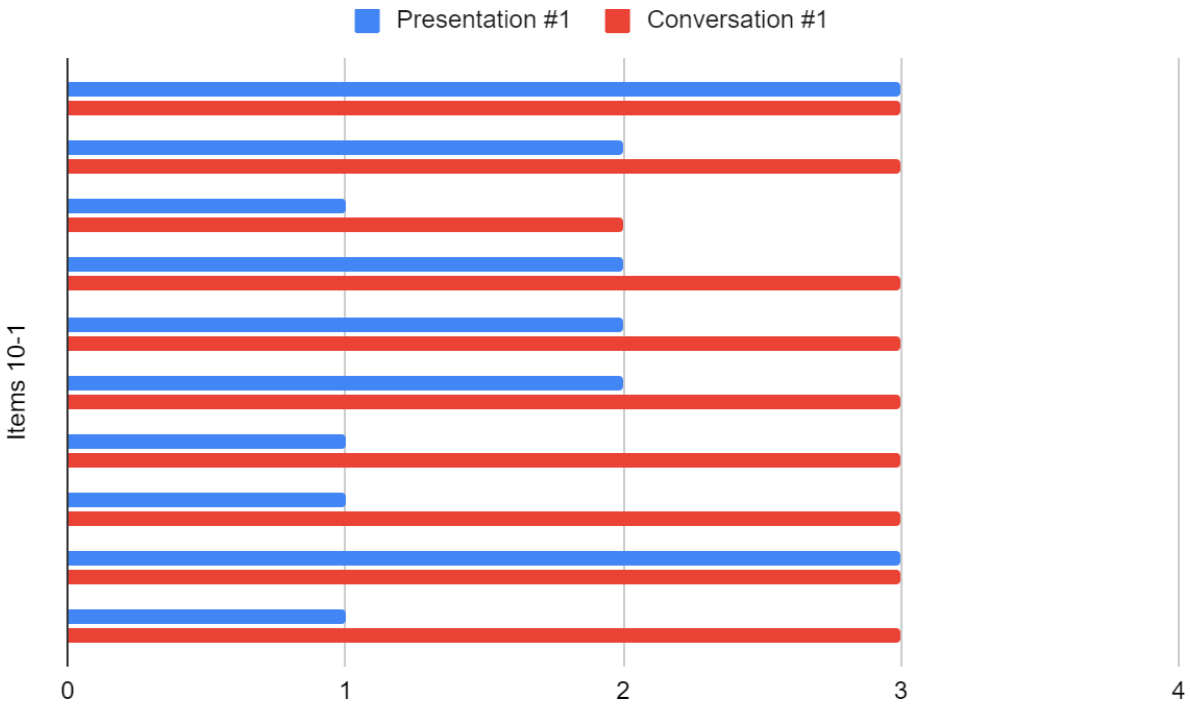
Presentation	0.10	78.75	0.16	229.96	3.78

Finally, the remaining 14 (~35%) of the participants were found to have changed at least five (50%) of their responses to attitude surveys between tasks. Figure 17 below illustrates the contrast between participant #1's responses to both attitude constructs for the two speaking tasks. In line with the mean scores for both attitude constructs, participant #1 reported an overall more positive attitude towards their language ability in the conversation than in the presentation.

As can be seen in Figure 17, participant #1 only chose the same level of agreement (e.g., 1 = completely disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = completely agree) for any single item twice (item 1: *I made mistakes when I was speaking Spanish during the conversation/the presentation*, item 9: *It was important to me to sound like a native speaker of Spanish during the task)* during the two speaking tasks while the rest of their responses to the survey were different between the two speaking tasks.

Figure 16

Participant #1 - Attitude Surveys Results from Both Speaking Tasks



For example, Figure 17 shows that participant #1 indicated that they somewhat agreed with item 2 (*I spoke Spanish very well during the task*) during the conversation task, but somewhat disagreed with the same statement during the presentation. A starker contrast is shown on item 10 (*I know I sounded like a native speaker of Spanish during the task*) as the participant completely disagreed with that statement during the presentation task but somewhat agreed with it during the conversation task. Overall, the lack of overlap between the two lines (red = conversation, blue = presentation) reveals that participant #1 changed their responses to eight out of 10 items on the attitude survey between tasks. This shows that participant #1 had a lower opinion of their language ability and language identity during the presentation task than the conversation task.

Table 24 shows the mean scores for the speech features of participant #1. These averages change very little between tasks. For example, the mean intensity of participant #1 varies by less

than 0.5 decibels between tasks. Also, the mean score for speech rate varies by ~0.5 of a syllable per second. This participant's attitudes varied greatly while their speech features were stable.

Table 24

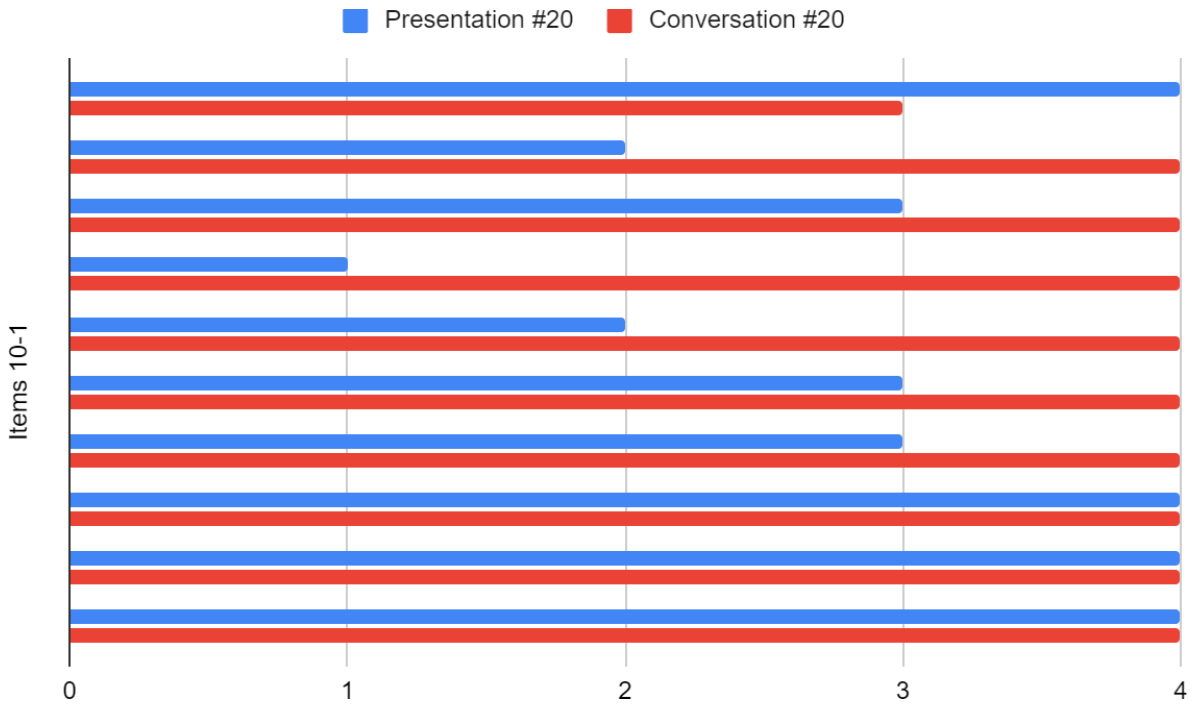
Mean Scores of Speech Features for HLL Participant #1

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.13	63.15	0.14	280.28	3.96
Presentation	0.20	65.51	0.22	285.99	3.38

See Figures 18 and 19 below for more examples of participants who changed at least half of their attitude responses between the speaking tasks. Figure 18 shows the responses of participant #20 to the attitude survey from both speaking tasks (red = conversation, blue = presentation). As can be seen, participant #20 only selected the same level of agreement on the same item once (item 8: *The way I sounded when I was speaking Spanish during the task is a part of my identity*). The red line across the top of Figure 18 shows that, with the exception of item 1 (*I made mistakes when I was speaking Spanish during the task*), that participant #20 felt confident in their language ability and language identity during the conversation task.

Figure 17

Participant #20 - Attitude Surveys Results from Both Speaking Tasks



This changes, however, during the presentation task. As shown by the blue line, participant #20's attitude towards their language ability and identity was lower during the presentation than the conversation. Table 25 shows the mean scores for the speech features of participant #20. The mean scores of rhythm and syllable duration are quite similar between tasks. The mean score of intensity is ~10 decibels higher during the presentation than the conversation. This participant's mean speech rate increases in the conversation task by more than 1 syllable per second compared to the presentation task. Finally, the mean pitch height of this participant is higher in the presentation by ~30 hertz than in the conversation.

Table 25

Mean Scores of Speech Features for HLL Participant #20

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.12	66.92	0.16	244.13	4.46

Presentation	0.10	76.43	0.19	279.66	3.35

Figure 19 shows the responses that participant #30 made to the attitude survey during both activities. Figure 19 is another example of a participant whose attitudes varied across the speaking tasks. For example, the figure below shows that their response to item 1 (*I made mistakes when I was speaking Spanish during the task*) was 'completely agree' during the presentation and 'completely disagree' during the conversation. All but one of the items changed (item 10: *I know I sounded like a native speaker of Spanish during the task*) for this participant.

Figure 18

Participant #30 - Attitude Surveys Results from Both Speaking Tasks

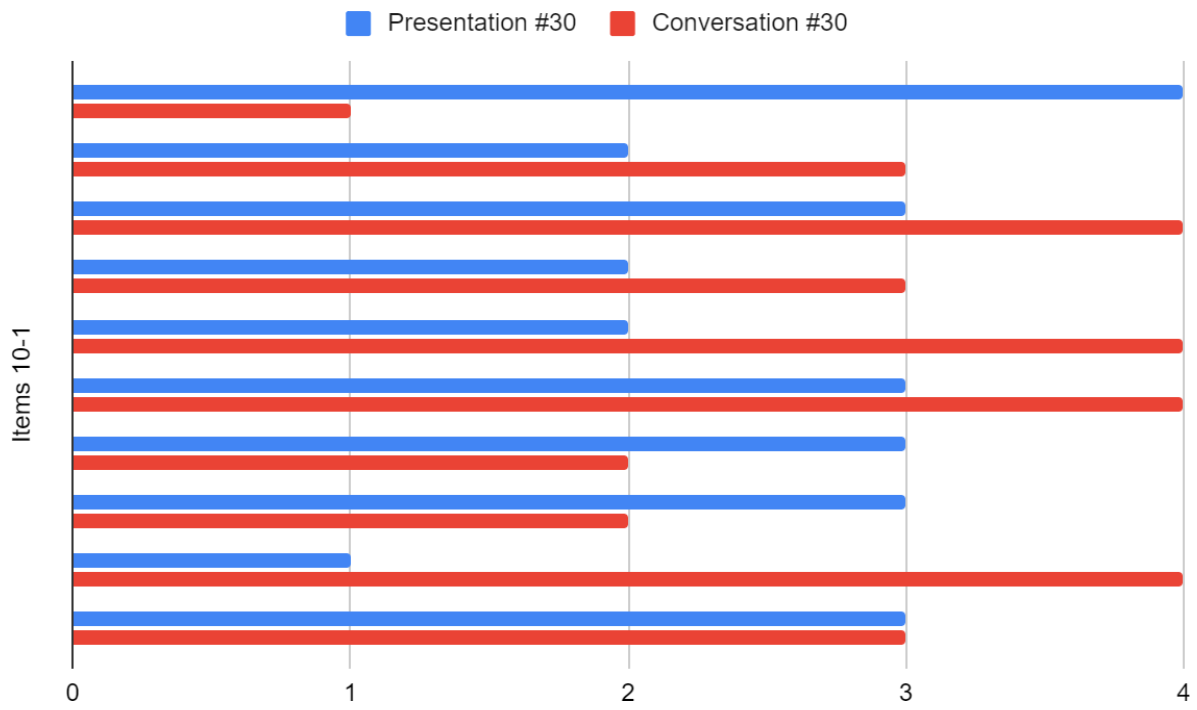


Table 26 shows the mean scores for the speech features of participant #30. The mean pitch height changes by ~130 hertz between the tasks. The mean speech rate increases in the conversation task by more than 1 syllable per second. The mean intensity is ~10 decibels higher

in the presentation than in the conversation. Overall, participant #30 appears to have changed both their attitudes and speech patterns between tasks.

Table 26

Mean Scores of Speech Features for HLL Participant #30

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.13	64.20	0.21	270.61	4.08
Presentation	0.16	75.26	0.16	127.34	2.86

The analysis of individual attitude responses and mean scores of individuals' speech features suggest that while some participants appear to be stable in their attitudes and speech patterns across tasks, there are clearly individual heritage language learners that vacillate in their attitudes towards their language ability and their language identity across tasks. Additionally, some of these participants' speech patterns vary between tasks while others' do not and not necessarily in tandem with attitudes.

In addition to qualitative analyses of individual's attitude scores and speech patterns. The researcher examined the biographical data in an effort to better understand the attitude and speech data shown in this section. The biographical data included information about the participants' language background such as the participants' age of exposure to both English and Spanish, the frequency of use of Spanish (speaking and listening), and the familial relation who spoke Spanish with them growing up.

The researcher examined all of these as possible variables for explaining the variation in speech patterns and attitudes described in this section. This process consisted of organizing the participants' biographical data according to how much their attitudes varied. This followed the

three groups described previously. The only language background variable that showed patterning similar to the attitude variation was the frequency of use. It was found that 21 respondents mentioned speaking Spanish often, while 6 reported not doing so often, and 11 stated they almost always speak it. In terms of hearing Spanish, 22 participants reported hearing it often, 2 reported not often, and 14 stated they almost always hear it.

In comparing the frequency of use to variation in attitude, it was found that the group who exhibited the most changes in their attitude scores across tasks also reported hearing and speaking Spanish less than either of the other two groups. Specifically, one participant from this group reported that they speak Spanish almost always, nine participants of this group said they spoke Spanish often, and four reported not speaking often. In contrast, of the group that exhibited the least number of changes in their attitudes across tasks, six reported that they almost always speak Spanish, six reported that they speak Spanish often, and one reported that it is not often that they speak Spanish. The group that changed between three and four of their attitude responses across tasks reported speaking Spanish more than the least stable group and less than the most stable group. This same pattern was found in the individual's reported frequency of hearing Spanish. The following chapter discusses the implications of individuals' varying (and stable) language attitudes and speech patterns in addition to the other analyses included in this chapter.

Chapter 5: Discussion

This chapter discusses the results of the present study in the order of research questions. First, the researcher explores the ramifications of the results from the analysis of attitude variation across tasks. This is followed by a discussion of the variation found in speech features across tasks and focuses on the implications these results have on situational characteristics of tasks. Then, this chapter includes a discussion on the relationship between attitudes and speech production. Finally, this chapter concludes with a discussion on the implications of the results from the qualitative analysis which includes insights to the effect that task type has on speech as well as the role that language background plays on attitude variation.

5.1. Attitudes towards Language Ability and Identity

Analysis of the language ability and language identity attitude scores showed a consistent change across speaking tasks: attitudes towards linguistic ability and language identity were higher during the conversation task than during the presentation task. This could be explained by the defining situational characteristics of both these tasks (see Appendix E for full list) and the likely reactions language learners would have to both. For example, key situational characteristics of the presentation task differed from the conversation task in that it was public and lacked an interlocutor. These differences required the participants to speak to a classroom of peers without any turn taking; they carried the entirety of the communicative burden with multiple listeners in a language that is not their dominant language.

As a result of these situational characteristics, it can be expected that a presentation task is to be a more stressful speaking task. This is important to note because it could mean that the lower attitudes reported during the presentation task for this study may be a result of the

participants feeling stressed rather than a direct result of the situational characteristics of the task. If it is stress, it appears to be reflected in the way participants view their language ability and their identity as a heritage speaker of Spanish.

Previous research perhaps sheds some light on these findings. These results are not unlike the findings of Colantoni et al (2016) which was mentioned previously. In their study, Colantoni et al had groups of participants produce a read-aloud script and a semi-structured narrative. They found that the heritage speakers deviated linguistically from the Spanish dominant bilinguals more in the scripted task than in the less-controlled task. The researchers found that the heritage speaker participants experienced some type of adverse conditions (e.g., anxiety) in reading the scripted task but not in the unscripted task and subsequently performed differently from the first task to the second. They concluded that the anxiety the heritage language participants experienced, and the subsequent deviation from native norms observed between the two task types, was due to the situational characteristic of the tasks. They suggested that it was because the HLL participants had less practice reading aloud in their heritage language than producing unscripted speech. The observed effect on the production of the heritage language participants from their study reinforces the importance of accounting for the effect task type can have on spoken language.

Like the experience that Colantoni et al's participants had, an explanation for the consistent change in attitudes between speaking tasks observed in the present study could be because the HLL participants from this study have had more practice in conversation type situations compared to presentations. The biographical data collected from the participants provides evidence that the HLL participants have had consistent opportunities to speak Spanish in informal, conversational situations. For example, all participants indicated that they grew up in

a home where Spanish was spoken by at least one parent and 20 of the 38 indicated that parents and siblings spoke Spanish. With this language background, it is reasonable to assume that HLLs have enough opportunity to practice conversation in their heritage language to an extent that they would feel relatively comfortable engaging in similar conversational situations.

The variation in attitudes found across speaking tasks in the present study shows that the selection and design of task types has an impact on the level of confidence a HLL has in their linguistic ability and their language attitude. As seen in these results, heritage language speakers are more likely to have a higher confidence in their language ability and have more positive feelings towards their identity as a heritage speaker in speaking tasks that are private, have an interlocutor and cover more familiar topics such as hobbies and family. In contrast, speaking tasks that are presentational and include unfamiliar topics or lexicon are expected to result in lower confidence in linguistic ability and more negative attitudes towards heritage language identity.

Based on the statistically significant difference found in the attitude scores, the researcher proposes that speaking tasks for heritage language learners that include an interlocutor and are complete in smaller groups (e.g., 1 to 1 conversational types) can be expected to encourage more positive attitudes in HLLs regarding their language attitude and identity. It is not suggested here that monologic tasks or presentational communication be avoided. Rather, based on these findings, it could be beneficial to offer scaffolded monologic tasks that help HLL gain more experience in and subsequent confidence in their ability to carry the entirety of the communicative burden in public situations. These findings show that HLL with high linguistic ability are still subject to insecurities regarding their linguistic ability. This can be carried out via task design that is guided by identifying the situational characteristics of target, real-world

registers. As mentioned before, previous research (e.g., Crawford & Zhang, 2021; Staples, 2012) suggests that the design of speaking tasks can benefit from using the vast amounts of work done to describe real-world registers (e.g. Biber & Conrad, 2019; Biber et al, 2021; Biber et al, 2006).

It is important to remember that the examination of individuals' survey responses in the previous section revealed potential grouping directly related to the self-reported language ability and language identity scores. This reasonably suggests not all of the participants can accurately be described to the same extent with the Student *t*-test results. Rather, approximately 36% of participants scored quite differently in their attitude scores between the two tasks: at least half of their answers changed from one task to the other. Another ~36% of participants changed at least a third of their responses from one task to another. The remaining participants changed only 1-2 of their responses from one task to another. This suggests that some portion of heritage language learners are more stable in their confidence of their language ability and their attitudes towards their identity as a heritage language user. Conversely, this could also mean that a large portion of heritage language learners are influenced by task type to such an extent that it affects the way they view themselves in regards to their language ability and language identity.

The diversity of language attitudes found in the present study corroborate the findings of Carreira and Kagan (2011) who explain the results of a survey which was conducted across different heritage languages (a total of 22) and geographic regions in the United States. They found seemingly juxtaposed responses in this survey. For example, participants were asked to reflect on their attitudes towards their heritage language and while the majority of respondents (85%) claimed that their heritage language was an important part of their identity, some of those same respondents expressed that they sometimes felt embarrassed (30%) about their heritage

language and that it made school more difficult (~19%). This is an example of how a speaker of a heritage language can experience mixed or complex feelings towards their heritage language.

It is suggested here that the results from the present study reflect the findings of previous work (e.g., Carreira & Kagan, 2011; Kutlu & Kircher, 2021) in that it shows different HLL experiencing different attitudes towards their heritage language identity and linguistic ability within the same situation (i.e., speaking task). Some participants were quite stable in their self-reported attitudes while others were quite fluid, depending on the task type. This highlights the importance of taking into account task selection for heritage language classrooms.

Beyond affecting the types of speaking tasks used in heritage language classrooms, there is potential here for informing how the field of heritage speaker research categorizes heritage language speakers/learners: through identifying pedagogical needs. As stated at the beginning of this dissertation, the definition of heritage language speaker is not generally agreed upon (Rao & Ronquest, 2016; Xiao-Desai, 2019). As a result, a variety of different labels are used to describe this type of bilingual speaker such as native speakers, bilingual speakers and home-background speakers, to name a few (e.g., Valdés, 2001; Xiao-Desai & Wong, 2017). The results of this study suggest that within a fairly homogeneous group of heritage speakers, there will be differences in how these speakers view their language ability and identity that affects their speech performance to some extent.

Perhaps then, the classification of heritage learners for pedagogical reasons can root itself in identifying students by their instructional needs through assessment of the learner's perception of self. This approach to categorizing heritage language learners may appear to have its place after a learner has been placed in a language course based on linguistic ability and/or cultural knowledge. However, future research could explore the efficacy of gauging heritage language

learners' self perception of language ability and identity as a way of determining course placement and do so with some confidence that fairly clear grouping will be found.

5.2. Variation in Target Speech Features

The target speech features of the present study included rhythm, speech rate, and then 4 components of speech meant to represent lexical stress taken from 3-syllable (atonic-tonic-atonic) sequences: syllable duration, intensity, pitch height, and listener ratings of vowel quality. Of these, rhythm, intensity, and speech rate were significant. Specifically, rhythm was significant, $t(37) = 2.06$, $p < .05$. Cohen's d revealed a small effect size of 0.33. Also, intensity was significant, $t(37) = -6.04$, $p < 0.05$. And Cohen's d revealed a large effect size of -0.98. showing that participants produced greater intensity in instances of lexical stress during the presentation task than in the conversation. Speech rate was also significant, $t(37) = 9.49$, $p < .05$. And Cohen's d revealed a large effect size of 1.54. This means that speech rate on average was approximately 30% faster in the conversation task than during the presentation. The paired sample *t*-tests revealed that there was no effect in pitch height, syllable duration, and vowel quality across tasks. These results could be explained, at least in part, by sample size, however the researcher proposes here that the overall attempt to capture lexical stress through the measurement of discrete speech features should be reconceptualized.

The statistically significant differences observed in these speech features are likely explained by the situational characteristics as well as familiarity with topics. In regard to familiarity with the topics in the first task, one common error observed during data collection was that these participants were not familiar with the vocabulary needed to describe the population of a country. Specifically, the word *poblacion* ('population') and the use of numbers

were difficult for the participants to accurately produce. This phenomenon was not included in the linguistic analysis so there is no quantitative or statistical description offered here. However, the researcher mentions it as evidence to suggest that heritage speakers were not familiar with the language needed for completing the presentation task, which is one reasonable explanation for the variation observed in the target speech features. Specifically, regarding speech rate, the variation observed between the two tasks could be less fluid speech due to lack of familiarity. Not only could the rate of speech be interrupted by the time needed to use unfamiliar vocabulary, but also by the anxiety a HLL might feel as they publicly struggle with their rate of speech.

This is further described by previous research which has shown that differences in phonological production across tasks are explained, to some extent, by the amount of attention a speaker pays to their speech and that the more attention they pay to their speech the less systematic or regular it will be (Tarone, 1983, p. 151). In this case, as HLL participants struggled with topic familiarity, the more attention they paid to their speech, and the less regular it became for them.

To interpret the variation found in intensity, the researcher considered the intensity measurements of the baseline speakers. The baseline speakers had higher intensity during the presentation than in the conversation. The same is true for the HLL participants which suggests that they followed Spanish language native norms. The higher intensity could be due to the nature of a presentation requiring the speaker to project their voice to a crowd, rather than an indication of language proficiency. In fact, contrary to previous research (i.e., Kim, 2020) on the production of Spanish HLL's production of lexical stress, the vowel quality ratings for this group of HLL participants were consistently high at ~12 (out of 15 possible) in both tasks indicating an absence of English native norms (e.g., vowel reduction). As explained earlier in this study,

lexical stress in Spanish is created by increased pitch height, increased intensity and extended duration of the stressed syllable (Ladefoged, 2001). English uses the same suprasegmental but relies primarily on reducing the vowels surrounding the stressed syllable to create that same effect (Ortega-Llebaria, 2013). As a result, the syllable that is being stressed has higher pitch, higher intensity and a longer duration than the syllables that precede and follow it (Ortega-Llebaria, 2013). In other words, instances of lexical stress in both languages experience an increase in the suprasegmental features of pitch height, intensity and syllable duration. The important difference lies in the fact that, in English, this is largely a by-product of vowel reduction. The absence of vowel reduction evinced by the listener ratings combined with the similarities between the HLL participants' and baseline speakers' intensity as well as the relative stability in pitch height and syllable duration is interpreted by the researcher to mean that the production of lexical stress by these HLLs approximated native speaker norms and demonstrated variation that was appropriate for the task types.

A point made earlier in this project is that research on spoken heritage language is typically focused on determining how closely heritage speakers approximate either L2 or monolingual speech rather than asking how closely *can* and under what conditions *would* heritage speakers approximate L2 or monolingual speech. The first approach seems to take for granted that what a speaker produces represents their productive ability. This research suggests that this is too narrow of a view and that, given the variation that has been observed in heritage language production of speech, other factors such as register (i.e., situational characteristic, commonly occurring linguistic features and the functional association between those two) and attitude towards heritage language should be considered to help understand heritage speakers. It is proposed here that the variation shown in speech rate, rhythm and intensity is evidence that

HLLs' reaction to situational characteristics reflects both a controlled linguistic ability and uncontrolled linguistic performance. Therefore, research that seeks to describe HLL proficiency levels should take into account the effect that task type and register has on speech production.

The speech features collected from the baseline showed some variation to those taken from the heritage speaker participants. For example, the speech rate of the baseline speakers in the conversation task ranged from 2.9-3.9 syllables per second while the heritage speaker participants ranged from 3.08 to 5.26 with an average of 4.34, suggesting that heritage speakers had a higher speech rate than the baseline speakers during the conversation. During the presentation task, the baseline speakers had a smaller range of speech rate from 3.84 to 4.12 while the heritage speakers had a range of 2.27 to 4.56 and an average of 3.57, again showing a higher speech rate than the baseline speakers. In both speaking tasks, the heritage speaker participants showed a greater range in their number of syllables produced per second than the baseline speakers.

In contrast to the difference between heritage speaker and baseline speaker speech rates, rhythm for both types of speakers was similar during both speaking tasks. For example, the standard deviation of syllable duration for heritage speakers ranged from 0.1 to 0.18 in the conversation task and increased slightly to 0.23 as a maximum in the presentation. The researcher interprets this a highly stable rhythm which would be expected in a syllable-timed language such as Spanish. The baseline speakers showed slightly more stable rhythm measurements with two of the three showing standard deviation in syllable duration as low as 0.06 and 0.09. Otherwise, the baseline speakers had rhythm scores between 0.11 and 0.13.

Overall, the heritage speaker participants show consistent similarities to the baseline speakers with some small differences. This aligns with the researcher's expectations of the heritage speakers' Spanish language proficiency.

5.3. Relationship between Attitudes and Speech

In an effort to understand the variation found in the speech variables of this study, the researcher generated correlations between the attitudes and the speech features. The results showed moderate to large, positive *r* values existed between rhythm and attitudes towards language identity during the conversation task, and also a large, positive correlation between speech rate and attitude towards language ability in both of the speaking tasks. These correlations offer valuable insights into the relationships between attitudes and speech patterns. The analysis of correlations between the speech features and attitudes towards language ability and identity during presentation and conversation tasks reveals nuanced relationships. The correlations found between syllable duration and attitudes revealed that participants' syllable duration in instances of lexical stress decreased as attitudes towards their language ability increased. This same relationship was also found during conversation tasks, syllable duration and rhythm similarly decreased with more positive attitudes towards language ability, supported by the small, negative correlations found.

Additionally, the analysis done to explore the relationship between attitudes and speech patterns showed that speech rate increases as attitudes towards language identity increase during presentation tasks, backed by a small, positive correlation.

A similar connection was found between speech rate and attitudes towards language ability during conversation tasks, with a small to moderate, positive correlation. As attitudes

toward language ability increased, participants' speech rate also increased, suggesting an important relationship. Finally, the relationship between rhythm and attitude towards language identity showed a significant, negative, small correlation. This illuminated that participants tended to adopt a more syllable-timed rhythm as their attitudes towards language identity become more positive. These findings collectively highlight the interplay between speech patterns and attitudes towards language ability and identity.

One of the primary purposes of this dissertation has been to respond to Chang's (2020) inquiry made to the field of heritage language research, asking whether or not heritage language speakers are actually strategic in their language production rather than having a language proficiency that is limited to the language production they display. The results from this study give little evidence that heritage language learners' attitudes surrounding language ability and language identity motivate their use of the linguistic features targeted in this study. At least, the attitude constructs used in this study do not serve to explain very much of the variation found in the speech features of this study.

However, the results from the study suggest that these attitudes show a clear pattern of variation across speaking tasks. Therefore, while this study did not find relationships between attitudes and all of the targeted speech feature, the researcher proposes that there is clear evidence of attitude fluctuation across speaking tasks that is reasonably explained by situational characteristics in terms of the effect they have on speakers (e.g., anxiety), as well as linguistic forms and functions, required by the situational characteristics.

5.4. Qualitative Analysis of Attitudes and Speech Patterns across Task Types and Language Background

The fourth research question of this study was explored with a qualitative analysis of individuals' responses to the attitude survey from both tasks, a description of their speech patterns for both tasks, and a description of the participants' language background. This process revealed that the relationship between task type, attitudes and speech patterns is complex and intriguing. For example, some heritage language learner participants were more stable in their attitudes across tasks than others. Specifically, it was found that 13 (~30%) of the participants experienced little to no changes (2 items or less out of 10 items) in their attitudes towards their language ability and language identity between the two tasks, 11 (~30%) of the participants showed a 30%-40% change in their attitudes and the remaining 14 (~35%) of the participants demonstrated a minimum of 50% change in their attitudes between tasks. The specific attitudes that changed across tasks as well as the grouping of participants' attitude stability is worth discussing.

As mentioned in the Analysis and Results chapter, some of the changes described here include drastic shifts in attitudes towards language ability and language identity. For example, participant #12 made only three different selections in the attitude survey between the two tasks which suggests relative stability in their attitudes across tasks. However, one of the items that changed from complete agreement during the conversation to complete disagreement during the presentation was item number 6 (*I defined myself as a Spanish speaker during the task)*. This particular item, related to language identity and reflecting one's sense of belonging to a Spanish-speaking community, highlighted the participant's shift in self-identification between tasks. This

example illuminates the extent to which task type can affect one's sense of belonging to a particular language group.

The researcher also included the mean scores for each participants' speech features in an effort to describe their speech patterns in relation to attitudes and task type. The researcher compared mean scores of speech features to changes in attitude. The original intention was to find a pattern that would show that if a participant's attitudes changed, then their speech patterns were also likely to change. However, this was not found in this qualitative analysis. Instead, the researcher found that the group of 13 participants whose attitudes changed the least between activities had the most variation in their speech rates between tasks. It was also found that the group who had the most variation in their attitudes had the approximately the same variation in their syllable duration as the group with the least amount of attitude variation. In other words, the researcher was not able to find any qualitative evidence that would suggest that speech features vary exclusively with attitudes, or that attitudes have an effect on the production of speech features. Instead, the analysis of individual attitudes and speech features corroborated the results from the paired samples *t*-tests which showed differences in attitudes and speech features across speaking tasks.

The analysis used to answer research question 4 provided evidence that variation in speech features and attitudes do not correlate. Rather, task type is what influences language attitudes and suprasegmental speech patterns and that there are clear patterns of how these variables are influenced. For example, attitudes towards language ability and language identity were either higher or did not change in the conversation task. Also, 36 out of 38 of the participants had a faster speech rate during the conversation than during the presentation. Another example, 30 out of 38 of the participants produced lower intensity in instances of lexical

stress during the conversation than in the presentation. Of those that produced lower intensity during the conversation, 16 participants had a decrease of 10-20 decibels in their intensity measurement which, considering the logarithmic perception of decibels, is likely perceived as a large difference in volume to the human ear. These variations in attitudes and suprasegmental speech patterns show that task type is much more likely to influence language attitudes and production of speech features than the other way around.

In an effort to answer the fourth research question, the researcher also performed a qualitative analysis of the biographical data collected from the HLL participants to better understand the pattern observed in attitude variation across tasks. The study uncovered a link between how often people use Spanish and how their attitudes change. The group that had the most change in their attitude scores also reported speaking and hearing less Spanish than the other groups. This connection suggests that using Spanish less often might make attitudes less stable in certain situations.

Looking at groups with different attitude stability levels showed a clear pattern in how much Spanish they use. The group with the most stable attitudes reported hearing and speaking Spanish more than the other two groups, while the group with some changes in attitudes fell in between. This matching pattern in how often they spoke and heard Spanish supports the idea that language use could affect how stable attitudes are.

The study included biographical data of participants in the qualitative analysis, focusing on language background variables to help explain the variations in speech patterns and attitudes observed. The participants' age of exposure to English and Spanish, frequency of Spanish use in speaking and listening, and familial exposure to Spanish were analyzed in relation to attitude fluctuations. Among these variables, the frequency of Spanish use emerged as an important

factor. Specifically, those who reported using Spanish less frequently tended to exhibit more pronounced shifts in attitudes, while increased Spanish use correlated with more stable attitudes. This connection highlights the impact of frequency of language use in shaping participants' responses to speaking tasks and the formation of their attitudes towards language ability and language identity.

These findings underscore the intertwining relationship between language background and attitude variations, emphasizing the need to explore the connections between language usage and attitude development further. The results from this study suggest that understanding how individuals form their attitudes necessitates a closer examination of their linguistic backgrounds. The study highlights the impactful role language background plays in comprehending the variance in attitudes across different task types, especially for heritage language learners exhibiting varying attitudes. Furthermore, while attitudes may fluctuate, the absence of a direct correlation between attitudes and speech patterns suggests that HLL possess agency over their speech production irrespective of their sentiments about language ability or identity. Instead, they recognize and adapt to the linguistic demands of distinct situations, modeling control over their speech regardless of their attitudes. This nuanced interplay between language background, attitudes, and speech production underscores the multifaceted nature of language perception and adaptation among heritage language learners.

Chapter 6: Conclusions

The final chapter of this study presents the implications of the findings of this study. This first section shows the addition these findings make to the field in terms of the effects task type can have on heritage language learner attitudes and speech patterns. This is followed by the limitations of this dissertation and concludes with suggestions for future research that explores the same topic.

6.1. Implications of the Results

Over the last decade, multiple studies have recognized the social complexity faced by heritage language speakers and have successfully documented qualitative and quantitative data to help describe this phenomenon (e.g., He, 2010; Kircher & Kutlu, 2022; Kutlu & Kircher, 2021; Leeman, 2015; Prada et al, 2020). For instance, Prada et al. (2020) discovered that HLL enrolled in courses tailored for heritage speakers experienced notably lower anxiety levels compared to those taking traditional L2 courses. This dissertation adds to these findings by demonstrating that the task type specifically influences heritage language learners' attitudes towards their language ability and language identity. These findings call for attention to be paid to the classroom experience of heritage language learners by underscoring the important role that heritage language pedagogy has in shaping individuals' identity and linguistic confidence. This dissertation shows that the nature of tasks within heritage language classrooms directly affects learners' attitudes towards language ability and language identity.

This study sheds light on two important aspects that deepen our comprehension of this domain and suggest a direction for future research. First, these findings highlight the multifaceted nature of attitudes among heritage language learners, emphasizing the necessity to

separate seemingly uniform attitude components asymmetrically. Second, it underscores the influential role of situational characteristics and expected linguistic forms in a given register, significantly impacting HLL attitudes. These factors demand attention in data that is collected from heritage language learners and are necessary in explaining variations in HLL attitudes.

Furthermore, this research, through qualitative analysis, describes the nuanced differences in attitudes among heritage language learners. It identifies specific aspects of attitude constructs that exhibit variance and outlines individual-level variations. The results from this qualitative analysis suggest the potential for distinct groupings based on variations in HLL attitudes and language background.

These findings offer valuable insights for improving how heritage language learners are taught. Heritage language instructors can adapt their teaching methods by using real-world registers for the selection and design of speaking tasks. Specifically, it is suggested here that heritage language pedagogy adopt the practice of offering speaking tasks that bridge the gap between speaking tasks that are comfortable for HLL and ones that are stressful. This approach could help HLL approach intimidating speaking tasks with more confidence in their language ability and more stability in their sense of identity as a heritage language user.

Introducing tasks that are modeled after real-world registers into the classroom provides a step-by-step process for heritage language learners. As they work through these tasks, they get more practice in using language that they would encounter in real life. This can help them become more confident in using their heritage language. Overall, this method can positively influence how these learners view themselves as language speakers, making them more self-assured when faced with tasks that might typically make them feel stressed or unstable in their language identity.

6.2. Limitations of the Present Study

One limitation of the present study is the simple approach taken to analyze the data. This allowed for clear observation of any possible differences in attitudes across speaking tasks. However, the simple approach used in this study to finding a difference in attitudes across speaking tasks leaves a lot of room for future research to utilize more complex methods of analysis in order to understand the nuances of attitude variation in heritage language learners.

Another limitation of this study, in regard to responding to Chang's (2020) question, is the lack of a variety of registers represented in the speaking tasks. Given the fact that this study included only two speaking tasks, it is possible that more tasks that represent more real-world registers could elicit a strong social response from the participants. The lack of diversity in real-world tasks is evinced by different situational characteristics of the tasks used. For example, the interviewer was non-Hispanic and spoke Spanish as a second language. This could have dampened any motivation in the HLLs to make an effort to construct a clear identity as a Spanish speaker through their speech. This could explain why this study was not able to find evidence for strategic deployment of linguistic cues that shape identity and reflect attitude.

Beyond that, comparing heritage language learners to baseline speakers can be both useful and problematic. It is useful when it allows researchers to establish a generalized, accepted standard of speaking; there is no higher language proficiency than that of a native, dominant speaker of that language. Therefore, HLL researchers can quantify the extent to which HLL production approximates native speaker norms. This enables us to describe, through comparison, HLL linguistic features in an interpretable way. However, comparing HLL language production to native speaker norms can distract from the field's goal of understanding what pedagogical needs these types of speakers have.

Other limitations of this study are that the tasks designed for this study are not totally authentic because they are designed to elicit speech, and this may inhibit participants from behaving as they would in a real-world register. Another potential limitation to the proposed study is that there are other speech features that could be included but have not been either in an effort to make the data analysis fit within time constraints or because they do not seem as promising as the ones selected here.

A last limitation of this dissertation that should be considered is the homogeneity of the participants recruited for this study. As described in the Method chapter, the participants for this study were recruited from university Spanish language classes. As a result, the findings presented in this study should not be generalized to heritage speakers that do not fit into the narrow demographic included in the present study.

6.3. Future Directions

While this study focused solely on Spanish as a heritage language, there exists a variety of heritage language learners within the United States that have pedagogical needs related to their heritage language (e.g., Albrini, 2014; Carreira & Kagan, 2011; Chang & Yao, 2016). Spanish as a heritage language, despite being a minoritized language, enjoys a much larger community throughout various parts of the United States than any other heritage language found in the U.S. (e.g., Arabic, Armenian, Cantonese, Korean, and Mandarin, to name a few; Carreira & Kagan, 2011). As such, future research should continue to explore whether the findings of this study are present in learners of other heritage languages.

In addition to including other heritage languages, it is recommended here that future research focuses on teasing apart the variables that influence variation in attitude as well as

speech features. This could be done by collecting more data on individual differences as well as controlling for situational characteristics for any given communicative situation. Some work has been done on this topic. As an example of this, Prada et al (2020) undertook a qualitative approach by recording spoken reflections on Spanish heritage language learners' experiences in Spanish language classrooms. They found that HLL participants consistently experienced anxiety when asked to speak in front of their class. The findings from this study add to that by finding differences in two types of speaking tasks (i.e., conversational and presentational) but this could be expanded greatly to help the field pinpoint which situational characteristics are adversely affecting heritage language learners and respond accordingly.

In addition to identifying variables that affect speech rate and rhythm, further research on this topic will enable the field to more fully describe register differences in terms of speech features. From the present study, the researcher is able to add some description of the speech rate, rhythm, and lexical stress of conversational and presentational task types. For example, speech rate was higher and rhythm had more variation during the conversation than the presentation. However, repetition under the same situational characteristics is needed to describe registers by suprasegmental speech patterns.

Recall that one major endeavor of this dissertation was to test whether or not heritage language speakers are able to modify their spoken language in response to situational characteristics and their attitudes about their language ability and language identity within those situations. Analysis of the data was able to show that attitudes do change between situations as well as speech features. The next step was to show that the attitude data could predict the production of the targeted speech features and thereby provide clear evidence that heritage language learners were modifying their speech production based on how they felt.

Regarding pedagogical implications, the results from this study suggest that task type has an effect on learner attitudes and language production. The statistically significant difference that was found in attitudes towards language ability and language identity is strong evidence that future research should continue to account for the effect that task type can have on attitudes but also seek to explain these differences. It is worth noting again that when the individuals' survey responses were looked at, there were clear differences between different groups of the participants to suggest that some are more stable than others in their attitudes across speaking tasks. Said another way, there is change in the attitude scores that potentially show a pattern of participant grouping. Future research from collecting a bigger sample to enable the identification of HLL grouping by attitude results.

In conclusion, this study provides clear evidence that heritage language learners can experience a change in their attitudes across speaking tasks, and the situational characteristics of those tasks can be designed to be less stressful for language learners. The results from this study also suggest that different heritage language learners will have different attitudes regarding their ability and identity even with the same speaking task. As a result, future research that is concerned with spoken language, even beyond HLL research, should account for task type and the effect it has on language attitude when describing language production.

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Appendix A

Prompts for Speaking Tasks

Actividad 1

For this task you will prepare a brief (1 minute) oral class presentation on a Spanish speaking country of your choice. You will present this to the class

Prep time (10 minutes)

Presentation time: 1 minute. You have to fill the time.

Your presentation needs to include:

1. State your name
2. Provide the name and population of the country
3. Introduce 5 historical facts about the country
4. Describe why you chose the country.

Actividad 2

For this task you will have a short, casual conversation with the researcher. Please wait to be invited one at a time.

Questions for the face-to-face conversation:

1. What is your name?
2. Where are you from?
3. What is your family like?
4. Do you have a best friend? What are they like?
5. What do you do for fun? Do you have any hobbies? How did you get into your hobbies?
6. Does your family have any traditions? Please describe them.
7. What classes are taking?
8. What is your major? How did you decide on it?
9. Do you know what you want to do when you graduate?
10. If you could travel anywhere in the world, where would you go?

Appendix B

Language Attitude and Self-perception Survey

Q1 What's your name?

_____

Q2 Please indicate which task you just completed

o Conversation with researcher (1)

o Presenting in front of the class (2)

Q3 On a scale of 1-4 please rate how you felt during the speaking task

1=completely disagree
2=somewhat disagree
3=somewhat agree
4=completely agree

	1	2	3	4
It was important to me to sound like a native speaker of Spanish during the conversation/the presentation				
I made mistakes when I was speaking Spanish during the conversation/the presentation				
I spoke Spanish very well during the conversation/the presentation				
I sounded like a native speaker of Spanish during the conversation/the presentation				
I was confident in my Spanish speaking abilities during the conversation/the presentation				
I spoke Spanish fluently during the conversation/the presentation				

I defined myself as Spanish speaker during the conversation/the presentation	
I felt like I belong to Spanish speaking communities because I spoke Spanish during the conversation/the presentation	
The way I sounded when I was speaking Spanish during the conversation/the presentation is a part of my identity	
I know I sounded like a native speaker of Spanish during the conversation/the presentation	

Appendix C

Biographical Survey

Name_____

SPA class time_____:_____

7. What's your gender?
8. Do you consider yourself a heritage Spanish speaker?
9. Were you raised in a home where Spanish was spoken?
    a. If so, who in your family speaks Spanish?
        i. Do they speak English or Spanish more?
10. As a baby, were you exposed to Spanish before English?
    a. At what age were you exposed to Spanish (If it was your home language you can put "0")
    b. At what age were you exposed to English (If it was your home language you can put "0")
11. How often do you speak Spanish?
    a. Never
    b. Not often
    c. Often
    d. Almost Always
12. How often do you hear Spanish?
    a. Never
    b. Not often
    c. Often

d. Almost Always

Appendix D

Classroom Presentation for Data Collection

Actividad 1

Actividad 1

For this activity you will prepare a brief (1 minute) oral class presentation on a Spanish speaking country of your choice. You will present this to the class

Prep time (10 minutes)

Presentation time: 1 minute. You have to fill the time.

Your presentation needs to include:

1. State your name
2. Provide the name and population of the country
3. Introduce 5 historical facts about the country
4. Describe why you chose the country.

Pensar en la actividad 1

Actividad 2

For this activity you will have a short, casual conversation with the researcher.

Please wait to be invited one at a time.

Also, remember to fill out the survey once finished the conversation.

Survey:

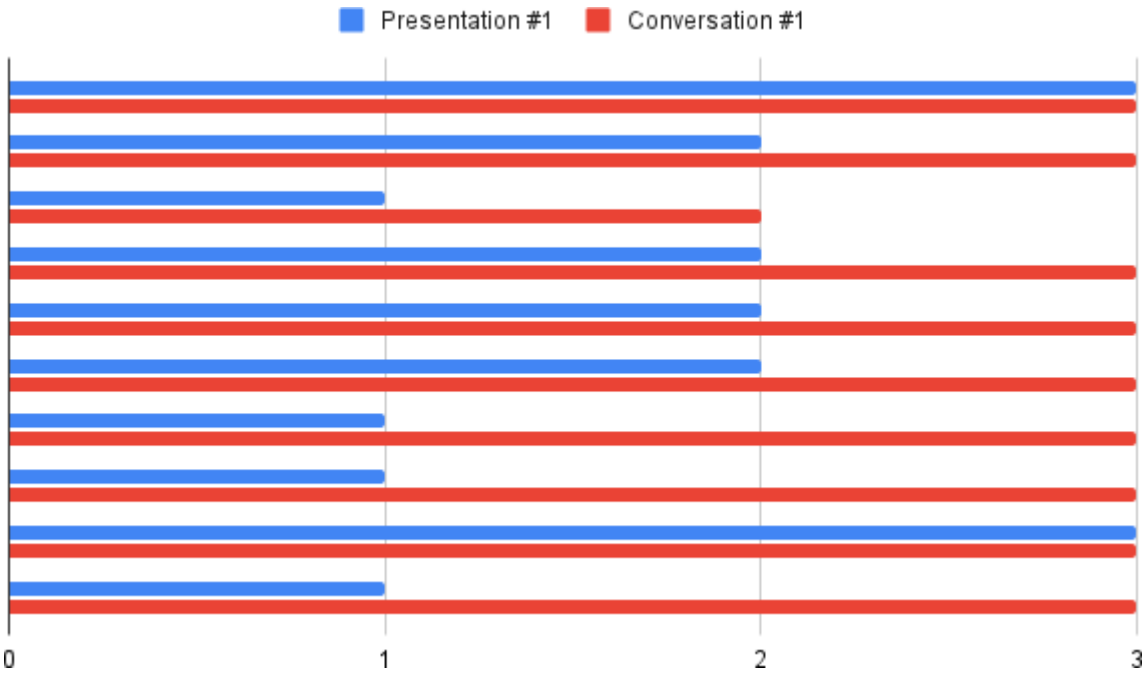
Appendix E

Speaking Tasks that Reflect Classroom Registers

Situational Characteristics	*Task 1 - Presentation*	*Task 2 - Conversation*
Participants		
Speaker	HLL	HLL
Interlocutor	None	Researcher
Relations among participants		
Interactiveness	No interaction, presentational	Highly interactive, question and answer structure
Social Roles	Relatively same social status	Social imbalance between HLL and researcher
Personal Relationships	classmates	interviewer - interviewee
Channel		
Mode	Spoken	Spoken
Medium	Transient, synchronous	Transient, synchronous
Production Circumstances	Real time, unscripted, planned	Real time, unscripted, unplanned
Setting		
Time and Place	Classroom, during class time, space and time shared	Outside classroom, during class time, space and time shared
Private/Public	Public	Private
Communicative Purposes		
Purpose	Present findings, inform, summarize information	
Factuality	Factual	Opinion, imaginative
Topic	Spanish speaking country of interest	Family, hobbies, school,

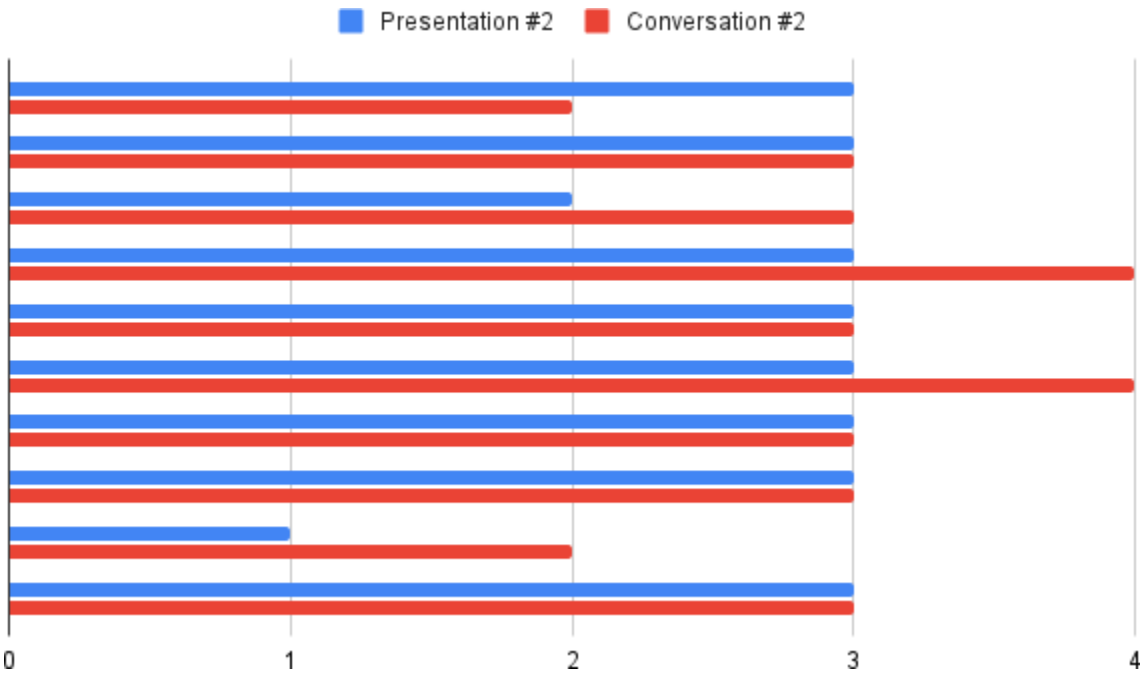
Appendix F

Line graphs and speech patterns for individual participants' responses



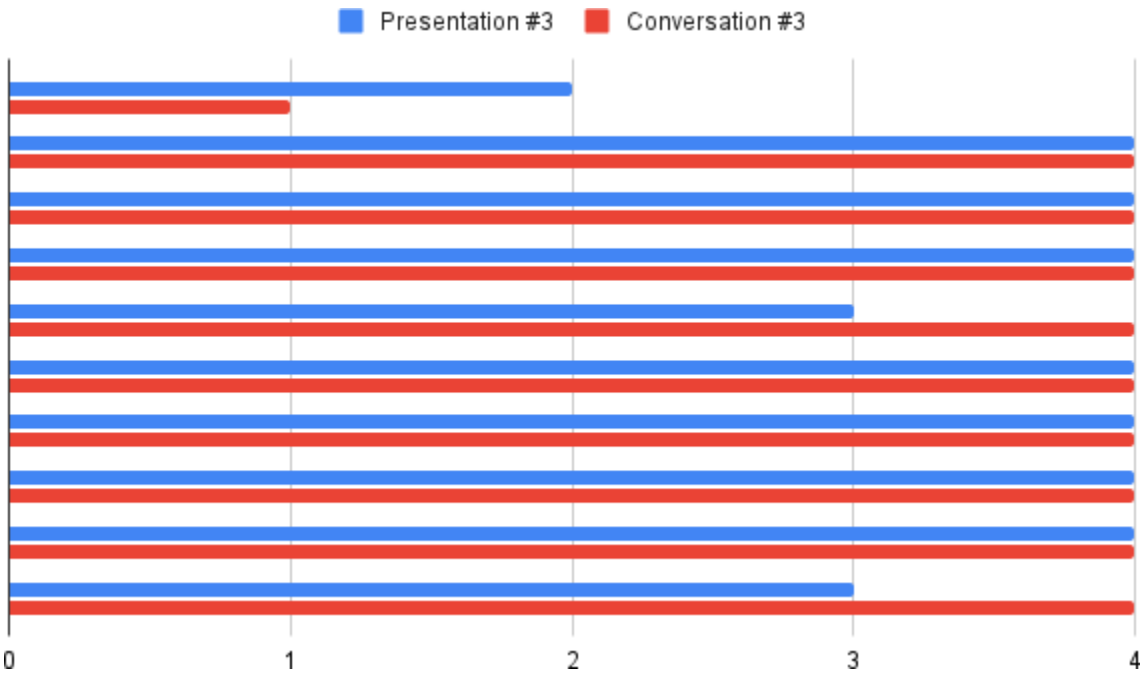
Mean Scores of Speech Features for HLL Participant #1

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.13	63.15	0.14	280.28	3.96
Presentation	0.20	65.51	0.22	285.99	3.38



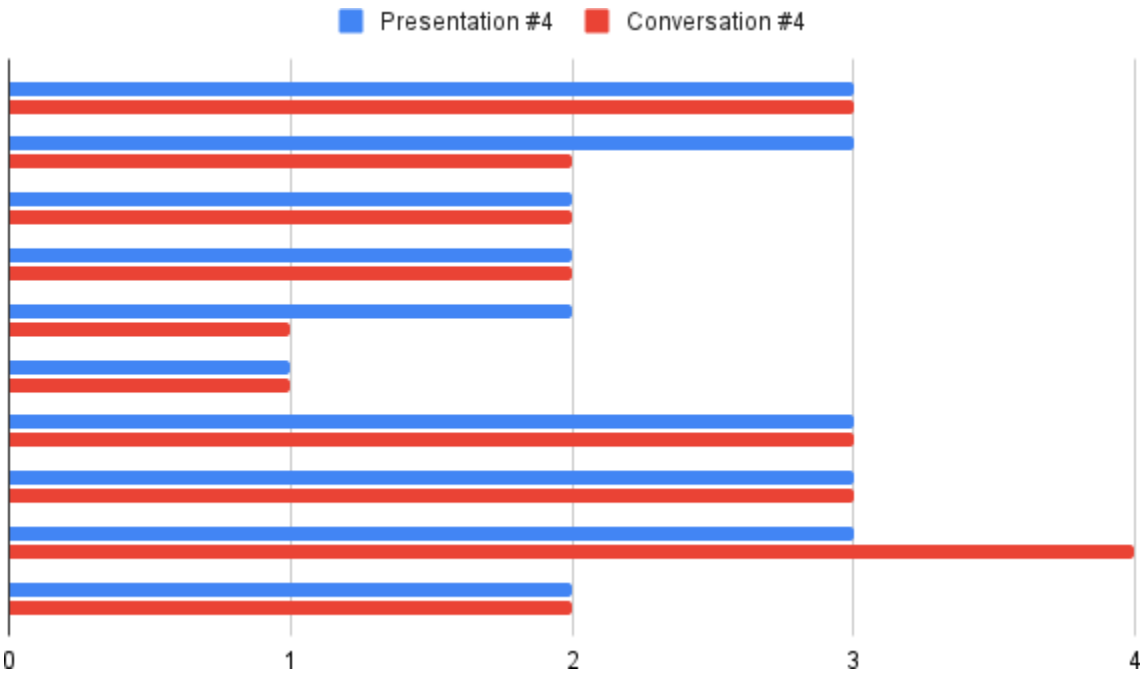
Mean Scores of Speech Features for HLL Participant #2

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.14	66.43	0.16	238.84	4.12
Presentation	0.10	73.76	0.17	253.41	3.90



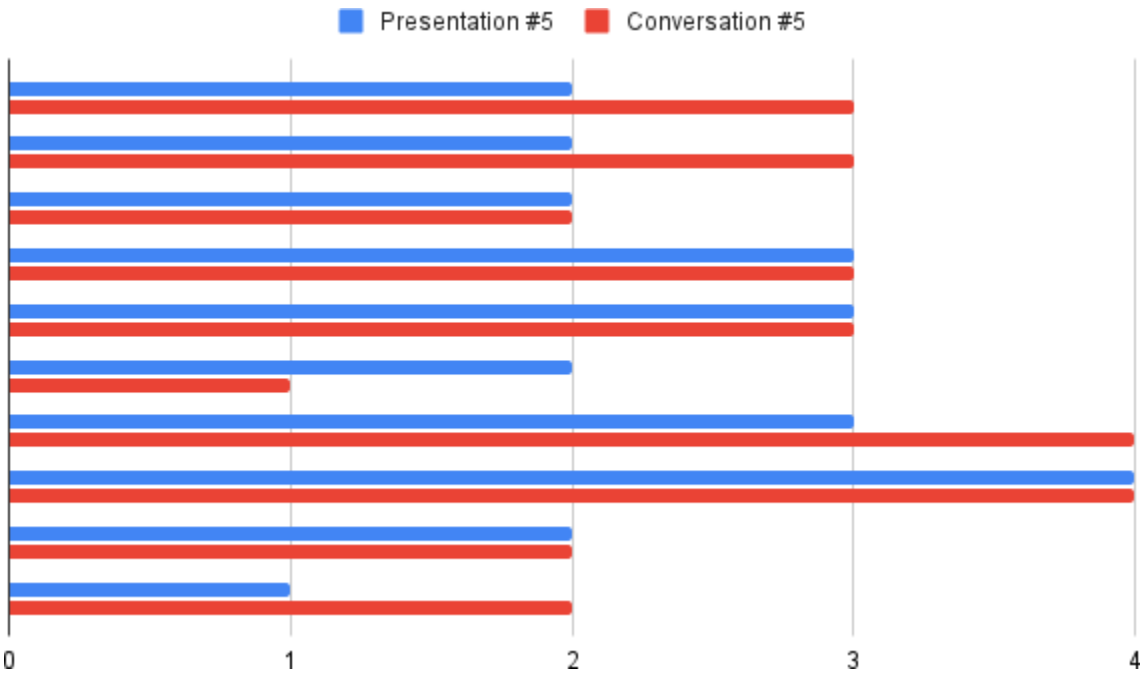
Mean Scores of Speech Features for HLL Participant #3

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.14	70.13	0.19	247.53	4.34
Presentation	0.13	77.27	0.16	225.15	3.51



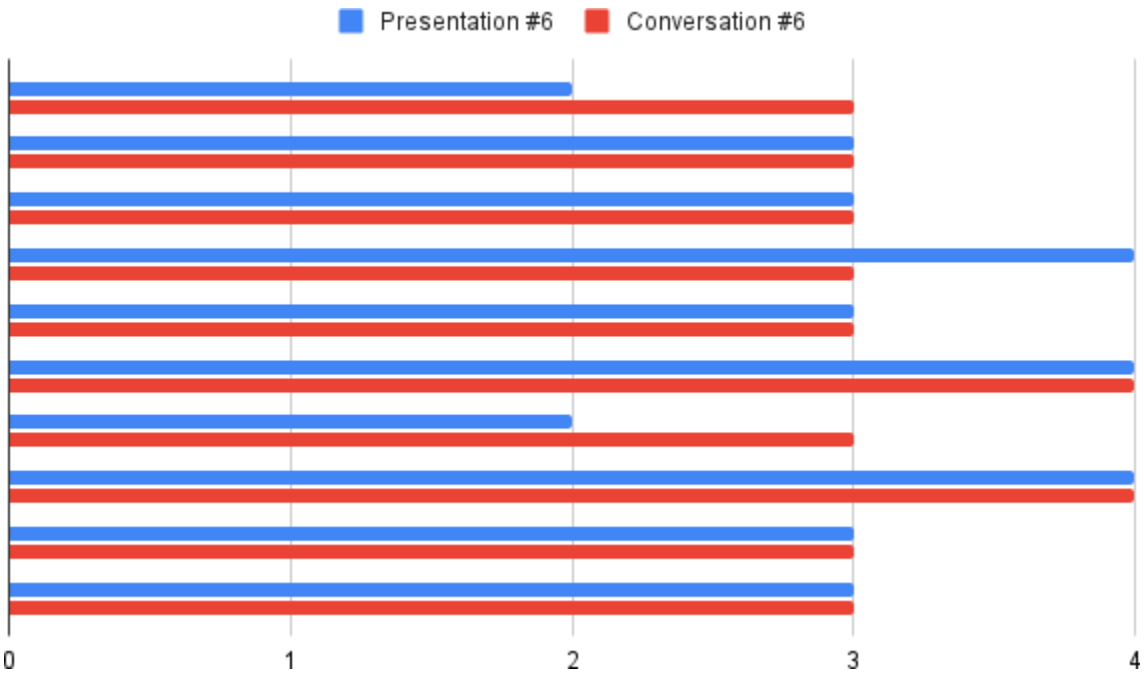
Mean Scores of Speech Features for HLL Participant #4

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.15	67.06	0.17	182.22	4.22
Presentation	0.10	73.02	0.15	209.39	4.39



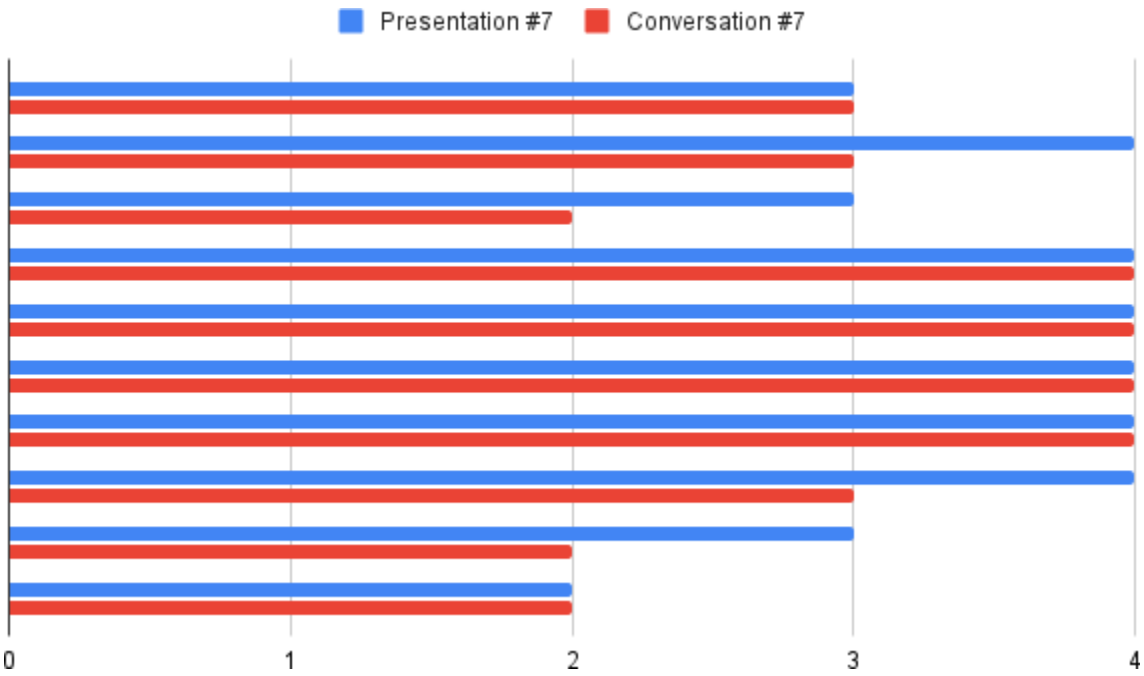
ean Scores of Speech Features for HLL Participant #5

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.11	64.67	0.16	195.69	4.88
Presentation	0.10	64.48	0.14	265.02	3.62



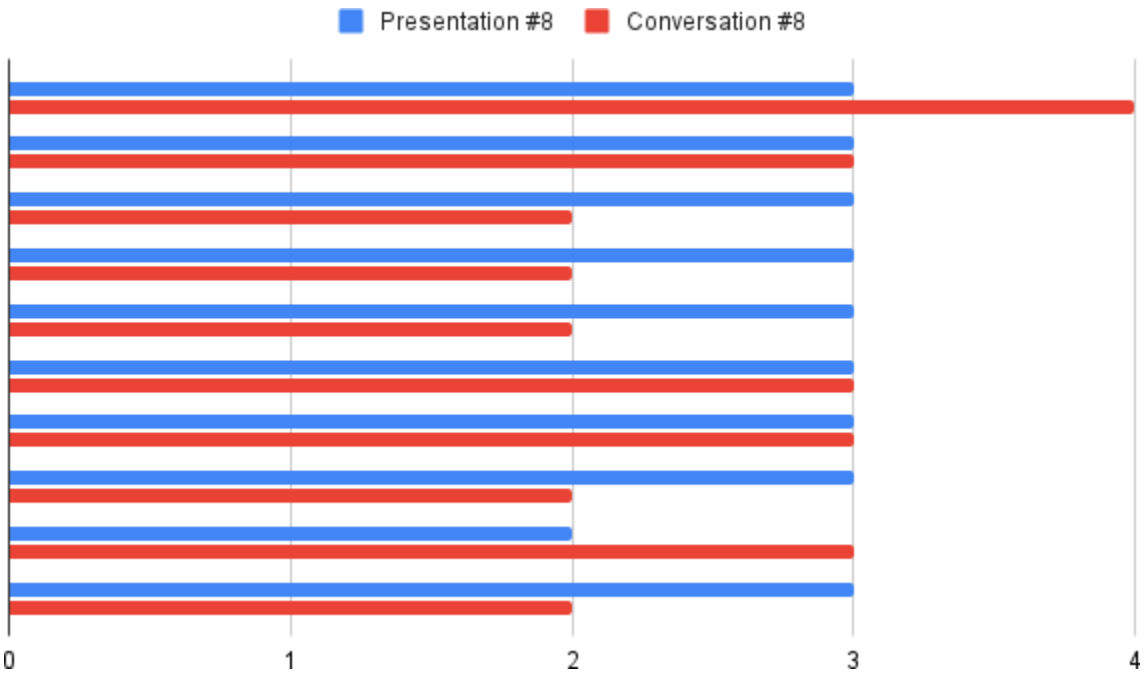
Mean Scores of Speech Features for HLL Participant #6

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.15	65.32	0.20	236.80	3.97
Presentation	0.23	73.51	0.18	251.92	3.68



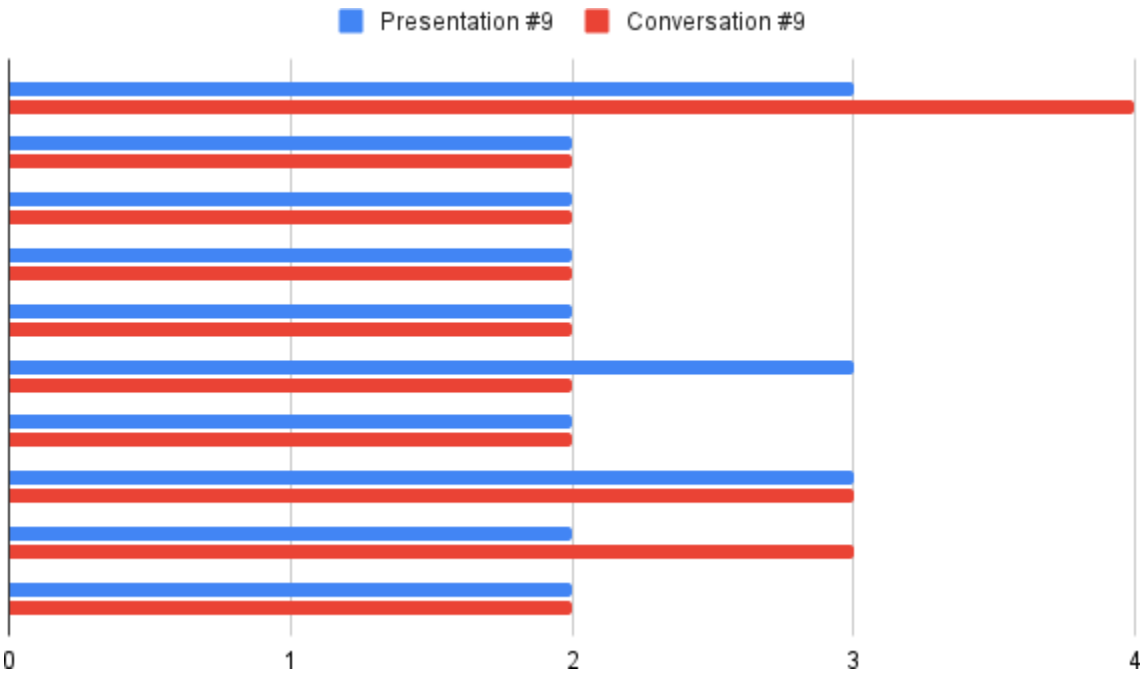
Mean Scores of Speech Features for HLL Participant #7

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.15	66.88	0.19	122.39	4.01
Presentation	0.14	67.26	0.19	107.37	3.2



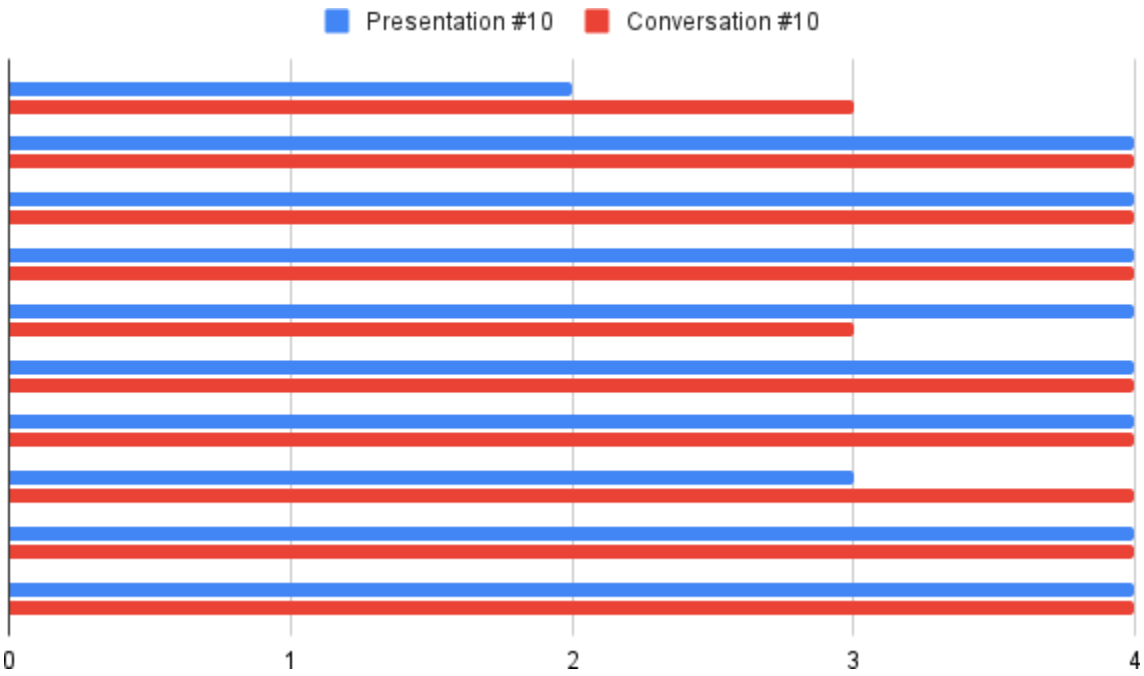
Mean Scores of Speech Features for HLL Participant #8

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.15	68.986	0.18	112.36	3.08
Presentation	0.10	75.66	0.16	120.94	3.69



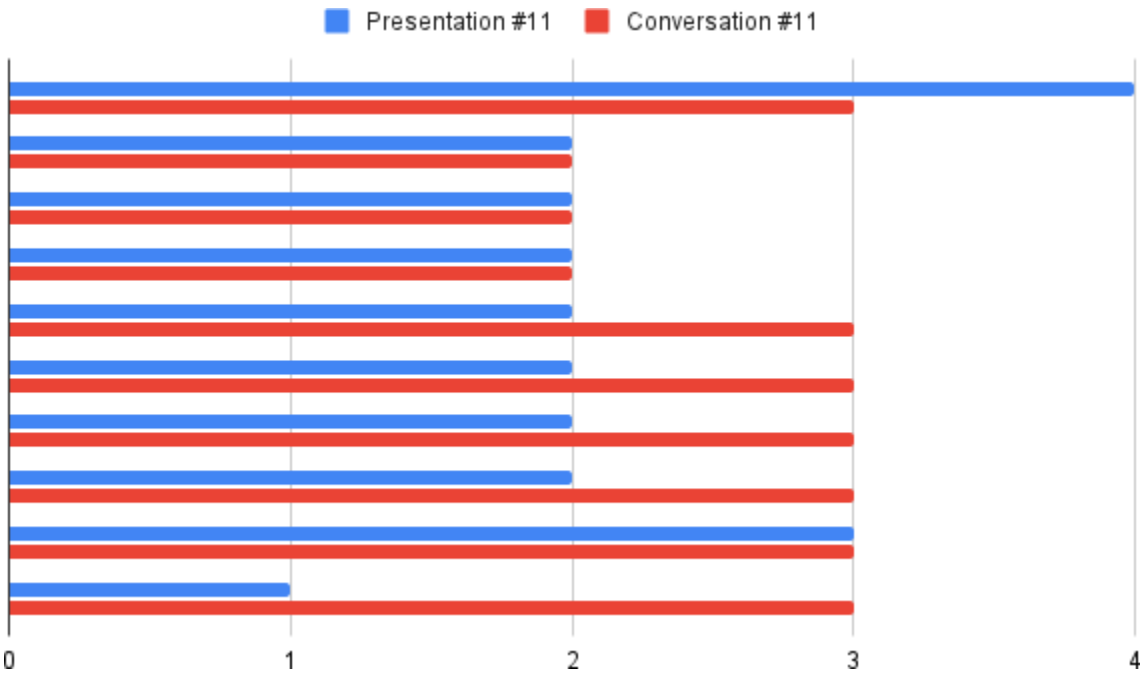
Mean Scores of Speech Features for HLL Participant #9

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.13	63.70	0.17	155.92	3.88
Presentation	0.11	69.36	0.17	196.94	3.49



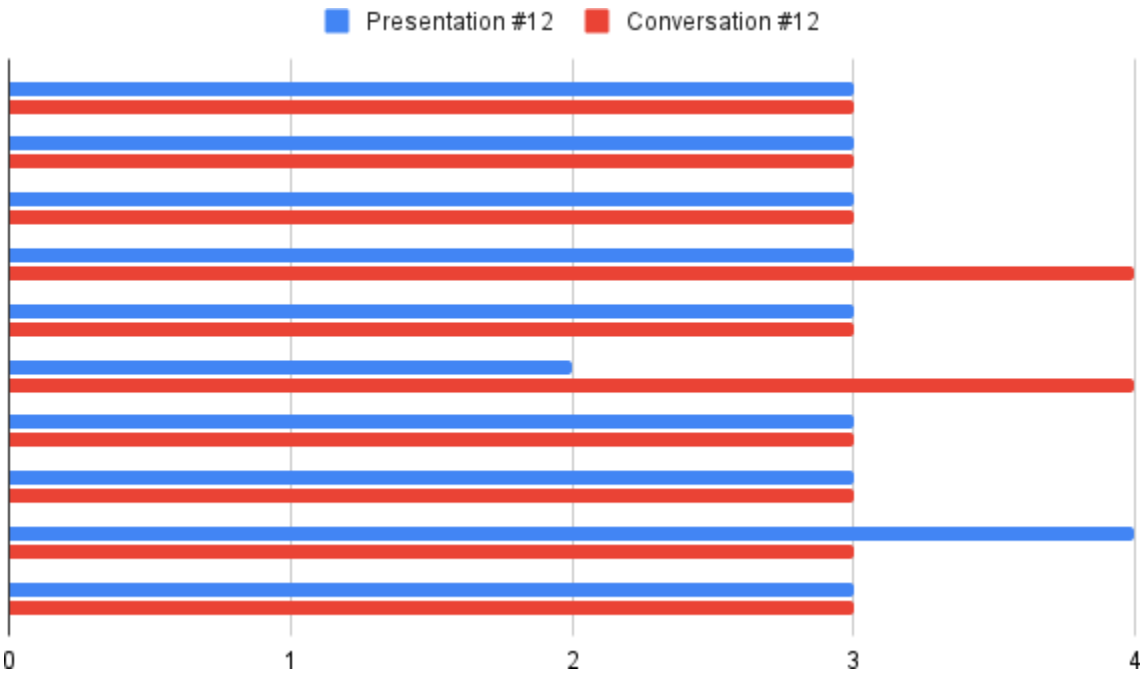
Mean Scores of Speech Features for HLL Participant #10

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.14	65.95	0.19	216.55	4.38
Presentation	0.15	71.10	0.16	213.42	3.42



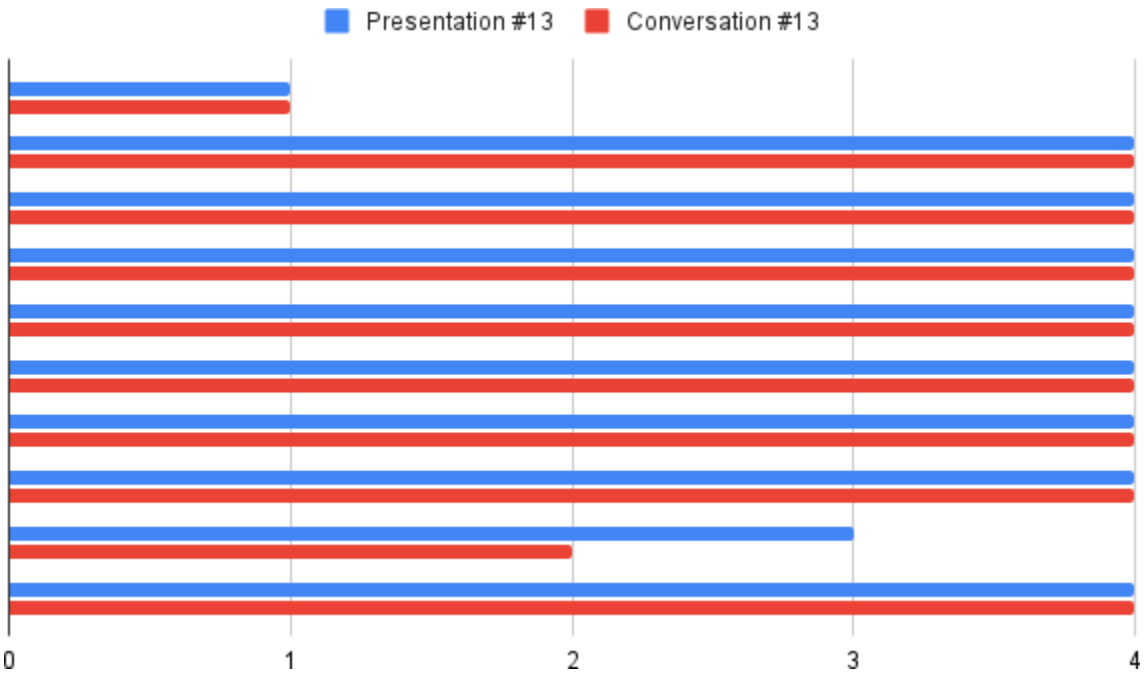
Mean Scores of Speech Features for HLL Participant #11

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.10	76.10	0.21	260.20	4.68
Presentation	0.10	77.59	0.29	210.68	3.87



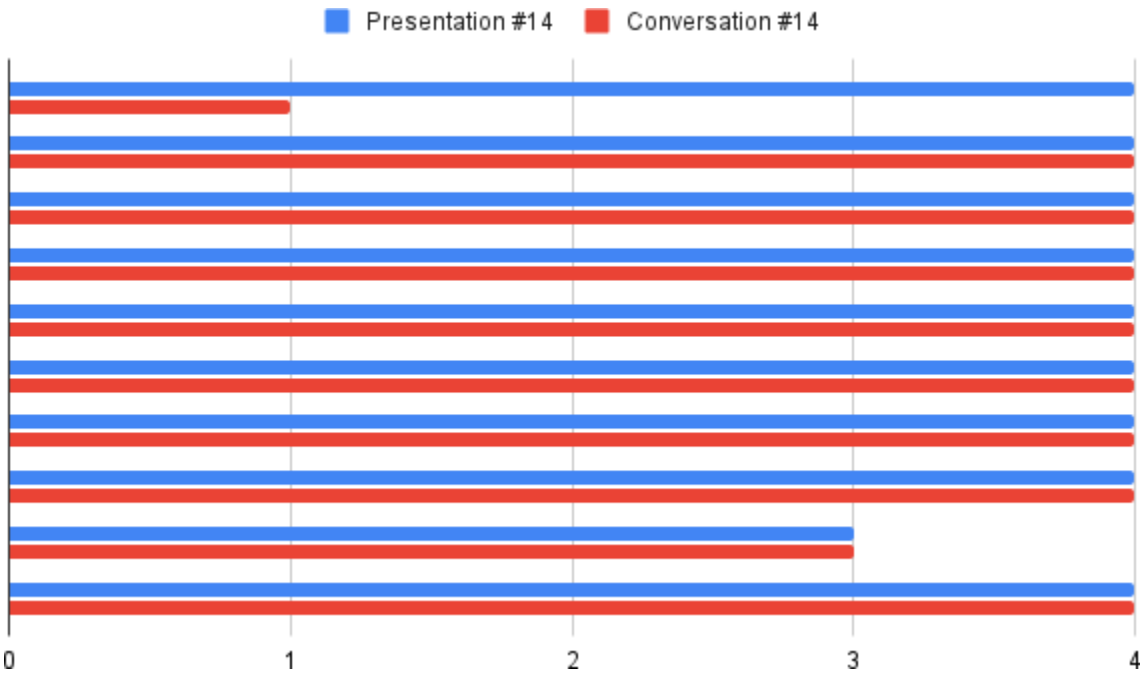
Mean Scores of Speech Features for HLL Participant #12

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.11	69.79	0.14	216.78	4.96
Presentation	0.10	78.75	0.16	229.96	3.78



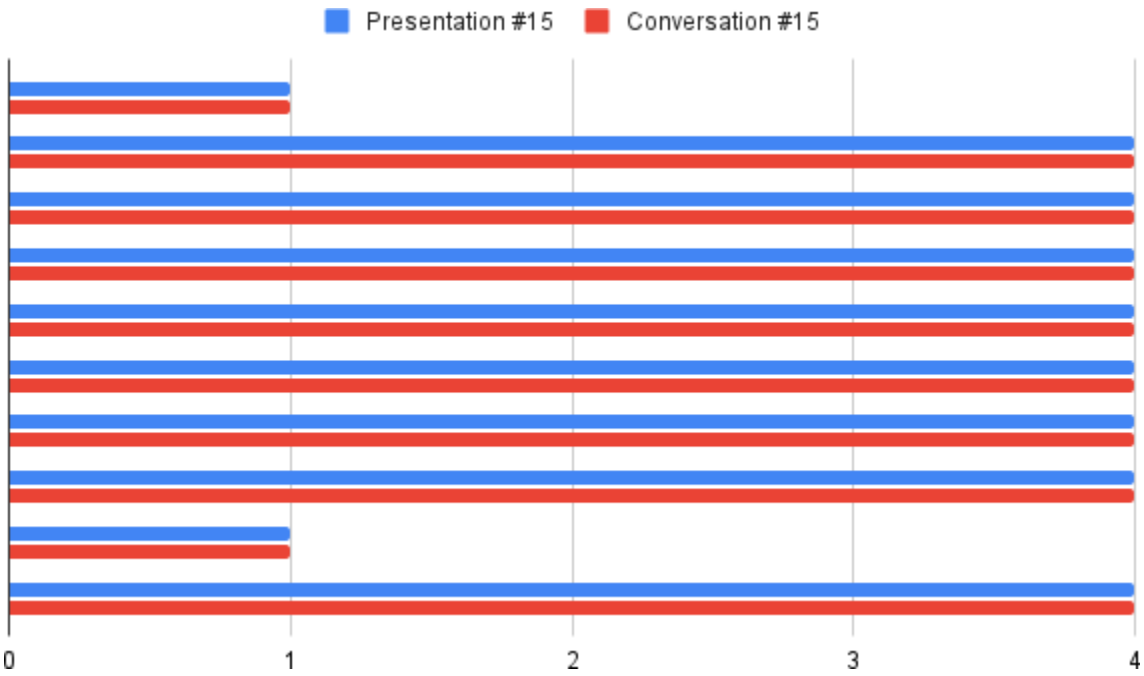
Mean Scores of Speech Features for HLL Participant #13

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.11	67.78	0.20	237.01	5.26
Presentation	0.11	75.17	0.20	251.60	4.24



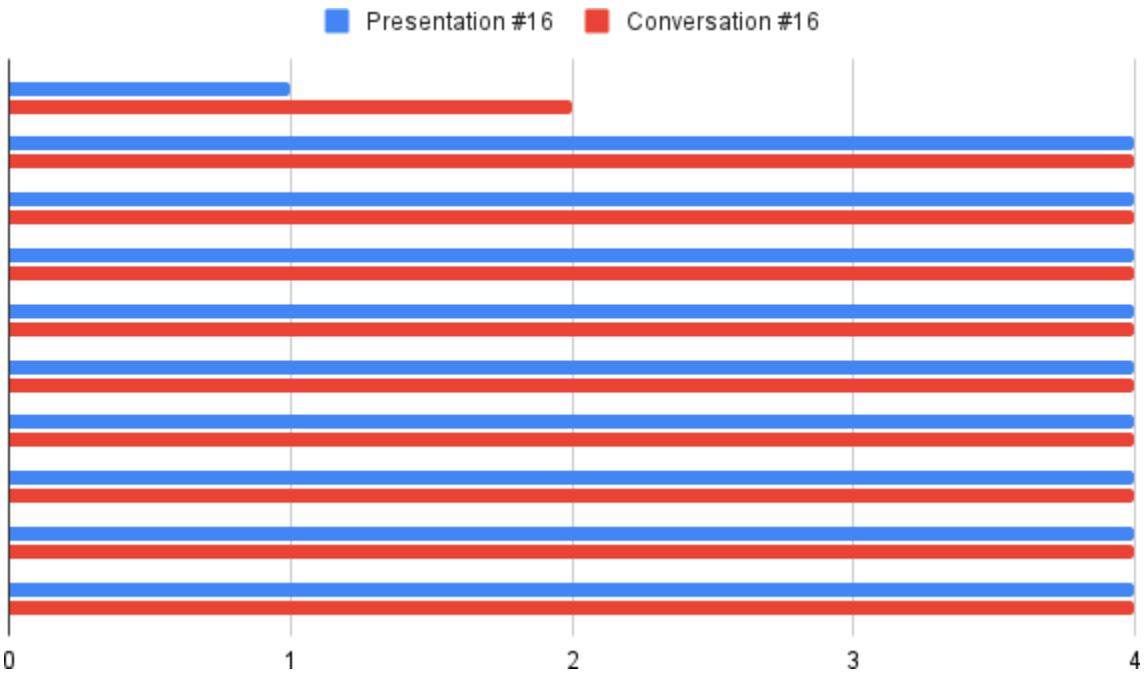
Mean Scores of Speech Features for HLL Participant #14

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.11	68.82	0.13	220.64	4.8
Presentation	0.17	73.10	0.17	226.70	4.4



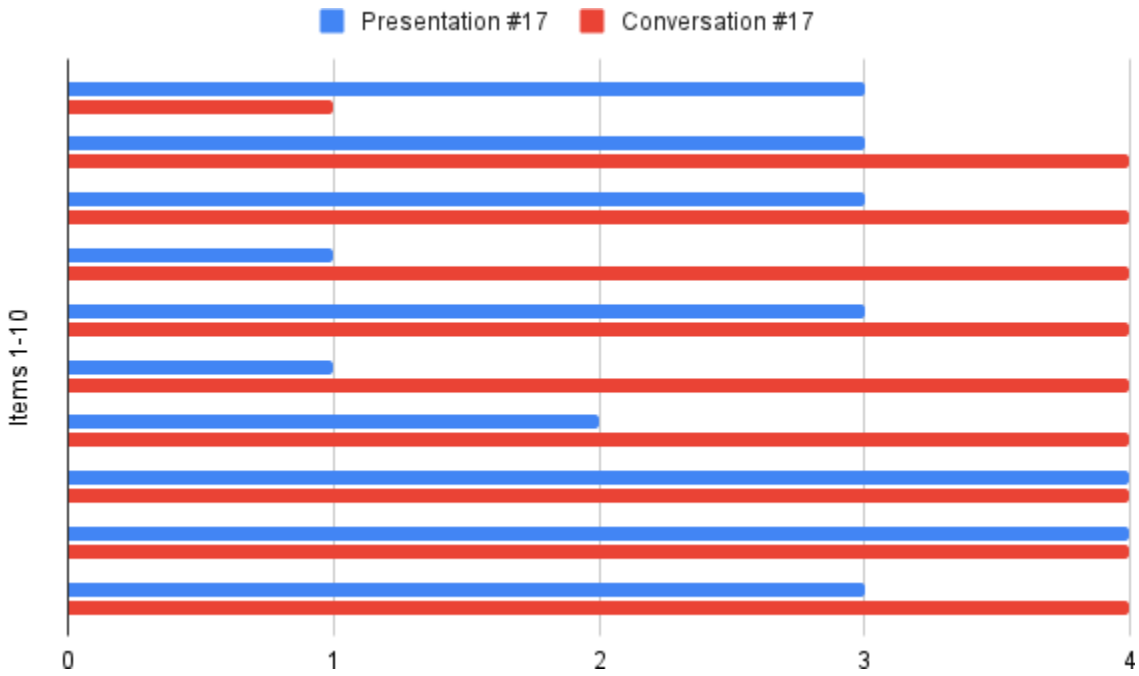
Mean Scores of Speech Features for HLL Participant #15

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.11	64.67	0.16	181.69	4.45
Presentation	0.11	78.33	0.19	215.49	3.54



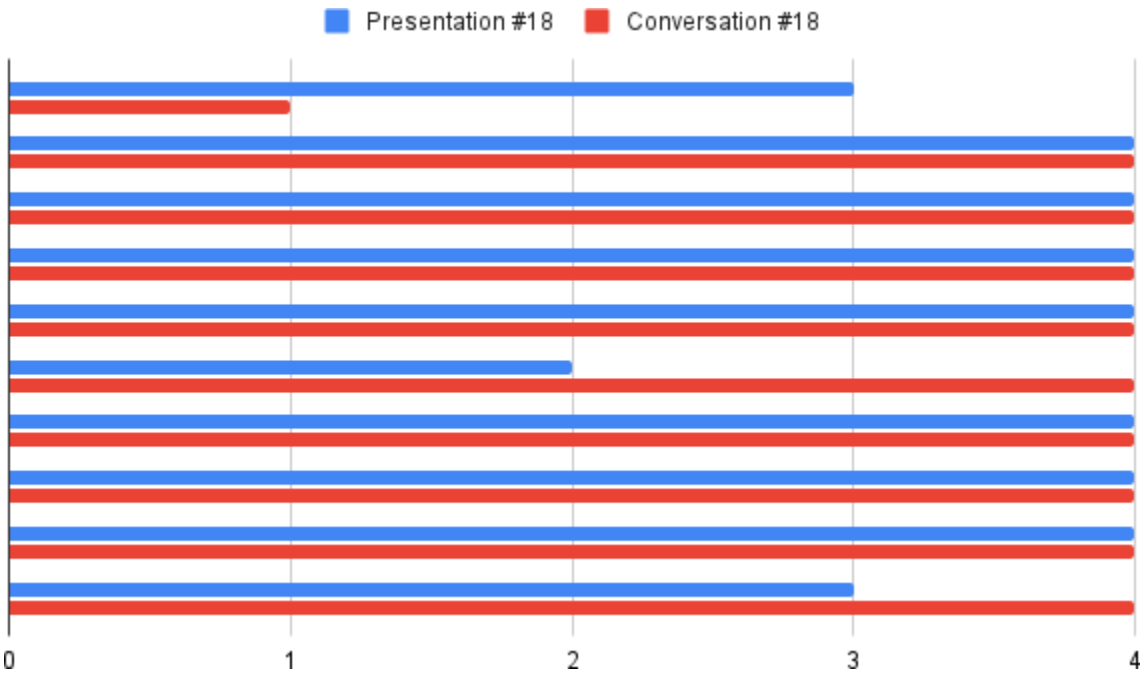
Mean Scores of Speech Features for HLL Participant #16

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.13	65.46	0.14	119.94	4.52
Presentation	0.12	77.56	0.16	131.16	2.98



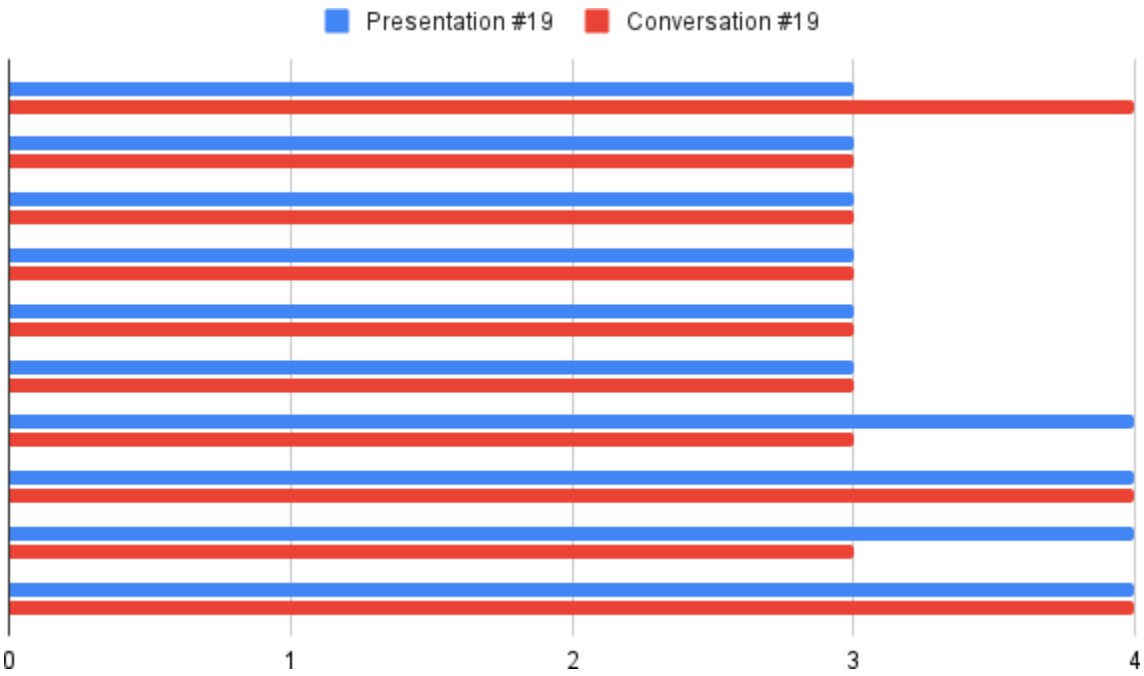
Mean Scores of Speech Features for HLL Participant #17

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.12	62.06	0.19	155.30	4.96
Presentation	0.10	73.94	0.20	189.32	4.05



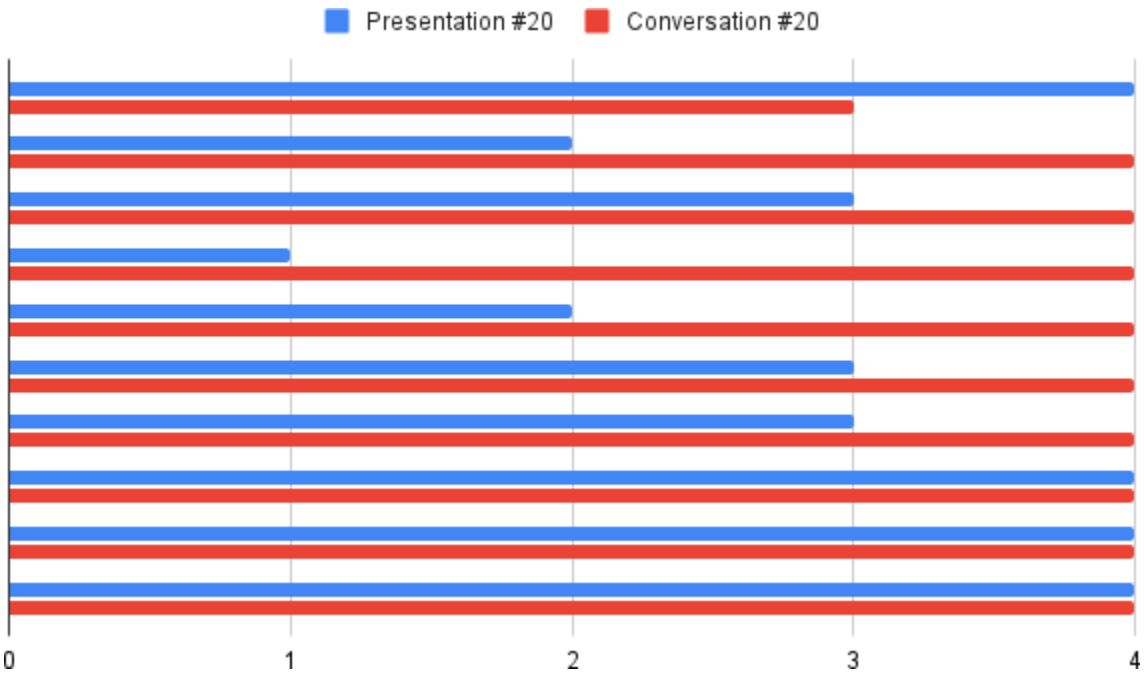
Mean Scores of Speech Features for HLL Participant #18

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.13	65.82	0.14	221.63	4.46
Presentation	0.10	80.12	0.24	227.29	3.62



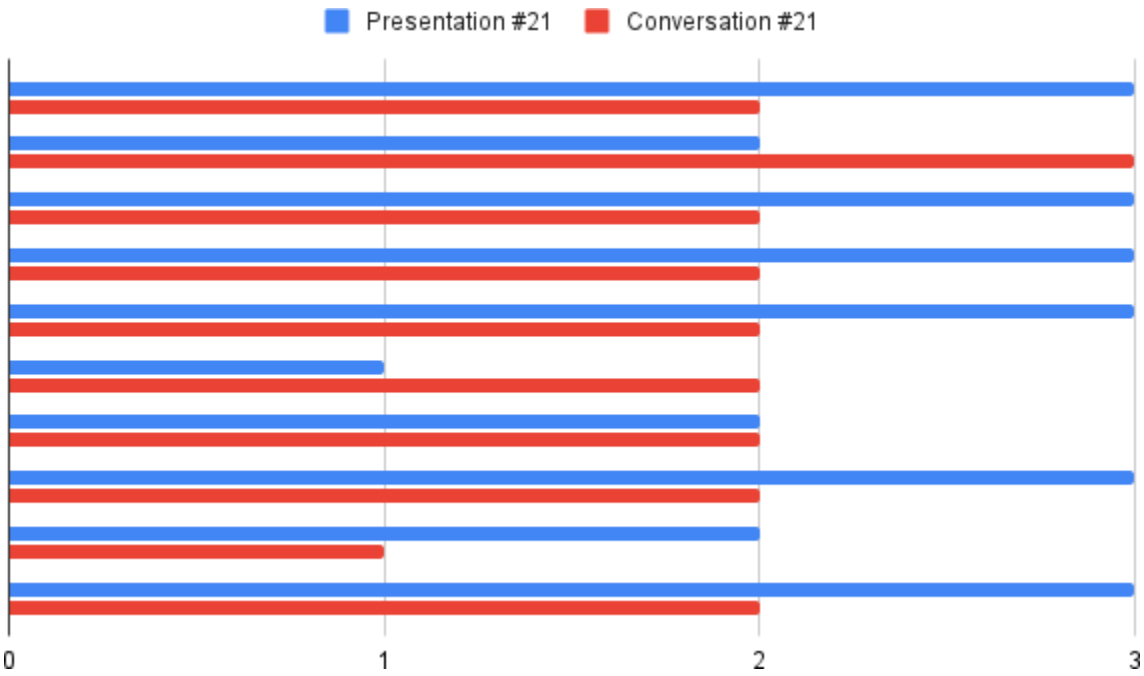
Mean Scores of Speech Features for HLL Participant #19

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.12	61.89	0.18	212.95	4.49
Presentation	0.10	77.99	0.21	231.22	3.74



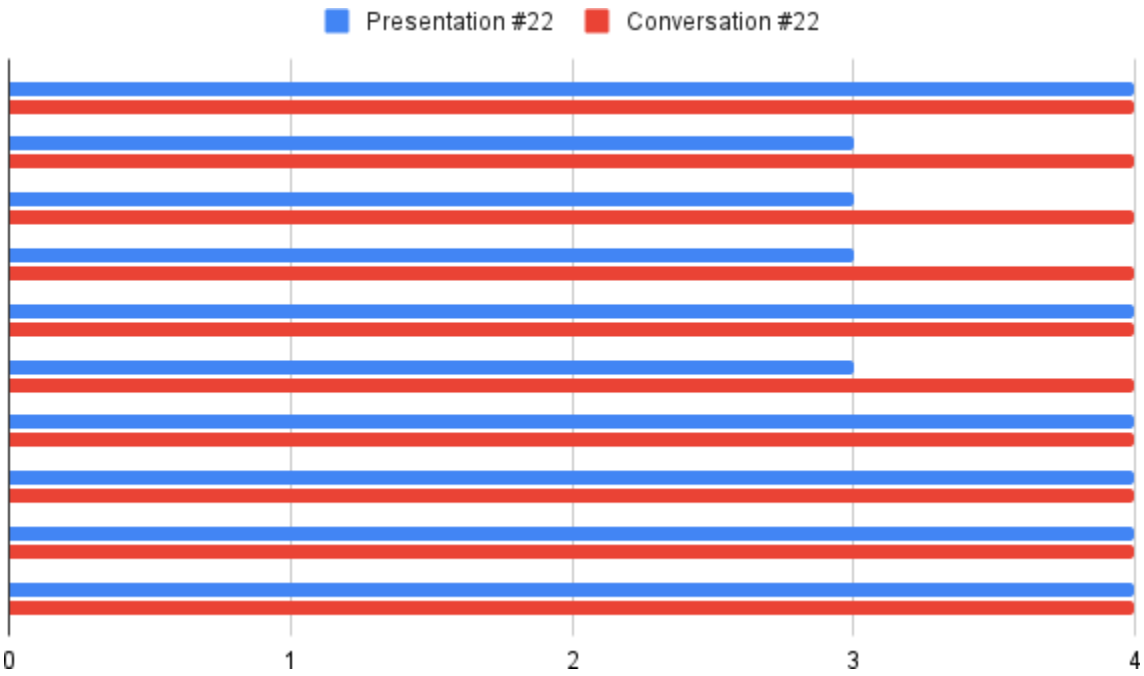
Mean Scores of Speech Features for HLL Participant #20

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.12	66.92	0.16	244.13	4.46
Presentation	0.10	76.43	0.19	279.66	3.35



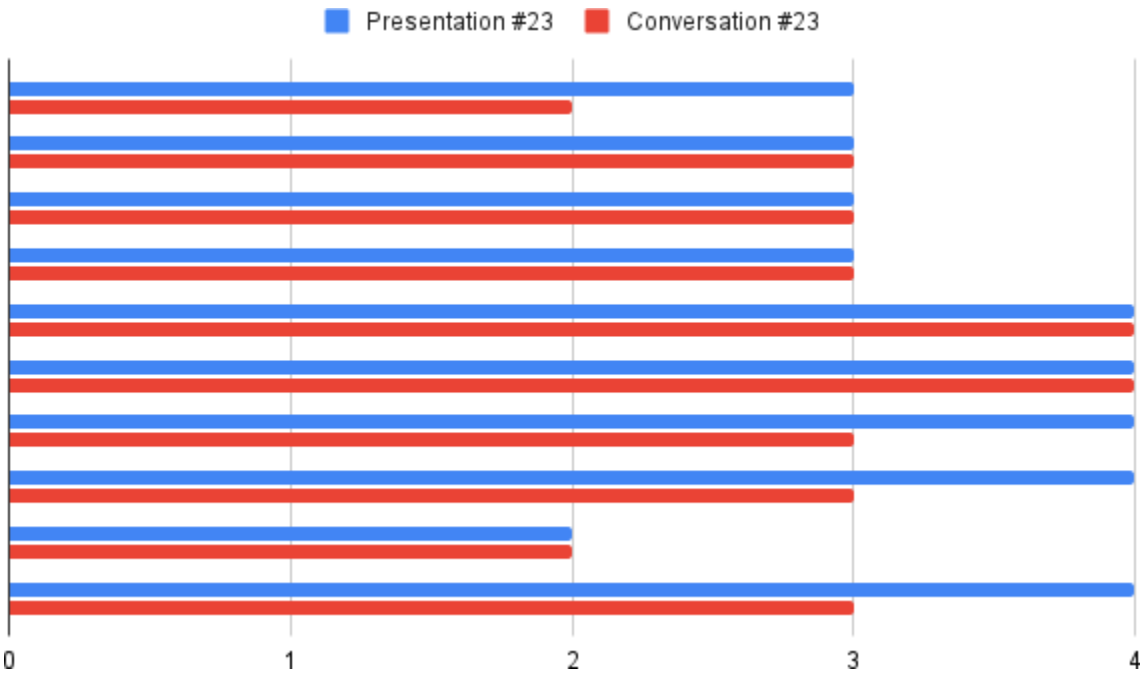
Mean Scores of Speech Features for HLL Participant #21

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.14	65.06	0.18	251.46	4.12
Presentation	0.10	73.99	0.19	221.96	3.15



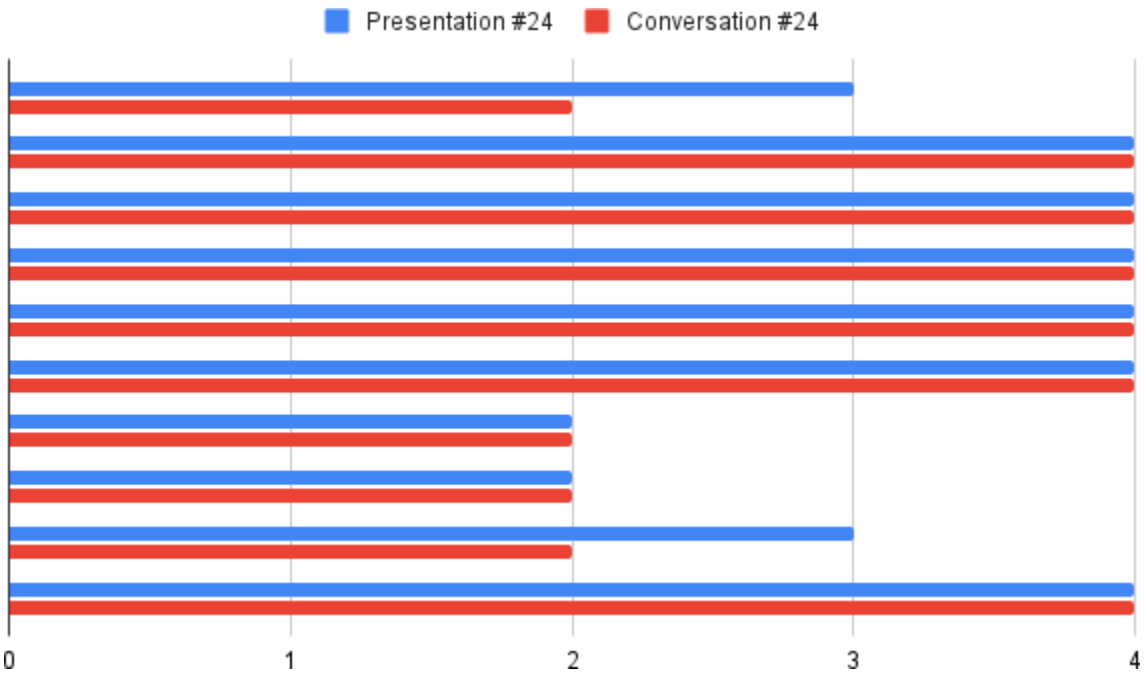
Mean Scores of Speech Features for HLL Participant #22

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.10	70.57	0.13	143.76	5.17
Presentation	0.12	68.59	0.19	146.69	4.19



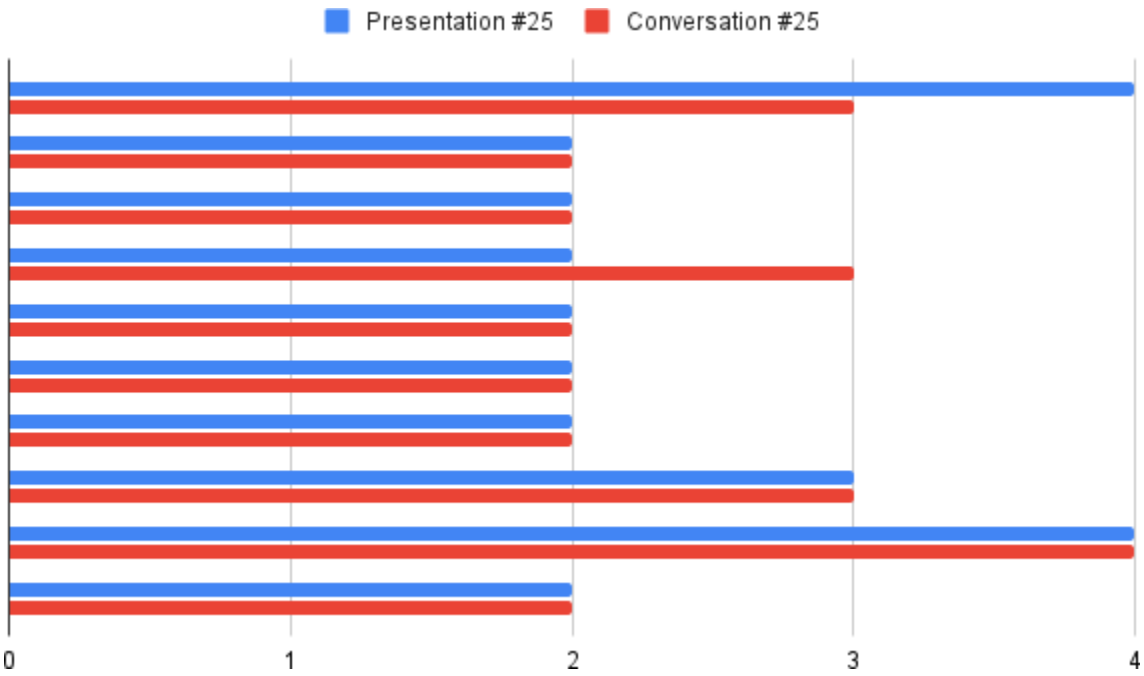
Mean Scores of Speech Features for HLL Participant #23

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.12	61.16	0.25	121.24	4.64
Presentation	0.11	81.54	0.21	165.25	3.89



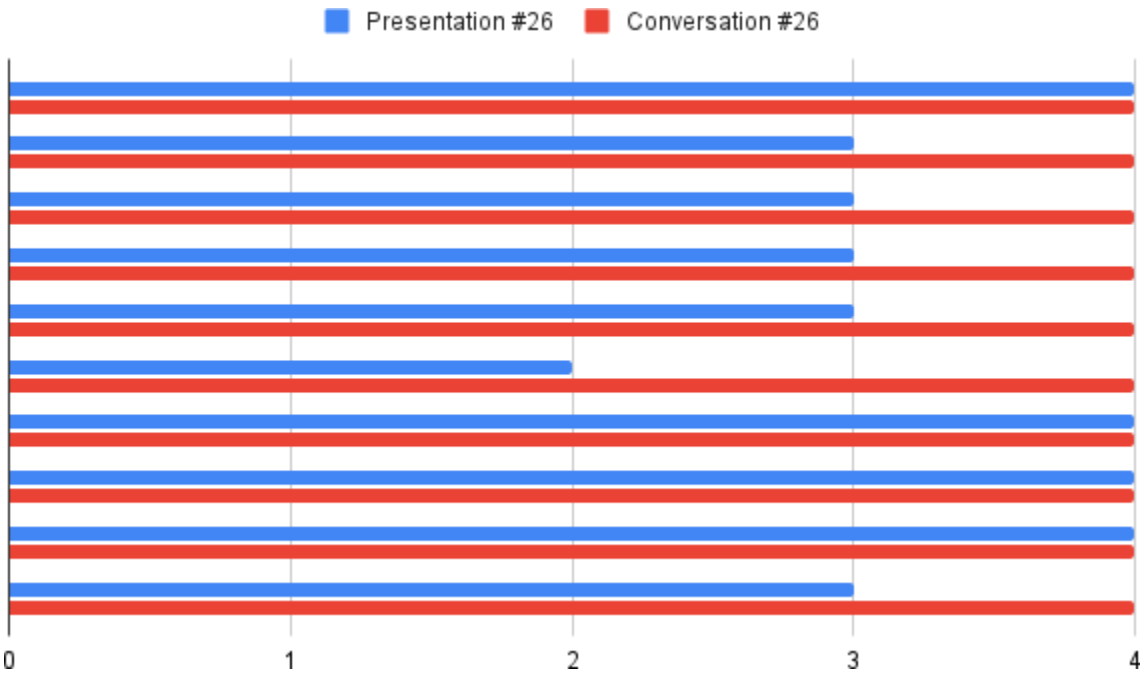
Mean Scores of Speech Features for HLL Participant #24

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.15	66.08	0.16	245.39	4.26
Presentation	0.10	75.75	0.19	279.77	3.75



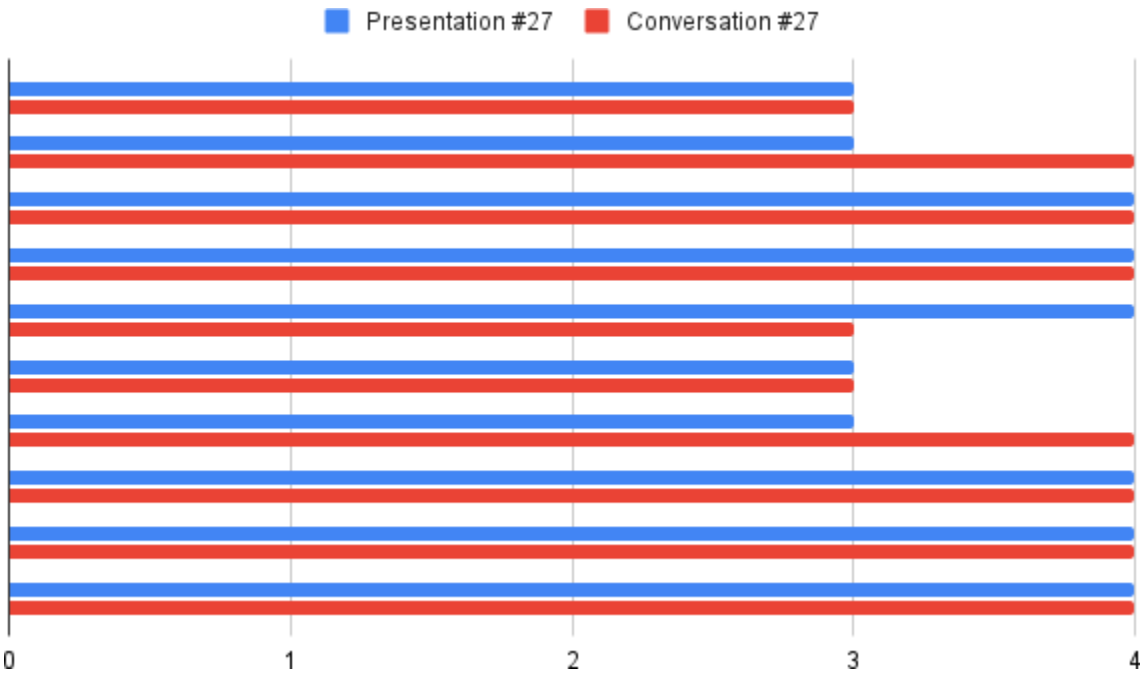
Mean Scores of Speech Features for HLL Participant #25

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.17	61.67	0.20	240.76	4.04
Presentation	0.13	74.38	0.27	264.76	3.61



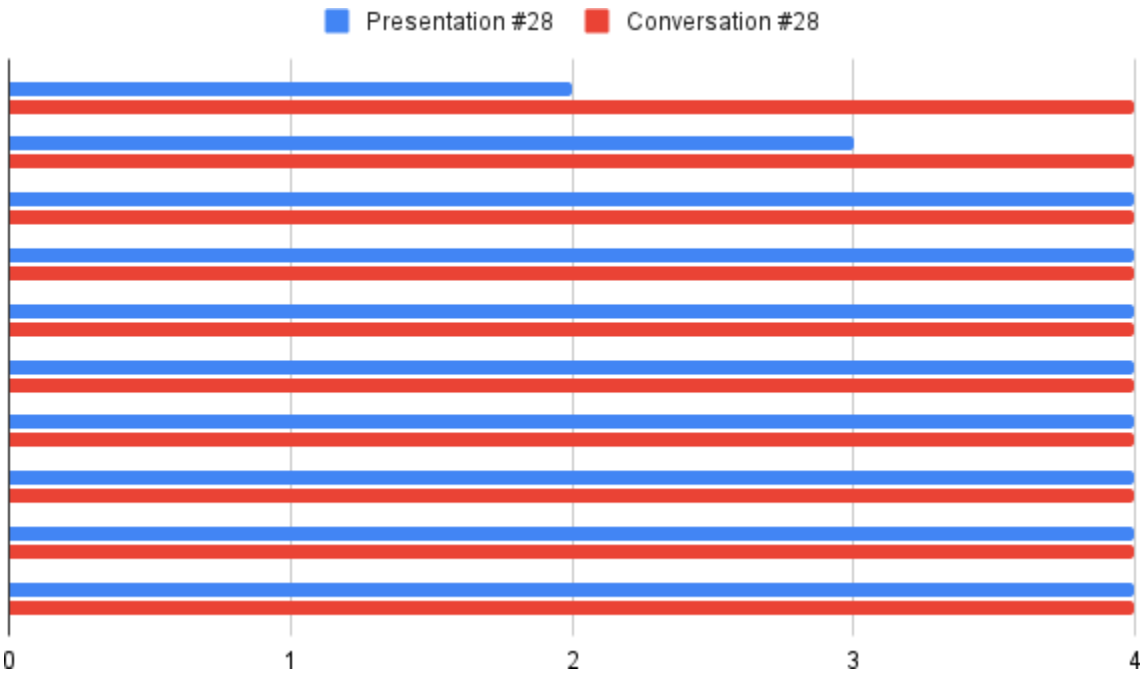
Mean Scores of Speech Features for HLL Participant #26

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.10	61.47	0.14	230.13	4.26
Presentation	0.10	70.33	0.21	239.28	3.45



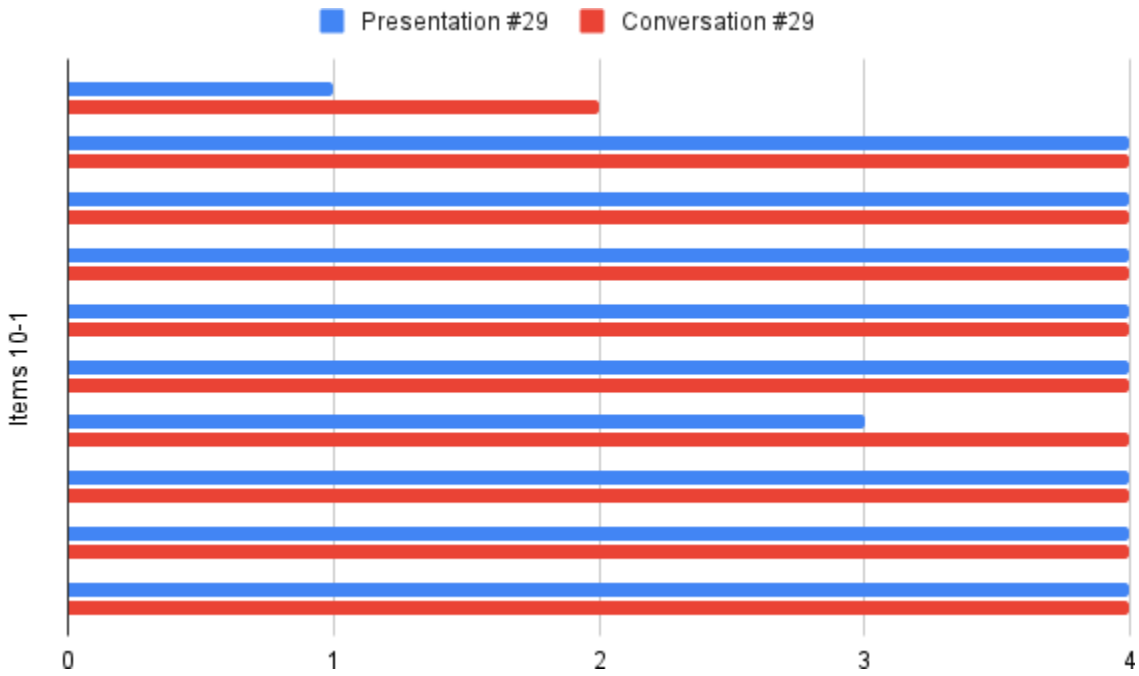
Mean Scores of Speech Features for HLL Participant #27

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.18	64.37	0.20	285.10	4.19
Presentation	0.10	75.09	0.18	276.54	3.13



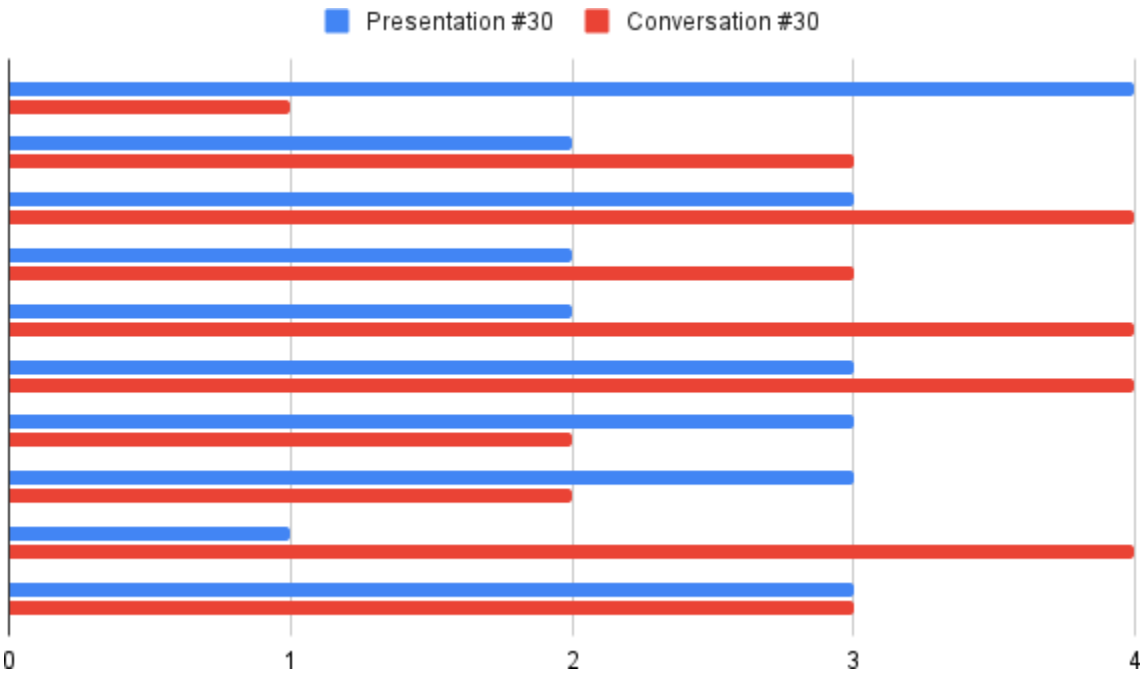
Mean Scores of Speech Features for HLL Participant #28

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.13	71.35	0.13	128.53	4.78
Presentation	0.10	78.36	0.17	118.80	3.58



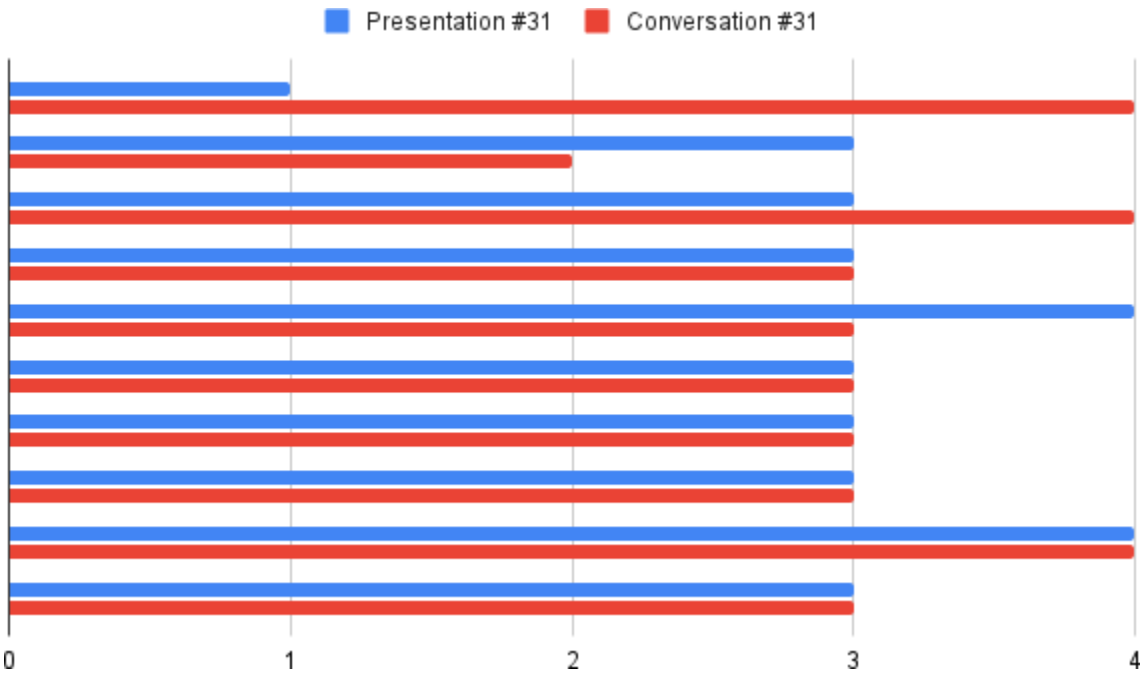
Mean Scores of Speech Features for HLL Participant #29

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.14	66.42	0.23	122.24	4.07
Presentation	0.12	71.98	0.16	121.86	3.73



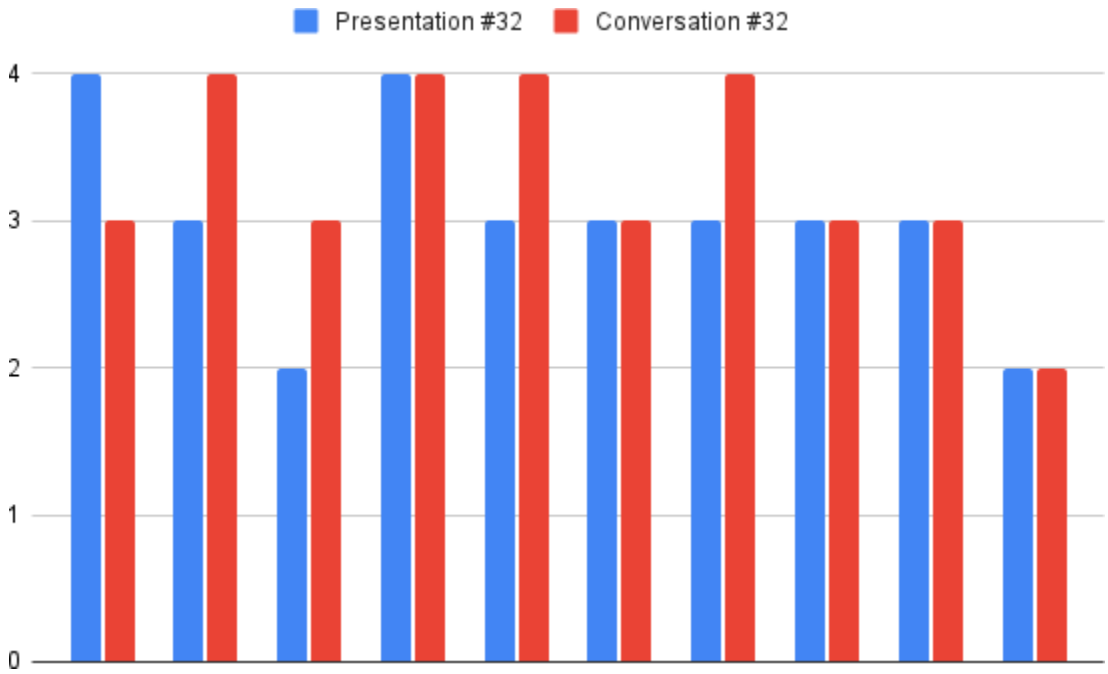
Mean Scores of Speech Features for HLL Participant #30

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.13	64.20	0.21	270.61	4.08
Presentation	0.16	75.26	0.16	127.34	2.86



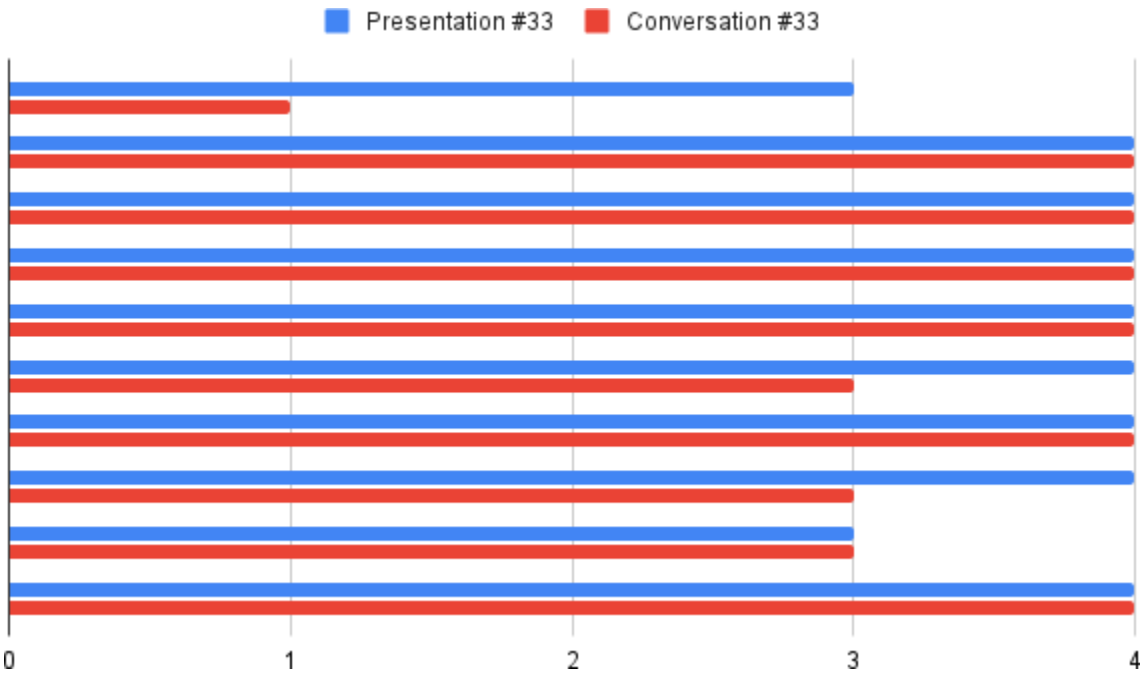
Mean Scores of Speech Features for HLL Participant #31

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.11	63.34	0.18	300.71	4.55
Presentation	0.10	72.33	0.19	275.37	4.56



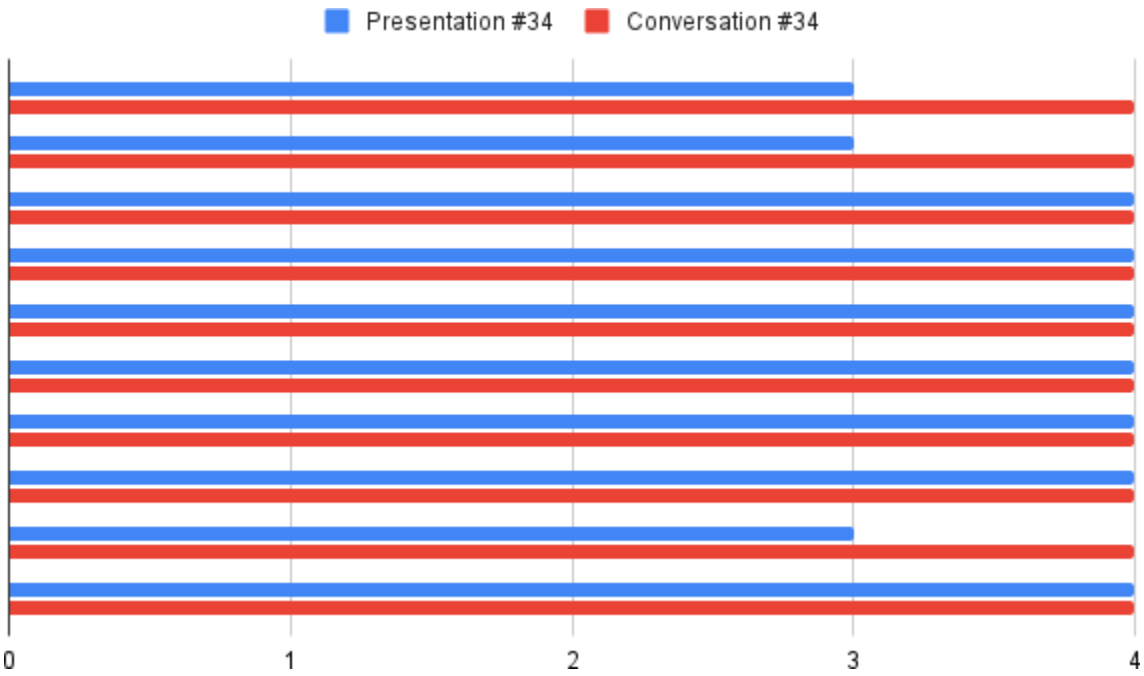
Mean Scores of Speech Features for HLL Participant #32

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.16	70.95	0.16	105.60	3.68
Presentation	0.11	63.30	0.18	99.54	2.85



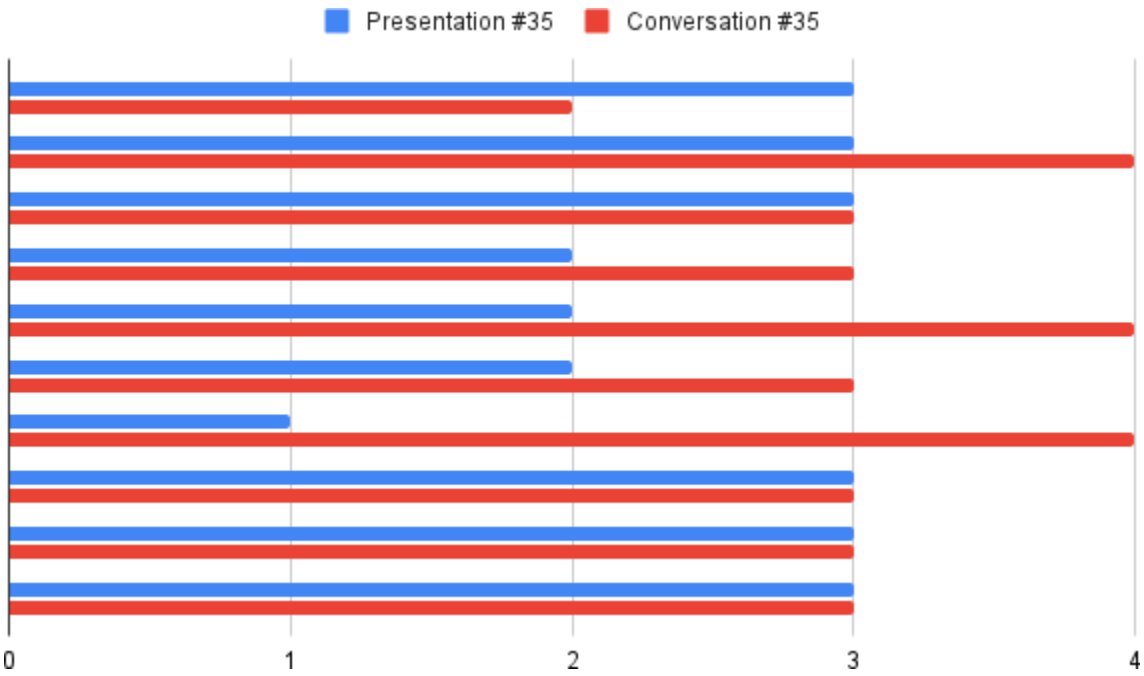
Mean Scores of Speech Features for HLL Participant #33

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.13	68.41	0.15	228.25	4.42
Presentation	0.14	58.18	0.15	198.15	3.41



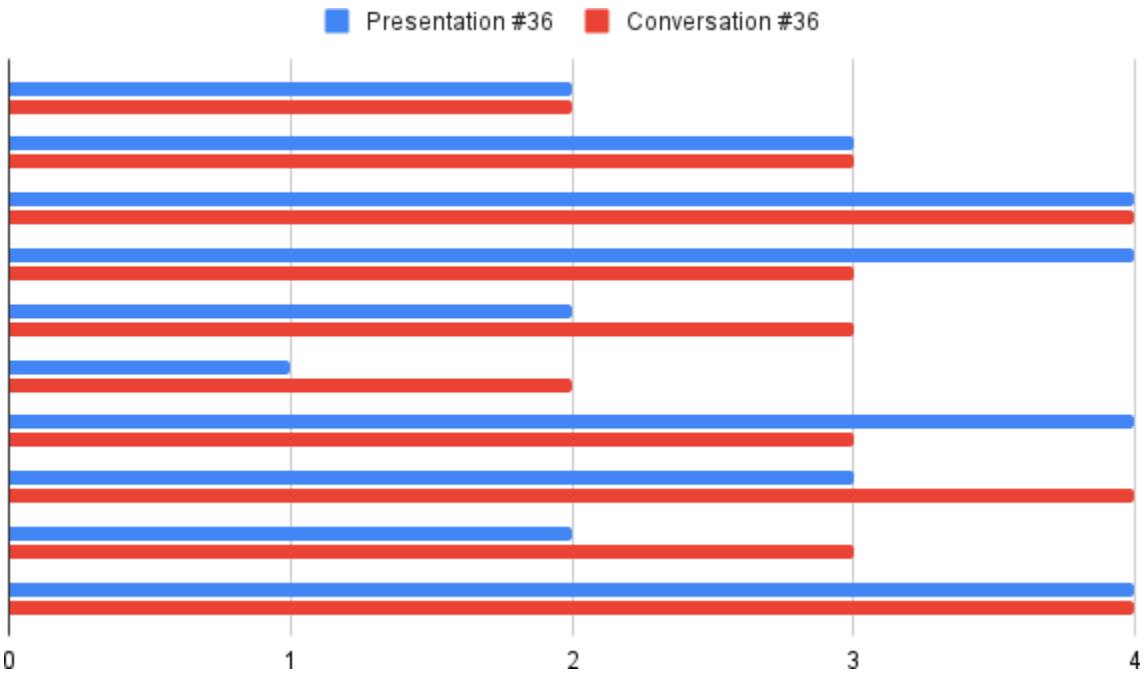
Mean Scores of Speech Features for HLL Participant #34

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.11	64.65	0.18	135.18	4.12
Presentation	0.10	62.21	0.15	128.38	3.99



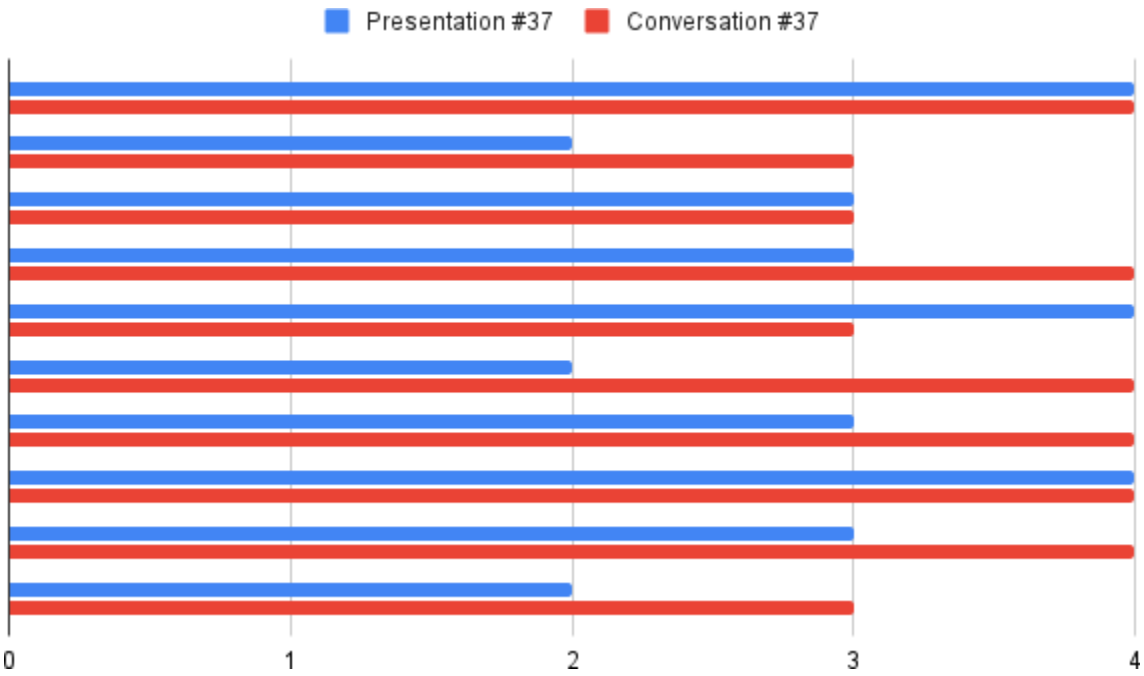
Mean Scores of Speech Features for HLL Participant #35

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.10	71.34	0.20	125.82	4.09
Presentation	0.13	70.27	0.17	122.45	2.35



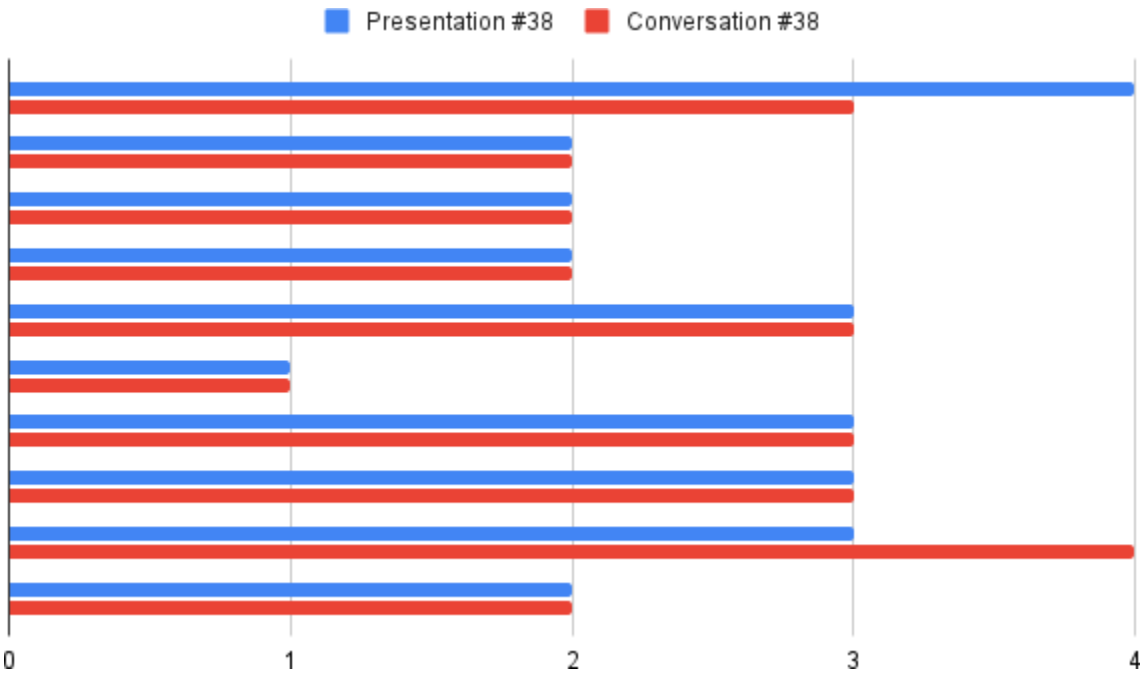
Mean Scores of Speech Features for HLL Participant #36

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.11	68.05	0.24	121.53	5.01
Presentation	0.10	67.90	0.20	123.10	3.43



Mean Scores of Speech Features for HLL Participant #37

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.15	70.84	0.24	219.46	3.95
Presentation	0.10	72.42	0.27	272.32	3.70



Mean Scores of Speech Features for HLL Participant #38

Task	Rhythm	Intensity	Syllable Duration	Pitch Height	Speech rate
Conversation	0.17	71.54	0.23	212.35	3.76
Presentation	0.13	71.98	0.24	238.21	2.27