Spring 5-15-2022

The Effects of Communication Differences on Listeners' Attitudes of Warmth and Competence, Credibility, Intelligences, and Social Distance

Rebecca D. Parks
University of Lynchburg, parks_rd@lynchburg.edu

The Effects of Communication Differences on Listeners' Attitudes of Warmth and Competence, Credibility, Intelligences, and Social Distance

Rebecca D. Parks

Senior Honors Project

Submitted in partial fulfillment of the graduation requirements of the Westover Honors College

Westover Honors College

May, 2022

_____
Ei Hlaing, PhD

_____
Virginia Cylke, PhD

_____
Laura Kicklighter, PhD

Abstract

Prior research has shown that listeners may hold a variety of negative attitudes towards individuals with speech or language disorders, such as beliefs that they are lower in intelligence, friendliness, or competence (Allards & Williams, 2008; Bettens et al., 2020; Lallh & Rochet, 2000). These studies have suggested that attitudes tend to vary based on the type and severity of the disorder, but results are inconclusive on specific communication characteristics impacting perceptions. The present study measured participants' attitudes towards an actor portraying either a language, fluency, articulation, or voice disorder. The between-subjects design involved participants being randomly assigned to listen to one of the four disorder conditions and then completing scales measuring their beliefs about the speaker's warmth and competence, credibility, intelligence, and how close they would be willing to become with the speaker. Participants rated the speaker's verbal intelligence significantly lower if the speaker had a lisp, and participants in the hoarseness of voice condition preferred significantly more distance from the speaker. Additional analysis indicated that participants in the Wernicke's aphasia condition rated the speaker significantly lower in the traits of competence, credibility, and overall intelligence. The results suggest that not all forms of attitudes are impacted by the presence of communication disorders; however, some negative attitudes do exist toward this population. Implications for potential anti-bias training are discussed, with a focus on the traits that significantly varied between disorders.

Key words: communication disorders, biases, attitudes, disabilities, warmth and competence

Introduction

Communication disorders have impacts that extend beyond the direct experience of challenging communicative exchanges. Research has indicated that disordered communication can have negative effects on social relationships, self-esteem, and overall attitudes towards people with these disorders (Bettens et al., 2020; Craig et al., 2003, Lallh & Rochet, 2000). It should thus be a goal of speech language pathologists and other professionals to both help individuals enhance their communication abilities as well as inform the general public on the common experiences of people with speech or language disorders. The term "communication disorders" encompasses a variety of specific deficits in producing or comprehending communication. Some of the major categories of these deficits include articulation, fluency, voice, and language disorders. Numerous communication disorders exist within each major category, and these specific disorders can vary in severity. Because there is a large range of characteristics that differ among different disorders, it can be expected that attitudes towards people with different disorders vary greatly.

People form judgments of others based on communication factors such as accents, tone of voice, and disordered patterns of speech. Researchers have investigated attitudes towards individuals with specific communication disorders, and the perceptions are often unfavorable. These populations receive less favorable ratings on various personality traits such as confidence, friendliness, and sociability (Altenberg & Ferrand, 2006; Bettens et al., 2020; Lallh & Rochet, 2000). People with speech or language disorders may be perceived as less intelligent (Allard & Williams, 2008; Amir & Levine-Yundof, 2013; Tiling, 2011), less reliable or believable (Allard & Williams, 2008; Tiling, 2011), or less competent (Altenberg & Ferrand, 2006; Lallh & Rochet, 2000; Tiling, 2011). Further research is needed to measure specific attitudes across different

communication disorder categories, as many studies have only investigated perceptions towards varying severity levels of a specific disorder. Additionally, many studies have not investigated the multiple dimensions of attitudes, and have instead used only one measure to report attitude differences (i.e., semantic differential pairs such as “intelligent/not intelligent” and “friendly/rude”).

Types of Attitudes

Attitude research indicates that there are multiple dimensions of an attitude that correspond to how an individual feels, thinks, and acts around a person or object they have formed an attitude about (Findler et al., 2007). The affective component of an attitude involves the personal feelings, sensations, and preferences an individual has in regards to an object or individual they have formed an attitude on. For example, stating that one’s significant other makes them feel happy and comfortable would be revealing of affective attitudes towards this person. Although similar, the cognitive aspects of an attitude are not determined by how an individual makes another feel, but rather the beliefs and attributions of another person’s traits. An example of this form of attitude would be making a statement that a professor is passionate, intelligent, and firm. The behavioral component of an attitude is the aspect that most directly influences the way in which one interacts with others, such as making a decision on how often to spend time with a person in question (Bettens et al., 2020; Findler et al., 2007). Studying multiple forms of attitudes is beneficial in psychological research because it paints a more holistic picture of views of group(s) of people. Measuring the attitudes that individuals have towards other people can either involve asking single-item questions or—when possible—using validated scales that identify specific trait scores, such as the dimensions of warmth and competence.

Warmth and Competence

Perceived warmth and competence can be a good measure of cognitive attitudes and stereotypes towards people with disabilities (PWD). Coleman et al. (2014) studied individuals' perceptions of the warmth and competence of disabled men and women, and using their knowledge of Fiske et al.'s (2002) Stereotype Content Model, the researchers explained that PWD are often perceived higher in friendliness (warmth) but lower in competence. Their experiment revealed that a female character was perceived as more competent when she had a physical disability rather than an intellectual disability, but there were no significant differences in warmth ratings of the characters. The findings suggest that the perception of competence encompasses more than physical capabilities, as the character portrayed with a physical disability was viewed as more competent than the character displayed with an intellectual disability. Competence ratings, therefore, are likely based on a variety of areas one believes (or does not believe) another person is capable of succeeding in, such as in academics, career skills, communication ability, etc.

There is little research on ratings of warmth and competence of people with communication disorders, but Hughes et al. (2010) use the warmth/competence model to describe trends in participants' explanations of their beliefs towards people who stutter. They note that people who stutter were frequently described in ways that would be categorized as high warmth (i.e. nice, compassionate, accepting), yet ways that would simultaneously be considered low competence (i.e. that they are poor communicators). Hughes et al. (2010) note that this high warmth/low competence trend helps explain the mixed positive and negative ratings that this population often receives. The belief that people who stutter are less competent can explain ratings of their perceived high shyness, nervousness, or unemployability, despite this population

being simultaneously perceived as friendly and trustworthy via high warmth (Hughes et al., 2010). In addition to PWD being perceived as less competent, they may also be viewed as less intelligent, and this trait can be further broken down and studied as multiple types of intelligence.

Types of Intelligence

Measuring an individual's perceptions of another person/group's intelligence in a variety of domains is another way to identify cognitive attitudes towards that person or group. Psychologists have proposed that there is not one major domain of intelligence, but rather various domains in which individuals can have varying strengths in (i.e., musical, verbal, emotional, kinesthetic) (Gardner, 1999; Sternberg, 1988). Prior research has indicated that men rate themselves higher in intelligence traits than women, and that males in vignettes also receive higher intelligence ratings from the general public than females (Furnham & Shagabutdinova, 2012). Different groups of people may be stereotypically attributed with specific intelligence strengths, such as males being thought of as strong in spatial intelligence and females being generalized as gifted in emotional intelligence.

Furnham and Shagabutdinova (2012) studied sex differences in intelligence ratings of participants' selves and their parents, and they found that female participants rated their fathers higher on practical intelligence and their mothers higher on emotional intelligence. However, there was not a significant difference in overall intelligence ratings towards mothers and fathers. The researchers noted that their sample of women and men gave more similar ratings than compared with this repeated study in other countries. They explain that participants in countries where women have similar expectations and roles as men may produce similar ratings between genders. Extending these results to intelligence ratings of people with communication disorders, individuals with communication disorders may be rated positively in intelligence by participants

who live in cultures that are more accepting of disabled populations. Exposure to individuals with communication disorders may also improve credibility ratings towards this population, and perceptions of this trait are vital in forming relationships with others.

Credibility

When interacting with a new person, individuals form judgments on what they perceive the person's credibility to be, and ratings of the credibility of others is an additional example of a cognitive attitude. Being perceived as credible is especially important in careers such as telemarketing (Ketrow, 1990) and teaching (Simonds et al., 2006), as they involve communicating information to others' that must be believed and retained. Studies have indicated different speech characteristics that are related to credibility ratings. For example, Ozuro and Hirst (2006) found that falling intonations were rated as more credible than rising intonations. These findings can be further explained by Streeter et al. (1977), who found that average voice frequency is higher when lying. In addition to the quality of voice frequency, research suggests that people are perceived more positively when their tone of voice matches the mood of the message they are communicating. Beatty and Beatty (1976) found that teachers were perceived as more believable when their tone of voice matched that of the positive message they were communicating at a parent-teacher conference, and Lim et al. (2021) found that higher credibility ratings were associated with congruent speech and emotions. This suggests that individuals experience feelings of dissonance when the way in which someone sounds does not match the content of what is being said. Upon an extensive literature review, Ketrow (1990) proposed that the highest credibility of speakers was associated with fluent speech, a fast but natural conversation rate, slightly loud voice, standard dialect, and clear pronunciation.

Additional research suggests that people with both disabilities that affect communication and foreign accents are viewed as less credible (Lev-Ari & Keysar, 2010; Lim et al., 2021; Schroeder et al., 2020). Some researchers have proposed two different ideas as to why speakers with an accent or disordered speech patterns may be perceived as less credible (Lev-Ari & Keysar, 2010; Schroeder et al., 2020). The first reason involves either conscious or unconscious stereotypes that arise when noticing a speaker's speech differences. The research of Schroeder et al. (2020) helps support this idea, as they found correlations between lower credibility ratings of people with atypical voices and unfavorable perceptions of this demographic's intelligence and knowledge levels. In both experiments conducted by Schroeder et al. (2020), participants perceived statements made from the voice-disordered speaker as "definitely false" significantly more than the statements made from other speakers (or the same speaker portraying a "typical" voice). Schroeder et al. (2020) argue that the unfavorable intelligence ratings towards this population highlight stereotypes, and these intelligence ratings/stereotypes correlated with—and therefore may have influenced—the negative credibility ratings.

The second explanation for negative credibility ratings of people who speak differently is known as the "processing fluency" or "processing difficulty" model (Lev Ari & Keysar, 2010; Schroeder et al., 2020). This hypothesis posits that the increased processing that must take place in order to interpret voices that are less intelligible is the reason for lower credibility ratings. This suggests that it is not an intentional bias individuals hold when perceiving those with communication differences as less credible, but rather a result of mental processes that view unfamiliar stimuli as less credible (i.e., how statements are perceived as true if they have been heard in the past) (Lev Ari & Keysar, 2010; Schroeder et al., 2020). Schroeder et al.'s (2020) research did not support this hypothesis, as participants' ratings of the speakers' intelligibility did

not correlate with credibility ratings. Lev Ari & Keysar (2010) designed their study to specifically test the processing difficulty model, telling participants that the speakers were only repeating statements made by the researchers, and found that speakers with mild and heavy accents were rated less credible than native speakers. Additionally, speakers with heavy accents still received significantly lower credibility ratings after the researchers primed participants to look past the speaking differences. Although Lev Ari & Keysar (2010) hold that the credibility ratings could not be attributed to stereotyping because participants knew the statements were not coming directly from the accented speakers, the researchers did not test potential stereotypes that could co-exist (as the research of Schroeder et al. (2020) did).

Social Distance

Lastly, the concept of social distance is a type of measurement of discrimination and stigma towards particular groups, such as immigrants or people with disabilities. The original measure was developed by Bogardus (1932), and similar scales have been adapted by various researchers (Coleman et al., 2014; Ouellette-Kuntz et al., 2010). These scales assess an individual's willingness to be in a variety of social relationships with a person from a stigmatized group, making this measure a behavioral attitude dimension. In the aforementioned study of Coleman et al. (2014), the female character portrayed with a physical disability received more favorable social distance ratings than when portrayed with an intellectual disability. Coleman et al.'s findings suggest that individuals may be more comfortable interacting with people whose disabilities impact their physical state but not their mental functioning (2014). The researchers did not find a significant effect of disability type on social distance ratings when the character portrayed was male; however, so gender may be a potential protective factor against negative attitudes (Coleman et al., 2014).

Huskin et al. (2018) explain the stigma hierarchy that other researchers have suggested through this model, indicating that certain characteristics and types of disabilities are related to more desire for social distance. Disabilities that are more visible, that affect mental functions, and that are seen as caused by the person with the disability tend to receive the least favorable social distance ratings. Additionally, prior studies have suggested that close, personal contact with individuals from a stigmatized group improves attitudes towards that population (Huskin et al., 2018).

To test the stigma hierarchy and effects of personal contact on social distance ratings, Huskin et al. (2018) studied the social distance ratings of 766 undergraduate students for ten different disability groups, as well as their contact experiences with individuals with disabilities. The largest (least favorable) social distance ratings were given to HIV/AIDS, followed by mental illness, intellectual disability, and autism. These findings are consistent with other studies, such as that of Coleman et al. (2014), suggesting college students are more readily accepting of individuals with physical disabilities. The relationship between contact with individuals with disabilities and behavioral attitudes appeared hierarchical: those who had frequent contact with PWD had significantly lower (and thus, more favorable) social distance scores than those who had occasional contact, and those who had occasional contact had more favorable scores than those who had no contact with PWD (Huskin et al., 2018). The researchers explain that the quality of contact with individuals with disabilities is likely more influential in dispelling stereotypes than the quantity of interactions.

With these results in mind, it is clear that stigma and misinformation towards individuals with psychological disabilities persist. While communication disorders are a different subset of disabilities, they involve deficits in either processing or producing speech and language. As these

are psychological processes, it can be hypothesized that this population may also receive unfavorable social distance ratings—particularly in communication disorders that present themselves as incomprehensible or confusing speech (i.e. Wernicke's aphasia).

Perceptions of Individuals with Communication Disorders

In order to make more accurate predictions about the attitudes people hold towards individuals with different communication disorders, it is helpful to understand the trends that have so far been revealed by the literature. Some researchers have investigated attitudes towards individuals with a particular communication disorder, such as cleft lip or palate (Bettens et al., 2020), voice disorders (Altenberg & Ferrand, 2006; Amir & Levine-Yundof, 2013; Lallh & Rochet, 2000), and stuttering (Tiling, 2011), while others have investigated differences in ratings of people with various communication disorders (Allard & Williams, 2008; Williams & Dietrich, 2001). Findings indicate that different disorders, and the severity of those disorders, relate to different levels of negative perceptions.

Articulation Disorders

Articulation disorders can be a result of developmental disorders/delays as well as physical abnormalities such as cleft lip +- palate. In their study of children's attitudes towards peers with speech differences due to cleft lip or palate, Bettens et al. (2020) measured the three aspects of attitudes to investigate if there are specific attitudinal differences towards varying levels of speech disorder characteristics. Seven personality trait pairs were used to measure the cognitive aspects of peer attitudes, while questions assessing the children's willingness to spend time with the speakers and their overall feelings towards the speakers respectively measured the behavioral and affective aspects. Bettens et al. (2020) viewed the multidimensional aspects of an

attitude important to study because prior research has mainly studied cognitive aspects of behavior alone.

Results did indicate effects of the children's speech characteristics on the peer ratings. A significant, positive correlation was found between cognitive and affective attitude ratings and speech intelligibility. The better peers were able to understand a child's speech, the more positive their ratings of both the child's personal attributes and their own feelings about the speaker. Additionally, a significant, negative correlation was found between all three dimensions of peer attitudes and ratings on hypernasality, audible nasal air flow, and articulation errors (Bettens et al., 2020). These findings suggest that trouble understanding individuals with communication disorders may be a contributing factor to negative perceptions. Specifically, the speech characteristics of hypernasality had the highest correlation coefficient and thus may be a larger component of attitude ratings than articulation itself. In line with these findings, studies that have compared attitudes across different disorder types have indicated articulation disorders receiving less negative ratings (Allard & Williams, 2008; Williams & Dietrich, 2001).

Fluency Disorders

Individuals can have difficulty speaking fluently due to a naturally-occurring stutter beginning in childhood, or they can develop a stutter later in life due to a traumatic brain injury (TBI), stroke, or other head trauma (National Institute on Deafness and Other Communication Disorders, 2017). One study by Tiling (2011) illustrated negative perceptions about the intelligence and competence of people who stutter, which are only measures of cognitive attitudes. Tiling (2011) included four different conditions of stuttered speech that each highlight a potential characteristic of stuttering (repetition of sounds/words or "stutter," hesitation before speaking, both stuttered and hesitant speech, and the drawing out of sounds or "prolongation").

The results indicated that hesitant speech alone received the most negative ratings, followed by stuttered/hesitant, and lastly a tie between stuttered and prolonged speech alone. Tiling (2011) concludes that the additional verbal avoidance behaviors used in hesitant speech, such as pauses and interjections, make speakers seem less competent in speaking. The fact that stuttering alone received the least negative ratings may suggest that fluency disorders are a category that receive better attitude ratings.

While there is not enough literature to definitively state that fluency disorders are perceived less negatively, it is known that misconceptions about this disorder category exist. Stereotypes of people with fluency disorders include ideas that they are shy, anxious, and insecure (Craig et al., 2003; Hughes et al., 2010). Craig et al. (2003) highlight potential reasons behind these stereotypes of individuals who stutter, and these explanations are important to consider when studying the attitudes of individuals with various communication disorders. Citing findings of prior literature, Craig et al. (2003) note that generalizations towards people who stutter may have valid bases, as anxiety, introversion, self-consciousness, and other similar traits may arise in some people who stutter due to barriers of social interaction. The researchers cite studies that found comorbidities of social anxiety and stuttering, as well as correlations of low employment and feelings of hopelessness in this population. This valid basis may partially explain the generalizations of this nature that are applied to people who stutter. No matter the basis for these stereotypes, it is important to identify in what conditions they exist in order to determine how to best decrease acceptance of misinformation.

Voice and Resonance Disorders

Voice and resonance disorders both affect the quality of sound that is produced in speech. While voice disorders can be caused by neurological disorders or trauma such as strokes and

TBIs (in addition to structural differences), resonance disorders typically are a result of purely physical differences such as cleft lip +- palate (American Speech-Language-Hearing Association). The research of Lallh and Rochet (2000) indicates differences between ratings of resonance and voice disorders in contrast to control groups. College students listened to nine speakers (three with normal voice/resonance, three with disordered voice, and three with disordered resonance) and completed Lallh and Rochet (2000)'s 24-item semantic differential scale for each voice, which includes traits such as intelligence, competence, friendliness, and reliability. A main effect for voice/resonance disorder was identified: speakers with resonance disorders were rated most negatively, followed by voice disorders, and then finally the control group. The researchers note that while this trend had been shown in prior literature, their study was the first to find a significant difference between ratings of resonance and voice disorders. Lallh and Rochet (2000) explain the utility of their findings (i.e. helpful for the counseling components of speech therapy), but do not pose reasons for resonance disorders receiving less favorable ratings.

Extending research of others, Altenberg and Ferrand (2006) found that the severity of voice disorders also impacts attitude ratings. The researchers adapted a 21-item semantic differential scale from Lallh and Rochet (2000) and Lass et al. (1991), and participants rated four non-disordered voices, two mild voice disorders, two moderate voice disorders, and two severe voice disorders on traits such as cleanliness and education. Results indicated that attitudes were increasingly more negative as voice disorder severity increased (Altenberg & Ferrand, 2006). The researchers emphasize the importance of this finding, as even mild voice disorders were perceived less positively than non-disordered voices, which highlights the importance of speech therapy in helping attenuate the characteristics of voice disorders of all severity levels.

Language Disorders

Language disorders involve difficulty comprehending and/or producing meaningful language. Wernicke's aphasia has a unique presentation, as an individual with this disorder can produce speech fluently but has difficulty comprehending the language that they—or others—produce. This disorder is typically caused by brain damage as a result of a stroke, infection, TBI, or a progressive neurological disorder (National Institute on Deafness and Other Communication Disorders, 2015). The present literature has not investigated attitudes based on varying levels of aphasia severity, but studies such as that of Williams and Dietrich (2001) and Allard and Williams (2008) have compared attitudes towards people with Wernicke's aphasia and other communication disorders.

Wernicke's aphasia received the most negative attitude ratings in Allard and Williams' (2008) investigation. This may be explained by public misconceptions of speech deficits and intelligence. The National Aphasia Association explains that the presence of aphasia does not impair intelligence, but rather the ability to access language to express thought. Still, the association's 2020 National Aphasia Awareness Survey revealed that 41.5% of individuals gave neutral responses or agreed with the statement that someone who has speech difficulties also has intellectual deficiencies. Since a main characteristic of Wernicke's aphasia is the production of nonsensical messages, this may exacerbate negative attitudes about intelligence and other trait ratings.

Multiple Disorders

An early study of perceptions of multiple communication disorders, conducted by Williams and Dietrich (2001), involved participants reading a vignette that only differed in its sentence describing what type of communication difference a person had, which included

language, fluency, voice, or articulation disorders. No sentence of this nature was involved in the control condition. The researchers wanted to add to the growing knowledge base of attitudes towards communication disorders, as some studies at this point still did not indicate differences between control groups and disordered speaking. In fact, the researchers did not find significant differences in all but one trait pair rating among the disordered and no disorder conditions in their own study. Participants answered nine trait pairs, such as unreliable/highly reliable, using a seven point Likert scale, and the only significant difference involved the control group being rated more negatively in ambition compared to the articulation disorder condition. Williams and Dietrich (2001) explain these lack of findings by noting that studies whose methodology involves audio portrayals of people with communication disorders tend to produce significant differences, while only reading about people with these disorders may not have a significant effect.

Since the foundational studies indicate the benefits of auditory conditions rather than vignettes, most of the current literature involves the former methodology. A vital study which encompasses the aforementioned topics is that of Allard and Williams (2008). The between-subjects design of the study involved participants listening to an actor read a script with either an articulation disorder (specifically, an interdentalized lisp), fluency disorder (stutter), voice disorder (hoarseness of voice), language disorder (Wernicke's aphasia), or no disorder. After listening to the video recordings in their randomly assigned conditions, participants rated their impressions of the speaker with nine trait pairs using the researchers' seven point Likert scale. The traits assessed were intelligence, self-esteem, decisiveness, reliability, emotional stability, social adjustment, stress-level, employability, and ambition. Results indicated that the no disorder condition produced the most favorable ratings of eight of the nine traits (excluding

stress-level), while the language disorder was rated the most negatively on all traits except ambition. There were no significant differences in ratings with relation to the demographic variables of age, gender, personal contact with someone with a communication disorder, or types of locations participants lived. These findings were consistent with prior literature, in which disordered speaking conditions were rated more negatively, and most demographic variables were not significantly related to ratings.

While the research provides evidence that individuals with communication disorders may be perceived more negatively on a variety of attributes, the findings do not emphasize how these perceptions affect the people with these specific disorders. The extent to which individuals with disorders feel impacted by their communication differences may only stem from how others interact towards them. Bettens et al. (2020) emphasized the World Health Organization's holistic framework of disability, which holds that the attitudes of people in the environment of a person with disability (PWD) impacts how impairing, or not impairing, a disability is. Thus, this model holds that communication disorders are mainly impairing only if people in the population hold negative attitudes that in turn make the disorders more difficult to experience. Through this theory, it is thus clear that negative perceptions towards individuals with communication disorders can have potentially damaging effects.

The Present Study

To extend the work of Allard and Williams (2008), the current study was largely modeled from their research. The purpose of this study was to measure the effects of four specific communication disorders on the attitude ratings of warmth and competence, types of intelligence, credibility, and social distance. The disorders studied were the same as those studied in Allard and Williams' (2008) research: frontal lisp, stutter, hoarseness of voice, and Wernicke's

aphasia. Rather than studying the nine trait ratings that were studied by Allard and Williams (2008), the aim of the present study was to identify specific cognitive and behavioral attitudes that have previously been judged negatively in disabled populations. Comparing perceptions of these four dimensions (warmth and competence, intelligence, credibility, and social distance) between four communication disorder conditions will provide new understanding of how different communication disorders may elicit different attitudes.

It is hypothesized that there will be a main effect of communication disorders on trait ratings. The predicted directions of ratings for each attitude measure, across disorder conditions, is displayed in Table 1. It is also hypothesized that there will be a difference in ratings between participants who have and have not had contact with an individual with a communication disorder. Participants (across all conditions) who have a family member or friend with a communication disorder will have more favorable attitudes than participants who do not have a close family member or friend with a communication disorder. Exploratory analyses will investigate possible effects of gender on attitudes towards the speaker. Any correlations between significant dependent variables will also be studied, as they may reveal patterns that can inspire further investigation in future studies.

Methods

Participants

Participants consisted of 101 students recruited from a small, liberal arts college in central Virginia. Participants were required to be 18 years of age or older, and the sample consisted of undergraduate and graduate students between the ages of 18 and 47 (M = 19.66, s = 3.18). Participants were mostly white (N = 77, 76.2%) and female (N = 66, 65.3%). Additionally, there were N = 8 (7.9%) Black or African American, N = 8 (7.9%) Hispanic or Latinx, N = 6

biracial or multiracial, and $N = 2$ (2.0%) Asian or Pacific Islander participants. Further gender breakdowns included $N = 29$ (28.7%) and $N = 6$ (5.9%) nonbinary participants. Most participants did not have a communication disorder ($N = 89$, 88.1%) or know somebody with a communication disorder ($N = 62$, 61.4%), whereas only $N = 8$ (7.9%) participants reported having a communication disorder and $N = 28$ (27.7%) reported knowing someone with a communication disorder.

In order to later run a matched sample design, 13 additional participants were not randomly assigned to a communication disorder category but rather deliberately assigned to a condition lacking an even number of participants. Participants from both the randomly assigned and non-random assignment conditions were matched by gender and race, and 55 participants remained for this further investigation (Table 3).

The study was conducted through a Google Form, which only students who resided in the United States and had ownership of the university's email account were able to access. Students could access the study at any time with their own computer or a computer on campus. Information about the study was sent via email from psychology and special education professors as well as through social media of the student researcher. Participants were not excluded based on presence of a communication disorder of their own, as this characteristic was a variable of interest. Students did not receive compensation for participation, however, the study counted as part of a research participation assignment for those students in an introductory psychology course.

Materials

Warmth and Competence

To measure warmth and competence, Coleman et al. (2014)'s Personality Characteristics scale was utilized. The scale consists of 24 Likert-scale items of words that describe an individual, and some of the items are filler questions that are not part of the later analysis (see Appendix A). The adjectives that measure warmth consist of *warm, good-natured, sincere, tolerant*, and the adjectives *competitive, independent, confident, competent* measure competence. The ratings for each item traditionally range from ratings of negative three to positive three, however, the numbers one through seven were used instead, because Google Forms do not allow negative numbers on Likert-scale questions. A score of one indicated that the word was not at all descriptive of the speaker, while a score of seven indicated that the word was very descriptive of the speaker. An average is measured for the words in each category, and higher scores indicate higher perceived warmth or competence. Coleman et al. (2014)'s scale has good internal consistency, (warmth: $\alpha = .92$, competence: $\alpha = .87$).

Types of Intelligence

Intelligence measures of interest were assessed using questions inspired by Furnham and Gasson (1998)'s Estimates of Intelligence questionnaire. Not all dimensions of intelligence were studied, as some would likely not produce much variation in responses when judging an individual based solely on their voice (i.e. spatial or bodily kinesthetic intelligence). The types of intelligence chosen are those that might be stereotyped in people with communication disorders, and they are traits that can be inferred through listening to the monologue the speaker reads. Participants answered on a Likert-scale of one to five, with one indicating below average/low on the trait and five indicating above average/high on the trait. The types of intelligence judged were overall, social/emotional, giftedness in the performing arts, and verbal intelligence. The social/emotional trait combines Gardner (1999)'s inter- and intra- personal intelligences as well

as Sternberg (1988)'s emotional intelligence to assess how well participants believe the speaker interacts with others, is aware of other's thoughts and feelings, and can manage their own emotions. Giftedness in the arts was inspired by Gardner (1999)'s musical intelligence, and the dimension was broadened to assess participants' judgments of how well they believed the speaker could perform tasks such as acting, singing, and other art forms in front of an audience (see Appendix B).

Social Distance

Coleman et al.'s (2014) Social Distance scale was used and includes eight Likert-scale statements that measure varying comfort levels of closeness to an individual. Items involved questions such as, "*How comfortable would you be having the speaker as a co-worker?*" and "*How comfortable would you be if the speaker married into your family*?" Items (see Appendix C) are rated on a scale of one to seven, with a selection of one indicating *not at all comfortable* and seven indicating *very comfortable.* An average is taken, and higher scores indicate wishing for less social distance between the other person. The scale has very good reliability ($\alpha = .93$) (Coleman et al., 2014).

Demographic Measures and Credibility Item

A demographic questionnaire was the last measure participants encountered, which assessed participant age, racial and gender identity, contact with a family member or friend with a communication disorder, presence of a personal communication disorder, and what type of communication disorder(s) if applicable (see Appendix D). To assess the perceived credibility of the speaker, one question-item asked participants to rate how credible they believed the speaker to be on a scale of one (not credible at all) to five (extremely credible). Although this item appears in the demographic section of Appendix D, the question was placed before the types of

intelligence section in the Google Form. The design did not employ counterbalancing, as scales were placed in a meaningful order to be taken after listening to the audio condition. The demographic questionnaire was required to be taken last, as it asked questions about communication disorders that could have primed participants if taken prior to their ratings of the speaker.

Audio Recordings

The levels of the main independent variable of communication disorder portrayed were presented through audio recordings. The script (see Appendix E) read by the actor in the current study was the monologue used in Allard and Williams' (2008) research. Four final recordings were obtained of the actor—who is a male speech-language pathologist—reading the script while portraying a frontal lisp, a stutter, hoarseness of voice, and Wernicke's aphasia. Each condition was recorded three times, and the speech language pathologist later listened to the recordings and chose the most accurate portrayal of each disorder to use for the study. Additionally, the speech pathologist was instructed to use the same positive tone of voice across conditions to help ensure that differences in ratings stemmed only from the speech characteristics pertaining to the disorders.

Procedure

The between-subjects experiment was conducted through Google Forms, which participants gained access to through their university email address. Students could participate whenever they chose to do so by clicking the study's link, found in the recruitment email or social media post. Participants first read the informed consent and clicked "I agree" to continue with the study. If "I disagree" was selected, the survey ended. For random assignment to one of four communication disorder categories, participants selected a random symbol pair that would

take the survey to one of the particular conditions. After listening to their assigned audio condition, participants completed the Personality Characteristics scale (Coleman et al., 2014), credibility item, intelligence items adapted from Furnham and Gasson (1998) and Furnham & Shagabutdinova (2012), Social Distance scale (Coleman et al. 2014), and the demographic questionnaire. The study took approximately twenty minutes to complete.

Data analysis involved two different phases: one set of analyses using true random assignment to measure the dependent variables between three disorder conditions (excluding Wernicke's aphasia), and another set of analyses using a matched-sample design to compare all four conditions. Two different methods of analysis were used due to a low number of participants who were randomly assigned to the language disorder (Wernicke's aphasia) condition ($N = 9$). In the matched-sample design, participants were matched by gender and race in order to be compared across the four conditions and still reach sufficient statistical power. An alpha level of .05 was used for all tests.

To measure the primary hypothesis of the influence of communication disorder type on beliefs of a speaker's warmth and competence, credibility, intelligence, and social distance, a one-way Analysis of Variance (ANOVA) was conducted for each of these dependent variables. An independent sample t-test was conducted to determine if there are significant differences between participants who know someone with a communication disorder and those who do not on ratings of the speaker's characteristics. Exploratory analyses involved running an independent sample t-test to measure differences in trait ratings between males and females, as well as running a Pearson correlation to study correlations between the dependent variables. Using the matched-sample design, a one-way ANOVA was conducted again for each of the dependent variables.

Results

The current investigation was undertaken to investigate the effects of different communication disorders on the ratings of distinct personality traits, as previous studies have indicated significant differences between personality ratings of different types/severity of these disorders. It was hypothesized that there would be a main effect of communication disorder type on personality ratings, with Table 1 indicating specific directions. The descriptive statistics for each disorder condition are presented in Table 2.

A one-way analysis of variance (ANOVA) was used to compare three experimental groups of communication disorder types on eight dependent variables (i.e., warmth, competence, credibility, overall intelligence, social/emotional intelligence, giftedness in the performing arts, verbal intelligence, and social distance). The omnibus test supported the hypothesis demonstrating a significant difference between at least two of the means for verbal intelligence scores, $F(2, 89) = 4.614$, $p = .012$. An LSD post hoc revealed that individuals in the lisp condition rated the speaker's verbal intelligence ($M = 2.65$, $s = 1.14$) significantly lower than those in the stutter condition ($M = 3.22$, $s = 1.01$) and those in the hoarseness of voice condition ($M = 3.41$, $s = .91$). Those in the lisp condition perceived the speaker to have significantly lower verbal intelligence than participants in stutter and hoarseness of voice conditions (Figure 1). There was also a main effect of communication disorder group on social distance scores, $F(2, 87) = 3.367$, $p = .039$. The LSD post hoc revealed that individuals in the hoarseness of voice condition had significantly lower social distance scores ($M = 4.96$, $s = 1.56$) than those in the lisp condition ($M = 5.72$, $s = 1.26$) and those in the stutter condition ($M = 5.77$, $s = 1.16$). Individuals in the hoarse voice condition desired significantly more distance from the speaker than those in the lisp and stutter conditions (Figure 2).

It was also hypothesized that there would be a difference between those who have had contact with someone with a communication disorder and those who have not on the dependent variables. An independent samples t-test was used to compare trait ratings between the two contact groups, and the two groups did not significantly differ (see Appendix F). Exploratory analyses were conducted to measure differences in trait ratings based on gender, and a one-way ANOVA revealed no significant difference between males and females on any of the ratings (Appendix F).

Pearson correlations were also conducted to analyze which dependent variables correlated with the ratings of social distance and verbal intelligence within each disorder condition. The correlations revealed that in the stutter condition, social distance scores were significantly related to warmth scores, $r(30) = .58$, $p < .001$. In the lisp condition, social distance scores were significantly related to warmth, $r(29) = .71$, $p < .001$, credibility, $r(29) = .49$, p , overall intelligence $r(29) = .43$, $p = .016$, social emotional intelligence, $r(29) = .44$, $p < .001$, and competence, $r(29) = .34$, $p < .001$. Similarly, social distance scores in the hoarseness of voice condition significantly correlated with warmth, $r(27) = .84$, $p < .001$, credibility, $r(27) = .49$, $p < .001$, overall intelligence $r(27) = .43$, $p < .001$, social emotional intelligence, $r(27) = .52$, $p < .001$, giftedness in the performing arts, $r(27) = .27$, $p < .001$, and competence $r(27) = .46$, $p =.015$. Table 4 displays additional information on the correlations of verbal intelligence and social distance with the other dependent variables.

In order to compare the scores of the unequal number of participants in the Wernicke's aphasia group with the attitude ratings between the other three conditions (and test the hypotheses to their full extent), a matched-samples design was used. As is the rationale in the natural pairs design, the purpose of using a matched pairs design is to reduce error variability by

controlling extraneous variables. Because this method does not utilize random assignment, additional participants were recruited and automatically placed in the Wernicke's aphasia condition. Using the matched sample design, 55 participants matched by gender and race were compared between the lisp condition ($N = 12$), stutter condition ($N = 14$), hoarseness of voice condition ($N = 14$), and Wernicke's aphasia condition ($N = 15$). Due to limitations in the diversity of the samples, the current sample size of each group was what could be obtained with the inclusion criteria. A one-way analysis of variance (ANOVA) was used to compare the four conditions across the eight attitude ratings, and the omnibus test found a significant difference between the disorder groups on the scores of competence, $F(3, 51) = 2.84$, $p = .047$; credibility, $F(3, 51) = 4.16$, $p = .010$; and overall intelligence, $F(3, 51) = 2.91$, $p = .043$.

An LSD post hoc revealed that participants in the Wernicke's aphasia condition gave significantly lower competence scores ($M = 4.07$, $s = .87$) than those in the hoarseness of voice condition ($M = 5.20$, $s = .94$) (Table 3). Participants in the Wernicke's aphasia group also gave significantly lower credibility ratings ($M = 2.93$, $s = 1.16$) than those in the lisp ($M = 3.58$, $s = 1.00$) and those in the stutter conditions ($M = 4.07$, $s = .92$) (Table 4). Lastly, participants in the Wernicke's aphasia group had significantly lower overall intelligence ratings ($M = 2.93$, $s = 1.10$) than participants in the lisp ($M = 3.17$, $s = 1.12$), stutter ($M = 3.29$, $s = .99$), and hoarseness of voice ($M = 3.64$, $s = .93$) conditions (Table 5). Participants viewed the speaker as significantly less intelligent when portrayed with Wernicke's aphasia, followed by a lisp, a stutter, and hoarseness of voice. These variables did not produce significant omnibus tests, so no further post hoc comparisons were needed.

Discussion

Judgments and impressions of others are based on a variety of characteristics—one of those being communication. In both the present study and those of which it is based, individuals only received the auditory stimuli of a speaker's voice to inform their attitude ratings. In studies that utilized a control group, results showed that speakers with communication disorders received less favorable reactions than those without (Allard & Williams, 2008; Lallh & Rochet, 2000). Since negative attitudes have been attributed to individuals with communication disorders, a goal of further studies is to identify differing perceptions based on severity and type of communication disorder (Allard & Williams, 2008; Altenberg & Ferrand, 2006; Bettens et al., 2020). The current study, largely based on the work of Allard and Williams (2008), studied the perceptions of an individual portraying either an articulation disorder (frontal lisp), a fluency disorder (stutter), a voice disorder (hoarseness of voice), or a language disorder (Wernicke's aphasia).

Linear order predictions were made for examining the effects of communication disorder type on the various trait ratings. Two of the eight traits (i.e., verbal intelligence and social distance) in the random assignment analysis had significantly different ratings based on type of disorder, and three of the eight traits (i.e., credibility, competence, and overall intelligence) in the matched-samples design significantly differed based on disorder category. This finding suggests that some attitudes may be more largely based on the way an individual speaks than others. Contrastingly, eight out of nine traits (i.e., intelligence, self-esteem, decisiveness, reliability, social adjustment, stress-level, employability, and ambition) were rated significantly lower for the language disorder condition in Allard and Williams' (2008) study. This difference may be explained by the age of the samples, as the present study consisted of mainly traditional college students (i.e., average age of 19), whereas Allard and Williams' (2008) study consisted of a more

even distribution across all ages. Younger participants have rated speakers with communication disorders as less stressed than older participants (Williams & Dietrich, 2001) and older adults have rated speakers with mild voice disorders more negatively than those with no disorder, whereas younger adults' ratings between the two groups did not significantly vary (Altenberg & Ferrand, 2006). Even if the current population did not display significant differences in many of the trait ratings, this does not automatically suggest that they do not hold negative attitudes towards the population. Specifically, the two traits that were rated differently based on disorder category in the randomized sample—verbal intelligence and social distance—are respectively cognitive and behavioral attitudes that highlight potential stigma.

Verbal intelligence is a dimension of intelligence that refers to one's ability to use words to express a message (Furnham & Shagabutdinova, 2012). Because each condition involved a disorder that affects the way in which individuals speak, it was hypothesized that the presence of communication disorders would be related to an overall lower rating of verbal intelligence for all conditions. This hypothesis on main effect was supported, however the articulation (lisp) condition received the lowest rating, which does not match the hypothesized order (Table 1). This condition was not expected to receive the most negative attitudes of verbal intelligence, as the characteristic of articulation errors has not been the largest contributor to negative ratings of various disorders (Bettens et al., 2020), nor has this group been related to significantly low ratings overall (Allard & Williams, 2008). However, the discovery that articulation errors as a characteristic of a disorder were rated less negatively may not generalize to ratings of articulation disorders as an entire disorder category (Bettens et al., 2020). Additionally, although the articulation (frontal lisp) condition received more positive ratings in Allard and Williams' (2008) study, the no disorder condition of their study was still rated the most positively for eight of the

nine traits, suggesting that the presence of this communication disorder negatively impacts attitudes. The significant difference in ratings of verbal intelligence in the current study suggest that when listeners hear a speaker with an articulation disorder, they interpret their speech differences as barriers to communicating effectively. This group maintained their lowest rating even after inclusion of the Wernicke's aphasia condition, suggesting that articulation disorders are consistently perceived as indicators of low verbal ability.

Social distance is a measure of the level of closeness one is willing to share with another person, and it is a widely used tool to investigate stigma (Coleman et al., 2014; Ouellette-Kuntz et al., 2010). Similar to the verbal intelligence results, there was a main effect of communication disorder type on social distance as hypothesized; however, the hoarseness of voice condition received the most unfavorable ratings rather than the stutter condition. Disabilities that are more visible and affect mental functioning tend to receive less favorable social distance ratings (Huskin et al., 2018), and it was predicted that a stutter may be perceived by the listeners as an indicator of a cognitive difference. Reconsidering this prediction, it is possible that listeners did not make their social distance judgments based on perceived cognitive levels, but other characteristics such as warmth. The exploratory Pearson correlations did reveal that for the stutter condition, social distance ratings were only significantly correlated with warmth ratings. This differed from the lisp and hoarseness of voice conditions, whose social distance ratings had significant correlations with warmth, credibility, overall intelligence, and social emotional intelligence. The stutter condition received a moderately high average in its warmth rating, which may suggest a relationship between its more favorable social distance average (see Table 2). Although the trait of social distance did not remain significant at the .05 level in the matched-samples design, the hoarseness of voice condition remained the least favorable in this

trait, with Wernicke's aphasia closely following (Table 3). As with verbal intelligence, this suggests that the characteristics of a hoarse voice may tend to consistently predict unfavorable social distance ratings, even when other types of communication disorders are added to the model.

Trends within the hoarseness of voice condition reveal particularly meaningful conclusions. This condition received both the most favorable verbal intelligence ratings and the least favorable social distance ratings when measured between the articulation and fluency disorders. Although it did not reach sufficient statistical power, the hoarseness of voice condition was also approaching near significance in receiving the most negative warmth ratings in both methods of analysis (random assignment and matched-samples). Of the disorder categories, hoarseness of voice contains many qualities that the general public is more familiar with. Differences in voice quality are often temporary effects of head colds, and Lallh and Rochet (2000) posit that this familiarity may lead to less negative ratings of voice disorders compared with other communication disorders. The favorable verbal intelligence ratings of this disorder condition suggests that participants did not portray the characteristics of hoarse voice to impact the speaker's ability to communicate effectively. As Fiske et al.'s (2002) Stereotype Content Model suggests, groups of people can tend to be perceived as high in one area of warmth/competence and simultaneously low in the other aspect. The current findings appear to fit in this model, with hoarseness of voice falling into high communicative competence but lower warmth and more desire for social distance. These findings are similar to those of Amir and Levine-Yundof (2013), who found that speakers with voice disorders were rated as more negative, ill, and tense. Attitudes towards people with communication disorders are complex, and

these findings highlight both positive and negative preconceptions individuals may have towards a particular disorder type.

The hypothesis that participants who knew someone with a communication disorder would give more positive ratings to a speaker than participants who did not know someone with a communication disorder was not found in either method of analysis. Although research has indicated that personal contact with individuals from a stigmatized group relates to better attitudes towards that population (Huskin et al., 2018), studies on communication disorder perceptions have yet to replicate this finding. Allard and Williams' (2008) study found no significant differences between any demographic variables—including contact with someone with a communication disorder—on attitude ratings, and this matched the trend of the prior literature that is cited by them. In alignment with the current study, these findings may suggest that communication disorders are a type of disorder that negatively impact automatic judgments of others regardless of exposure to these differences. Alternatively, many prior studies have not adequately measured the degree of closeness participants have experienced with individuals with communication disorders. Huskin et al. (2018) found a hierarchical relationship revealing regular contact with PWD to be associated with the most positive ratings of disability categories, followed by some but irregular contact, and lastly no contact correlating with the most negative ratings. Limitations of prior studies (as well as the present) are likely the exclusion of categories indicating level of closeness to people with communication disorders.

Similar to other studies, there was not a significant difference in attitudes towards a speaker based on participant's gender in either the randomized or matched-samples analyses (Amir & Levine-Yundof, 2013; Allard & Williams, 2008; Lallh & Rochet, 2000). The studies that did find gender differences tended to only find significance for some but not all traits

(Williams & Dietrich, 2001) or had a sample consisting of children (Bettens et al., 2020). Finding gender differences in attitudes can highlight groups that may form biases on a particular subject more so than others. Although it is never reassuring to learn that a group of people holds more biases than another, this information does provide a starting point for targeting biases. If negative attitudes towards people with communication disorders do not vary by gender, this suggests that the biases toward this population are widespread. They are potentially deeply ingrained in our culture, and they will likely be more challenging to extinguish.

With the opportunity to include the Wernicke's aphasia condition in the aforementioned analyses, participants' ratings of competence, credibility, and overall intelligence significantly differed, with Wernicke's aphasia rated the most negatively on each trait. These results match the hypothesized order for the language disorder group on the traits of competence and overall intelligence (see Table 1). Although it was hypothesized that the stutter condition would receive the least favorable credibility ratings (followed by Wernicke's aphasia), the finding that the language disorder received the lowest rating on this trait fits prior findings in which Wernicke's aphasia receives the most negative perceptions on multiple traits (Allard & Williams, 2008). Schroeder et al. (2020) explain the spread effect that can happen when judging people with disabilities, which refers to negative perceptions about one trait of an individual spreading to additional negative beliefs about other traits the individual has. This effect could help explain why in addition to being perceived as the least credible, the speaker portrayed with Wernicke's aphasia was additionally viewed as the least competent and least intelligent overall.

The finding that when portrayed with Wernicke's aphasia, the speaker was portrayed as the least competent fits Fiske et al.'s (2002) Stereotype Content Model. The disorder is one that affects receptive language, and although the disorder itself does not impact overall cognition, its

presentation of nonsensical speech may appear to listeners as an indication of lower cognitive ability. As seen in the research of Coleman et al. (2014), individuals with intellectual differences are often perceived higher in warmth and lower in competence. In addition to receiving the lowest competence ratings, the Wernicke's aphasia condition also received comparatively higher warmth scores (Table 3) in the present study, which indicates that this group's ratings are consistent with the previously noted findings. Knowledge of the potential belief that people with Wernicke's aphasia are seen as warm but not competent can allow disability advocates to directly target these beliefs in educational programs. Education about the disorder can highlight that although people with Wernicke's aphasia face challenges in their lives due to their impaired language comprehension, they can still successfully lead their lives with the help of rehabilitation and compensatory strategies.

In addition to the spread effect that potentially contributes to the Wernicke's aphasia condition receiving the least favorable credibility ratings, the processing fluency hypothesis may also be used to interpret the findings (Schroeder et al., 2020). Recall that this hypothesis holds that increased difficulty in processing someone's speech may unknowingly lead to unfavorable perceptions of that person. In the current study, processing the actor's message when it was portrayed with Wernicke's aphasia was arguably the most challenging. This condition involved the actor substituting words in the monologue to depict the characteristic of producing speech that appears nonsensical due to comprehension difficulty (i.e., "it was just what we were *masking* for" instead of "it was just what we were *looking* for"). The study only measured direct, self-reported attitudes towards the speaker, and it is thus in more support of Schroeder et al.'s stereotyping/spread effect hypothesis. Future studies should assess participants' beliefs about

how challenging processing the speaker's monologue was in order to further test the processing difficulty hypothesis.

Lastly, the trait of overall intelligence was perceived significantly lower in the Wernicke's aphasia condition. In addition to the spread effect that could have contributed to these low intelligence ratings (Schroeder et al., 2020), this finding highlights the misconception of language impairments being synonymous with intelligence. Although cognitive impairments can be comorbid with aphasia, they are not always co-occurring, and the definition of aphasia only refers to the language deficits one can experience after a stroke or other trauma (Lee & Pyun, 2014). Findings such as those of the present study suggest that further information needs to be provided in educational programs to make people aware of the difference between language deficits and overall cognitive decline.

The present study has limitations that may have affected the current results. The method of random assignment (selection of a random symbol pair) was not effective in evenly distributing participants to all four communication disorder conditions. Some symbols—even when chosen to not carry any intrinsic meaning—may be selected more often than others by individuals, leading to uneven sample sizes and questioning the validity of a true randomization even when studying the three evenly distributed categories. The ineffective random assignment may also be due to the fact that the symbols were always presented in the same order, which is another factor that could affect uneven selection. Future studies should implement computer-generated random assignment in order to analyze the results in a completely randomized design. Although all four groups were able to be compared using a matched-samples design, this method is not considered randomly assigned and is therefore less powerful. Another change to the study design could be placing all scales on the same Likert scale, as this would

make interpretation of results more clear. The highest possible score for warmth, competence, and social distance was seven, whereas the highest possible score for credibility and intelligence traits was five. When reading the results, one must keep this in mind as they compare a high score of five on intelligence with an above average score of five on social distance.

The present study is the first, to our knowledge, to measure ratings of multiple types of intelligence in regards to a speaker portraying varying communication disorders. While prior studies have shown these populations receive lower overall intelligence ratings (Allard & Williams, 2008; Amir & Levine-Yundof, 2013; Tiling, 2011), studying ratings of multiple intelligence domains can provide more comprehensive information about areas that are generalized to be strengths or weaknesses in people with communication disorders. In future studies, it may be helpful to include a brief definition of each intelligence domain to ensure that participants are interpreting areas such as "social/emotional intelligence" uniformly. Doing so may yield other significant relationships in addition to overall and verbal intelligence.

Future studies could also benefit from studying additional variables. Although the current variables were selected based on prior disability and attitude research, some variables that prior studies on communication disorder perception examined (i.e. employability, self-esteem, neuroticism) were omitted from the present study (Allard & Williams, 2008; Lallh & Rochet, 2000). Instead of using semantic differential scales that contain multiple, opposite descriptors (such as indecisive versus highly decisive), the goal of this study was to determine attitudes in four main domains: warmth and competence, types of intelligence, credibility, and social distance. It would be beneficial for future studies to include some of the omitted variables listed above—even for exploratory analyses that go beyond main hypotheses. Doing so will allow a larger amount of data to inspire future attitude research towards populations of people with

communication disorders. Lastly, although a "no disorder" control group was excluded from the current study because prior studies have already demonstrated that these conditions receive the most favorable ratings (Allard & Williams, 2008; Altenberg & Ferrand, 2006; Lallh & Rochet, 2000), including a control group would have provided additional comparisons for the specific population. From the present data, it cannot be known if participants produced significantly lower ratings than they would have if the speaker were to have no communication disorder at all.

The present study revealed significant differences in the ratings of verbal intelligence and social distance (as well as competence, credibility, and overall intelligence) between communication disorder categories. This finding demonstrates both cognitive and behavioral attitudes that can be influenced by the presence of someone's communication differences. Making a judgment about someone's ability to use words in communication (as well as rating their competence, credibility, and intelligence) is an example of an attitude pertaining to what one *thinks* a person can do, while making a judgment about how much time one would want to spend with someone else is a reflection of how they would *act* towards that person. It is concerning that individuals may think about and treat individuals with communication disorders poorly due to these negative attitudes. Speech language pathologists, disability advocates, and other educators can use information about specific negative attitudes when designing programs to increase knowledge and acceptance of these populations. For example, an outreach program about voice disorders could highlight the idea that a gruff voice does not indicate an individual's level of friendliness or cheerfulness. Further studies are needed to see if close contact with individuals with communication disorders can improve attitudes towards this population. Although the current findings suggest that these negative attitudes may be deeply ingrained in our culture, they also suggest that communication disorders do not influence all forms of

attitudes. As this potential trend hopefully continues through the use of educational and anti-bias training, future studies may not find any significant differences in attitudes towards this population.

References

Allard, E. R., & Williams, D. F. (2008). Listeners' perceptions of speech and language disorders. *Journal of Communication Disorders, 41,* 108-123. doi: 10.1016/j.jcomdis.2007.05.002

Altenberg, E. P., & Ferrand, C. T. (2006). Perception of individuals with voice disorders by monolingual English, bilingual Cantonese-English, and bilingual Russian-English women. *Journal of Speech, Language, and Hearing,* 49(4), 879-887.

American Speech-Language-Hearing Association. (n.d.). *Voice disorders.* https://www.asha.org/practice-portal/clinical-topics/voice-disorders/#collapse_3

American Speech-Language-Hearing Association. (n.d.). *Resonance disorders.* https://www.asha.org/practice-portal/clinical-topics/resonance-disorders/#collapse_3

Amir, O., & Levine-Yundof, R. (2013). Listeners' attitudes toward people with dysphonia. *Journal of Voice, 27*(4), https://doi.org/10.1016/j.jvoice.2013.01.015

Beatty, P. J., & Beatty, M. J. (1976). An investigation of the believability of verbal messages accompanied by incongruent paralinguistic cues. *Reading Improvement, 13*(2), 105-107.

Bettens, K., Alighieri, C., Bruneel, L., De Meulemeester, L., & Van Lierde, K. (2020). Peer attitudes toward children with cleft (lip and) palate related to speech intelligibility, hypernasality and articulation. *Journal of Communication Disorders, 85*. https://doi.org/10.1016/j.jcomdis.2020.105991

Coleman, J. M., Brunell, A. B., & Haugen, I. M. (2014). Multiple forms of prejudice: how gender and disability stereotypes influence judgments of disabled women and men. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues, 34*(1), 177-189. doi:10.1177/0146167214542800

Craig, A., Tran, Y., & Craig, M. (2003). Stereotypes towards stuttering for those who have never

had direct contact with people who stutter: A randomized and stratified study. *Perceptual and Motor Skills, 97*, 235-245.

Findler, L., Vilchinsky, N., & Werner S. (2007). The multidimensional attitudes scale towards persons with disabilities (MAS): Construct and validation. *RCB, 50*(3), 166-176, doi: 10.1177/00343552070500030401

Furnham, A., & Shagabutdinova, K. (2012). Sex differences in estimating multiple intelligences in self and others: A replication in Russia. *International Journal of Psychology, 47*(6), 448-459. http://dx.doi.org/10.1080/00207594.2012.658054

Hughes, S., Gabel, R., Irani, F., & Schlagheck, A. (2010). University students' explanations for their descriptions of people who stutter: An exploratory mixed model study. *Journal of Fluency Disorders, 35*, 280-298.

Huskin, P. R., Reiser-Robbins, C., Kwon, S. (2018). Attitudes of undergraduate students towards persons with disabilities: Exploring effects of contact experience on social distance across ten disability types. *Rehabilitation Counseling Bulletin, 62*(1), 53-63, https://doi.org/10.1177/0034355217727600

Lallh, A. K., & Rochet, A. P. (2000). The effect of information on listeners' attitudes toward speakers with voice or resonance disorders. *Journal of Speech, Language, and Hearing Research, 43*, 782-795.

Lee, B. & Pyun, S. B. (2014). Characteristics of cognitive impairment patients with post-stroke aphasia. *Annals of Rehabilitation Medicine, 38*(6), 759-765, doi: 10.5535/arm.2014.38.6.759

Lev Ari, S. & Keysar, B. (2010) Why don't we believe non-native speakers? The influence of

accent on credibility. *Journal of Experimental Social Psychology, 46*, 1093-1096, doi:10.1016/j.jesp.2010.05.025

Lim, A., Young, R. L., & Brewer, N. (2021). Autistic adults may be erroneously perceived as deceptive and lacking credibility. *Journal of Autism and Developmental Disorders,* https://doi.org/10.1007/s10803-021-04963-4

Mueller-Johnson, K., Toglia, M. P., Sweeney, C. D., & Ceci, S. J. (2007). The perceived credibility of older adults as witnesses and its relation to ageism. *Behavioral Sciences and the Law, 25*, 355-375, doi: 10.1002/bsl.765

National Aphasia Association. (n.d.). *Aphasia FAQs, https://www.aphasia.org/aphasia-faqs/*

National Aphasia Association. (2020). *2020 Aphasia Awareness Survey,* https://www.aphasia.org/2020-aphasia-awareness-survey/

National Institute on Deafness and Other Communication Disorders. (2017). *Stuttering.* U.S. Department of Health and Human Services. https://www.nidcd.nih.gov/health/stuttering

National Institute on Deafness and Other Communication Disorders. (2015). *Aphasia* [Fact sheet]. U.S. Department of Health and Human Services. https://www.nidcd.nih.gov/sites/default/files/Documents/health/voice/Aphasia.pdf

Ouellette-Kuntz, H., Burge, P., Brown, H. K., & Arsenault, E. (2010). Public attitudes towards individuals with intellectual disabilities as measured by the concept of social distance. *Journal of Applied Research in Intellectual Disabilities, 23*, 132-142.

Ozuru, Y. & Hirst W. (2006). Surface features of utterances, credibility judgments, and memory. *Memory & Cognition, 34*(7), 1512-1526.

Schroeder, S. R., Rembrandt, H. N., May, S., & Freeman, M. R. (2020). Does having a voice

disorder hurt credibility? *Journal of Communication Disorders, 87*, n.p., doi: 10.1016/j.jcomdis.2020.106035

Simonds, B. K., Meyer, K. R., Quinlan, M. M., & Hunt, S. K. (2006). Effects of instructor speech rate on student affective learning, recall, and perceptions of nonverbal immediacy, credibility, and clarity. *Communication Research Reports, 23*, 187-197.

Streeter, L. A., Krauss, R.M., Geller, V., Olson, C., & Apple, W. (1977). Pitch changes during attempted deception. *Journal of Personality and Social Psychology, 35*(5), 345-350.

Tiling, J. V. (2011). Listener perceptions of stuttering, prolonged speech, and verbal avoidance behaviors. *Journal of Communication Disorders, 44*, 161-172. doi:10.1016/j.jcomdis.2010.09.002

Williams, D. F., & Dietrich, S. (2001). Perceptions of communicative disorders: verification and specification of rater variables. *Journal of Communication, 34,* 355-366.

Tables and Figures

Table 1

Hypothesized Order of One-Way ANOVA Trait Ratings

Variable	Lisp	Stutter	Hoarseness of Voice	Wernicke's aphasia
Warmth	1	3	4	2
Competence	2	3	1	4
Overall intelligence	1	3	2	4
Social/ emotional intelligence	1	2	3	4
Giftedness in performing arts	3	4	1	2
Verbal intelligence	2	3	1	4
Credibility	1	4	2	3
Social distance	1	3	2	4

Note: Ratings are numbered in the descending order of the trait score, with 1 indicating the highest score possible and 4 indicating the lowest score possible. Higher scores on social distance are more favorable, which indicate *less* social distance desired.

Table 2

Descriptive Statistics for Randomly Assigned Conditions

Variable	*n*	*M*	*SD*
Social Distance			
Lisp	31	5.72	1.26
Stutter	31	5.77	1.16
Hoarse Voice	28	4.96	1.56

Total	90	5.50	1.36
Warmth			
Lisp	31	5.49	1.31
Stutter	32	5.17	1.18
Hoarse Voice	29	4.71	1.48
Total	92	5.13	1.35
Competence			
Lisp	31	4.49	0.93
Stutter	32	4.63	1.22
Hoarse Voice	29	4.78	0.88
Total	92	4.63	1.02
Credibility			
Lisp	31	3.48	0.92
Stutter	32	3.91	0.92
Hoarse Voice	29	3.69	0.81
Total	92	3.70	0.90
Overall Intelligence			
Lisp	31	3.48	0.77
Stutter	32	3.66	0.70
Hoarse Voice	29	3.52	0.69
Total	92	3.55	0.72
Social/Emotional IQ			
Lisp	31	3.23	1.02
Stutter	31	3.42	0.92
Hoarse Voice	29	3.55	0.99
Total	91	3.40	0.98
Gifted in Arts			
Lisp	31	3.32	0.87
Stutter	32	3.09	1.12
Hoarse Voice	29	3.45	0.99
Total	92	3.28	1.00
Verbal Intelligence			
Lisp	31	2.65	1.14
Stutter	32	3.22	1.01
Hoarse Voice	29	3.41	.91
Total	92	3.09	1.07

Note: Scales ranged from 1-5 for the variables of credibility and intelligence types. Scales ranged from 1-7 for warmth, competence, and social distance measures.

Table 3

Descriptive Statistics for Matched-Samples Design

Variable	*n*	*M*	*SD*
Social Distance			
Lisp	12	5.65	1.36
Stutter	14	5.58	1.28
Hoarse Voice	14	5.12	1.39
Wernicke's	15	5.16	1.25
Total	55	5.36	1.30
Warmth			
Lisp	12	5.88	1.19
Stutter	14	4.93	1.17
Hoarse Voice	14	4.89	1.41
Wernicke's	15	5.50	0.73
Total	55	5.28	1.18
Competence			
Lisp	12	4.69	1.01
Stutter	14	4.52	1.34
Hoarse Voice	14	5.20	0.94
Wernicke's	15	4.07	0.87
Total	55	4.60	1.11
Credibility			
Lisp	12	3.58	1.00
Stutter	14	4.07	0.92
Hoarse Voice	14	4.00	0.78
Wernicke's	15	2.93	1.16
Total	55	3.64	1.06
Overall Intelligence			
Lisp	12	3.67	0.65
Stutter	14	3.64	0.84
Hoarse Voice	14	3.57	0.76
Wernicke's	15	2.87	1.06
Total	55	3.42	0.90
Social/Emotional IQ			
Lisp	12	3.17	1.12
Stutter	14	3.29	0.99
Hoarse Voice	14	3.64	0.93

Wernicke's	15	2.93	1.10
Total	55	3.25	1.04
Gifted in Arts			
Lisp	12	3.50	0.91
Stutter	14	3.00	1.30
Hoarse Voice	14	3.57	1.02
Wernicke's	15	3.47	1.46
Total	55	3.38	1.20
Verbal Intelligence			
Lisp	12	2.67	0.89
Stutter	14	3.07	0.92
Hoarse Voice	14	3.64	0.84
Wernicke's	15	2.93	1.34
Total	55	3.09	1.06

Note: Scales ranged from 1-5 for the variables of credibility and intelligence types. Scales ranged from 1-7 for warmth, competence, and social distance measures.

Table 4

Correlations of Social Distance and Verbal Intelligence with other Traits within each Condition

	Social Distance	Credi-bility	Overall IQ	Social/ Emotional IQ	Gifted in Arts	Verbal IQ	Warmth	Compet-ence
Social Distance								
Stutter	–						.58**	
Lisp	–	.49**	.43*	.44**			.71**	
Hoarse	–	.49**	.49**	.52**			.84**	.46*
Verbal IQ								
Stutter		.37*	.48**	.52**		–		
Lisp		.67**	.54**	.50**		–	.42*	.43*
Hoarse		.62**	.39*	.38*	.58*	–		

Note: *Correlation is significant at the .05 level (2-tailed), **Correlation is significant at the .01 level (2-tailed)

Figure 1

One Way ANOVA Results of Verbal Intelligence Ratings Differing by Three Disorder Conditions

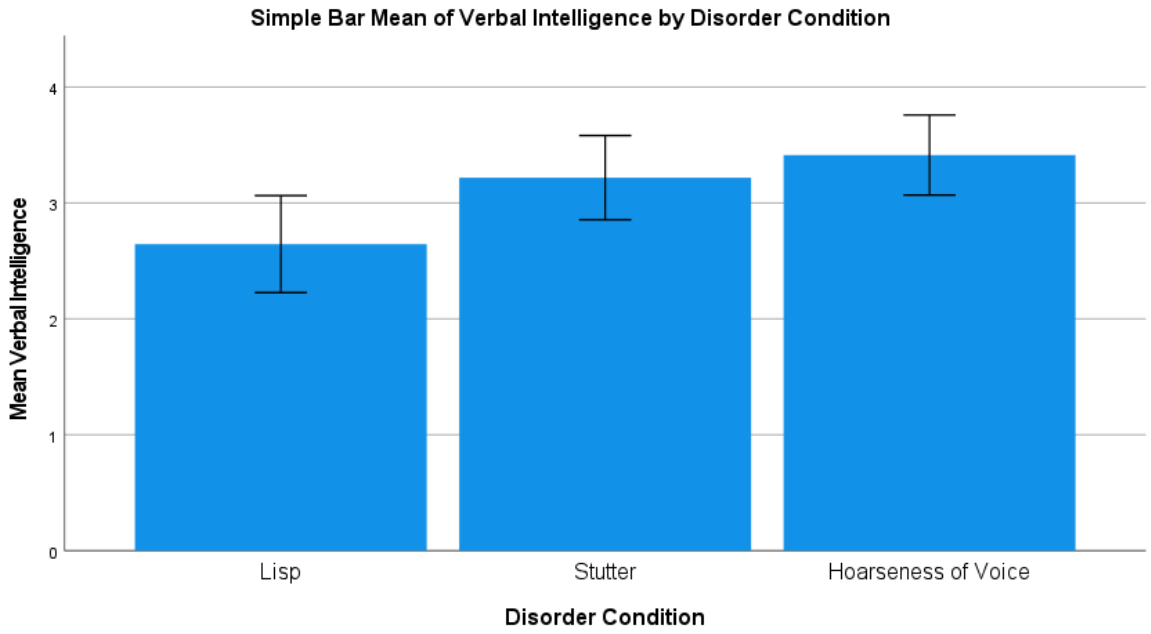


Figure 2

One Way ANOVA Results of Social Distance Ratings Differing by Three Disorder Conditions

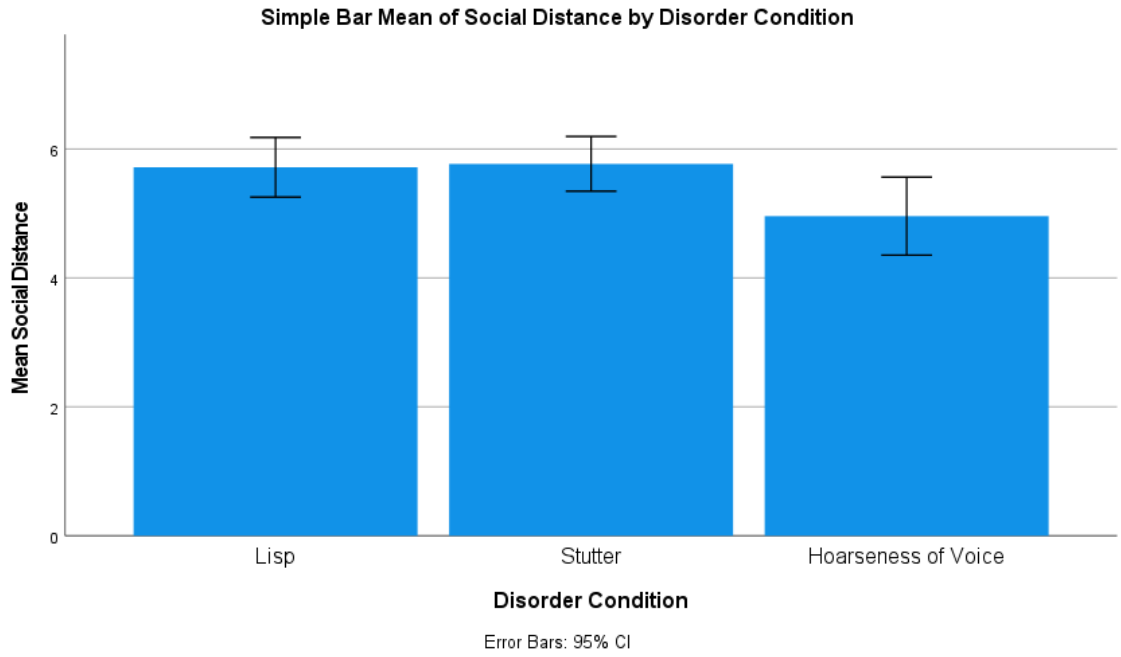


Figure 3

One Way ANOVA Results of Competence Ratings Differing by Four Disorder Conditions

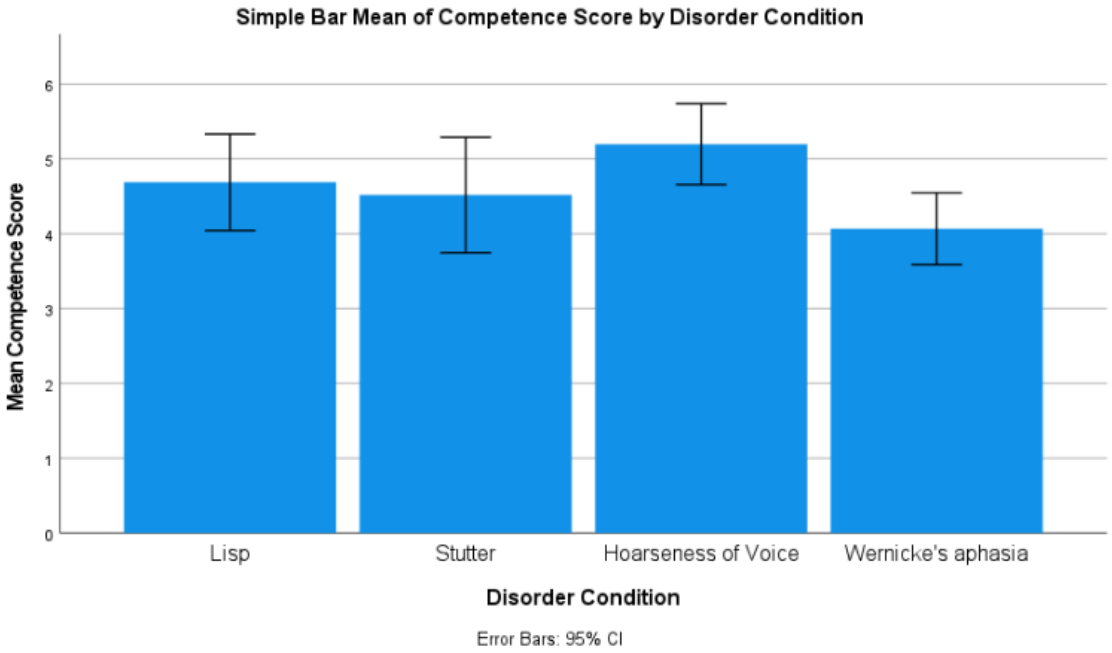


Figure 4

One Way ANOVA Results of Credibility Ratings Differing by Four Disorder Conditions

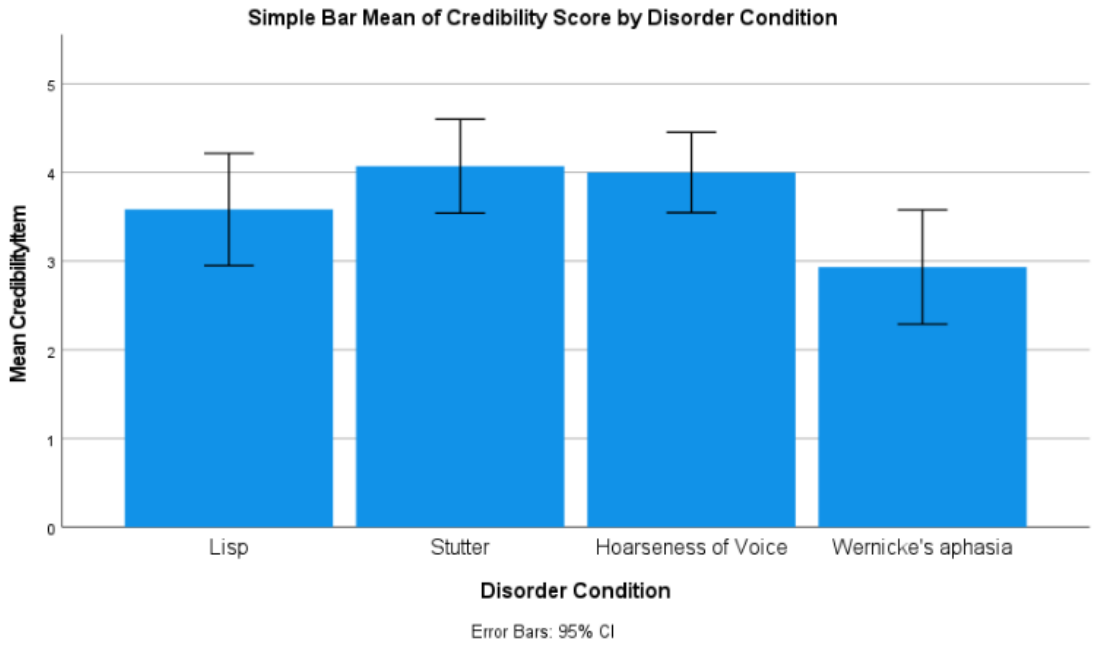
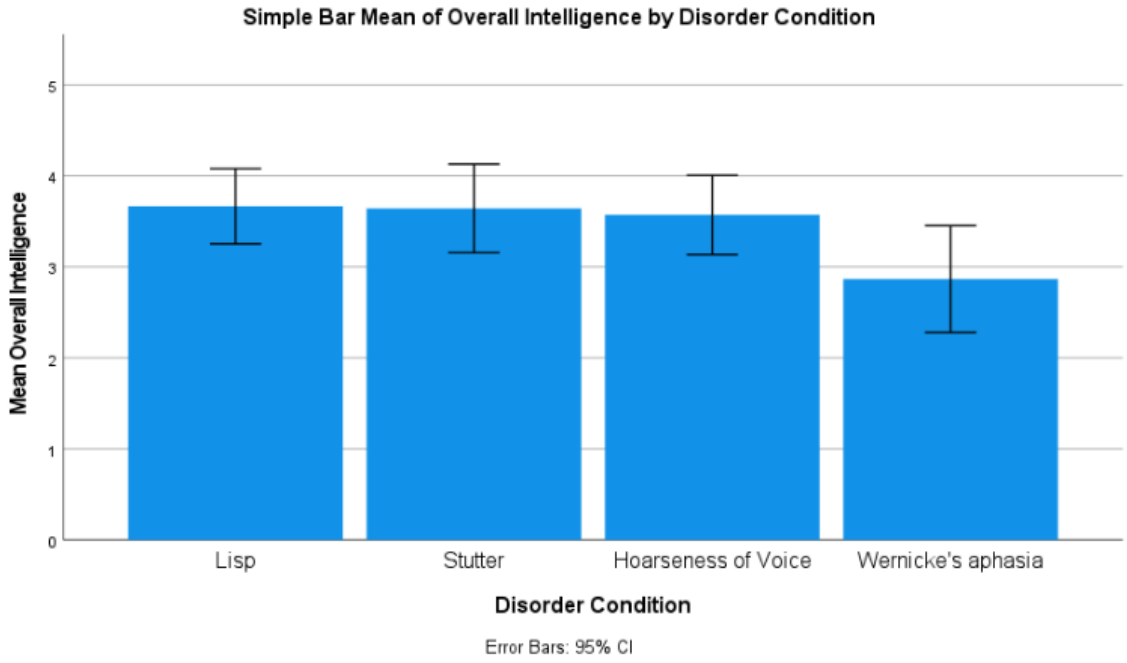


Figure 5

One Way ANOVA Results of Overall Intelligence Ratings Differing by Four Disorder Conditions



Appendix A

Personality Characteristics Scale (Coleman et al., 2014)

Please rate how descriptive each of the following traits is of the speaker, using the scale provided

(-3 = not at all descriptive, 0 = neutral, 3 = very descriptive)

____ good
____ pleasant
____ calm
____ active
____ tense
____ competent
____ confident
____ independent
____ competitive
____ intelligent
____ tolerant
____ warm
____ good natured
____ sincere
____ physically attractive
____ outgoing
____ fun
____ worthless
____ fair
____ fast
____ strong
____ likeable
____ happy
____ friendly

Appendix B

Intelligences - Adapted From (Furnham & Gasson, 1998; Furnham & Shagabutdinova, 2012)

What do you think the speaker's overall intelligence is? (1 = below average, 3 = average, 5 = above average) ____

How socially/emotionally intelligent do you think the speaker is? (1 = not socially/emotionally intelligent at all, 3 = average social/emotional intelligence, 5 = high in social/emotional intelligence) ____

How gifted do you think the speaker is in the performing arts? (1 = not at all gifted, 3 = average performing, 5 = very gifted) ____

What do you think the speaker's verbal intelligence is like (the ability to use words)? (1 = very low, 3 = average, 5 = very high) ____

Appendix C

Social Distance Scale (Coleman et al., 2014)

Please select one number that corresponds with how comfortable you would be being in each of the following relationships with the speaker, using the scale provided: (1 = not at all comfortable, 4 = somewhat comfortable, 7 = very comfortable).

How comfortable would you be as the speaker's friend? ____

How comfortable would you be if the speaker lived in your neighborhood? ____

How comfortable would you be if the speaker married into your family? ____

How comfortable would you be if the speaker dated one of your friends or family members?

____

How comfortable would you be having the speaker as a co-worker? ____

How comfortable would you be having the speaker as an acquaintance? ____

How comfortable would you be having the speaker as a family member? ____

How comfortable would you be having the speaker as a resident of your city? ____

Appendix D

Demographic Questionnaire and Credibility Item

1. Age __
2. What is your primary racial identity?
    a. Black or African American
    b. Asian or Pacific Islander
    c. White
    d. Hispanic or Latinx
    e. Native American or American Indian
    f. Biracial or Multiracial
    g. A race/ethnicity not listed here: ___
3. To which gender identity do you most identify?
    a. Female
    b. Male
    c. Non-conforming
    d. Prefer to self-describe: ___
4. College major(s) ___
5. Did you notice differences in the way the speaker communicated from the general population?
    a. Yes
    b. No
6. Do you/have you had a friend or family member with a speech or language disorder?
    a. Yes

    b. No

7. Do you/have you had a speech or language disorder?

    a. Yes

    b. No

8. If yes, what type?

    a. ____

    b. Prefer not to say

On a scale of 1 to 5, how credible do you think the speaker is? (1 = not credible at all, 3 = average in credibility, 5 = extremely credible)

Appendix E

Audio Script

"This weekend we went to Englewood. This was a wonderful resort because it was just what we were looking for. As soon as we got there, I saw a pair of gopher turtles. One or the other made its way to the cottage where I was staying each morning where it would rest on the welcome mat of my front door. I must show you the great pictures I took of it. I never got bored there and was amazed at the activities available like walking the miles of sandy beach, playing tennis or basketball, splashing in the pool, hiking on the nature trails or taking the club's boat out for a sail. The beach near the resort was loaded with shells and every morning we walked the beach, collected shells, splashed in the waves and admired the railroad plants that stretched across the sand. I was interested to see the sea-turtle nesting spots on the sand. The rest of the time we hung out at the pool in the afternoons and went out for dinner then made it back in time to watch the sunset from the porch. I was sad to leave yesterday and would recommend the resort to anyone." (Allard & Williams, 2008).

Appendix F

Report of Insignificant Findings

An independent samples t-test revealed there were no statistically significant differences between participants who have had contact with a person with a communication disorder (N = 28) and participants who have not (N = 62) on the attitude ratings of warmth, $t(86) = .36$, p = .359, competence, $t(86) = .56$, $p = .288$, social distance, $t(85) = -.74$, $p = .231$, credibility, $t(86)$ = -1.45, $p = .076$, overall intelligence, $t(86) = -.66$, $p = .254$, social/emotional intelligence, $t(85)$ = .56, $p = .288$, giftedness in the performing arts, $t(86) = 1.24$, $p = .109$, or verbal intelligence, $t(86) = .89$, $p = .187$. This test was conducted using a one-sided alpha level of .05.

An independent samples t-test revealed there were no statistically significant differences between females (N = 66) and males (N = 29) on the attitude ratings of warmth, $t(91) = 1.07$, p = .291, competence, $t(91) = .-.55$, $p = .582$, social distance, $t(89) = .76$, $p = .450$, credibility, $t(91)$ = -1.56, $p = .115$, overall intelligence, $t(91) = -1.53$, $p = .131$, social/emotional intelligence, $t(90)$ = -.42, $p = .673$, giftedness in the performing arts, $t(91) = -.23$, $p = .821$, or verbal intelligence, $t(91) = -1.05$, $p = .295$.