Communication Sciences and Disorders Students' Attitudes About American Sign Language, English, and Deaf Culture

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ABSTRACT

Speech-language pathologists, who are considered experts for speech and language development of deaf children, often lack the training necessary to support the language development of deaf children (Brackett, 1997). Little research has been conducted on the attitudes of communication sciences and disorders (COMD) students towards ASL intervention and spoken English intervention for deaf children. Additionally, more research is needed on COMD students' beliefs about Deaf culture and Deaf personhood. This study is a descriptive study using an online survey to collect data about what attitudes undergraduate COMD students hold regarding ASL, spoken English, and Deaf culture. Forty-eight students participated in the study. On average, students had favorable attitudes of ASL interventions for deaf children and slightly negative attitudes about spoken English interventions. Students also reported a more cultural view of Deaf personhood compared to a medical view on ten questions from the Attitudes About Deafness scale created by Cooper et al. (2004). Negative correlations were found between spoken English scores and Deaf culture scores, meaning that on average, the higher a student prioritized spoken English, the less positive views they had of Deaf culture. Students who had taken aural rehabilitation and/or audiology had significantly higher prioritization of spoken English interventions. Students who had taken an ASL class had significantly more positive views of Deaf culture. Understanding how COMD students view ASL, spoken English, and Deaf culture can provide valuable information on how to increase acceptance of signed languages and Deaf culture in the professions of speech-language pathology and audiology.

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"When a flower doesn't bloom, you fix the environment in which it grows, not the flower."

— Alexander Den Heijer

Dr. Sanjay Gulati (2018) classifies the incomplete language acquisition of deaf children as "an epidemic" that affects the social, emotional, and cognitive development of deaf children worldwide. He states, "Deaf children can be raised in loving homes, treated by medical specialists, fitted with high-tech electronic aids, and provided special education, yet still emerge from childhood with a devastating, permanent, and *preventable* disability" (p. 24). Incomplete language acquisition of children due to a lack of adequate language input is a phenomenon referred to as "language deprivation," which is when a child does not develop a fluent first language in early childhood (Glickman & Hall, 2018). This epidemic is of importance to speech language pathologists, whose role in deaf education is to provide effective speech and language interventions for deaf children and their families (Brackett, 1997). Many interventions that support speech and language acquisition are used in the United States to teach deaf children, such as auditory-verbal therapy (AVT), American Sign Language (ASL) exposure, and signed systems of English (American Speech-Language and Hearing Association [ASHA], 2018; Marschark & Hauser, 2012; Martin & Clark, 2012; Valli, Lucas, & Villanueva 2011). While many interventions exist, there is growing evidence that auditory-verbal approaches alone are insufficient in creating English language proficiency, leaving deaf children without fluency in a first language (Dunn et al., 2014; Geers et al., 2003; Gstoettner et al., 2000; Gulati, 2018;

Marschark & Hauser, 2012; Niparko, 2010; Svirsky et al., 2000). Research has shown that deaf children who are taught fluent ASL from birth do not exhibit delays in language, cognition, emotional development, or social development but reach all language and developmental milestones at the same rate as hearing children (Newport & Meier, 1985; Petitto, 2001). Speech-language pathologists and audiologists are the professionals who educate parents and have power in recommending which interventions can be chosen by the educational team. Little is known about what attitudes these professionals have about sign language intervention compared to spoken language intervention and how these attitudes change over time. There is also limited research in what these professionals believe about Deaf community, Deaf personhood, and Deaf culture. Since all speech pathologists and audiologists must first complete a bachelor's degree in Communication Sciences and Disorders (COMD) before being accepted into master's degrees or doctorate degrees and acquiring a license to practice, understanding their beliefs about signed and spoken language interventions can add to the limited existing research. The current study seeks to collect descriptive data about undergraduate COMD students' beliefs about ASL, spoken English, and Deaf culture.

The Role of Speech-Language Pathology

In 2018, the American Speech-Language and Hearing Association (ASHA), the national professional, scientific, and credentialing association for speech-language pathologists and audiologists, reported 51.4% of the speech-language pathologists represented by the organization worked in school settings (ASHA, 2018). For deaf children who are in public education settings, the speech language pathologist employed by the school acts as a case manager, service provider, and team member for the deaf child and is considered the "resident expert" in speech and

language development for deaf children (Brackett, 1997). Because of the low incidence of deaf and hard of hearing children (1-3 of every 1,000 children in the United States), it is unlikely that there will be other professionals employed by the school with expertise in deaf education and speech- language pathologists in this setting typically have limited information and experience in creating and implementing interventions for deaf children (Brackett, 1997; CDC, 2009; NIDCD, 2010).

As a case manager and team member, speech-language pathologists are required to gather resources to distribute to the child's educational team, collaborate with other educators and professionals in the school, and coordinate which services and interventions the child should receive. As a service provider, the speech-language pathologist provides direct services to the deaf child in the form of individual or group therapy sessions by creating individualized goals and objectives that fit the client's needs. Many speech-language pathologists in this setting report feeling unqualified to handle the responsibility of all these roles since deaf and hard of hearing children often have complex communication deficits from language deprivation (Brackett, 1997). Although speech-language pathologists in these settings may lack confidence in their ability to address the complex communication needs of deaf children, they are required by ASHA to use evidence-based practice, a combination of research, client's needs, and clinical experience, to provide effective and ethical services.

Cultural Competence in Speech-Language Pathology

ASHA outlines their non-discrimination policy to ensure their practices do not discriminate on the premise of race, ethnicity, sex, gender identity/gender expression, sexual orientation, age, religion, national origin, disability, culture, language, dialect, or socioeconomic

status. The terms "culture," "language" and "disability" in this statement relate to how speech-language pathologists interact with deaf clients in the Deaf community. Capital-D "Deaf," refers to the cultural identity of a Deaf individual and differs from the lowercase-d "deaf," which is the medical diagnosis of having a hearing loss. The Deaf community has customary beliefs, social forms, and material traits that differ from the hearing majority (Humphries & Padden, 2005). Examples of these differences are norms related to eye-contact, touch, storytelling, facial expressions, and candidness, to name a few (Humphries & Padden, 2005). Deaf culture emerged in communities of Deaf people who interact with the world visually. Humphries and Padden (2005) explain that Deaf history involved social connections at Deaf residential schools and connections through employment. Deaf communities formed around Deaf poetry and art, and from those communities, Deaf people developed a shared dialogue around their lived experiences. It is important to note that "Deaf capital," the knowledge and skills that Deaf adults use to navigate the world, has been transmitted from Deaf adults to Deaf children through many avenues, but most notably Deaf residential schools (Ladd, 2003). Since most deaf children are born to hearing parents, this cultural transmission does not typically happen intergenerationally as many racial and ethnic cultures do. Deaf acculturation is a process that does not necessarily happen once someone loses their sense of hearing, but instead happens as one connects with other Deaf individuals, embraces a Deaf identity, and becomes active in social Deaf spaces (Maxwell-McCaw & Zea, 2011).

Pertaining to "language" in ASHA's non-discrimination policy, culturally Deaf people come together around a shared language—ASL. ASHA states that out of 191,104 speech therapists and audiologists certified by the organization, 702 (0.004%) report fluency in

American Sign Language (ASHA, 2018). Understanding the differences in visual and auditory languages firsthand is an invaluable skill for those that provide services to deaf children. For example, a speech-language pathologist could be unaware that English and ASL have completely different grammar and syntax rules. If this clinician were evaluating an ASL/English bilingual child, it would be necessary to understand the differences in visual and auditory languages.

Speech and Language Development in Deaf Children

To understand communication interventions for deaf and hard of hearing children, one must first understand the differences between speech and language (ASHA, n.d.). Speech is the ability to form sounds into words by using one's vocal cords and oral cavity (tongue, lips, & palate) and includes voice, fluency, and articulation. In contrast, language is the meaning behind speech or signs that is composed of grammar, syntax, and morphology. For example: If a hearing child cannot say his /r/ sound but has a very robust vocabulary and reads at reading level, his speech skills are affected, but not his language skills. If a child can repeat words accurately but he does not know the meaning of the word or how to formulate a sentence from the word, this would be a deficit in his language skills, but not his speech skills. It is possible that a person without any speech skills could be fluent in the English language through alternate modes (reading and writing). Signed languages (such as British Sign Language, American Sign Language, French Sign Language, ProTactile) do not require speech, but instead use manual, tactile, and/or visual modalities.

Typical Language Development for Speaking Children

Typically developing hearing children acquire a strong foundation for speech and language in the critical period for language development (from birth to 5) and continue to learn

language across the lifespan (Center on the Developing Child, 2007). Some relevant language milestones in early childhood development are listed in Appendix A.

Typical Language Development for Signing Children

Simms et al. (2013) created the standardized Visual Communication and Sign Language (VCSL) Checklist for Signing Children as an assessment tool to aid educators in developing appropriate goals and learning materials for signing children and to help identify deaf children's gaps in language learning from birth to age five. Simms et al. identify 113 language milestones exhibited by ASL-signing children and present norms at which the milestone is marked as "emerging", "inconsistent use," or "mastered." Some notable items are addressed in Appendix B.

Critical Periods for Hearing, Language, and Cognition

Language milestones discussed above are outlined from birth to five years of age. While language learning happens across the lifespan, birth to five is considered the "critical period" for language development (Center on the Developing Child, 2007). This critical period is defined by the brain's ability to rapidly form new connections during developmental windows in childhood. The Center on the Developing Child at Harvard University (2007) outlines the development of three areas: (a) sensory pathways (vision and hearing), (b) language pathways, and (c) cognitive functions. The researchers explain how the brain's plasticity (ability to create strong new neural connections) peaks at a specific time in childhood and how plasticity decreases with an increase in age. These areas are of importance to speech-language pathologists for understanding the sensory, language, and cognitive development of deaf children. If a child does not have adequate input of appropriate and reliable stimuli in this timeframe, "the brain's architecture does not form as expected, which can lead to disparities in learning and behavior" (Center on the Developing

Child, 2007).

Sensory Pathways. The sensory pathways (vision and hearing), begin before birth, peak at 3-4 months of age and taper off by five years. In the first year of life, the peak drops drastically, as seen in Figure 1. If a child does not have auditory stimuli within the first year, these neurological pathways will not likely develop at a normal rate and the child's auditory process will be affected. In the United States, congenitally deaf children who show minimal benefit from hearing aids are candidates to receive a cochlear implant by 12 months old or older (Cochlear Americas, n.d). By 12 months, the brain's plasticity decreases significantly, which impairs the way the brain interprets auditory stimuli. At this point, hearing pathways typically do not develop effortlessly, therefore, a deaf child with a cochlear implant at 12 months must undergo aural habilitation to strengthen the brain's comprehension of the auditory stimuli (Srinivasan, 1996). While hearing pathways are important with spoken language development of deaf children, it is important to note that language and cognition are not reliant on hearing. Congenitally deaf children without amplification who are exposed to a signed language from birth may never develop typical sensory pathways of hearing but can easily develop typical language and cognition skills (Newport & Meier, 1985).

Language Pathways. Language learning pathways begin before birth, peak around 8-9 months and taper off by five years of age (Center on the Developing Child, 2007). Mehler et al. (1988) found that hearing neonates start developing language even before birth by preferring the language they heard while they were in their mother's womb. Like hearing pathways, most of the language "peak" is within the first year of life (Center on the Developing Child, 2007). Deaf children who are born to Deaf ASL-signing parents receive comparable language exposure as

their hearing peers and develop all language milestones on time (Meier, 1991). Alternately, deaf children who are born to hearing parents in spoken language environments often have limited access/exposure to spoken language in the home before their hearing loss is detected or diagnosed (Friedmann & Rusou, 2015). If the child does not develop fluency in a first language before age five, the child may not later develop complete fluency in any language at all and have structural brain differences compared to typically developing children (Pénicaud et al., 2012).

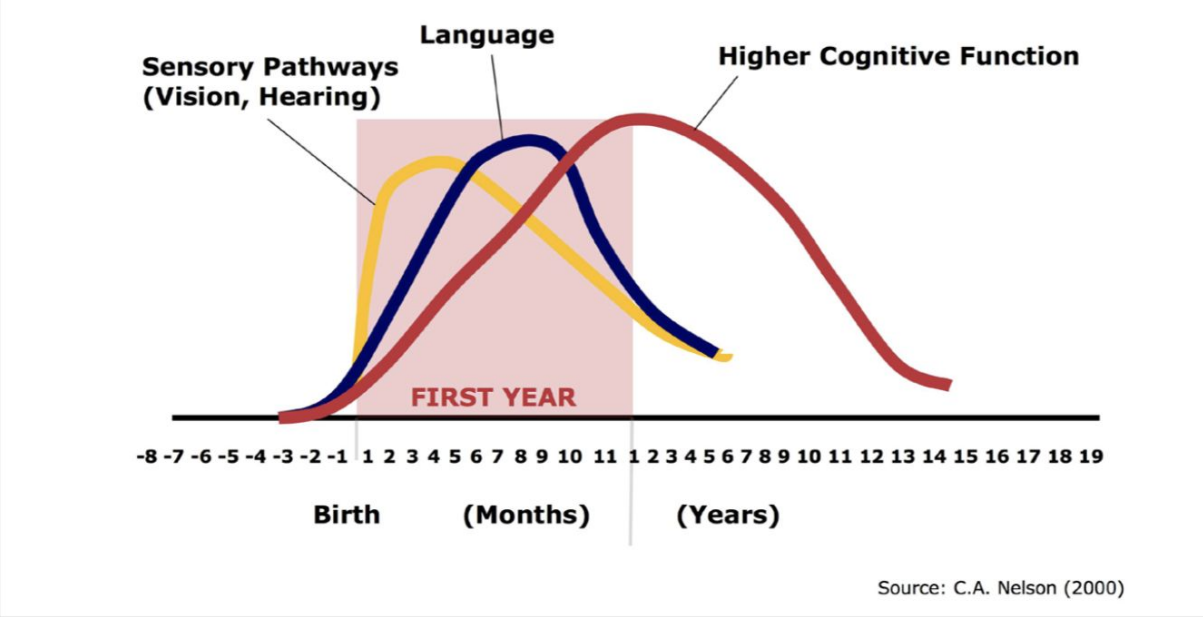
Yoshingaga-Itano and Apuzzo (1998) tested 40 deaf children on general development skills (gross motor, fine-motor, expressive language, comprehension-conceptual, situation-comprehension, self-help, and personal-social) and found that infants whose hearing loss was diagnosed before 6 months had significantly better outcomes in expressive language and conceptual measures compared to children diagnosed after 18 months. Whether the language exposure one receives is spoken or signed, strong language input is critical for the developing deaf person (Mayberry et al., 2002). Marschark and Hauser (2012) explain, "Delaying the learning of a signed language in the hope of better speaking skills in deaf children-- like delaying cochlear implantation-- has not been shown to have any advantages" (p. 44). While both spoken language and signed language add to early language exposure, signed language is completely accessible to deaf children visually, while spoken language has barriers. Deaf children who are only exposed to auditory languages do not receive language input until they are fitted with a cochlear implant or hearing aid, which is confounded by the critical period for hearing. A deaf child's brain must first learn to understand auditory input by decoding sounds (strengthening hearing pathways) before he has access to learning what those sounds mean (strengthening language pathways). Congenially deaf children are at greater risk for language deficits, while

children who lose their hearing during or after these windows are partially protected, but still require active intervention.

Higher Cognitive Function Pathways. A strong language foundation is critical to developing higher cognitive functions (Astington & Baird, 2005). At 12 months, cognitive functions peak in development and taper by 14 years of age. For children who are not provided a strong language foundation in the critical period, deficits will also be seen in cognition (executive planning, attention, and memory). Cognition is discussed in more detail under Language Deprivation.

Figure 1

Human Brain Development: Neural Connections for Different Functions Develop Sequentially.



Note. Adapted from Center on the Developing Child (2007) and Nelson (2000).

Since the critical period for developing hearing, language, and cognition peaks before or at the first year, early interventions are pivotal in creating a strong foundation for later in life.

Hearing Assistive Devices

For developing hearing pathways, two common devices used by deaf and hard of hearing children are hearing aids and cochlear implants, which, in most cases, provide the child with more access to the sound environment than without intervention.

Hearing aids

Hearing aids are devices that can be thought of as "personalized public-address systems" (Martin & Clark, 2012). Sounds are picked up by the hearing aid's microphone (known as the input transducer) and are amplified and electrically transmitted to a miniature speaker (output transducer) and into the patient's external ear canal. Hearing aids have the capability to filter sounds by omitting environmental noise and heightening speech sounds (Martin & Clark, 2012). Hearing aids typically do not require any type of surgical intervention (Martin & Clark, 2012).

Cochlear Implants

An increasingly popular intervention for patients who get limited benefit from hearing aids is the surgical insertion of a cochlear implant. Cochlear implants are surgically implanted devices that provide a sense of audition to people with a moderate to profound hearing loss (Martin & Clark, 2012). Cochlear implants innervate the cochlea with 22 electrodes, which replace the 5,000 inner hair cells of the cochlea (Wilson et al., 2011). Cochlear implants consist of two parts: the internal receiver (which is surgically implanted behind the pinna) and external components (which attach to the implant through a magnet) (Martin & Clark, 2012). A microphone that is attached to the ear hook picks up sounds that are transmitted to the processor

(the behind-the-ear casing) where sound information is coded. From the processor, the signal is delivered to the transmitter which changes the signal into magnetic impulses that are sent through a magnetic field to the internal receiver and directly stimulates the auditory nerve (Martin & Clark, 2012). If the external components of the cochlear implant are not attached to the internal receiver, the patient will not be able to receive any auditory stimuli through the ear since the cochlear implant replaces any residual hearing (Martin & Clark, 2012). Candidacy for cochlear implantation is outlined in Figure 2 with information collected from Cochlear Americas (n.d.).

Figure 2

Cochlear Implant Candidacy Criteria

Age of Implantation
Adults ● Individuals 18 years of age or older ● **Moderate to profound** sensorineural hearing loss in both ears ● Limited benefit from amplification defined by preoperative test scores of **≤ 50% sentence recognition in the ear to be implanted** and **≤60% in the opposite ear** or binaurally **Children (2-17 Years)** ● **Severe to profound** sensorineural hearing loss in both ears ● Limited benefit from binaural amplification ● Multisyllabic Lexical Neighborhood Test (MLNT) or Lexical Neighborhood Test (LNT) scores **≤ 30%** **Children (12-24 Months)** ● **Profound** sensorineural hearing loss in both ears ● Limited benefit from binaural amplification

Cochlear Implant Efficacy.

In the Deaf community, the development of cochlear implants has sparked many conversations and controversies around medical ethics and Deaf identity (Sparrow, 2005; Christiansen, 2002). Some of these questions include (a) Are cochlear implants a "cure" for being deaf? (b) Does being deaf need a cure? and (c) Is it ethical for children to receive cochlear implants, although they are not medically necessary? While these questions are integral to the field of speech-language pathology and these questions continually need to be explored, there is a more tangible and applicable question that speech-language pathologists must answer: Are cochlear implants currently benefiting deaf people enough to use them (and aural habilitation from speech-language pathologists) as a stand-alone intervention?

When deaf children receive a cochlear implant, they must be taught how to understand the "sound" signals from the implant which requires years of aural habilitation from an audiologist or speech-language pathologist (Dunn et al., 2014; Geers et al., 2003; Gstoettner et al., 2000; Svirsky et al., 2000). Outcomes of cochlear implants are highly variable, and relate to many medical, demographic, and audiological factors (Dunn et al., 2014; Geers et al., 2003; Gstoettner et al., 2000; Svirsky et al., 2000). Children with the highest speech and spoken language skills correlate with children who are implanted early in life (prelingually), children with higher levels of pre-implantation hearing, and longer use of the implant, though there still is high variability within these groups (Dunn et al., 2014; Kirk et al., 2002; Miyamoto et al., 1999; Nicholas & Geers, 2006; Waltzman et al., 2002).

Speech-language pathologists must consider that deaf children with cochlear implants must first have to "learn to listen" (learn to understand the auditory-like signals from the

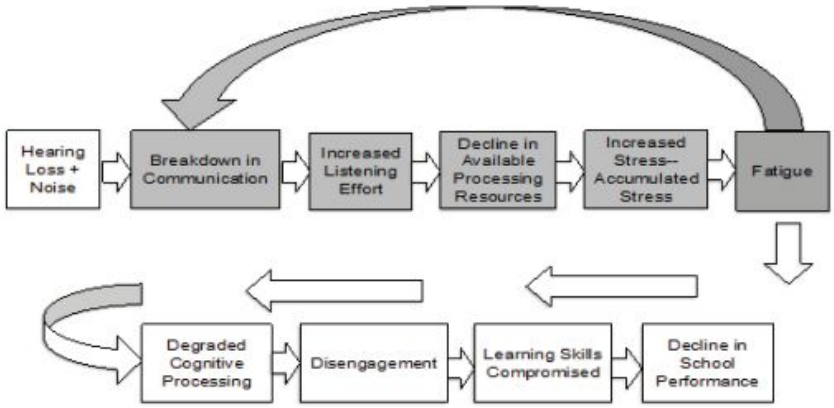
cochlear implant) before they "listen to learn" (use spoken English to access information). Using a cochlear implant to understand speech requires attention and effort, which differs greatly from the way that hearing children effortlessly hear things in their environment. Even with children who receive quality interventions, have a supportive family, and who are motivated to pursue aural habilitation, and who are implanted early, there still is high variability of the effectiveness of the cochlear implant as a reliable stand-alone intervention for language development (Kral et al., 2012).

For many cochlear implant users, using spoken communication in an educational setting requires more effort than for their hearing peers, which leads to fatigue. One personal account states, "I go to bed most nights with nothing left. It takes so much energy to participate in conversations all day, that I'm often asleep within minutes" (Portis, 2008). Hornsby et al. (2014) compared deaf and hearing students' reports of daily fatigue using the Pediatric Quality of Life Inventory (PedsQL) Multidimensional Fatigue Scale. They concluded that across all fatigue domains (general, sleep/rest, cognitive), deaf children reported significantly higher fatigue rates compared to their age-matched hearing peers. Lewis et al. (2014) discuss how some children who have mild to moderate hearing loss may be able to recognize speech in a noisy classroom, but when asked to perform comprehension tasks that took additional effort, they performed lower than their hearing peers. This research indicates that even when deaf children seemingly have access to the spoken language within a classroom, they still face challenges related to stress, effort, and fatigue. Bess and Hornsby (2014) created a model to explain daily fatigue and stress for deaf children in sound environments. They conclude that daily fatigue, effort, and stress leads to long term effects of compromising the child's learning skills and school performance. This

process is depicted in Figure 3.

Figure 3

Conceptual Model Linking Hearing Loss to Fatigue and School Performance



Note. The shaded areas represent events that occur repeatedly throughout the school day. From "The Complexities of Fatigue in Children with Hearing Loss" by F. H. Bess and B.W.Y. Hornsby (2014). Perspectives on Hearing and Hearing Disorders in Childhood, 24(2). (http://dx.doi.org/10.1044/hhdc24.2.25). Copyright 2014 by the American Speech-Language Hearing Association.

Spoken Language Interventions

The auditory verbal and auditory oral approaches are two of the most widely used therapy techniques in North America for spoken language development in deaf and hard of hearing children (Marschark & Hauser, 2012).

Auditory Verbal Therapy (AVT)

Auditory verbal therapy (AVT) utilizes one-to-one speech therapy instruction to enhance the child's listening skills and decrease dependence on speechreading (Marschark & Hauser, 2012). Clinicians of AVT cover their mouth when speaking to the child so the child does not have visual aids from watching the clinician's speech movements. This intervention requires that the child have appropriate hearing amplification to be able to access speech sounds without visual aids. Through AVT, parent involvement is crucial in that most of the speaking and listening practice/training is done at home (Marschark & Hauser 2012). Therapists support the parents, who are given "the primary responsibility for their child's success" (Marschark & Hauser, 2012).

Auditory Oral Approach (AO)

The auditory oral (AO) approach is like AVT but allows the child to use visual speechreading along with residual hearing to decode a speaker's message (Marschark & Hauser, 2012). While AVT practitioners advocate for deaf children to be placed in mainstream classroom settings, AO practitioners advocate for a variety of settings, such as separate classrooms for deaf and hard of hearing children (Marschark & Hauser, 2012). Speechreading alone, without reliable residual hearing, only allows for the speechreading child to catch approximately 30% of English phonemes. This is due to the visual similarities of many phonemes. In the case of voiced/unvoiced phoneme pairings, such as f/v, t/d, k/g, and s/z, the lips supply the same visual information and can only be differentiated through auditory discrimination or sufficient context around the statement. Speechreading, therefore, leaves significant gaps in linguistic information and requires a strong understanding of the language to supply context.

Spoken Language Intervention Variability

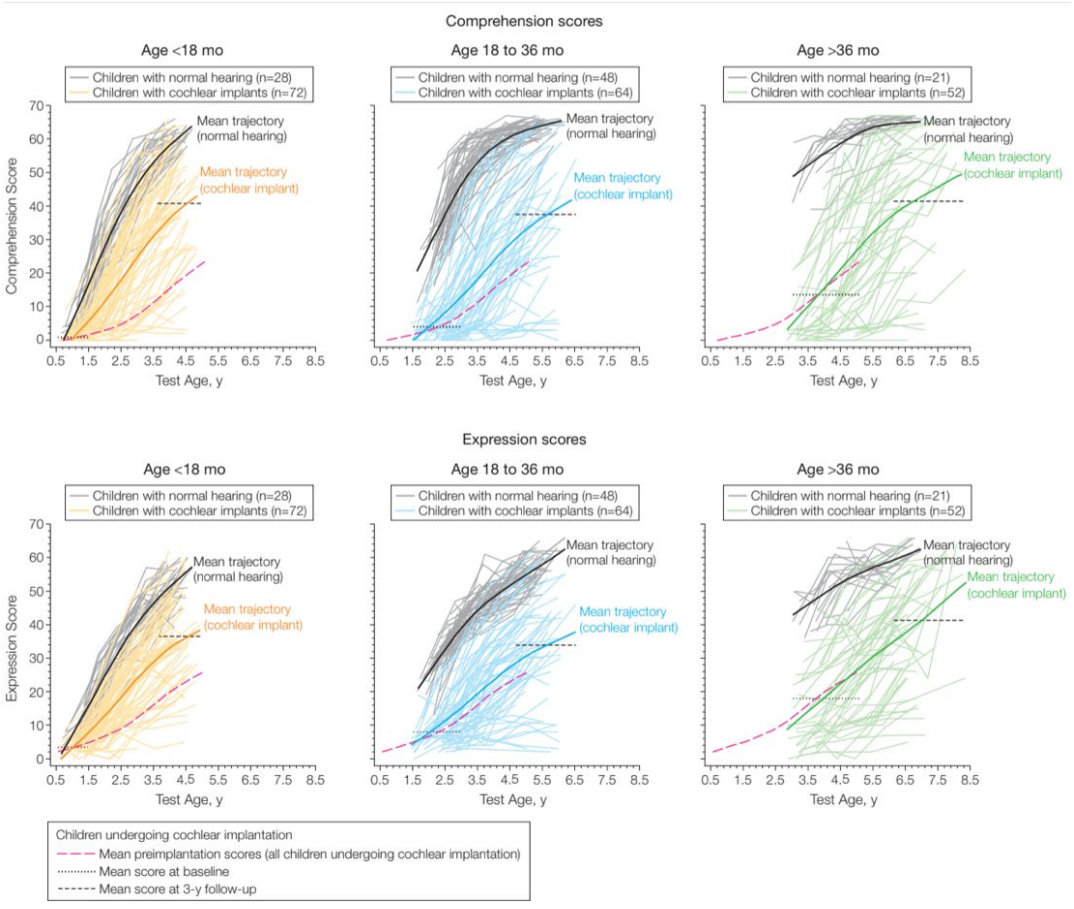
At this point, there is no way to predict which children will develop spoken language skills from the cochlear implant and which will fall short (Kral et al., 2012). While variability of language outcomes with cochlear implants is clear in the literature, (Dunn et al., 2014; Geers et al., 2003; Gstoettner et al., 2000; Niparko, 2010; Svirsky et al., 2000) the suggested solutions to absolve deficits tends to be through earlier implantation. It is important to note that while many researchers report "better outcomes" with early diagnosis, early implantation, greater residual hearing prior to implantation, and strong familial support, this does not mean that the majority of deaf children undergoing spoken language interventions are reaching typical levels of language development (Szarkowski, 2018). In a study by Geers et al. (2017), 49% of children with cochlear implants in the sample were not developing age-appropriate spoken language skills. Tobey et al. (2012) stated that in a group of eight- to nine- year-old children who were implanted at ages two to five "only about a third of the sample scored normally on measures of syntax," which would leave two-thirds of the sample unable to reliably process English syntax.

Niparko et al. (2010) conducted a three-year long prospective, longitudinal, and multidimensional study of spoken language development in 188 children in English-only programs with severe to profound hearing loss who were implanted before five years of age. Their overall conclusion was that "the use of cochlear implants in young children was associated with better spoken language learning than would be predicted from their preimplantation scores." The researchers provided a graph to show the participant's scores on the Reynell Developmental Language Scales (RDLS) test on comprehension and expression for children who were implanted before 18 months old, between 18-36 months old, and after 36 months old, shown in

Figure 4.

Figure 4

Developmental Trajectories of RDLS Raw Scores of Comprehension and Expression Grouped by Age at Baseline



Widths of the horizontal dashed and dotted lines representing Reynell Developmental Language Scales (RDLS) scores span the age ranges at time of testing. Interactive graphs are available at http://www.jama.com. Preimplant trajectories were nonparametrically estimated based on cross-sectional data from baseline. Other trajectories were nonparametrically estimated based on longitudinal data over 3 years of follow-up.

1502 JAMA, April 21, 2010—Vol 303, No. 15 (Reprinted)

Note. From "Spoken Language Development in Children Following Cochlear Implantation" by J.K. Niparko et al., 2010, *Jama, 303*(15), p.1502.

While the children with cochlear implants in the >18 months group had better outcomes than the other groups, the graphs very clearly show the vast variability of deaf children with cochlear implants having nearly nonexistent language skills to skills at or near hearing controls.

Sign Language Interventions

Both English and ASL are robust naturally occurring human languages and are "equal citizens" in that the brain engages with both equally, whether spoken or signed (Emmorey, 2002). One of the biggest differences between ASL and English is how the languages differ in modality (auditory vs visual). English words are made of phonemes (speech sounds) where a speaker uses articulators of the oral cavity and larynx to produce sounds. Traditionally, a receiver then decodes the message through hearing the speech sounds. Expression of emotion can be conveyed through many factors, including prosody, intonation, pitch, and loudness. ASL phonology is made through five parameters: handshape(s), movement, location, non-manual signals, and palm orientation (Valli, Lucas, & Villanueva, 2011). Non-manual markers can include facial expression, mouth morphemes, body shifts, and changing eye gaze to alter or add to the meaning of one's message (Valli, Lucas, & Villanueva, 2011). In ASL, the receiver decodes the message visually. Both visual and auditory languages have variation in accents and dialects (Valli, Lucas, & Villanueva, 2011). Deaf children who are taught sign language early in life, with or without simultaneous spoken language intervention, have been found to perform higher academically and have better social relationships with their family members and peers compared to children who receive spoken language interventions only (Marschark & Hauser,

2012).

American Sign Language

American Sign Language (ASL) is the primary language of the Deaf community in the United States and Canada. Interestingly, while the United Kingdom speaks English like the United States and Canada, British Sign Language (BSL) has few similarities with ASL. In fact, French Sign Language (LSF) more closely resembles ASL since the founder of the first deaf school in the United States, Thomas H. Gallaudet, studied under a Deaf LSF teacher named Laurent Clerc. Gallaudet and Clerc established American School for the Deaf in Hartford, Connecticut where the beginnings of ASL were formed (Ladd, 2003). ASL (and other signed languages) have classifiers, which are handshapes that are used to describe shapes, show how something or someone moves, and describe the location of objects, along with many other communicative functions (Valli, Lucas, & Villanueva, 2011). For example, the "3" handshape in ASL (with the thumb, pointer finger, and middle finger) is used as a classifier for a car. With this handshape, the signer can move the classifier in various ways to show "the car turned left" or "the car was on a bumpy street" depending on the movement of the 3-handshape. While English does not have classifiers, some spoken languages have classifiers, such as Navajo, Thai, and Japanese (Marschark & Hauser, 2012). ASL also has the use of a manual alphabet, known as *fingerspelling* (Valli, Lucas, & Villanueva, 2011). Before signing children learn to read, they interpret fingerspelled words as a series of handshapes instead of letters representing a word (Marschark & Hauser, 2012). For example, the word "pen" in ASL is lexicalized. Signing children may sign "Mom, how do you spell 'pen'?" while fingerspelling the word "pen" to ask the question. High fingerspelling skills have been identified as a predictor of literacy

development in deaf children who sign (Allen, 2015).

Deaf children with cochlear implants learn both spoken and signed words rapidly (Giezen et al., 2014). Children exposed to two languages can develop both languages without negative effects to either language, even between spoken and signed languages (Genesee, 1989; Lyness et al., 2013; Petitto, 2001). In ASL/English bilingual programs, ASL proficiency is the single predictor for higher scores on nationally standardized measures of reading comprehension, English language use, and mathematics (Hrastinski & Wilbur, 2015). A strong foundation in ASL has been shown to have positive effects on spoken language development and reading skills in children with cochlear implants (Davidson et al., 2014; Nussbaum & Scott, 2004; Nussbaum et al., 2012; Robbins, 2002). Deaf children with CIs born to Deaf parents who sign have better spoken language skills when compared with deaf children who have hearing parents, which could be due to high signing skills (Hassanzadeh, 2012). Deaf children who have Deaf parents who use a natural sign language typically reach all language milestones on time, have better academic outcomes, higher self-esteem, better reading skills, and better social development (Meier, 1991; Petitto, 2001). Children implanted early (at 1-2 years old) who receive both oral-aural intervention and sign intervention can have expressive vocabulary scores and receptive syntax scores comparable to their hearing peers (Yoshinaga-Itano et al., 2010).

While all the benefits of bilingualism are clear in the literature, many professionals still advise against sign language development (Hall, 2017). There are many factors to examine when evaluating the effectiveness of different deaf education programs. As Marschark (2010) states,

> an ongoing bias toward spoken language in society means that children who are ‘oral failures’ frequently have to acquire sign language later than is natural. With unnecessary

> language delays already in place, those children experience a variety of related cognitive, social, and academic challenges-- all of which contribute to some mythical 'average' performance level among children who sign (e.g. in schools for the deaf) being lower than children who speak. (p. 6)

When evaluating research comparing children using spoken language and sign language, one must consider that many children begin in oral programs, then if they are not developing spoken language, they may transfer to a program with sign language. These children in the sign programs, who were not picking up spoken language, are then further behind with language skills in both spoken and signed languages. It is important for speech- language pathologists to have an informed understanding that language deficits in deaf and hard of hearing people are due to insufficient linguistic input in the critical period for language development rather than that ASL creates barriers to English language learning.

Sign Systems

While American Sign Language is a naturally occurring language separate from English, there are sign systems to represent English in a visual modality. These sign systems are not languages, but coded symbols to represent the English language (Valli & Lucas, 2000). Some deaf educators that were proponents of visual communication still prioritized English acquisition of deaf children and created signs for English words that did not have a direct translation into ASL (Padden & Humphries, 2005). The most used of these systems in the United States are Signed Exact English (SEE), and Conceptually Accurate Signed English (CASE) (Marschark & Hauser, 2012).

Signed Exact English uses signs adapted from ASL in English word order and adds

grammatical markers of English (plurals, -ing, -s) and initialized signs (Gustason, 1990). For example, Signed English adapted the ASL sign for "have" by changing the handshape of the sign depending on the English grammatical features of the word. Instead of a bent-5 handshape in ASL, Signed English uses a "v" handshape to differentiate "have," an "s" handshape for "has," and a "d" handshape for "had" (Marschark & Hauser, 2012). There is no evidence that signed systems have any better outcomes in producing English language fluency when compared to ASL interventions, and historically signed systems were considered too cumbersome to be one's primary mode of communication (Lane, 1992; Marschark & Hauser, 2012). Some common concerns with the way SEE is functionally utilized are that teachers: (a) break up words in ways that are conceptually inappropriate (e.g., understand becomes under+stand), (b) create new signs irresponsibly, and (c) expect that children will use SEE as their primary communication mode instead of as a tool to access English visually (Gustason, 1990).

Simultaneous Communication

Some clinicians may use the technique of "simultaneous communication," colloquially known as "SimCom" which is where a person voices English words and simultaneously uses signs. There is a lot of variation with how SimCom is functionally utilized, in that information from both modalities can be lost. In this case, the signed expression is typically at a slow rate, in English word order and lacking both ASL and English grammar and structure (Akamatsu & Stewart, 1998; Marmor & Petitto (1979); Marschark & Hauser, 2012). Since the differences in ASL and English grammar are so vast, it is impossible to create both simultaneously. Children exposed to SimCom will not have optimal language input for either language. Power et al. (2008) explain, "signing accompanying speech is non-grammatical and sometimes unintelligible

to its recipients because it violates the naturally occurring visual and movement structures of natural sign language." In this case, the child does not have access to higher-level grammatical skills in either language.

Language Deprivation in Deaf Children

When a child does not receive language input during the critical period for language development, the result is called "language deprivation syndrome." This term was coined by Dr. Sanjay Gulati, who describes language deprivation syndrome as "incomplete neurodevelopment" that manifests as an intellectual disability with a predictable set of clinical features (Gulati, 2018). He asserts that, although preventable, "language deprivation places children at risk for cognitive delays, mental health difficulties, lower quality of life, and limited health literacy, and [is] very highly correlated with dangerousness to others" (Gulati, 2018). In discussing language deprivation in deaf children, it is important to note that a child being deaf does not cause impairments of language, cognition, or social/emotional development. Deaf children who have an accessible first language do not exhibit the characteristics of language deprivation syndrome (Hall, 2017). Additionally, some deaf adults who have experienced varying levels of language deprivation are highly resilient and are able to acquire high level language skills through the limited amount of language input they received as children, but others are not as lucky. Understanding language deprivation in detail is critical for speech-language pathologists in assessing and treating deaf individuals.

Linguistic Deficits

Linguistic deficits from language deprivation will appear across all languages and modalities a person knows. If the person uses both English and ASL, deficits will be found in

both languages (Mayberry, 2007). These linguistic deficits can take many forms, but difficulties with morphosyntax, abstract thinking, arranging narratives in a linear sequence, cause and effect, answering "why" questions, understanding time concepts, and understanding the conversational partner's need for context are common characteristics (Gulati, 2018; Hall, 2017; Quinto-Pozos, 2014). Huston (2008) explains "the concept of 'why' can only arise from an understanding of time, which is an essential ingredient in narrative. Something happens, then something else happens, and we assign the whole thing a meaning, including our own role in it." Glickman (2007) identifies the following errors as characteristic of language deprivation in ASL:

- sign vocabulary is made of concrete objects, actions, and descriptions
- time concepts (later, tomorrow, next year) are not fully grasped
- grammatical set-up of space in ASL is impaired
- disordered syntax
- reliance on gestures and pantomime over vocabulary

Gregory et al. (1995) found that nearly every deaf person with severe language deficits, even if they were initially instructed with oral approaches, eventually found some form of sign language. It would be a fallacy to assume that the linguistic deficits exhibited by these adults were due to them learning sign language, when the true cause was from language deprivation or other co-occurring diagnoses.

Cognitive Deficits

Language deprivation can cause a host of impairments in cognition, including learning difficulties, deficits in executive function and memory, impaired attention regulation, poor impulse control, and poor theory of mind (de Villiers & de Villiers, 2012; Gulati, 2018; Hall,

2017; Marschark & Hauser, 2012; Morgan & Kegl, 2006). Many cognitive functions fall under the category of executive functioning, which is composed of both metacognition (thinking about thinking) and behavioral regulation (controlling one's emotions and behaviors). Executive function abilities are used to problem solve, organize, plan, and integrate previous knowledge with a novel situation.

Another key component of language and cognition is theory of mind (ToM), which is the ability to identify others' thoughts, feelings, and emotions and separate them from one's own (Astington & Baird, 2005). A classic example of a theory of mind measure is called the *false-belief task*. With two children in the room, an examiner will show both children a piece of candy and cover the candy with a box. The examiner will then ask one child to leave the room, and then move the candy under a basket. When the child out of the room returns, the examiner asks the remaining child "Where will he look for the candy?" The correct answer is that he will look under the box, since that was his last experience with the candy, even though the remaining child knows it is currently under the basket. Many deaf children struggle with ToM tasks because language abilities and ToM skills are linked (Astington & Baird, 2005). Deaf children who have signing parents develop ToM skills at the same rate as hearing children (de Villiers & Pyers 2003), and deaf children with hearing parents to sign to them have better ToM skills than children who use spoken language only (de Villiers, 2005) indicating that accessible language exposure is a predictor for positive outcomes with theory of mind. Even with children who were given cochlear implants before age three and who showed sharp progress with spoken language skills, the children with cochlear implants still had considerable delays in theory of mind compared to hearing controls (Ketelaar et al., 2012). In a study comparing Italian deaf children in

bilingual programs (Italian Sign Language and Italian) and deaf children in mainstream programs (with SimCom), and hearing children in public schools on theory of mind skills, the bilingual deaf children performed even better than hearing controls, but mainstreamed deaf children performed significantly behind both groups (Tomasuolo et al., 2012).

Academic Deficits

A strong language foundation is integral for children to learn academic concepts and build on existing knowledge. Without an effective and robust first language, deaf children often struggle to compete with their hearing peers academically. Because of this gap in language acquisition, educators and speech-language pathologists spend a significant amount of the school day developing a child's speech and grammar that other academic areas (such as math, science, literacy, and social studies) are affected (Moores & Martin, 2006). A common statistic referenced in deaf education is that half of deaf students graduate high school with a 4th grade reading level or lower, decreasing their likelihood of pursuing postsecondary education (Cawthon, 2004; Garberoglio et al., 2014).

Social and Emotional Deficits

Language deprivation does not only affect a person linguistically and academically, but also emotionally. Without having the necessary language skills to process one's feelings and express one's needs to another, language deprived individuals struggle to emotionally regulate themselves or receive emotional support from others (Gulati, 2018). Adults with language deprivation syndrome also have difficulty forming relationships and understanding social ties. Deficits in theory of mind, time concepts, story sequencing, and cause and effect all inform the way a person understands their own sense of personhood as well as how they understand their

social connections (Gulati, 2018). These struggles with emotional and social development in more extreme situations can lead to huge consequences. Individuals who have been language deprived can exhibit antisocial behavior, dangerousness to others, and dangerousness to themselves (Gulati, 2018). In circumstances where a language deprived person commits a crime, they may not be able to ethically stand trial due to language dysfluency. This could create a moral dilemma without a good solution, since the etiology of the crime connects their inability to understand the concept of law, yet they remain dangerous to others (O'Rourke et al., 2013).

Listman et al. (2011) conducted a research study about the effect of stress on the developing deaf person. Their research sought to identify which factors were correlated with resilience of deaf individuals. They define resilience as the ability to overcome stress, conflicts, disagreements, bad experiences, and adversities. They concluded that high ASL skills and a high sense of Deaf identity and involvement in the Deaf community (measured using the Deaf Acculturation Scale) were positively correlated with resilience.

Language Deprivation as Iatrogenic

Since language deprivation syndrome is preventable with a natural sign language (such as American Sign Language), professional advice to exclude sign interventions for the purpose of "forcing" reliance on sound makes language deprivation syndrome iatrogenic (caused by medical interventions) (Hall, 2017). To explain the relationship between medical interventions and language deprivation, Dr. Gulati (2018) uses the following metaphor:

> Imagine a condition where children are unable to walk, but able to learn wheelchair use. Now imagine a new "walking implant" which can permit some of the children to walk. However, because the implant does not work reliably, and the children take naturally to

> wheelchairs, surgeons and physical therapists advise against them. Half or more of the children are rendered unable either to walk or use a wheelchair with ease, yet academic publications assess only the extent of walking, never the extent of *mobility.* (p. 39)

In this example, Dr. Gulati (2018) parallels walking with hearing, and wheelchair use with the development of a natural signed language. The "walking implant" resembles the cochlear implant in that it is only successful in creating a strong language foundation with a limited number of patients. Doctors and speech-language pathologists discourage or remain neutral about the use of natural signed languages for their deaf clients with hope that a child's spoken language skills will develop. Providing every child with a natural signed language, whether the child had accompanying cochlear implant intervention, would render every child's language skills high whether or not the implant intervention was successful (Hall, 2017). The child could also decide if spoken language or sign language use was more beneficial for particular environments at particular times.

Deaf Culture and Identity

Shifting the view of deaf personhood from a medical model (that deaf people cannot hear) to a cultural model (Deaf people are a part of a marginalized minority in contrast to the hearing majority) creates a new layer of understanding a speech-language pathologist's role in how to provide ethical services to the Deaf community while challenging commonly held beliefs about normalcy, disability, and human diversity. In contrast to the commonly medically used phrase "hearing loss" Bauman and Murray propose the idea of "deaf gain," that there are many positive aspects to the deaf experience (2014). Bauman and Murray argue that deaf people throughout history have made important contributions to society not *despite* being Deaf, but

because they are Deaf. The researchers assert that in the same way the biodiversity of ecosystems is an indicator of the health of the ecosystem, that biocultural linguistic diversity adds to the health of a society. Bauman and Murray argue that Deaf people, who have an acuity for visual and tactile stimuli, provide special insight into the fields of architecture, filmmaking, linguistics, education, technology, universal design, theater, and art. As Deaf performance artist Aaron Williamson stated, "Why had all the doctors told me I was losing my hearing, and not a single one told me I was gaining my deafness?" (Bauman & Murray, 2014).

Audism and Linguisticism

With a cultural framework of Deaf personhood, Deaf individuals experience oppression from the hearing majority. Similarly to ways that others use the words "racism," "sexism," "ableism," or "homophobia" to describe the personal and structural injustices that marginalized groups experience, "audism" is used to describe bias that hearing people hold against the Deaf community (Eckert & Rowley, 2013). The term "audism" was coined by Tom Humphries in 1975 and is defined as, "the notion that one is superior based on one's ability to hear or behave in the manner of one who hears" (Humphries, 1975, as cited in Eckert & Rowley, 2013). Humphries also notes that audism is "in the form of people who continually judge deaf people's intelligence and success on the basis of their ability in the language of the hearing culture" (Eckert & Rowley, 2013). The term "linguisticism" refers to the prioritization of certain languages over others, and "phonocentrism" refers specifically to spoken languages over visual/tactile languages (Bauman, 2004; 2008). By these definitions, we can understand why speech-language pathologists, who work with Deaf people by teaching speaking and listening skills in English, play a key role in perpetuating audism, linguisticism, and phonocentrism when

their therapy practices do not respect ASL or use ASL in their practice. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) released a report on deaf education in which they state: “We must recognize the legitimacy of signed languages as linguistic systems and they should be accorded the same status as other languages… it is no longer admissible to overlook them or to fail to encourage their integration into deaf education” (UNESCO, as cited in Lane, 1992).

Few studies exist on speech- language pathologist's beliefs about signed languages and sign language interventions. Cripps et al. (2016) conducted a study of 32 speech-language pathology graduate students at Towson University by evaluating (a) their attitudes toward the use of signed language, (b) their awareness of signed language disorders, (c) opportunities for treatment in signed language, and (d) a need for this type of training in graduate education. In this study, the researchers found that more than 90% of the participants agreed with the statement “ASL should be treated equally as one of the human languages” (Cripps et al., 2016). While 90% is a high majority of agreement, one would assume that if posed the question “French should be treated equally as one of the human languages” that 100% of respondents would agree. Once the respondents were made aware of signed language disorders, 97% agreed that Deaf persons with signed language disorders can benefit from therapy in ASL but a majority of the respondents also felt they did not have the expertise and training needed to provide sign language services to someone who uses ASL (Cripps et al., 2016).

In the field of speech-language pathology at large, clinicians report significant concerns with ethically providing services to culturally and linguistically diverse clients, namely concerns with a lack of experience in dealing with language barriers, difficulty identifying a language

difference from a language disorder, and lack of competence with culturally appropriate assessment and treatment options (Kohnert et al., 2003; Kritikos, 2003; Stockman et al., 2008). Blackburn (2012) conducted a study on speech-language pathology students' knowledge and beliefs about the African American English (AAE) dialect. Her research questions were: (a) if explicit instruction on the rules of AAE impacts student's knowledge of AAE phonological and grammatical rules, (b) if educating students about ASHA's statement on the validity of minority dialects changes the student's beliefs about the dialect, and (c) if students' knowledge of AAE rules correlated with their beliefs about the validity of AAE. Students' knowledge of AAE features significantly improved after direct instruction and their attitudes changed significantly on certain measures. Blackburn found that overall, students had positive views of AAE as a valid minority dialect that does not require language intervention, although 19% of students still agreed that AAE is an incorrect form of Standard American English. Students who exhibited more knowledge of AAE features showed more sensitivity to obstacles faced by culturally and linguistically diverse children (Blackburn, 2012). Like Blackburn's (2012) findings related to AAE, a minority dialect, this project seeks to gain insight on COMD students' attitudes about a minority language-- ASL.

Sager et al. (2019) researched audiology students' attitudes about Deaf culture through using the Attitudes About Deafness scale created in 2004 by Cooper et al. Additionally, Sager et al. (2019) completed a series of interviews with audiology students to further study their beliefs about Deaf culture using the framework of General Systems Theory and Critical Disability Theory, evaluating if audiology students viewed Deaf personhood through a cultural model or a medical model. Sager et al. found that on the Attitudes About Deafness scale, students' scores

aligned with a more cultural model of understanding of Deaf personhood, while in more in-depth case-study interviews, students demonstrated more medical attitudes about being deaf. While the students indicated positive views of ASL, they demonstrated a preference for spoken language interventions. All students interviewed believed hard-of-hearing children should receive spoken language interventions only. Some students who had taken ASL classes were more open to the use of ASL in deaf children's intervention plans, yet others had preferences for spoken language approaches alone. Students did not demonstrate knowledge about how to collaborate with the Deaf community and with Deaf educators as an audiologist, but understood their medical role in the lives of families with deaf children.

In summary, speech-language pathologists, who are the resident experts in speech and language development, should treat spoken and signed languages as equal. When ASL is prioritized as highly as spoken English, deaf children flourish in all aspects of their development (Hall, 2017). Undergraduate COMD students' attitudes about spoken and signed language interventions have yet to be explored.

Purpose

The purpose of this study is to expand the current literature on attitudes toward spoken and signed language interventions and how these attitudes compare. Undergraduate COMD students were surveyed in order to develop an understanding of their attitudes toward ASL, English, and Deaf culture. Participants were asked seven demographic questions and 30 questions about ASL, English, and Deaf culture on a Linkert scale from one to six. The relationships between those attitudes were then analyzed and possible correlation between those factors was evaluated. The specific research questions are as follows:

1. What attitudes do undergraduate students in COMD classes hold about ASL, speech and listening skills in English, and Deaf culture?
2. How do attitudes about ASL, English, and Deaf culture correlate with each other?
3. What demographic differences are there between groups (upperclassmen vs underclassmen, students who have taken audiology, aural rehabilitation, or ASL classes vs those who have not, bilingual students vs monolingual students)?

For the first research question, it is expected that students will have neutral opinions about ASL vs. spoken English. Since all students are presumably hearing with limited knowledge of ASL, they could also have negative attitudes towards using ASL with deaf children. While it may seem logical that children who receive spoken language interventions alone would have higher English skills, the above presented research on language deprivation concludes that many children do not acquire fluency in English through spoken language interventions alone. In contrast, since ASL is a completely accessible language for all deaf children, deaf children with strong ASL skills have a basis for language development and function as strong ASL/English bilinguals. These trends, when one does not have knowledge of critical periods for language acquisition, may seem counterintuitive to students who are still developing awareness of speech and language development at the undergraduate level. Additionally, it is hypothesized that undergraduate students in COMD classes will have a neutral-to-positive view of Deaf culture. With certain questions, such as “Deaf people are handicapped,” students will more likely strongly disagree. With other questions, like “More research should be done to find cures for deafness” there could be a wider range of attitudes. Similar to what Sager et al. (2019) found, it is hypothesized that students will demonstrate

cultural views of Deaf personhood on this scale compared to medical views.

It is anticipated that the results of the second research question will demonstrate a correlation between ASL attitudes and Deaf culture attitudes, because ASL and Deaf culture go hand in hand. If students have positive views of ASL, it is likely they will have positive views about Deaf people. It is hypothesized that ASL attitudes and English attitudes will have a negative correlation- if a student prioritizes ASL, they are less likely to prioritize spoken English and vice versa. It is expected that students will believe that if one prioritizes ASL, that means they will have to devalue spoken English, although it is possible to value both strongly.

The third research question focuses mainly on the demographics of the participants of this study. Due to the characteristics of the population sampled, it is anticipated that the data will show that upperclassmen (those who are more likely to have taken aural rehabilitation and audiology) will have more positive views of English compared with underclassmen. It should be noted that students in COMD typically take aural rehabilitation and audiology as required courses in their junior or senior year. COMD students can elect to take ASL as a "foreign language" credit, beginning as early as freshman year. While aural rehabilitation and audiology are required courses, ASL is an optional class to fulfill the requirement for a "foreign language" course. When comparing students who have taken audiology and aural rehabilitation to those who have not (similarly to upperclassmen vs underclassmen), it is expected that these students will have more positive views of English. Aural rehabilitation and audiology are courses with a primary focus on speech and listening skills in a spoken language for deaf and hard of hearing people of all ages, therefore it is hypothesized that students will value spoken English more after taking these classes. When comparing students who have taken at least one semester of ASL

compared to those who have not, it is predicted that those students will have significantly more positive attitudes towards ASL and Deaf culture. ASL courses at the University of Houston-main campus include instruction about Deaf history and culture, therefore it is hypothesized that students who have taken the course would prioritize ASL as important and view Deaf personhood more as a cultural difference rather than a medical diagnosis.

Methods

Participants

Participants in this study were recruited through undergraduate classes in the Communication Sciences and Disorders (COMD) department at the University of Houston-main campus. The COMD department at the University of Houston-main campus houses classes related to speech-language pathology and audiology. To be certified by the American Speech, Language, and Hearing Association (ASHA) as a speech pathologist or audiologist, one must complete all required courses from an accredited COMD undergraduate-level major and also obtain a Master's degree in COMD (for speech-language pathologists) or an AuD in audiology (for audiologists). It is important to note that the ASL interpreting (ASLI) program falls under the COMD department, although ASLI majors have a completely different set of class requirements compared to COMD majors. To be included in the survey, the participants must be (a) enrolled in a COMD undergraduate level course, (b) be 18 years of age or older, and (c) live in the United States. In total, 48 students participated in the study.

Survey

A survey was created to collect descriptive data about COMD students' attitudes about ASL, English, and Deaf culture; the full survey can be found in Appendix C. The introduction to

the survey included preliminary information to inform the participant that the survey is anonymous and voluntary. Participants were instructed that all responses were optional except for eligibility questions. The survey questions are separated into four major sections: (a) Demographic Information, (b) American Sign Language (ASL), (c) Spoken English, and (d) Deaf culture. The first section, demographic information, collected data about each participant's classification, prior coursework, language fluencies, and major/minor. The remaining questions are presented on a 6-point Likert ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). This 6-point scale does not have a midpoint, therefore answers from respondents had to be either positive or negative to some degree. A score of 6 was indicated as the most positive response, and a score of 1 was the most negative response.

The ASL and spoken English sections consist of 10 questions each. These 10 questions are similarly structured, replacing "ASL" with "speech and listening skills in English." For example, item five under "ASL" states, "I believe ASL should be taught to every deaf child," which correlates to spoken English section item five: "I believe speech and listening skills in English should be taught to every deaf child." In the ASL and English subsections, item three was reversed, where a low number would indicate a positive view and a high number would indicate a negative view.

The final 10 questions were selected from the Attitudes to Deafness scale developed by Cooper et al. (2004) and adapted by Sager (2019). Cooper et al. developed the Attitudes to Deafness scale to evaluate cultural attitudes of hearing professionals working with Deaf people. Using a focus group of Deaf individuals, the researchers created a pool of 60 possible items, and identified 22 items on a 6-point Likert scale that were the most statistically reliable in

discriminating between individuals with positive views and negative views about Deaf people. 10 of the 22 items on the scale were chosen that were the most applicable to speech language pathology. Some of these items include "Deaf children should learn to speak with hearing parents" and "Deaf people should not be viewed as impaired."

Procedures

Students were recruited from COMD classes at the University of Houston- main campus. Surveys were distributed to undergraduate professors, who forwarded a link to the survey and posted the survey online through BlackBoard. The survey data was collected using Google Forms, and downloaded as a spreadsheet to complete data analyses.

Data Analysis

Analyses and visualizations were conducted in R version 3.6.2 (R Core Team, 2019), using R core syntax and the packages *ggplot2* (Wickham, 2016), *ggpubr* (Kassambara, 2019), *yarrr* (Phillips, 2017), and *summarytools* (Comtois, 2019). Analyses were carried out with the assistance of Dr. Autumn McIlraith. Descriptive statistics were calculated for each question on the survey, and for the three sum scores for questions pertaining to ASL, English, and Deaf culture. Bivariate correlations were calculated among the three sum scores. Finally, independent samples *t*-tests were calculated to address the research questions pertaining to group differences, including comparisons of upperclassmen and underclassmen, and students who had taken (or were currently enrolled) in audiology, aural rehabilitation, or ASL compared to students who had not taken those courses. Due to the number of *t*-tests conducted, to control for multiple comparisons and reduce the chance of false positives, alpha was set at 0.01 (*p*-values less than 0.01 indicated a statistically significant finding).

Results

Descriptive statistics

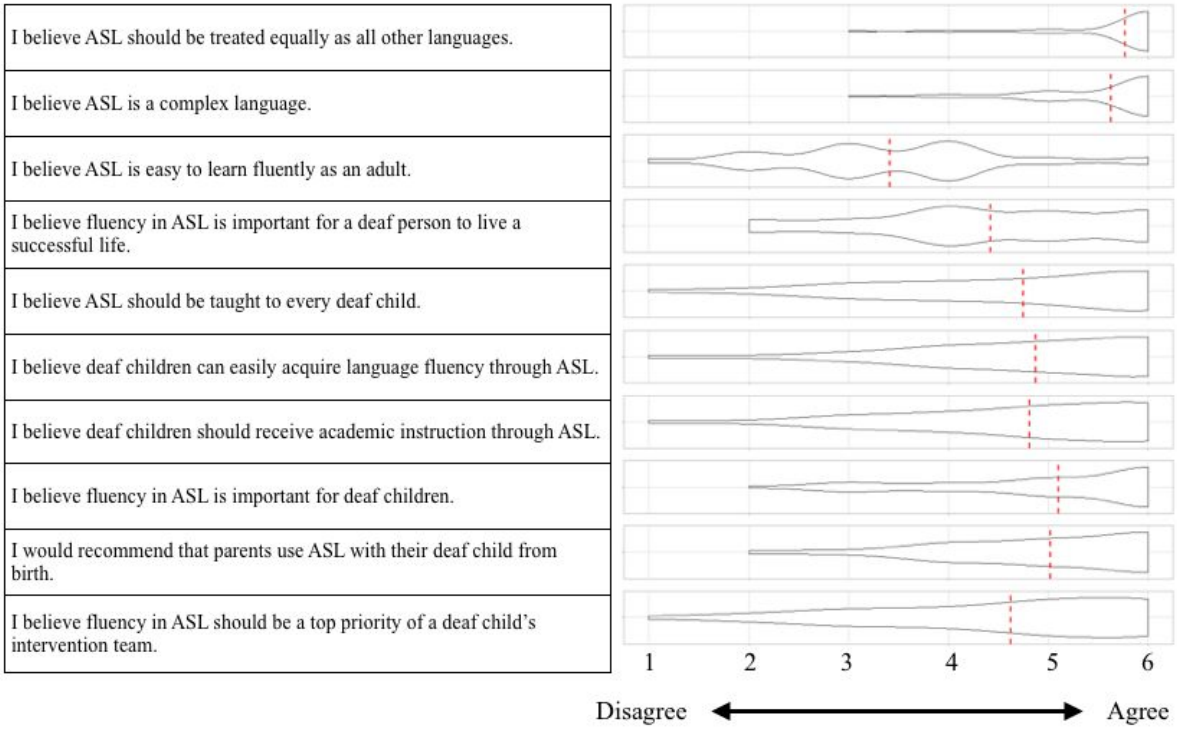
Demographic information. The survey received 48 responses. All respondents confirmed that they were over 18 years of age, enrolled in at least one COMD course, and lived in the United States. Demographic data was collected regarding each participant's major, minor, classification, languages, and coursework. Of the 48 responses, 47 participants (97.9%) were COMD majors, and one (2.1%) was a psychology major with a minor in COMD. Of the 47 COMD majors, two had a double major in psychology and one had a double major in Spanish. In the sample, two respondents (4.2%) were freshmen, four (8.3%) were sophomores, 13 (27%) were juniors, 27 (56.3%) were seniors, and two (4.2%) were post-baccalaureate students. When asked to self-rate their level of English fluency, 23 students (47.9%) responded that they were "native" speakers, 21 (43.7%) responded "fluent", two responded "intermediate," one (2.1%) responded "none," and one (2.1%) did not respond. When asked to self-rate their level of Spanish proficiency, 12 students (25%) responded that they were "native" speakers, three (6.3%) responded "fluent," 11 (22.9%) responded "intermediate," 9 (18.8%) responded "beginner," and 13 (27%) either did not respond or responded "none." When asked to self-rate their level of ASL fluency, no students reported that they were "native," one (1.2%) responded stating they were "fluent," two (4.2%) responded "intermediate," 13 (27%) responded "beginner," and 32 (66.7%) did not respond or responded "none." When asked to self-rate their level of proficiency of another language not listed, two respondents (4.2%) responded "native," three (6.3%) responded "fluent," one (2.1%) responded "intermediate," four (8.3%) responded "beginner" and 38 (79.2%) either did not respond or responded "none."

Students were asked about prior and current coursework related to ASL, COMD, and Deaf culture. Thirty-four of the participants (70.8%) reported they had never taken an ASL class before. Seven students (14.6%) had taken (or are currently enrolled in) 1-2 semesters of ASL, four students (8.3%) had 3-4 semesters, and two participants (4.2%) had 5+ semesters. One participant (2.1%) reported taking ASL prior to college. Of the 48 students, 26 (55.3%) have taken or were currently enrolled in audiology, 27 (57.4%) have taken or were currently enrolled in aural rehabilitation, and five (10.4%) have taken or were currently enrolled in Deaf culture.

ASL scores. An ASL sum score was calculated using the initial 10 items from the survey. Three of the 10 items were reverse-coded. The mean of 48.50 out of 60 possible points from the sample indicates that, on average, participants had favorable opinions about ASL (higher scores indicating more favorable opinions). The first three items addressed ASL generally, as a language (i.e. *ASL is a complex language*). The remaining seven items addressed the importance of ASL in a deaf child's life or intervention plan (i.e. *I believe fluency in American Sign Language is important for deaf children*). The responses to these seven items were averaged to form an "ASL intervention" score. The ASL intervention score for this sample was 4.8 (on a scale from 1-6), indicating students on average "agree" that ASL intervention is important for deaf children.

Figure 5

Range of Responses to the ASL Portion of the Survey.



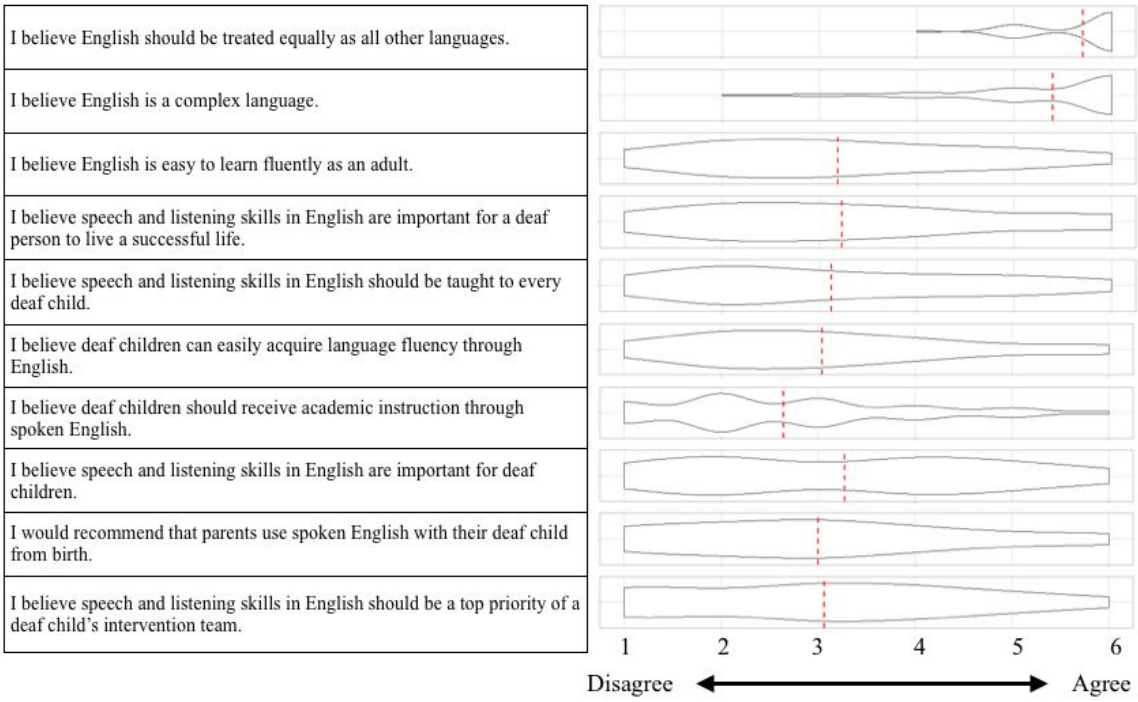
Note. Dashed red lines indicate the mean per item across the sample.

English scores. An English score was calculated using the next 10 items from the survey. The mean of 36 out of 60 possible points indicates that on average, respondents have more variable, neutral and slightly negative views of speech and listening skills in English for deaf children. Similar to the ASL section, the first three items of 10 addressed English generally, as a language (i.e. *English is a complex language*). The remaining seven items addressed the importance of speech and listening skills in English in a deaf child's life or intervention plan. An

"English intervention" score was then calculated with the average responses from items 4-10. The English intervention score for this sample was 3.05 (on a scale of 1-6), indicating students on average "*slightly disagree*" that spoken English interventions were important for deaf children.

Figure 6

Range of Responses to the English Subsection of the Survey.

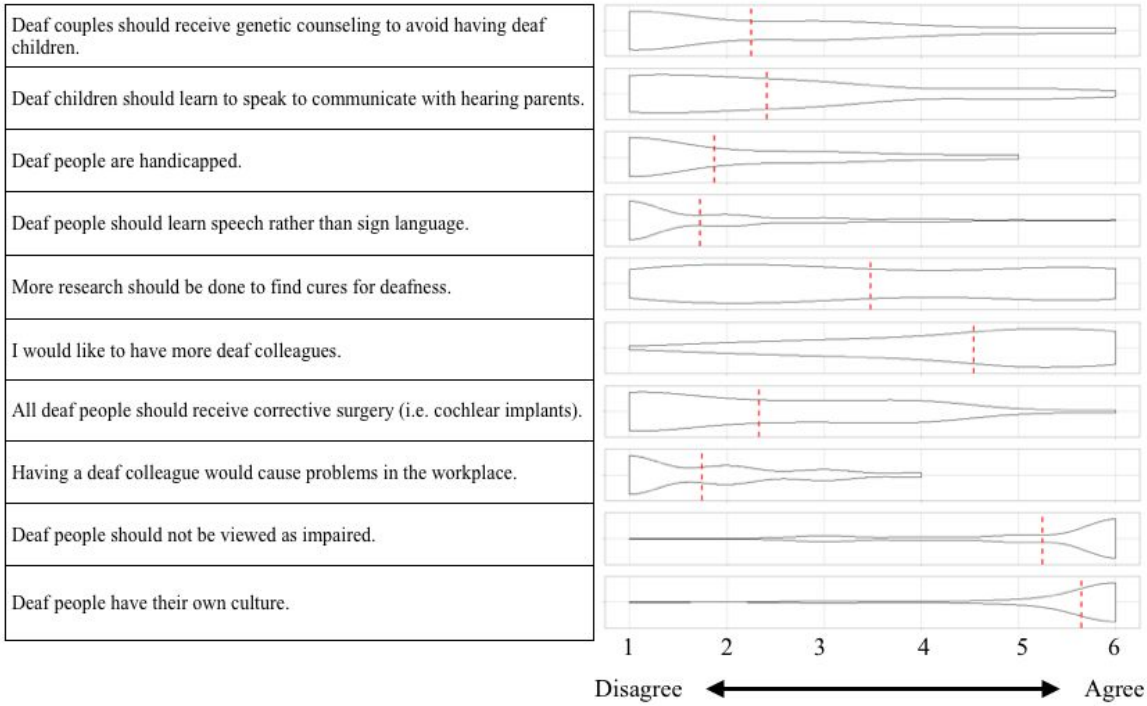


Note. Dashed red lines indicate the mean per item across the sample.

Deaf culture sum score. A Deaf culture score was calculated using the final 10 questions from the survey. The mean sum of 48.53 out of 60 possible points indicates a more cultural view of Deaf personhood compared to a medical view. Means on individual items ranged from 1.73-5.65.

Figure 7

Range of Responses to the Deaf culture Subsection of the Survey.



Note. Dashed red lines indicate the mean per item across the sample.

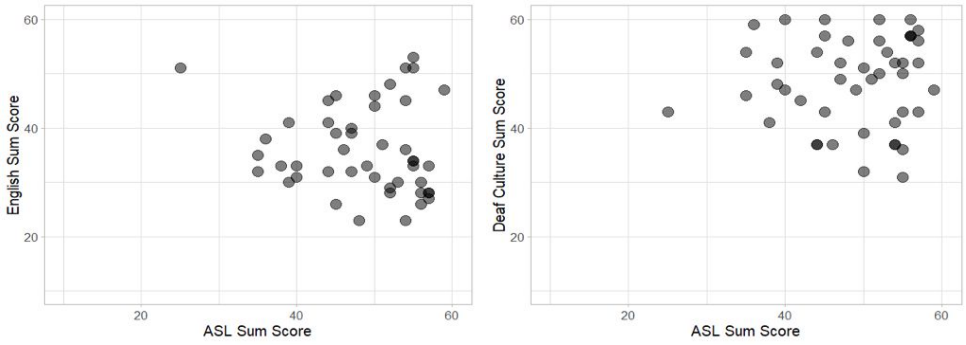
Bivariate correlations

Bivariate correlations were calculated among the ASL, English, and Deaf culture sum scores. The correlation between the ASL sum score and the English sum score was not statistically significant, nor was the correlation between the ASL sum score and the Deaf culture sum score. This indicates that, on average, if a student has a high ASL sum score, they could still have a variability of English sum scores. This is also true of ASL sum scores and Deaf culture

sum scores, indicating that if a student has a high ASL score, they could have a range of Deaf culture scores. Note that the lack of statistically significant correlation between the ASL sum score and the other sum scores is likely due to a lack of variability in ASL sum scores: most individuals scored very high on the ASL scale.

Figure 8

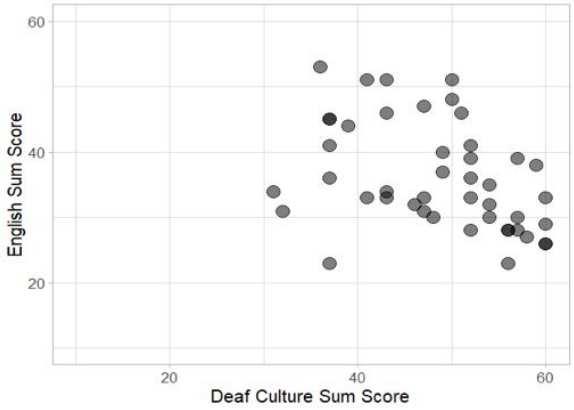
Scatterplots of English/ASL Sum Score and Deaf culture/ASL Sum Score



The correlation between the English sum score and the Deaf culture sum score was statistically significant ($r = -0.41$, $p < .01$). This correlation between English and Deaf culture was negative, indicating that individuals who scored higher on the English scale tended to score lower on the Deaf culture scale. This suggests that the more a student prioritizes spoken English in a deaf child's life, the more they perceive Deaf culture in a medical framework compared to a cultural framework.

Figure 9

Scatterplot of English Sum Score and Deaf Culture Sum Score



Group comparisons

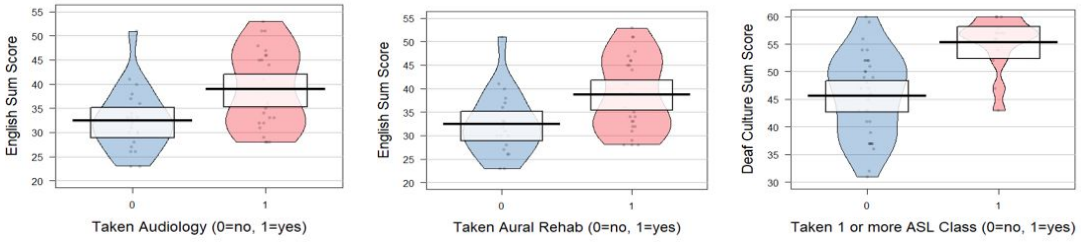
Statistical analyses were conducted to determine if upperclassmen vs lower classmen, number of languages, ASL class experience, or audiology/aural rehabilitation class experience determined ASL sum sores, English sum scores, or Deaf culture sum scores. Since only five students had taken a class in Deaf culture, the sample was not large enough to report accurate comparisons and therefore is not reported. Few significant differences were found among these subgroups; the statistically significant contrasts are described below. It should be noted that due small numbers in specific subgroups, interpretations must be considered with caution.

Students who have taken or are currently enrolled in audiology and/or aural rehabilitation did not have significantly different sum scores in ASL or Deaf culture, but had higher English sum scores than students who had not taken those courses (audiology: $t(44) = -2.94$, $p < 0.01$; aural rehabilitation: $t(44) = -2.86$, $p < 0.01$). Students who have taken at least one ASL class had

a significantly higher Deaf culture score compared to students who have not ($t(45) = -4.33$, $p < 0.01$).

Figure 10

Group Comparisons of Significant Findings



Discussion

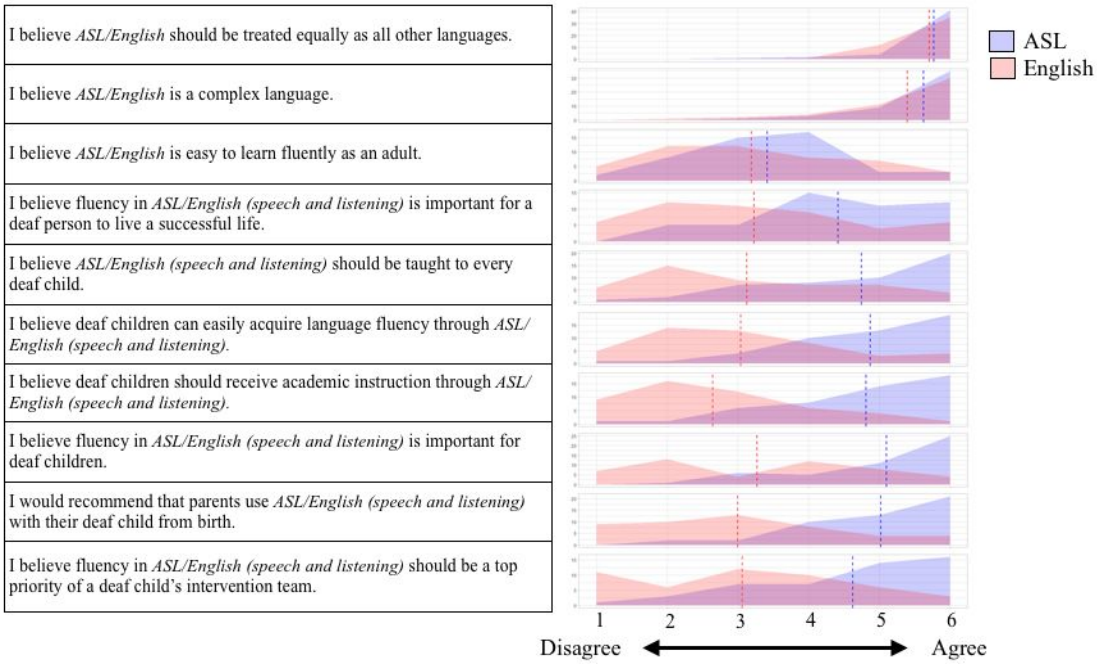
The purpose of the current study was to collect data on the attitudes COMD students hold about ASL, English, and Deaf culture. The main findings of this study were that on average, students in this study have favorable beliefs about ASL intervention for deaf children and slightly negative beliefs about spoken English intervention for deaf children. Additionally, based on 10 questions from the Attitudes About Deafness Scale (Cooper et al., 2004), students reported a more cultural view of Deaf personhood compared to a medical view.

Notable responses to ASL and English questions are as follows: The first three questions that address ASL/English in general (unrelated to deaf children), provided near the same averages. Students generally strongly agreed that ASL and English should be treated equally as all other languages and that both ASL and English are equally complex. There was more

variability in if students believed that ASL/English was easy to learn fluently as an adult. Responses indicate that students may believe ASL is slightly easier to learn as an adult than English, but no major differences in averages were noted. Because of the variability in response and that the average response was more neutral, this question is not a reliable item in comparing one's attitude of ASL and English. The average of responses for questions four through ten comprised the ASL intervention score and English intervention score. The ASL intervention score for this sample was 4.8 (on a scale from 1-6), indicating students on average "*agree*" that ASL intervention is important for deaf children. The English intervention score for this sample was 3.05 (on a scale from 1-6), indicating students on average "*slightly disagree*" that spoken English interventions were important for deaf children. This gap between the ASL intervention score and English intervention score is surprising, given that speech-language pathologists are typically responsible for spoken English development and aural rehabilitation in deaf children. It is possible for students to believe that both spoken English intervention and ASL intervention is both of high importance, though this was not the case on average for this sample.

Figure 11

Comparing Responses of ASL and English Subsections



Students on average reported a more cultural perspective of Deaf personhood compared to a medical perspective. Aligning with findings from the ASL and English subsections, students on average either disagreed or strongly disagreed that *Deaf people should learn speech rather than sign language* and that *Deaf children should learn to speak to communicate with hearing parents*. These findings are fascinating in that all COMD students are taught about speech and listening skills for deaf children, but few have proficiency in ASL. The item with the most variability was: *More research should be done to find cures for deafness.* From a medical perspective, being deaf is something that needs a cure, although from Bauman and Murray's

(2014) work on "Deaf gain," being Deaf is something to be valued. Perhaps this concept, that being Deaf can be an ideal state that is not better or worse than hearing, requires more discussion in our field. A high majority of respondents devalued words like "handicapped" or "impaired" to describe Deaf people, though the outdated terminology "hearing impaired" is still rampant in the field of speech-language pathology. It is important to note there were one or two outliers who had strong medical views of deaf personhood on this scale.

There was no correlation between ASL sum scores and English sum scores, indicating that students in this sample who value ASL could value or devalue spoken English, and vice versa-- students who value spoken English could value or devalue ASL. This finding was surprising given that historically, spoken language only interventions (such as auditory-verbal therapy) devalue signing (Marschark & Hauser, 2012). There was a correlation between English sum scores and Deaf culture sum scores, indicating that the higher a student valued spoken English interventions, the less they viewed Deaf personhood in a cultural framework compared to a medical framework.

Students in this sample who have taken audiology and/or aural rehabilitation had, on average, significantly higher English sum scores, but no differences were noted with ASL sum scores or Deaf culture sum scores. Since audiology and aural rehabilitation are both classes that address a deaf person's access to spoken English, this finding is not surprising. Students who have taken at least one ASL class have significantly higher Deaf culture sum scores, but not ASL sum scores or English sum scores. ASL classes typically address more than just learning the language. At the University of Houston, students are taught about Deaf history, Deaf culture, and Deafhood while also learning vocabulary and grammar. What was interesting about this finding

was that the students who took at least one ASL class did not have significantly higher ASL scores.

These findings overlap in some ways with Sager's (2019) dissertation, which addressed audiology graduate students' attitudes towards Deaf culture. Sager found that although audiology students on average reported a cultural view of Deaf personhood on the Attitudes About Deafness scale (Cooper et al., 2004), in-depth interviews revealed a mixture of cultural and medical beliefs. This could be the case with the given sample as well. My findings also aligned with Cripps et al.'s (2016) work through the item *I believe ASL should be treated equally as all other languages*. Both the current study and Cripps et al.'s study found that a large majority of respondents agreed with that statement.

Limitations

The current study contains multiple limitations. First, the primary researcher is a strong supporter of ASL and Deaf Culture, and acknowledges that she therefore has a bias due to her interest in promoting positive views of the Deaf community and of ASL speakers. Every effort was taken to avoid this bias affecting the outcomes of the research. The Attitudes About Deafness scale (Cooper et al, 2004) was used to mitigate the potential influence of creating new survey questions that had not been tested for reliability. Additionally, both ASL and English subsections were created with nearly identical wording to reduce bias in comparing the two to each other (i.e. Item 2 under ASL states *I believe ASL is a complex language* and aligns with Item 2 under English, *I believe English is a complex language*.) The primary researcher also took care to avoid confirmation bias, or "taking in only those facts and opinions that support their established viewpoints" (Ruth, 2018), by analyzing all of the data objectively and presenting all

of the results based solely on statistical analysis rather than the results that aligned with her own attitudes toward the topics discussed in the study. The author had taken into account the possibility of allowing personal bias to affect the outcomes of this research before beginning her experiment, and she used previous research to inform created survey questions in order to mitigate any chance that her viewpoints would affect respondents' results or the ultimate outcomes found in the data. Dr. Autumn McIlraith conducted all statistical analyses to reduce the chance of bias influencing the outcomes of the data.

Secondly, since surveys only provide a snapshot of variable views of attitudes, more research and interviews should be conducted to further assess students' cultural or medical beliefs about Deaf culture. If present, this could have occurred in part due to the concept of social desirability response bias (Marlowe & Crowne, 1964, as cited in Arnold & Feldman, 1981). Social desirability, or the need for social and cultural approval and acceptance, can lead to "attribution of culturally approved statements to oneself and the denial of culturally unacceptable traits" (Arnold & Feldman, 1981). Because COMD students are in a program that emphasizes cultural competency for minority languages/dialects, the participants may have been previously exposed to discourse related to the debate between medical and cultural beliefs regarding Deaf personhood, and may have perceived that it was important for them to respond in a socially desirable manner. Surveys about attitudes to topics that involve controversy cannot always be assumed to be 100% representative of respondents' true beliefs.

Thirdly, because this study was performed using a sample of students from only one university, we cannot generalize the results of this study as applicable to all COMD students without further research. The university at which the study was performed is located in Houston,

Texas, and has a higher population of students exposed to ASL than might be found at other universities. The University of Houston has an ASL interpreting major under the same department, which may influence these results. As such, it is not possible to determine whether the attitudes of students at the University of Houston are consistent with attitudes of students at other universities. Additionally, the vast majority of the participants in this study were upperclassmen, which is not representative of all COMD students at the University of Houston, or at universities across America. Additionally, UH is one of the most diverse universities in the nation where many students are bilingual or multilingual, which may impact their beliefs about minority languages in general. Therefore, although this study provides an idea of the attitudes of COMD students, it is possible that these results would be different if the study was conducted with a larger sample size of participants that more closely represent the overall COMD student population.

Future directions

More research needs to be conducted on what attitudes COMD students, speech-language pathologists, and audiologists hold about ASL, spoken English, and Deaf culture, how these attitudes change over time, and what factors influence these changes. In this current study, only COMD undergraduate students' attitudes were addressed. The attitudes of COMD graduate students and speech-language pathologists who are actively working with Deaf children and adults has yet to be studied. The current study focused on comparing two intervention strategies, spoken English intervention and ASL intervention, although many philosophies that combine or exclude these interventions exist (total communication, auditory verbal therapy, auditory-oral therapy, cued speech, etc.) More research should be conducted on what speech-language

pathologists and audiologists believe regarding these philosophies and which philosophies yield high and low beliefs about Deaf people and Deaf culture. Like Sager's (2019) work suggests, interviews of speech-language pathologists and COMD students should be conducted to provide a more in-depth look at attitudes about ASL, English, and Deaf culture in this population.

Conclusions

Speech-language pathologists, who are considered the "resident expert" at schools for speech and language development of deaf children, often lack the training necessary to support the language development of deaf children (Brackett, 1997). Since many misconceptions about utilizing signed languages in deaf education exist, speech-language pathologists should be on the front lines of combatting those misconceptions. Little research has been conducted on the attitudes of COMD students towards ASL, spoken English, and Deaf culture. This study is a descriptive study using an online survey to collect data about what attitudes undergraduate COMD students hold regarding ASL, spoken English, and Deaf culture. On average, students had favorable attitudes of ASL interventions for deaf children and slightly negative attitudes about spoken English interventions. Students also reported a more cultural view of Deaf personhood compared to a medical view on ten questions from the Attitudes About Deafness scale created by Cooper et al. (2004). Students who had taken at least one ASL class had much higher views of Deaf culture. This may suggest that taking an ASL course could expand one's understanding of Deaf personhood in a cultural view. However, it should be noted that the ASL courses were optional and students who elected to take an ASL course may have already had more favorable views of Deaf culture.

These findings require more thorough study, but provide preliminary data that COMD

students in this sample are moving away from outdated views that deaf children must learn speech and listening skills only. Instead, this preliminary data may suggest that students believe ASL and Deaf culture are to be valued instead of ignored. Since COMD students become speech-language pathologists or audiologists that are responsible for spoken English interventions, these findings are surprising and hopeful. With more professionals in deaf education who support a deaf child's right to a natural language from birth, we will be better able to combat language deprivation in our communities.

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Appendix A

Developmental Milestones for Typically Developing Children: Notable Items

Milestone	**Age of Acquisition**
Babbling emerges	4-6 months
Responds to changes in one's tone of voice Turns toward speaker when name is called Understands words for common items or people First words emerge around 12 months	7-12 months
Uses a lot of new words Puts two words together Follows one-part directs (such as "*roll the ball*")	1-2 years
Follows two-part directions Talks about things that are not in the room Uses two-to-three words	2-3 years
Answers simple who, what, where questions Uses pronouns and plural words Puts four words together Talks about what happened during the day by using four sentences at a time	3-4 years
Follows multi-step directions (such as *"put your pajamas on, brush your teeth, then pick out a book")* Tells short stories Keeps a conversation going	4-5 years

Appendix B

Visual Communication and Sign Language (VCSL) Checklist: Notable Items

Milestone	25% mastered	50% mastered	75% mastered
Hand babbling emerges	4 months	9 months	10 months
Participates in communicative play	6 months	9 months	10 months
Recognizes name sign	1:1	1:5	1:8
First ASL signs using simple handshapes	1:3	1:4	1:8
Forms two-sign sentences (ex. EAT MORE)	1:3	1:7	1:8
Uses descriptive classifiers	2:0	2:2	2:5
Expressive vocabulary range of 250-350 signs	2:2	2:7	2:8
Understands simple fingerspelled words	2:4	2:6	2:8
Answers questions (ex. WHY, HOW, DO++)	3:4	3:6	3:8
Uses handshapes of increasing complexity	3:5	3:7	3:8
Uses complex sentence structures consistently	4:2	4:3	4:5
Storytelling includes setting up people and objects in space that are not present	4:3	4:5	4:8
Verb modifications show intensity (CRY/BAWLED), manner (ex. STANDS? STANDS FOR LONG TIME), and temporal aspect (ex. Over and over CRY)	4:3	4:5	4:8
Beginning awareness that lexicalized signs are made up of handshapes	4:3	4:7	4:9

Appendix C

COMD Students' Opinions About ASL, English, and Deaf Culture

Demographic Information	
Major, minor Classification	Languages and Fluency (beginner, intermediate, advanced, native)
Previous/Current ASL or Deaf Studies coursework	Previous/Current speech-language pathology/ audiology coursework

1 Strongly Disagree	2 Disagree	3 Somewhat Disagree	4 Somewhat Agree	5 Agree	6 Strongly Agree

American Sign Language (ASL)

1. I believe ASL should be treated equally as all other languages.

   1 2 3 4 5 6

2. I believe ASL is a complex language.

   1 2 3 4 5 6

3. I believe ASL is easy to learn fluently as an adult.

   1 2 3 4 5 6

4. I believe fluency in ASL is important for a deaf person to live a successful life.

   1 2 3 4 5 6

5. I believe ASL should be taught to every deaf child.

   1 2 3 4 5 6

6. I believe deaf children can easily acquire language fluency through ASL.

   1 2 3 4 5 6

7. I believe deaf children should receive academic instruction through ASL.

   1 2 3 4 5 6

8. I believe fluency in ASL is important for deaf children.

   1 2 3 4 5 6

9. I would recommend that parents use ASL with their deaf child from birth.

   1 2 3 4 5 6

10. I believe fluency in ASL should be a top priority of a deaf child's intervention team.

    1 2 3 4 5 6

1 Strongly Disagree	2 Disagree	3 Somewhat Disagree	4 Somewhat Agree	5 Agree	6 Strongly Agree

English

1. I believe English should be treated equally as all other languages.

   1 2 3 4 5 6

2. I believe English is a complex language.

   1 2 3 4 5 6

3. I believe English is easy to learn fluently as an adult.

   1 2 3 4 5 6

4. I believe speech and listening skills in English are important for a deaf person to live a successful life.

   1 2 3 4 5 6

5. I believe speech and listening skills in English should be taught to every deaf child.

   1 2 3 4 5 6

6. I believe deaf children can easily acquire language fluency through English.

   1 2 3 4 5 6

7. I believe deaf children should receive academic instruction through spoken English.

   1 2 3 4 5 6

8. I believe speech and listening skills in English are important for deaf children.

   1 2 3 4 5 6

9. I would recommend parents use spoken English with their deaf child from birth.

   1 2 3 4 5 6

10. I believe speech and listening skills in English should be a top priority of a deaf child's intervention team.

    1 2 3 4 5 6

1 Strongly Disagree	2 Disagree	3 Somewhat Disagree	4 Somewhat Agree	5 Agree	6 Strongly Agree

Deaf Culture

1. Deaf couples should receive genetic counseling to avoid having deaf children.

   1 2 3 4 5 6

2. Deaf children should learn to speak to communicate with hearing parents.

   1 2 3 4 5 6

3. Deaf people are handicapped.

   1 2 3 4 5 6

4. Deaf people should learn speech rather than sign language.

   1 2 3 4 5 6

5. More research should be done to find cures for deafness.

   1 2 3 4 5 6

6. I would like to have more deaf colleagues.

   1 2 3 4 5 6

7. All deaf people should receive corrective surgery (i.e. cochlear implants).

   1 2 3 4 5 6

8. Having a deaf colleague would cause problems in the workplace.

   1 2 3 4 5 6

9. Deaf people should not be viewed as impaired.

   1 2 3 4 5 6

10. Deaf people have their own culture.

    1 2 3 4 5 6