Eastern Illinois University

The Keep

2022 Awards for Excellence in Student Research and Creative Activity - Documents

2022 Awards for Excellence in Student Research and Creative Activity

Spring 2022

Patterns of Social Competencies in Children with ADHD

Ashtyn Wilhelm

Follow this and additional works at: https://thekeep.eiu.edu/lib_awards_2022_docs



Patterns of Social Competencies in Children with ADHD

Ashtyn Wilhelm

Eastern Illinois University

Chapter I

Introduction

Language acquisition is a complex process, and many factors can influence language development. Pragmatic language, more specifically, can be described as using language to communicate during social interactions. Social skills, social behaviors, and social cognition are often used to describe the use of pragmatic language in context. Many cognitive skills influence pragmatic language development, including attention.

Attention-Deficit Hyperactivity Disorder (ADHD), a commonly diagnosed disorder among school-age children, is characterized by difficulty attending and frequent impulsivity (American Speech-Language-Hearing Association [ASHA], n.d.-a). The characteristics associated with ADHD can negatively affect the social skills of a person diagnosed with ADHD. Thus, children diagnosed with ADHD often have a significantly harder time using and understanding social skills (Bruce, Thernlund, & Nettelbladt, 2006).

Children with social communication deficits often demonstrate difficulties in understanding and using both verbal and nonverbal skills needed for social reciprocity (Kim & Kaiser, 2000). Differences in the way individuals demonstrating social communication deficits interact with others can be apparent through poorly modulated eye contact, closed off or inattentive body language, and/or lack of gestures to share information. Verbally, these children may not respond to social overtures or make social bids of their own to engage the communication partner. Children with ADHD are at an increased risk of social language deficits due to the role attention and appropriate impulse control plays in developing age-appropriate social exchanges.

Chapter II

Review of the Literature

Attention-Deficit Hyperactivity Disorder

Attention-Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder that affects 2.4 million children (Centers for Disease Control and Prevention [CDC], 2020b) and can manifest in three different ways, categorized by which symptoms are the most prevalent in an individual. Predominately Inattentive Presentation ADHD is characterized by the inability to organize, finish a task, or pay attention to details. It often appears that the person is easily distracted or forgets details easily. Predominantly Hyperactive-Impulsive Presentation ADHD is characterized by fidgeting, excessive talking, restlessness, and impulsivity. Lastly, Combined Presentation ADHD occurs when symptoms of both types of ADHD are present in an individual (CDC, 2020a). Individuals with ADHD have a pattern of inattention that interferes with their ability to carry out everyday activities; they often fail to stay attentive to details, become easily distracted by stimuli, are forgetful of everyday routines, and dislike doing activities like schoolwork due to the needed mental effort, focus, and organization required to carry out the activity. ADHD is a common childhood diagnosis, with an average 9.4% of all children meeting criteria for one of the ADHD categories. ADHD is more commonly diagnosed in males, with 12.9% of those diagnosed being male and 5.5% female (CDC, 2020b). Symptoms of ADHD affect interactions and performance in social, academic, and occupational settings.

Though younger children may demonstrate characteristics associated with ADHD, it is often not until a child enters grade school that clinically significant characteristics associated with ADHD are first noted. Chan and Fugard (2018) found that when children display difficulties related to ADHD, the characteristics are first noticed by general practitioners and

pediatricians or educational psychologists and classroom teachers, who then make a referral to start the diagnostic process. It is important to note that a healthcare professional that diagnoses ADHD, such as a psychiatrist or pediatrician, must follow the criteria set by the *American Psychological Association Diagnostic and Statistical Manual of Mental Disorders* (DSM-V), allowing for a consistent diagnosis that follows the same standards across nations and cultures. Individuals sixteen years old and younger must display six or more symptoms of inattention and hyperactivity/impulsivity for a minimum of six months for the behaviors to be diagnosed as ADHD (CDC, 2020a).

There is not a single test to take or criterion that must be met in order to receive a diagnosis of ADHD, but the diagnostic process typically starts with a medical exam in order to eliminate other potential diagnoses that share similar characteristics. Next, a survey or questionnaire is often given to parents, teachers, or caregivers asking them to rate ADHD symptoms that may or may not be seen in the child undergoing the evaluation. Depending on the age of the child going through the diagnostic process, the child themselves may receive an evaluation checklist for a self-evaluation on characteristics they think they may experience (CDCa, 2020). Additionally, observational methods may be utilized to assess presence of ADHD characteristics. Informal observation in unstructured settings allows evaluation of how the child engages naturally with others. A speech-language pathologist (SLP) may also be part of the assessment team and use observation to gather information about characteristics of ADHD that may affect the evaluation of communication abilities (Elleseff, 2015).

SLPs often work with students with ADHD due to the disorder's impact on learning language. Children who demonstrate inattention, impulsivity, and/or hyperactivity behaviors often have difficulty using language successfully in interactions. Approximately 50-75% of

children who present with ADHD require intervention services from an SLP due to an existing language disorder or delay as a common co-occurring disorder (Bruce, Thernlund, & Nettelbladt, 2006). A diagnosis of ADHD increases the likelihood of a child also receiving speech-language therapy over a child who demonstrates language concerns alone (Redmond, 2016). Roitsch, Phalen and Watson (2019) found that 61.1% of SLPs seek professional development training on working with children with ADHD due to the likelihood of the child receiving services to help remediate language deficits. The comorbidity of ADHD and language disorders is notable.

Influence of ADHD on Language Development

Children with Attention-Deficit Hyperactivity Disorder (ADHD) often experience inadequate language development, including deficits in language comprehension and expressive language skills, as well as academic learning. The impulsivity, hyperactivity, and inability to plan/organize associated with ADHD makes developing or formulating language harder for children with ADHD in comparison to their typically developing peers. This often results in difficulty using language successfully in social interactions. Children with ADHD often lack the ability to focus on what their communication partner is saying, making it more difficult to formulate a socially acceptable response (Bruce, Thernlund, & Nettelbladt, 2006).

Several studies have assessed and compared language learning and usage in children with ADHD and children who are typically developing. Kim and Kaiser (2000) used the *Test of Pragmatic Language* (TOPL) and the *Pragmatic Protocol* to assess the pragmatic language of children, ages 6 to 8 years, with ADHD and children who were typically developing. An unstructured 20-minute language sample was collected and rated as appropriate, inappropriate, or not observed to evaluate pragmatic language using the *Pragmatic Protocol*. The TOPL evaluated pragmatic language in relation to physical settings, audiences, topics, purpose, visual-gestural

cues, and abstraction. The study indicated that children diagnosed with ADHD performed worse than their typically developing peers in pragmatic language, including being more likely to produce inappropriate social behaviors during conversation, not responding to questions or requests from the speaker, interrupting others, and providing little feedback to the speaker.

A study by Oram, Fine, and Tannock (1999) further supports concerns with language development in children with ADHD. During a study using the standardized assessment *Clinical Evaluation of Language Fundamentals – Revised* (CELF-R), children, aged 7 to 11 years, with ADHD received a significantly lower score in comparison to their typically developing peers in the subtest of *Formulated Sentences*. In this task, children were given a stimulus word and asked to provide a sentence using the target word that is semantically, syntactically, and pragmatically correct. Based on performance, the authors concluded that the impulsivity associated with ADHD caused the students to use the target immediately rather than think through the sentences they were forming, resulting in syntactically incorrect sentences. Most students with ADHD were also not aware that their impulsivity in completing the task resulted in errors. When children have difficulty using foundational language skills such as formulating sentences, pragmatic language and using social language in context is often also an area of weakness.

Social Communication Development

Like other language skills, social communication develops over time. Social communication encompasses the many ways individuals use language, both verbally and nonverbally, for different reasons, changing language for the listener/situation, and following the social rules for conversations (ASHA, n.d.-c). Social communication is often used interchangeably with other words like "social skills," "pragmatics," and "social competence" in the research literature.

Social communication is complex and continues to develop and refine as individuals gain language skills and social experiences. To understand how social communication progresses, social skill development can be divided into a hierarchy of initial, intermediate, and advanced social skills (Elleseff, 2015). In the initial stage of social communication children may have difficulties with attention to social cues, initiation of social interactions, communication for social purposes, and following typical social rules. Once these skills are mastered, children will move to the intermediate phase of social skills. Intermediate-level social communication includes problem-solving in social scenarios, interpreting figurative language, understanding/using humor, and taking the perspective of others. Lastly, mastery of the most complex social skills, advanced functioning, is expected. Social communication at the advanced level includes skills such as supporting others in social contexts, social adaptability, understanding the motives of others, interpersonal negotiation for conflict resolution, and the ability to self-regulate one's own behavior (Elleseff, 2015). Individuals use both verbal and nonverbal language skills within each level to interact in socially appropriate ways.

Positive social interactions rely heavily on the ability to use expected social communication, and school-age children need to use social skills appropriately to achieve academic success and establish peer relationships (Leonard, Milich, & Lorch, 2011). In academic settings, school-aged children must communicate for group work, attend, and respond to questions and directions in class, understand words with multiple meanings, and cooperatively learn in a group setting. Alternatively, when establishing peer relationships, social communication needs may include waiting to speak, staying on topic during conversation, understanding the language of their peers, and changing communication style for specific social settings (Timler, 2018).

Verbal Social Communication Behaviors

Social communication refers to using language within social situations. Specifically, verbal social communication requires the use of social cognition, pragmatics, and language processing during social interactions (ASHA, n.d.-e). While there are many different verbal social communication skills, properly using social bids and social responses significantly enhances effective exchange of information between two people.

Defining Social Bids and Responses. A social bid refers to any behavior initiated by a speaker that is directed towards the other person for the purpose of communicating social intent. For example, a social bid could include making a comment or asking a question to initiate an exchange with someone. Social responses, however, refer to any behavior that is in *response* to another person's actions with the intent of communication. Essentially, individuals respond to another person's social bid by providing a related comment, asking a question, or reacting nonverbally. When two people actively use social bids and social responses within conversation, social reciprocity is formed. Social reciprocity refers to the ability for two people to initiate, respond, and take turns during conversation (ASHA, n.d.-b).

Crooke, Winner, and Olswang (2016) define social competence as a judgement other people form about individuals based on their social abilities. Social bids and responses are important for an individual to use because they are considered an expected verbal behavior.

Using social bids and responses are a part of being socially competent.

Development of Social Bids and Responses. Social communication behaviors begin developing at birth and continue to increase in frequency and complexity into adulthood.

Children will start with foundational social skills like joint attention and understanding others' intention. However, as children grow, they will begin to engage in more complex social

behaviors like social attention, interpretation, self-awareness, and self-regulation (Crooke, Winner, and Olswang, 2016). Essentially, as a child begins to mature developmentally through increased semantics, syntax, attention, and cognition, their social skills evolve.

At approximately 18 months of age, children will begin participating in verbal turn-taking for the first time. By the time a child reaches school-age years they will have practiced and used social reciprocity behaviors. For example, typically developing school-age children display the ability to continue a conversation by responding to their communication partner to allow for more turns to occur within the conversation (ASHA, n.d.-d). However, though children with atypical social development can interact with their peers, their responses are often poor (i.e., odd, inadequate) and peers do not know how to respond, resulting in little to no social reciprocity (Bauminger-Zviely et al., 2019).

A study conducted by Li, Hestenes, Wang (2014) found that preschool children who engage in pretend play have higher social skill abilities in the areas of cooperation, self-control, and assertion. To be able to participate in pretend play, children must be able to think in an abstract way, which is an advanced cognitive process. As a child participates in pretend play, they are involved in more social interactions, which will promote more refined development of their social skills. Thus, the study concluded that children who have advanced cognitive processing abilities will demonstrate better social skills throughout their social interactions. As children mature, their social cognitive abilities become more abstract and complex (Crooke, Winner, & Olswang, 2016).

Nonverbal Social Communication Behaviors

Nonverbal communication refers to the facial expressions, body movements, eye contact, gestures, touch, and space used when communicating verbally (Segal et al., 2020). Nonverbal

communication helps deliver or enhance the message that the communicator is attempting to convey verbally. While there are many different nonverbal communication skills, gestures significantly contribute to communicating during conversation by strengthening and emphasizing the message being verbally conveyed.

Defining Gestures. Using gestures while in conversation helps to enhance or emphasize the speaker's intent. Examples of common gestures that are typically used in conversation include pointing or the use of hands for emphasis during an argument (Crais, Watson, & Baranek, 2009). People naturally use gestures without putting thought into the gestures they are using. The use of gestures is beneficial and makes conveying a message easier.

Assessing the use of gestures, or lack thereof, during conversation can help identify children who may be at risk for having a communication deficit. Children who may be at risk of a communication deficit often use gestures in an abnormal or reduced way (Cook & Goldin-Meadow, 2006).

Gestures have been defined in many ways in previous research and are often categorized by their function. The *Autism Diagnostic Observation Schedule-Second Edition* (ADOS-2) (Lord et al., 2012) defines descriptive gestures as actions that help describe an action, object, or event during communication like holding hands apart to represent how big an object was. Conventional gestures are gestures that change meaning when used in different cultures. For example, in North America putting a thumb up represents good job. However, in another culture using a thumb likely means something else. Informational gestures are used when the speaker wants to represent specific information being conveyed like holding up one finger to represent the number one. Emphatic gestures are hand movements that are used to provide emphasis (Lord et al.,

2012). Gestures are an important and commonly used form of communication that begins to develop in early childhood and continues to refine and expand as children reach school age.

As defined earlier, Crooke, Winner, and Olswang (2016) describe social competence as a judgement other people form about individuals based on their social abilities. As a person engages in social interactions it is expected that they will use gestures. Whether a person uses the gestures in an expected or unexpected way will determine if another individual perceives the person as being socially competent.

Development of Gestures. Gestures develop as a prelinguistic skill to help children intentionally communicate, often prior to the development of spoken language. For young children with communication deficits, the use of gestures will often continue to dominate over production of verbal language for communicative purposes (Crais, Watson, & Baranek, 2009). Gesture understanding and use, however, continue to be important for communicative interactions, regardless of verbal language abilities.

Gestures have been found to promote learning, as the use of gestures reduces the amount of labor on the working memory system. When children produce gestures, it helps promote learning because children must first understand the meaning of a word before using a gesture to accompany a word. A child will remember more when they use gestures to explain a concept in comparison to not using gestures due to the visual and kinesthetic enhancement of the information. Using gestures helps children create an image or understanding of concepts. Gestures aid in storing new representations in the brain by creating a longer-lasting representation of a concept. Children who use gestures demonstrate a better understanding in relation to their own thinking and the concept at hand (Cook & Goldin-Meadow, 2006).

Goldin-Meadow (2009) discussed that children use gestures to communicate knowledge or information they have that they are incapable of expressing using verbal language. As children are learning to communicate, they will use nonverbal social communication (i.e., gestures) before they use verbal social communication. Children will often use gestures to express their wants and needs. As children begin to talk, they will use a single word or a two-word combination often with a gesture to communicate. Thus, Goldin-Meadow (2009) concluded that the use of gestures reflects a child's thought. The use of gestures is fundamental to language development.

Gestures continue to develop as an integral part of communication as children interact with peers and adults, particularly in school settings. A study conducted by Church and Goldin-Meadow (1986) investigated gesture knowledge and use by asking 5- to 8-year-old children to make six judgements during conversation and then explain their judgments. All the children used gestures while explaining their judgments, but when the children were less knowledgeable in the information they were conveying, the gestures they used did not match the verbal information they were providing, causing a gesture-speech mismatch. Likewise, children who were confident in the verbal information they were providing had gesture-speech matches. The authors concluded that gestures help show the difference between knowledge that is being acquired and knowledge that is solidified. Children use meaningful and matched gestures to convey information more efficiently.

Additionally, using gestures while expressing verbal information has been shown to be more beneficial than using only speech. A study conducted by Cook and Goldin-Meadow (2006) worked with a group of 49 third and fourth grade students to assess their use of gestures when given instructions. The children were given instructions with and without gestures. When

instructions were given to the third and fourth grade students, the instructors used the same gestures on all instructions given. The authors noted that using gestures when giving instructions may have helped prevent children from getting lost during instruction. Using gestures may have helped the children focus their attention on the important parts of the instructions. As the children focused on the gestures used during instruction, it allowed them to create a visual understanding of the concept.

From the same study conducted by Cook and Goldin-Meadow (2006), when the children were given instructions with speech and gestures, the students were more likely to reproduce the information accurately in their own gestures in comparison to when the information was given without gestures. The use of gestures when giving instructions also resulted in children producing gestures of their own. Gestures do representational work, meaning the children used the body to represent verbal information. The authors concluded that when one communication partner uses meaningful gestures to communicate verbal information it can increase both the number and type of gestures used by other communication partners.

Influence of ADHD on Social Communication

The deficits associated with ADHD can negatively impact the social communication of children diagnosed with ADHD, making them more likely to have difficulties with pragmatic skills in comparison to other language domains. More specifically, children with ADHD have more problems with nonverbal communication and forming social relationships in comparison to typically developing children (Geurts & Embrechts, 2008).

A study by Kim and Kaiser (2000) found when children with ADHD were assessed on their *understanding* of social communication, they performed just as well as their typically developing peers. However, during a conversational setting, requiring both receptive and

expressive social communication, children with ADHD were more likely to display inappropriate social skills. Inappropriate social skills used by children with ADHD included not responding to questions asked by their communication partner, interrupting other speakers, providing irrelevant information during conversation, and using nonspecific vocabulary. Bruce, Thernlund, and Nettelbladt (2006) concurred, noting it is typical for children with ADHD to say socially inappropriate things as well during conversation. In addition, children with ADHD were found to have difficulty maintaining a conversation, explaining previous events, and staying on topic when trying to tell information. The authors also found that children with ADHD have difficulty following social rules, expressing their emotions in words, and using appropriate vocal inflection to convey meaning (Bruce, Thernlund, & Nettelbladt, 2006).

Social communication is often difficult for children with ADHD due to difficulties with attention, impulsivity, and hyperactivity resulting in poor behavioral inhibition and insensitivity to social cues. Children with ADHD often do not actively listen when directly spoken to, making them appear disinterested in the conversation. Likewise, children with ADHD tend to interrupt other speakers due to a short attention span on what the speaker is saying (Kim & Kaiser, 2000). When a child is unable to filter reactions to outside stressors like name calling, rejection, or rudeness from previous social communication partners, the child with ADHD may use lack of eye contact, interruptions, and impolite social behaviors to cope (Leonard, Milich, & Lorch, 2011).

Current Study

Previous research studies have shown that children with Attention-Deficit Hyperactivity

Disorder (ADHD) experience difficulties with language development as well as social

communication due to associated characteristics of inattention, impulsivity, and hyperactivity

(Kim & Kaiser, 2000). How characteristics of ADHD specifically affect certain aspects of social communication development, however, is not clear, and speech-language pathologists (SLPs) need to assess both verbal and nonverbal social deficits to plan effective therapy sessions for children with ADHD who have poor social skills. This study aims to investigate both verbal and nonverbal skills in school-age children with ADHD to increase understanding of social communication deficits in this population. Specifically, the following research questions will be investigated:

- 1. How frequently do school-age children with ADHD use gestures to enhance communication during social communication contexts?
- 2. What types of gestures do school-age children with ADHD use most frequently during social communication?
- 3. How frequently do children with ADHD respond to social bids during conversation?
- 4. What types of responses do children with ADHD use in conversation?
- 5. How frequently do children with ADHD demonstrate inattentive or impulsive behaviors that interrupt social reciprocity during conversation?
- 6. What is the relationship between characteristics of ADHD and verbal and nonverbal social communication skills?

Chapter III

Methodology

Participants

Participants consisted of 10 male, school-aged children (ages 7:5 - 15:11) who participated in a larger study on social pragmatic language sampling. To be included in the current study participants had a diagnosis of attention-deficit hyperactivity disorder (ADHD) as part of their reported treatment diagnosis at the Eastern Illinois University (EIU) Speech-Language-Hearing Clinic. Participants with only subjectively reported behavioral concerns related to attention deficits were not included. The examiners conducting the language sampling procedures were either the main faculty investigator or communication disorders and sciences graduate student clinicians under the supervision of certified practicing speech-language pathologists.

Procedure

Information was obtained about participants diagnosed with ADHD from a larger study conducted by Dr. Nichole Mulvey. Participants were provided with three prompts about age-appropriate topics (see Appendix A). Examiners used socially based language sampling techniques to elicit social discourse (i.e., increased use of cognitive state verbs, expectant pauses, contingent responses instead of questions, staged communication breakdowns). Conversations were video and audio recorded and transcribed and coded using systematic analysis of language transcripts (SALT). For the current study, videos and transcripts were reviewed and analyzed for use of gestures, social bid responses, and inattentive and impulsive behaviors.

Two types of gestures were specifically measured in this study, emphatic and descriptive.

Emphatic gestures use hand movements to provide emphasis while speaking and do not convey

specific information. For example, an individual may clap their hands to emphasize a specific word being used. Descriptive gestures were measured when participants used their hands to represent an action or object (e.g., moving hands quickly back-and-forth to represent how quickly an object was moving). While other gestures were present, they were not measured in this study. Emphatic and descriptive gestures are frequently used by typically developing individuals in conversational exchanges. For the current study emphatic and descriptive gestures were measured as they are more commonly used and easiest to differentiate between.

Two characteristics of social bid responses were measured in the study, duration and relevance. Duration of social bid responses can be described as mean length of utterance (MLU) or the average number of morphemes in each utterance participants produced following a social bid provided by the examiner. The relevance of a social bid response was determined by whether the statement provided by the participant was on topic in relationship to what the examiner said. Relevance was determined by a four-part scoring system. Social bid responses were coded as relevant, irrelevant, acknowledgement, or semantically related. A relevant social bid response maintained the conversation and topic whereas an irrelevant social bid response changed the topic and did not maintain conversation. A social bid response coded as an acknowledgment refers to general responses such as, "okay" or "yeah". Lastly, a semantically related social refers to a response that did not answer the social bid, but it did maintain the topic. Duration and relevance were evaluated given known language characteristics often associated with ADHD including inattention and impulsivity.

Given the hallmark characteristics of ADHD, participants were measured in their use of inattentive and impulsive behaviors while in conversation with the examiner. While additional inattentive behaviors may have been present, this study specifically looked at distracting

fidgeting like restlessness of the hands and extraneous body movements, as these were apparent given the video angle. Though impulsivity could be shown in many ways, this study specifically measured interruptions made by the participants while the examiner was speaking, as interruptions were likely to disrupt social exchanges.

Table 1 provides definitions of gestures, social bid responses, and ADHD characteristics measured in the study and used for scoring purposes.

 Table 1

 Definitions of Measured Variables

Behaviors Measured	Definition
Gestures: Emphatic	Hand movements to provide emphasis
Gestures: Descriptive	Movements used to represent an action or object
Social Bid Response: Duration	Mean length of utterance (MLU)
Social Bid Response: Relevance	Statement in response to examiner that maintains topic
ADHD Characteristic: Inattentive	Lack of attention including distracting fidgeting;
ADHD Characteristic: Impulsive	Actions with no thought to consequences that may occur including interruptions of the examiner

Measures and Data Analysis

To measure gestures, a frequency tabulation was conducted throughout the conversational sample. In addition, for each gesture noted, the gesture was categorized into emphatic or descriptive gesture, when applicable. Percent gestures used over time was calculated for each participant as well as frequency of categorical gestures. This analysis provided information on how frequently school-age children with ADHD use gestures and specifically which types of gestures they use most frequently to convey non-verbal information in social exchanges. To account for the variability in the length of the samples by participant, gestures

were measured by minute (e.g., in minute 1, the participant used X gestures) and the average number of gestures was then calculated for each participant.

To measure ADHD behaviors, a frequency tabulation occurred to account for the variability in the length of the samples by participant, gestures were measured by minute (e.g., in minute 1, the participant used X gestures) and the average number of gestures was then calculated for each participant.

To measure social bid responses, for each participant, each social bid response (previously coded in the context of the larger study) was measured for mean length of utterance (MLU). An average MLU was then calculated for each participant based upon all their social bid responses. In addition, each response was subjectively rated as relevant or not relevant to the prompted topic. Percent relevant utterances was calculated for each participant. This analysis provided information on how frequently children with ADHD respond to social bids during conversation and the contingency of responses they give using various amounts of language.

Finally, correlational analysis between measured variables was conducted to determine relationships. Specifically, ADHD characteristics of impulsivity and inattentiveness were analyzed for influence on gestures and social bid responses. Relationships between verbal and nonverbal social behaviors were also investigated. Overall disruptions in social reciprocity during conversation were analyzed.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.).
- American Speech-Language-Hearing Association. (n.d.-a). *Attention-Deficit/Hyperactivity Disorder (ADHD)*. Retrieved from https://www.asha.org/public/speech/disorders/adhd/.
- American Speech-Language-Hearing Association. (n.d.-b). *Components of social communication*. Retrieved from https://www.asha.org/siteassets/practice-portal/social-communication-disorder/components-of-social-communication.pdf.
- American Speech-Language-Hearing Association. (n.d.-c). *Social Communication*. Retrieved from https://www.asha.org/public/speech/development/social-communication/.
- American Speech-Language-Hearing Association. (n.d.-d). *Social communication benchmarks*.

 Retrieved from https://www.asha.org/siteassets/practice-portal/social-communication-disorder/social-communication-benchmarks.pdf.
- American Speech-Language-Hearing Association. (n.d.-e). *Social Communication Disorder*.

 Retrieved from https://www.asha.org/practice-portal/clinical-topics/social-communication-disorder/.
- Bauminger-Zviely, N., Eytan, D., Hoshmand, S., & Ben-Shlomo, O. (2020). Preschool peer social intervention (PPSI) to enhance social play, interaction, and conversation: Study outcomes. *Journal of Autism and Developmental Disorders*, 50(1), 844-863. doi:10.1007/s10803-019-04316-2
- Bruce, B., Thernlund, G., & Nettelbladt, U. (2006). ADHD and language impairment: A study of the parent questionnaire FTF (five to fifteen). *European Child & Adolescent Psychiatry*, 15(1), 52-60. doi:10.1007/s00787-006-0508-9

- Centers for Disease Control and Prevention. (2020a). *Attention-Deficit/Hyperactivity Disorder* (ADHD). Retrieved from https://www.cdc.gov/ncbddd/adhd/facts.html
- Centers for Disease Control and Prevention. (2020b). *Attention-Deficit/Hyperactivity Disorder*(ADHD) Data and Statistics About ADHD. Retrieved from

 https://www.cdc.gov/ncbddd/adhd/data.html
- Chan, K. & Fugard, A. (2018). Assessing speech, language and communication difficulties in children referred for ADHD: A qualitative evolution of a UK child and adolescent mental health service. *Clinical Child Psychology and Psychiatry*, 23(3), 442-456. doi:10.1177/1359104517753510
- Church, R.B., & Goldin-Meadow, S. (1986). The mistmatch between gesture and speech as an index of transitional knowledge. *Cognition* (23), 43-71. doi: 0010-0277/86/\$9.20
- Cook, S., & Goldin-Meadow, S. (2006). The role of gesture in learning: Do children use their hands to change their minds? *Journal of Cognition and Development*, 7(2), 211-232. doi:10.1207/s15327647jcd0702 4
- Crais, E., Watson, L., & Baranek, G. (2009). Use of gesture development in profiling children's prelinguistic communication skills. *American Journal of Speech-Language Pathology*, 18(1), 95-108. doi:10.1044/1058-0360(2008/07-0041)
- Crooke, P. J., Winner, M., & Olswang, L. (2016). Thinking socially: teaching social knowledge to foster social behavioral change. *Topics in Language Disorders*, *36*(3), 284-298. doi:10.1097
- Elleseff, T. (2015). Assessing social communication abilities of school-aged children. *Perspectives on School-Based Issues, 16*(3), 79-86. doi:10.1044/sbi16.3.79

- Geurts, H., & Embrechts, M. (2008). Language profiles in ASD, SLI, and ADHD. *Journal of Autism & Developmental Disorders*, 38(10), 1931-1943. doi:10.1007/s10803-008-0587-1
- Kim, O. & Kaiser, A. (2000). Language characteristics of children with ADHD.

 Communication Disorders Quarterly, 21(3), 154-165. doi:10.1177/152574010002100304
- Leonard, M., Milich, R., & Lorch, E. (2011). The role of pragmatic language use in mediating the relation between hyperactivity and inattention and social skills problems. *Journal of Speech, Language, and Hearing Research*, *54*(2), 567-579. doi:10.1044/1092-4388
- Li, J., Hestenes, L. L., & Wang, Y. C. (2016). Links between preschool children's social skills and observed pretend play in outdoor childcare environments. *Early Childhood Education Journal* 44(1), 61-68. doi:10.1007/s10643-014-0673-2
- Lord, C., Rutter, M., DiLavore, P.C., Risi, S., Gotham, K., & Bishop, S. L. (2012). *Autism Diagnostic Observation Schedule, Second Edition (ADOS-2)* [Manual: Modules 1-4].

 Torrance, CA: Western Psychological Services.
- Oram, J., Fine, J., & Tannock, C. (1999). Assessing the language of children with attention deficit hyperactivity disorder. *American Journal of Speech-Language Pathology*, 8(1), 72-80. doi:10.1044/1058-0360.0801.72
- Redmond. S. (2016). Language impairment in the attention-deficit/hyperactivity disorder context. *Journal of Speech, Language, and Hearing Research, 59*, 133-142. doi:10.1044/2015 JSLHR-L-15-0038
- Roitsch, J., Phalen, L., & Watson, S. (2019). Predictors of comfort level in speech-language pathologists working with students with attention-deficit/hyperactivity disorder.

 *Perspectives of the ASHA Special Interest Groups, (4), 1097-1109.

 doi:10.1044/2019_PERS-SIG16-2019-0012

- Segal, J., Smith, M., Robinson, L., & Boose, G. (2020). *Nonverbal communication and body Language*. Retrieved from https://www.helpguide.org/articles/relationships-communication/nonverbal-communication.htm.
- Timler, G. (2018). Using language sample analysis to assess pragmatic skills in school-age children and adolescents. *Perspectives of the ASHA special interest groups SIG 1, 3*(1), 23-35. doi:10.1044/persp3.SIG1.23

Appendix A

Conversation Sample Prompts

Conversation 1 – conversation, personal narratives

Prompt: This year I thought all of my friends forgot my birthday because no one called me to wish me a happy birthday – I was really sad. The day after my birthday, I thought I was going out to dinner with my best friend, but when I got there all my friends were there. It was a surprise party! My friends didn't forget my birthday after all!

Conversation 2 – expository discourse

Prompt: I love to play monopoly. When I play monopoly, I like to be the banker. The banker gets to pass out and collect all the money. I wait until someone takes a turn and rolls the dice. Then, I see where they land. If they are supposed to get some money, then I give it to them. For example, sometimes you get to pick a card and the card might say something like, "Win a prize, collect \$100.00. Then I get to give them the money. If the card says that they owe money, then I get to collect it! I think monopoly is fun because anything can happen and a different person always wins. But when you're the banker, you can't lose!

Conversation 3 – narrative-story retell

Prompt: I like the Harry Potter movies! I'll tell you about one of my favorite scenes. In

Harry Potter and the Chamber of Secrets, Harry and Ron went down into the

chamber of Secrets where they landed on old crunchy bones. It was dark and

damp down in the chamber. Harry walked through the slimy tunnel alone to find

Ginny... He was scared because he heard the hissing of the snake. I like the scary parts!