

ASSESSING PRAGMATIC LANGUAGE IN CHILDREN THROUGH A BRIEF
ASSESSMENT OF IDIOM COMPREHENSION: A PILOT STUDY

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DEDICATION

This dissertation is dedicated to Catherine S. Snodgrass. Your book helped spark the idea that led to this dissertation. It is my hope that this will lead to future research and a better understanding of pragmatic language in children. Thank you for allowing me to use your book and illustrations!

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ABSTRACT

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ASSESSING PRAGMATIC LANGUAGE IN CHILDREN THROUGH A BRIEF ASSESSMENT OF IDIOM COMPREHENSION: A PILOT STUDY

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The purpose of this study was to assess pragmatic language in children within a clinical population (i.e., children with ASD and ADHD) and nonclinical population (i.e., typically developing children) by using a newly formed Test of Idioms. The total number of participants who participated in the study was 36 with 18 participants in each group (i.e., clinical and nonclinical). Each participant in the study was given a series of 25 idiom phrases and was asked to identify what each phrase meant. If the participant responded incorrectly, they were given a visual cue and asked to guess again. This study aimed to not only demonstrate that the Test of Idioms was a useful tool for identifying pragmatic language difficulties among a clinical group, but may also help differentiate between children with ASD and ADHD. The study examined the relationship between the Test of Idioms and another measure of pragmatic competence (i.e., TOPS 3) through a Spearman's correlation. Results from the analysis demonstrated that two of the five composite scores on the Test of Idioms (i.e., Food, Home and School) showed significant correlations with the TOPS 3. Next, a Cronbach's alpha was conducted to measure the inter-item reliability. Three of the five composites (i.e., Food, Animal, Home and School)

were just below the threshold of .70, which is considered acceptable reliability. However, the overall score showed strong inter-item reliability. A Mann Whitney – *U* analysis was employed to examine differences in performance between the clinical and nonclinical group. The results revealed a significant difference between groups on two of the composites (i.e., Animal, Home and School). Furthermore, a Mann Whitney – *U* was also utilized to examine differences in the obtainment of 1-point and 2-point responses between participants with ASD and ADHD. No significant differences between groups were identified. Overall, the Test of Idioms showed potential in becoming a reliable and valid measure for assessing pragmatic language in children. In addition, it proved to be a quick and user-friendly assessment that most children reported enjoying.

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CHAPTER I

INTRODUCTION

“I don’t understand why people never say what they mean... Seriously, how could anyone who isn’t a native English speaker ‘get the picture,’ so to speak, and not assume it has something to do with a photo or a painting?” (Picoult, 2010, p. 19) This statement, quoted from the novel *The House Rules*, accurately describes the difficulty that some individuals face when attempting to understand the ambiguities of pragmatic, or figurative, language.

Pragmatic language is often defined as the social use of language that includes both verbal and nonverbal skills (Staikova, Gomes, Tartter, McCabe, & Halperin, 2013). It also requires individuals to incorporate their knowledge of social information with contextual cues when interacting with others (Murza & Nye, 2013). Pragmatic language impairments are often identified in children who: (1) struggle with the recognition of social cues, (2) have a difficulty understanding and engaging in small talk, (3) engage in tangential speech (e.g., wandering train of thought), and (4) give conversational responses that are socially inappropriate (Ryder & Leinonen, 2014; Simmons, Paul, & Volkmar, 2014; Volden & Phillips, 2010). Pragmatic language is thought to be the communicative domain that is most commonly impaired in children with autism spectrum disorder (ASD), even when other language domains are within normal limits. Research has shown that children with ASD have trouble understanding figurative

language, which often leads them to respond in an overly literal manner in conversation (Volden & Phillips, 2010). Pragmatic language deficits have also been identified in children with attention-deficit/hyperactivity disorder (ADHD; Staikova et al., 2013). The presence of these pragmatic language deficits in children with ASD and ADHD may lead to difficulty forming and maintaining friendships with peers as well as fear and avoidance of social interactions. This fear and avoidance is more common in children who are higher functioning due to their heightened awareness of their social and communication difficulties (Murza & Nye, 2013).

Assessing Pragmatic Language

Pragmatic language is thought to be influenced by cognitive, social, linguistic, and cultural competencies (Tolchinsky, 2004). Each of these factors is important for a child's development of pragmatic language and overall communication. Because several areas of functioning influence how an individual communicates, the assessment of language, particularly in the area of pragmatics, can often be challenging (Adams, 2002). In addition, it is difficult to assess pragmatic language without also taking into account an individual's receptive and expressive language skills, as well as his or her cognitive and social abilities (Landa, 2005). Language assessments are traditionally conducted using a developmental descriptive model, which typically uses a combination of standardized instruments, observations, and informal checklists to gather information about a child's strengths and weaknesses in communication (Adams, 2002).

Difficulties in Assessing Pragmatic Language

Many researchers have identified a lack of consensus for conducting pragmatic language assessment specifically due to limitations in the research (Adams, 2002). Further, while pragmatic language deficits are commonly identified in children, particularly if they have a comorbid developmental disorder such as ASD or ADHD, few standardized measures exist that can adequately quantify these impairments. Researchers have identified that many measures being utilized to identify speech and language impairments focus heavily on linguistic structure (e.g., phonetics, grammar, syntax) and language meaning and less on the use of pragmatic language (Volden & Phillips, 2010).

In fact, some assessment measures for speech and language fail to test pragmatic skills altogether. There are several reasons that few measures exist to test pragmatic language. First, pragmatic language is thought to be context specific and thus does not always lend itself well to a structured and formalized assessment procedure. Second, children with pragmatic language difficulties sometimes perform better during a structured assessment where they are provided with context and clear instructions as opposed to a more ambiguous naturalistic setting which may amplify their struggles with pragmatic language. This is likely because of the unpredictability that is present in most social environments (Adams, 2002; Volden & Phillips, 2010).

The Use of Idioms for Assessing Pragmatic Language

Idioms are defined as phrases that have a figurative meaning and cannot be interpreted through analyzing each word in the phrase (e.g., *he spilled the beans*; Titone & Connine, 1994). Throughout the literature, idiom comprehension is identified as an

important component in pragmatic language development in children. In addition, understanding how to interpret and use idiom phrases in everyday speech appears to be important for effective communication and social interaction among children (Norbury, 2004). Idioms are commonly used in both written and spoken language across a variety of settings. Many children are exposed to idioms at school, at home, and in their community (Kerbel & Grunwell, 1997; Nippold & Martin, 1989; Norbury, 2004). Some research has even suggested a positive correlation between idiom comprehension and academic achievement (Nippold & Martin, 1989). Many researchers have suggested that understanding the level of idiom comprehension in children and adolescents can guide treatment planning for individuals with speech and language impairments (Norbury, 2004). This is because children use different cognitive skills, such as theory of mind, inferencing, and cognitive flexibility, to understand idioms than they do to interpret more literal language (Titone & Connine, 1994).

Purpose and Rationale of the Study

Statement of the Problem

Currently, there is no well constructed standard for assessing and diagnosing pragmatic language impairments in children (Reisinger, Cornish, & Fombonne, 2011). While there are tests that report to measure pragmatic language in a variety of ways, they do not always succeed in identifying pragmatic language deficits in children due to the structure of the tests and challenges in measuring all potential areas of pragmatic language impairment (Volden & Phillips, 2010). In order to appropriately identify and diagnose pragmatic language impairments and provide effective interventions, more

research on the assessment process and psychometrics of new and previously utilized standardized assessments of pragmatic language is critical. Additional research in this area will help provide a more universal process for assessing pragmatic language in children.

Brief Description of the Study

The ability to interpret idioms is a complex process that requires an individual to not only possess basic language skills, but also have a working understanding of the intentions of others (Whyte, Nelson, & Scherf, 2014). The current study aimed to assess pragmatic language in a sample of children within a clinical population (i.e., children with ASD and ADHD) and nonclinical population (i.e., typically developing children) by using a newly formed Test of Idioms. Each participant in the study was given a series of 25 idiom phrases, such as, *it's a piece of cake*, and was asked to identify what the phrase meant. If the participant failed to guess correctly, he or she was shown a picture that illustrated the idiom and was asked to guess again.

Purpose of the Study

The differential diagnosis of high functioning ASD and ADHD can be challenging due to the similar communication and social impairments across both disorders (Geurts et al., 2004; Staikova et al., 2013). This study aimed to not only demonstrate that the Test of Idioms was a useful tool for identifying pragmatic language difficulties among a clinical group, but may also help differentiate between children with ASD and ADHD based on their performance on the measure of pragmatic language and ability to use contextual cues. By providing a new instrument for assessing pragmatic

language, the current study intended to enhance the assessment and treatment planning for pragmatic language impairments in children within specific clinical populations such as ASD and ADHD.

Research Questions

The current study aimed to answer the following research questions. These questions, along with their associated hypotheses, will be discussed in Chapter III, IV, and V.

1. Is the Test of Idioms a psychometrically sound instrument with strong reliability and validity?
2. How useful is the Test of Idioms for screening pragmatic skills in children ages 7 to 12?
3. How well does the Test of Idioms differentiate between children with ADHD and ASD based on their performance?

Definition of Terms

The following definitions are provided for the terms that will either be commonly used throughout this document or that provide important context regarding topics relevant to this dissertation.

Attention-Deficit/Hyperactivity Disorder (ADHD): One of the most common chronic developmental disorders that often begins in early childhood. ADHD is characterized by inattention, hyperactivity, and/or impulsivity that is more severe than would be appropriate for a typically developing child of the same age. Individuals with

ADHD often have associated impairments in language, social skills, and motor coordination (American Psychiatric Association [APA], 2013).

Autism Spectrum Disorder (ASD): A pervasive developmental disorder that is characterized by difficulties with social interaction and communication, as well as restricted interests and/or repetitive patterns of behavior. These characteristics typically begin early in childhood and can vary in the level of severity across individuals (APA, 2013).

Idioms: Phrases commonly used in English language that have figurative meanings and are not easily interpreted from examining the words and their composition in the phrase (Nippold & Duthie, 2003; Titone & Connine, 1994). Examples include: *it's a piece of cake*, *it's raining cats and dogs* and *you are skating on thin ice*.

Linguistics: “The academic discipline that takes language as its topic” (Ashcraft & Radvansky, 2010, p. 321).

Phonology: “Refers to the rules governing the sounds of language” (Banich & Compton, 2011, p. 240). Linguists identify two representations of speech sounds, *phonemes* and *phonetics*. *Phonemes* are the smallest unit of sound used in conjunction with other sounds to signal meaning. *Phonetics* are represented differently in speech depending on how they are used (e.g., the occasion and the context). For example, the sound /p/ in the word pill is made with “a burst of air” while the sound /p/ in the word spill is not (Banich & Compton, 2011, p. 240).

Pragmatic Language: The social use of language that involves three major communication skills including using language (e.g., greeting, informing, demanding,

requesting), changing language according to listener's needs or the situation, and following social rules (e.g., conversational turn taking, topic maintenance, using verbal and nonverbal signals, using eye contact and facial expressions, and rephrasing when needed). It is important to note that the rules of pragmatics often vary across cultures, which is why it is important for an individual to know which rules to follow when communicating with different people (American Speech-Language-Hearing Association [ASHA], 2016).

Pragmatic Language Impairments: Individuals with pragmatic language impairments may use appropriate grammar and syntax but struggle with mastering the rules for social language. These individuals may: (1) have trouble staying on a specific topic (2) misuse or have trouble integrating nonverbal skills with verbal skills (3) over rely on the literal meaning of phrases and (4) have trouble understanding humor, metaphors, and idiom phrases (ASHA, 2016).

Psycholinguistics: "The study of language as it is learned and used by people" (Ashcraft & Radvansky, 2010, p. 321). It divides language into three distinct components: *syntax*, *phonology*, and *semantics* (Banich & Compton, 2011).

Semantics: The fundamental idea that language is used to convey meaning; the functionality of the words or sounds that people produce is often to send a message (Ashcraft & Radvansky, 2010).

Syntax: "The arrangement of words as elements in a sentence to show their relationship to one another; grammatical structure; the rules governing the order of words in a sentence" (Ashcraft & Radvansky, 2010, p. 521).

Theory of Mind (TOM): Theory of mind is an individual's ability to think about the thoughts, intentions, and beliefs of other people. This theory posits that an individual has a cognitive representation of the knowledge and feelings of other people (Banich & Compton, 2011).

CHAPTER II

LITERATURE REVIEW

This chapter will discuss the topics most relevant to understanding pragmatic language and how it has been measured in children through standardized assessment. First, pragmatic language will be defined and covered in depth, with a specific focus on figurative language. Neurological and cognitive considerations for language development will also be discussed. The development of pragmatic language, with an emphasis on the differences in pragmatic language identified in clinical populations, will be reviewed. This chapter will also highlight past and current literature on the assessment of pragmatic language with a specific emphasis on the use of idiom comprehension for identifying pragmatic language deficits in children. Finally, other measures currently being utilized to assess pragmatic language skills in children will be identified and discussed.

Introduction

“Language is the mental faculty that many people consider most uniquely human and that most distinctly separates us from the other species that inhabit the earth” (Banich & Compton, 2011, p. 232). Psycholinguistics, or the study of how people understand and use language, has been researched by individuals in the field of cognitive neuroscience and neuropsychology for many years (Ashcraft & Radvansky, 2010; Banich & Compton, 2011). The ability to understand language and communicate effectively involves a number of complex processes working together (Landa, 2005; Vulchanova, Saldana,

Chahboun, & Vulchanov, 2015). These processes will be described further in the following sections. Currently, identifying specific language impairments in children has proven to be challenging and requires input from multiple sources of information including observations, parent checklists, and standardized assessment measures (Ryder, Leinonen, & Schulz, 2008). Among the specific language impairments commonly identified in children, pragmatic language impairments are arguably the most challenging to assess (Ryder et al., 2008).

In order to understand how children use language, it is important to first discuss the appropriate functions for communicating with others. Landa (2005) identifies three specific domains for understanding communication including form, content and use. *Form* refers to the idea that communication takes place through various modalities including speech, writing, sign language, gestures, tone, and facial expressions. *Content* involves the ability to derive meaning from a series of words or phrases with added context. Both literal and nonliteral language would fall into this category. Examples of nonliteral language include humor, metaphors, and figurative language, which will be discussed in depth in the following section. Finally, *use* refers to the methods or modes in which communication is applied. This is thought to include the pragmatic language system. In order to be able to understand and use pragmatic language, an individual must have largely intact receptive and expressive language skills (Ryder et al., 2008).

Overview of Pragmatic Language

To communicate effectively, a person must demonstrate the ability to not only use language appropriately, but also process and evaluate the social language cues that other

people use to communicate (Murza & Nye, 2013). Pragmatic language is often defined as the social use of language that includes both verbal and nonverbal skills (Simmons et al., 2014; Staikova et al., 2013). “This type of social language competence...includes verbal (e.g., topic maintenance), paralinguistic (e.g., pausing), and nonverbal (e.g., facial expression) aspects of communication” (Murza & Nye, 2013, p. 85). Pragmatic language also requires individuals to incorporate their knowledge of social information with contextual cues when interacting with others (Murza & Nye, 2013). While pragmatic language skills begin emerging in childhood, they typically develop gradually over a period of several years. The development of pragmatic language is often challenging to assess due to its strong reliance on multiple factors working together (Mashal & Kasirer, 2011). Many researchers have identified that pragmatic language is influenced by cognitive, social, linguistic, and cultural competencies. It also defines how an individual comprehends social language and facilitates communication with others (Adams, 2002).

Domains of Pragmatic Language

Some researchers have suggested that pragmatic language is separated into three distinct domains: communicative intentions, presupposition, and discourse management skills (Landa, 2005). Examples of *communicative intentions* include informing, requesting, teasing, and commenting. These can be either direct or indirect.

Presupposition is the ability to use background information/context, understanding of vocabulary and grammar, and social understanding to communicate effectively.

Discourse management skills require an individual to be able to appropriately start, maintain and end a conversation (Landa, 2005).

Communicative intention. Landa (2005) describes communicative intention as the child's predetermined goal for communicating. The purpose can be either declarative (i.e., for social purposes) or regulatory (i.e., to make a request or regulate an interaction for reasons other than social). One of the key aspects to studying communication in infants revolves around joint attention, which is a child's "ability to coordinate attention with a social partner around an event or object" (Landa, 2005, p. 248). Joint attention emerges during early infancy and is one of the most widely studied principles of communicative intention. Researchers have highlighted the importance of joint attention to the later development of theory of mind (TOM), which will be discussed in a later section. In addition, the failure to develop joint attention during the first few years of life is correlated with developmental disorders, such as ASD. Children with various degrees of speech and language impairments often have some restrictions in their ability to express social and communicative intent and this can suggest the presence of pragmatic language deficits (Landa, 2005).

Presupposition. This domain begins to develop during the preschool years and often becomes more sophisticated as the child continues to develop linguistic, social, and metacognitive skills. The ability to use context when communicating requires individuals to consider: their relationship with the listener (e.g., peer versus authority figure), how much information the listener has about the topic, the type of language to use, and when to use flexibility to phrase or rephrase their communication so that it appropriately fits the situation (Landa, 2005).

Discourse management. This is perhaps the most challenging and complex form of communication for children because it requires advanced social and communicative skills such as conversational turn taking, monitoring the listener's understanding of the topic, and following a number of social norms for any given situation (e.g., interacting in the classroom versus the playground). As stated previously, difficulty with discourse management, particularly in early childhood, is often associated with certain developmental disorders (e.g., ASD, ADHD) and/or speech and language impairments (Landa, 2005).

Figurative Language

Figurative, or nonliteral, language fits under the umbrella of pragmatic language (Vulchanova et al., 2015). Various aspects of figurative language (e.g., proverbs, humor, idioms) and how children learn to use figurative language are topics widely studied and discussed in the literature. The current study focuses specifically on children's understanding of figurative language through the use of idioms.

Figurative language is defined as “a cover term for linguistic expressions whose interpretation is nonliteral, where the meaning of the expression as a whole cannot be computed directly from the meaning of its constituents” (Vulchanova et al., 2015, p. 1). Simply put, figurative language requires the listener/interpreter to determine the meaning of a phrase or group of phrases based on what is being implied. This requires them to use contextual cues and have a general understanding of the speaker's, or writer's, intention instead of interpreting what is said or written literally (Abkarian, Jones, & West, 1992; Vulchanova et al., 2015; Whyte et al., 2014).

Figurative language is often described as a complex process that is more difficult to understand than other types of language due to its heavy reliance on visual and contextual content as well as its incorporation of multiple domains including linguistic, cognitive, and pragmatic skills (Tolchinsky, 2004; Vulchanova et al., 2015). Further, unlike other types of language, figurative language develops slowly over time and is often impaired in individuals with certain developmental disorders. Many researchers, who have studied the development of language in children, have suggested that figurative language begins to develop after the age of five and is often learned gradually once the child has developed the usage of vocabulary and semantics (Vulchanova et al., 2015; Whyte et al., 2014). The next section will review some of the neurological underpinnings that are necessary for understanding language processing.

Neuroanatomy of Language

Historically, some of the breakthrough findings in language and communication research were discovered by examining the brains of individuals who had various types of language dysfunction. For example, in the late 1800s, Paul Broca learned that the right and left hemispheres of the brain have different functions by studying a patient who had lost his ability to produce fluent speech (Banich & Compton, 2011). Broca discovered that this patient had a lesion in a specific place in his left hemisphere. This region was later named Broca's area and an individual's loss of speech production when his or her language comprehension is still intact was labeled Broca's aphasia (Banich & Compton, 2011). Aphasia is a term used to describe the loss of the ability to process language after brain damage. A few decades later, Karl Wernicke discovered a condition in which

individuals had the ability to produce speech but what they said made little to no sense. This syndrome was later named Wernicke's aphasia. These two major findings paved the way for future research and suggested that speech production and comprehension are found in two completely separate regions of the brain. There are several other types of aphasia and they are dependent on the area(s) of the brain that sustained damage (Banich & Compton, 2011). The following two sections will discuss the contributions of the left and right hemispheres to language processing.

Left Hemisphere Contributions

Past and present research in the field of cognitive neuroscience has found that the left hemisphere is responsible for speech production (Banich & Compton, 2011; Hamberger, 2007; Rasmussen & Milner, 1977). Interestingly, some research has focused on language production based on handedness (e.g., right or left). This research suggests that regardless of whether an individual is right or left handed, most of language production occurs in the left hemisphere (i.e., 96% for right handedness and 70% for left handedness; Banich & Compton, 2011).

Psycholinguistics describes language as being composed of three main functions: phonology, syntax, and semantics. While each function has a unique purpose in the ability to produce and understand language, it would be difficult to communicate without each function working together (Banich & Compton, 2011). Phonology involves all of the rules that make up the sounds in language. Phonological processing allows an individual to create or understand the composition of certain sounds (e.g., phonemes) to make meaningful words. Research has found that the left inferior regions of the brain are

“involved in linking the sound-based linguistic representation to motor production” (Banich & Compton, 2011, p. 245). Individuals with Broca’s aphasia have difficulty producing phonetic representations to create meaningful speech sounds. Syntax is critical for determining how to put words together in order to create meaningful sentences. Syntax is thought to occur primarily in the posterior frontal region and dorsal temporal region of the brain. Finally, the primary purpose of semantic processing is to help an individual determine the meaning of words or combinations of words. Semantic processing occurs predominately in the temporal lobe via two separate routes. The dorsal route is utilized for auditory language and the ventral route is activated for visual language (Banich & Compton, 2011).

Right Hemisphere Contributions

It has been well established throughout the literature that the left hemisphere contributes significantly to an individual’s ability to produce and process language (Banich & Compton, 2011; Lindell, 2006). However, it is important to also understand the unique functions of the right hemisphere in language and communication. Banich and Compton (2011) identify three important aspects that the right hemisphere contributes to language: prosody, narrative, and inference. Prosody refers to the ability to interpret intonation patterns such as tone and pitch, particularly in emotionally charged speech. For example, an individual who struggles to interpret prosodic cues may have trouble detecting sarcasm or a friendly versus frustrated tone. Research on right hemisphere damage has found that these individuals have trouble integrating information to follow a storyline or making inferences based on previously learned information. Other research

has demonstrated that the right hemisphere also is particularly important for the understanding of nonliteral language such as metaphors and humor. Neuroimaging studies have shown activation in the middle temporal gyrus when an individual is asked to determine a theme from an untitled paragraph or while reading a fable (Banich & Compton, 2011). This finding highlights why the ability to deduce or develop a meaningful theme from a group of sentences is an important factor in the understanding of humor or jokes. Specifically, neuroimaging has revealed that along with the middle temporal gyrus, the frontal lobe is involved in the processing of metaphoric, or figurative language (Banich & Compton, 2011).

Consideration of Cognitive Factors

It is important to understand the cognitive factors that contribute to an individual's understanding of language, particularly in the area of social or pragmatic language. One cognitive theory that has been linked to the success of later language development is theory of mind (TOM). This principle involves abstract reasoning and is difficult for most children younger than five years old. TOM requires individuals to understand the beliefs and intentions of other people. This ability involves a complex understanding of how other's beliefs are formed and the idea that one's own knowledge and beliefs do not always match that of others. TOM has been linked to success in forming relationships with others and being able to anticipate how others will react in a given situation (Norbury, 2005; Tolchinsky, 2004). For this reason, TOM has been suggested to play a major role in the identification of pragmatic language impairments in

children. Many pragmatic language assessments include a TOM task, which will be discussed in depth in the following sections.

Throughout the literature, problem solving is identified as one of the key abilities needed in language development. The ability to problem solve involves taking previously learned information and integrating that information with relevant contextual and conceptual information. In order to do this, individuals are required to observe the stimuli in their environment and determine what information is relevant and will help guide them toward an answer or solution (Ryder & Leinonen, 2014). This ability to communicate using specific problem solving strategies is thought to develop in children between the ages of three and six years old and requires a great deal of trial and error. For instance, young children often have difficulty teasing out relevant information from irrelevant information when learning to communicate. Instead, they over rely on methods such as using a key word, retrieving knowledge from memory, or simply guessing (Ryder & Leinonen, 2014).

Historical Considerations for Pragmatic Language and Communication

The development of language is a complex process that has been studied in great depth over the past few centuries. Noam Chomsky, a notable researcher in the study of language development and a contributor to the growth of studying the innate factors involved in language acquisition, introduced the principle of Universal Grammar (Ashcraft & Radvansky, 2010). This theory posited that much of an individual's ability to learn language is prewired. Chomsky believed that children's brains had the ability to generate language beyond what they were exposed to in their environment (Ashcraft &

Radvansky, 2010; Tolchinsky, 2004). Chomsky also introduced the concept of the Language Acquisition Device which suggested that children use cues from their environment to tailor their language to fit the context and follow grammatical rules (Ashcraft & Radvansky, 2010; Glackin, 2010). Past and present language theorists have debated over Chomsky's theories and suggested alternative views; however, the focus of research in language development continues to be "on the speed with which children acquire language, the amount of innate knowledge they possess, and the similarity of their grammar to that of adults" (Tolchinsky, 2014, p. 233).

Development of Pragmatic Language

As stated previously, pragmatic language is thought to be influenced by cognitive, social, linguistic, and cultural competencies (Tolchinsky, 2004). Each of these factors is important for a child's development of pragmatic language and overall communication. The development of communication involves not only learning basic linguistics, but also how to apply these principles in a social context. When a young child has difficulty identifying social cues in others, he or she is likely to struggle with learning pragmatics and experience overall challenges in language development (Landa, 2005). In the first year of life, children begin to develop the ability to engage in social exchanges and use gestures to communicate with their caregivers (Tolchinsky, 2004). These are often the product of object centered-joint attention, with rapid development in communication occurring in the months shortly after (Adams, 2002; Landa, 2005). At approximately three years old, children begin to understand the nuances of conversation and develop skills such as greetings, making demands or requests, and conversational turn taking.

Between four and six years old, children begin to develop more complex skills for communication including the ability to form a narrative, make inferences, understand the difference between literal and non-literal speech, and interpret idioms. Around seven years old, children begin to evaluate their own metapragmatic skills, or the ability to understand their own communication strengths and weaknesses (Adams, 2002). At this age, children begin to apply context to language in order to communicate more effectively (Ryder & Leinonen, 2014).

Many researchers have focused on the pragmatic aspects of language for children five years and older. At this stage, language development evolves into a more complex process of “distinguishing two or more meanings of a word; constructing a coherent representation of a text by integrating lexical and syntactic information with situational and linguistic context; and the awareness that what is said and what is meant do not always coincide” (Tolchinsky, 2004, p. 238).

Pragmatic Language Impairments (PLIs) in Children

Children who have specific impairments with one of more aspects of their language without other associated diagnoses to explain the difficulties with language are often identified as having specific language impairments (SLIs). Pragmatic language impairment (PLI) is one subgroup within SLI that includes a population of children who have pragmatic language skills that are developmentally inappropriate and disproportionate to their structural language abilities (Reisinger et al., 2011; Ryder et al., 2008). Pragmatic language or associated impairments are described as “difficulty with using language to convey and understand intended meanings: ‘a mismatch between

language and context” (Adams, 2002, p. 974). Pragmatic language impairments are often identified in children who struggle with the recognition of social cues, who have difficulty understanding and engaging in ‘small talk’, who often engage in tangential speech, and who tend to give conversational responses that are socially inappropriate (Ketelaars, Cuperus, Jansonius, & Verhoeven, 2010; Volden & Phillips, 2010). Pragmatic language impairments are commonly associated with certain developmental disorders such as high functioning autism, ADHD, Williams Syndrome, and other specific speech and language disorders (Hoffman et al., 2013; Norbury, 2004; Reisinger et al., 2011; Staikova et al., 2013). Research has shown that pragmatic language impairments are often linked to difficulties with peer relationships, academic performance, and psychosocial adjustment in children (Kim & Kaiser, 2000; Staikova et al., 2013).

Adams (2002) highlights the two main reasons that assessing pragmatic language skills is helpful for treatment planning across multiple developmental disorders. First, assessing pragmatic language can give the practitioner specific data regarding an individual’s social and cognitive functioning beyond what can be done with observing nonverbal behaviors alone. Second, identifying the specific strengths and weaknesses within an individual’s pragmatic language skills can provide more effective social and communication interventions.

Pragmatic Language in Specific Clinical Populations

Pragmatic language is thought to be the communicative domain that is most commonly impaired in children with ASD, even when other domains are within normal limits (Landa, 2005; Volden & Phillips, 2010). Research has shown that children with

ASD have trouble with figurative language and frequently respond in an over-literal manner during conversation. Pragmatic language deficits have also been identified in children with ADHD (Staikova et al., 2013). Interestingly, some current researchers have identified a group of children who do not fully meet the diagnostic criteria for ASD or ADHD but demonstrate significant difficulties with the social construct of communication including pragmatic language. These children have been identified as having Social (Pragmatic) Communication Disorder (Bishop, 2000; Botting & Conti-Ramsden, 1999; Gibson, Adams, Lockton, & Green, 2013; Russell & Grizzle, 2008). Children who are diagnosed with Social (Pragmatic) Communication Disorder have: (1) difficulty communicating socially (e.g., greeting, sharing information), (2) an inability to modify their communication to match various situations, (3) difficulty following the rules of conversation (e.g., turn taking, use of verbal or nonverbal signals), and (4) trouble making inferences (APA, 2013). Some research has explored the differences in the language profile of children with ASD and Social (Pragmatic) Communication Disorder. Gibson et al. (2013) found that the children with ASD were less likely to have expressive language impairments and more likely to have restrictive/repetitive patterns of behavior. Further, children with pragmatic or speech impairments were likely to have stronger receptive than expressive language skills while children with ASD had similar functioning in each area. This provides implications for practitioners by suggesting that the two disorders can be separated predominately by the presence of restrictive/repetitive patterns of interest (APA, 2013; Gibson et al., 2013).

Social (Pragmatic) Communication Disorder is a relatively new disorder, as it was first identified under the umbrella of communication disorders in the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5; APA, 2013)*. Limited information regarding the prevalence and etiology of Social (Pragmatic) Communication disorder has been published, which suggests a need for more research surrounding the disorder. Because of the limited research and perceived low prevalence, this disorder was not included in the target population for the current study. However, it is important for researchers to understand that pragmatic language impairments may occur outside of other developmental disorders such as ASD and ADHD (Gibson et al., 2013).

Further information about the diagnostic criteria, presentation, and etiology of ASD and ADHD will be discussed in the following section. Both ASD and ADHD have been well documented in the literature as having associated pragmatic language impairments and thus will be the focus for this research study.

Autism Spectrum Disorder (ASD)

Autism spectrum disorder (ASD) is a condition in which a person experiences difficulty engaging in reciprocal social communication and interaction (Criteria A), and exhibits repetitive patterns of behavior or restricted interests (Criterion B; APA, 2013). Both Criteria A and B must have been present from early childhood and must negatively affect the individual's everyday functioning. Recently, the prevalence of ASD has been estimated to occur in approximately 1.5% of the population nationwide. Many theories regarding the steady increase in ASD cases reported have been explored; however, the consensus continues to indicate that the rates have increased due to a heightened

awareness of the disorder, expanding the diagnostic criteria to include cases below the diagnostic threshold, advances in research and assessment procedures, unexplained environmental factors, and an actual increase in the prevalence of ASD (Corbett & Gunther, 2011). ASD is thought to be four times more likely to be diagnosed in males than females. In addition, when ASD occurs in females, it is more likely to include certain features including intellectual disability. When females are identified as having ASD without intellectual disability, the presentation can appear more subtle than it would in males in both the social and communication domain. This can make diagnosing females with ASD more challenging with a likelihood of some cases going unidentified (APA, 2013).

Behavioral Manifestations of ASD

The manner in which ASD manifests behaviorally often varies from person to person and is dependent on the individual's age and level of development, as well as the severity of the disorder. For example, while many individuals display language deficits, some may have more pronounced language impairments such as echoed or scripted speech, or a complete lack of speech, and others may appear to have mastered formal language (e.g., grammar, vocabulary) but still struggle with reciprocity/conversational turn taking or use overly literal language when conversing with others (APA, 2013; Murza & Nye, 2013; Volden & Phillips, 2010). According to the APA (2013), along with the diagnostic criteria that can be found in the *DSM-5*, ASD also has severity specifiers that may aid in describing the individual's current symptoms related to social communication and restricted, or repetitive behaviors. These specifiers are ranked from

Level 1 to Level 3. Level 1 suggests a difficulty “requiring support,” Level 2 indicates a difficulty “requiring substantial support,” and Level 3 is classified as a need “requiring very substantial support” (APA, 2013). The following information describes behaviors associated with ASD that might be observed in the various levels of severity.

Social communication. Children with ASD, Level 3 are described as having severe impairments in both their verbal and nonverbal communication. This can lead to extreme difficulty or a complete inability to initiate social interactions or respond to another individual’s social overtures. Further, they may only respond to “very direct social approaches” and may only initiate socially to get a specific need met (APA, 2013, p. 52). Children with ASD, Level 2 often demonstrate limited social interaction that revolves mainly around their specific areas of interests. Further, they may speak in one-word utterances or simple sentences and display significantly odd nonverbal communication even with specific supports in place. Children with ASD, Level 1 have less marked impairments in social interaction and communication than are seen with Level 2 and 3; however, they still demonstrate impairments in their communication and ability to interact socially without support or prompting (APA, 2013). For instance, a child or adolescent with ASD, Level 1 may speak in full sentences and possess age appropriate knowledge of grammar, syntax, and vocabulary, but lack the ability to engage in small talk, show reciprocal or back-and-forth conversation skills, or successfully formulate friendships (APA, 2013; Murza & Nye, 2013).

Restricted, repetitive behaviors. Children with ASD, Level 3 often demonstrate marked difficulty handling change and show extremely inflexible behavior across

settings. This difficulty with change causes marked distress and is likely to significantly interfere with their daily functioning. Further, they often engage in restricted or repetitive motor movements, speech or use of objects. For example, a child may repeatedly flap their hands, repeat simple phrases over and over, or line up toys to alleviate distress. Children with ASD, Level 2 show similar patterns of inflexible behavior and difficulty with change; however, while the unusual behaviors are obvious to others, they do not interfere to the same degree as Level 3 behaviors. Children with ASD, Level 1 also demonstrate inflexibility in behavior but it may only affect their functioning in one context (e.g., school versus home setting). They may exhibit difficulties with planning or organization and may appear to adhere to specific routines, showing rigidity when required to switch between activities. This can lead to difficulty in many settings including social engagements, school, or work (APA, 2013; Volden & Phillips, 2010).

ASD and Pragmatic Language

The focus of the current study is on understanding the difficulties associated with pragmatic language in specific populations of children, including children with ASD, through the use of idioms. As stated previously, one of the most common difficulties that individuals with high functioning/Level 1 ASD experience involves the understanding of pragmatic or figurative language (Whyte, Nelson, & Khan, 2011). In addition to difficulties with maintaining eye contact and interpreting nonverbal communication (i.e., facial expressions, emotions, posture, and gestures), individuals with ASD often misinterpret and struggle to understand various forms of humor, metaphors, and idioms due to their overreliance on the literal meaning of words or phrases (Rajendran, Mitchell,

& Rickards, 2005; Vulchanova et al., 2015; Whyte et al., 2014). While figurative language is thought to begin developing around age five in typically developing children, it is often delayed and dependent on other factors such as environmental influences and severity of language deficits in children with ASD (Vulchanova et al., 2015).

Relevance theory. One of the theories developed to explain why there is a common difficulty with pragmatic language skills in individuals with ASD is relevance theory (Happe, 1993). This concept suggests that in order to understand figurative language, an individual needs to have some “understanding of the speaker’s intentions” (Whyte et al., 2014, p. 120). This involves the listener making the assumption that the speaker is providing them with information that is relevant to them. Often, this involves going beyond the literal meaning of what is said and looking for context within the message (Ryder & Leinonen, 2014; Sperber & Wilson, 1995). Based on this idea that figurative language is directly linked to perspective taking, many measures of pragmatic language include a way to examine the individual’s theory of mind (TOM).

Linguistic theory. Other researchers have argued against relevance theory and stressed the idea that figurative language, particularly with the understanding of idioms, relies heavily on the individual’s structural language abilities, or understanding of basic language, including the knowledge of vocabulary and syntax (Gernsbacher & Pripas-Kapit, 2012; Norbury, 2004; Whyte et al., 2014). Interestingly, Norbury (2004) found that compared to typically developing peers, children with ASD struggled with the understanding of idioms only if they had associated impairments in both vocabulary and syntax.

Whyte and colleagues (2014) conducted a study to investigate figurative language abilities in children, aged five to twelve, with ASD through the use of syntax, idioms, and advanced TOM. Their results found that both TOM and linguistic skills affect the comprehension of idioms in children with ASD. Interestingly, children with ASD in the study performed similarly to their younger peers with the same language development. This supports the theory that the understanding of basic language, particularly vocabulary and syntax, contributes to the knowledge and understanding of figurative language. Their study also found that advanced TOM abilities were predictive of performance on comprehension of the idioms after controlling for basic language skills. The researchers' findings support both linguistic and relevance theories, suggesting that the ability to interpret idioms is a complex process that requires an individual to not only have basic language skills, but also have a working understanding of the intentions of others (Whyte et al., 2014).

Attention-Deficit/Hyperactivity Disorder (ADHD)

Attention-deficit/hyperactivity disorder (ADHD) is characterized by difficulties with attention/concentration and/or hyperactivity and impulsivity that are persistent and interfere with development and functioning across the lifespan (APA, 2013). ADHD is considered a chronic disorder that begins in childhood and accounts for the largest source of referrals to outpatient mental health facilities (Goldstein, 2011). While estimates of the prevalence vary, ADHD is still considered one of the most common disorders affecting children with a suggested rate between 5 and 8 percent (APA, 2013; Goldstein, 2011). ADHD is a disorder that is believed to begin in childhood, with several symptoms

beginning before the age of 12. While the symptoms of ADHD must be present in more than one setting (e.g., home, school, work), they can sometimes vary in type and severity depending on the setting. ADHD has three presentations: combined presentation (meets criteria for both inattention and hyperactivity/impulsivity), predominantly inattentive presentation (meets the full criteria only for inattentive type), and predominately hyperactive/impulsive presentation (meets the full criteria only for hyperactive/impulsive type).

Behavioral Manifestations of ADHD

Inattention. Children with ADHD-Predominantly Inattentive or ADHD-Combined Type often struggle with staying on task, sustaining their focus, organization, shifting their focus, and mentally transitioning between activities (APA, 2013). Interestingly, research has shown that these issues do not occur when children are involved with a task that they are motivated to complete or that they consider interesting. Instead, difficulties with attention occur more frequently when the task is mundane, repetitive, or arduous (Goldstein, 2011).

Hyperactivity. Children with ADHD-Predominantly Hyperactive/Impulsive Type or Combined Type may be prone to excessive motor activity such as running or climbing in situations where it is not appropriate and frequently getting in and out of their seat at school. They may also be observed fidgeting, tapping or squirming. Finally, children with this type of ADHD often have difficulty regulating their communication such as talking excessively or with poorly modulated volume (APA, 2013). During adulthood,

hyperactivity can manifest itself as severe restlessness or tiring others out with their level of activity.

Impulsivity. Children with ADHD-Predominantly Hyperactive/Impulsive Type or Combined Type often act in a hasty manner and their behavior appears to be, at times, unpredictable and lacking forethought. These behaviors can range from minor, such as blurting out answers, to more dangerous, such as walking into the street without looking for cars. The ability to communicate and participate in social conversation can be affected in children or adults with ADHD due to difficulty waiting their turn while speaking, blurting out responses, and finishing other people's sentences. This can lead people to view them as socially intrusive (APA, 2013). In addition, children and adults with ADHD may be driven to rely on instant gratification and have trouble delaying their rewards. Symptoms related to impulsivity and self-control affect an individual with ADHD differently across the lifespan. Further, individuals with ADHD may possess symptoms of impulsivity in multiple areas of their life (APA, 2013; Goldstein, 2011).

Other Symptoms Related to ADHD

While mild delays in motor, social, and language development are not specific symptoms of ADHD, they often occur in conjunction with an ADHD diagnosis. Both children and adults with ADHD often have a low threshold for tolerating frustration, lack emotional regulation, and appear irritable in some situations (APA, 2013). "Children with ADHD struggle to formulate goals and plans efficiently, to sequence them temporally, and to execute them, as well as to evaluate and reevaluate outcomes in light of the intended objectives" (Goldstein, 2011, p. 136). Language impairments are common in

children with ADHD with approximately half of children experiencing anywhere from mild to moderate language difficulties (Staikova et al., 2013). Difficulties with speaking and understanding language can also lead children with ADHD to have difficulties with social interactions.

ADHD and Pragmatic Language

Difficulties with social interactions are commonly reported in children with ADHD, with between 52% and 82% of children experiencing some level of impairment with social functioning across raters and settings. These social impairments typically begin around the age that the child begins preschool and can limit their ability to learn and practice social skills (Staikova et al., 2013). Due to varying difficulties with sustaining attention and controlling impulses, children with ADHD often have trouble with both verbal and nonverbal communication due to failure to listen to the speaker, difficulty waiting their turn, interrupting the speaker, staying on topic, and maintaining eye contact and appropriate proximity to the speaker (Camarata & Gibson, 1999; Staikova et al., 2013).

While many researchers have different theories surrounding social difficulties in children with ADHD, some have identified that pragmatic language impairments may account for the majority of cases (Baird, Stevenson, & Williams, 2000; Kim & Kaiser, 2000; Safwat et al., 2013; Staikova et al., 2013). Other studies examining pragmatic language in children with ADHD have suggested that these children experience the most difficulty with social interaction when they are involved in situations and conversations that are unstructured (Bignell & Cain, 2007; Kim & Kaiser, 2000).

While many researchers have suggested that pragmatic language difficulties are common in children with ADHD, few studies have examined pragmatic language deficits specifically in an ADHD population (Leonard, Milich, & Lorch, 2011; Staikova et al., 2013). Leonard et al. (2011) conducted a study examining whether pragmatic language served as a mediator between hyperactivity/impulsivity and social skills. Their results confirmed their hypothesis that pragmatic language fully mediated hyperactivity and social skills but only partially mediated the relationship between inattention and social skills (Staikova et al., 2013). Staikova and colleagues (2013) aimed to advance the research in pragmatic language and social impairment in the ADHD population. Their study was the first to date to show that children with ADHD have a range of pragmatic language impairments, even in the absence of other language difficulties. Specifically, they found through parent ratings, standardized assessment, and a narrative task that children with ADHD struggle with narrative discourse, presupposition, and discourse management. Further, their research suggests that certain pragmatic language deficits identified in children with ADHD go beyond skills that could be correlated with inattention or hyperactivity. Staikova and colleagues (2013) stress that “skills related to presupposition and narrative discourse cannot be directly accounted for by ADHD symptoms” (p. 1280). This study emphasizes the need for additional research examining the various pragmatic language deficits associated with ADHD to improve treatment planning as well as specific social skills interventions.

Pragmatic Language Assessment

As stated previously, a wide variety of factors influence how an individual communicates and this can often make the assessment of language, particularly in the area of pragmatics, challenging (Adams, 2002). In addition, it is difficult to assess pragmatic language without also taking into account an individual's receptive and expressive language skills, as well as his or her cognitive and social cognitive abilities (Landa, 2005). Language assessments are traditionally conducted using a developmental descriptive model, which typically uses a combination of standardized instruments, observations, and informal checklists to gather information about a child's strengths and weaknesses in communication (Adams, 2002). Many researchers have identified difficulties and a lack of consensus for conducting pragmatic language assessment specifically due to "limitations in normative research methodologies" (Adams, 2002, p. 974).

In order to accurately assess pragmatic language, researchers have stressed the importance of identifying the underlying causes for the individual's difficulty with communication. For instance, children with certain cognitive deficits may have difficulty communicating with others due to challenges with applying their vocabulary and word knowledge to form meaningful sentences. Adams (2002) identifies two key domains that have been identified as influential in assessing pragmatic language: linguistic and social/cognitive.

Linguistic

Some of the early theories surrounding pragmatic language focused more heavily on the formal linguistic abilities associated with pragmatic language. This involved both the ability to form sentences and use context to convey meaning to the listener (Adams, 2002). Like other types of language, pragmatics require an individual to understand the basic principles of linguistics and use this understanding along with available contextual information in order to communicate or interpret what another person is saying (Vulchanova et al., 2015).

Social/Cognitive

While several theories exist to explain the importance of social-emotional cognition, many researchers can agree that the understanding of nonverbal language plays a significant role in communication, particularly with a child's ability to understand and appropriately respond to the emotional states of others (McKown, 2007).

History of Pragmatic Language Assessment

One of the early linguistic theorists, J. R. Firth, emphasized the importance of studying conversation, as he believed it held critical information for understanding the inner workings of language (Coulthard, 1985). Firth also stressed the idea that language is most meaningful within the context of a situation. This concept paved the way for pragmatic language research as linguists began to focus not only on the lexical properties of communication but also how a group of words or sentences can be most meaningful in their given contexts (Coulthard, 1985). Two of the influential early theories included speech theory and conversation analysis (Adams, 2002; Coulthard, 1985; Sacks,

Schlegelhoff, & Jefferson, 1974). These two methods emphasized the need to examine how “speakers convey intended meanings (illocutionary force) by marrying sentences and contexts carefully” (Adams, 2002, p. 974). Another influential theorist of early pragmatic language assessment was Grice (1975) who led the field to begin looking at pragmatic language through a developmental approach with factors such as cognitive, social, and linguistics as key players (Adams, 2002; Bloom et al., 1999; Grice, 1975).

Standardized Measures for Assessing Pragmatic Language

While pragmatic language deficits are commonly identified in children with ASD and some children with ADHD, few standardized measures exist that can adequately assess these impairments (Bishop & Baird, 2001). “Traditional language assessment instruments focus mostly on linguistic structure and meaning rather than on pragmatic language use” (Volden & Phillips, 2010, p. 205). Furthermore, most assessment measures for speech and language fail to test pragmatic skills altogether. Currently, there are several measures to test pragmatic language and some of the most common measures are discussed in the following section (Young, Diehl, Morris, Hyman, & Bennetto, 2005). As stated previously, it is important to consider that the measures currently being utilized to assess pragmatic language in children are not always successful due to a lack of consensus in the field on how to assess pragmatics and an over-reliance on a structured format with little opportunity to observe the child’s pragmatic skills in a more naturalistic setting (Volden & Phillips, 2010).

Currently, the most common measures for assessing pragmatic language in children include the Test of Pragmatic Language, Second Edition (TOPL-2), the

Elementary Test of Problem Solving, Third Edition (TOPS 3), the Theory of Mind subtest from the NEPSY-II, the Children's Communication Checklist-2 (CCC-2), and the Monteiro Interview Guidelines for Diagnosing Asperger's Syndrome (MIGDAS). While several of these measures provide useful information regarding a child's pragmatic language skills, some are subtest specific (e.g., the NEPSY-II) or qualitative measures (e.g., the MIGDAS) and thus, they do not provide enough psychometrically sound information to establish a baseline of pragmatic functioning in children (Reisinger et al., 2011; Simmons et al., 2014). The two most common pragmatic language assessments referenced throughout the literature are discussed below.

TOPL-2. This measure was developed in 2007 and covers seven areas of pragmatics including audience, topic, physical context, purpose, visual-gestural cues, pragmatic evaluation, and abstractions but does not provide scores for each area. The version for children ages 8 to 18 has 43 items and the version for children ages 6 to 7 has 17 items. The TOPL-2 provides an overall score for pragmatic language with a mean of 100 and standard deviation of 15. The authors suggested interpretation is that any score below 90 should be considered below normal (Hoffmann, Martens, Fox, Rabidou, & Andridge, 2013; Phelps-Terasaki & Phelps-Gunn, 2007).

CCC-2. This measure was developed in 2006 and is a checklist consisting of 70 items on 10 subscales (e.g., speech, semantics, syntax, use of context, coherence, inappropriate initiation, nonverbal communication, stereotyped language, interest, and social relations). It is typically completed by the caregiver or teacher of a child and can be used for children ages 4 to 16 (Bishop, 2006; Hoffmann et al., 2013). The CCC-2

yields two overall scores: a general communication composite (GCC) and a social interaction difference index (SIDI). The CCC-2 is considered to have acceptable reliability with internal consistency reliability coefficients ranging from .94 to .96 (Volden & Phillips, 2010).

The current study aimed to measure pragmatic language skills with children in both a clinical and nonclinical sample through the use of idioms. Unlike other measures currently being utilized, the Test of Idioms includes a comprehensive list of idioms and aimed to assess children's knowledge of various idioms as well as their ability to use context (e.g., pictorial cues) to guess the meaning of unfamiliar idioms. The following section provides more information about how idioms have been used in other studies to measure pragmatic language in children across ages and disabilities.

The Use of Idioms for Assessing Pragmatic Language

Idioms are defined throughout the literature as being noncompositional phrases because they have a figurative meaning that cannot be interpreted through a literal analysis of the words in the phrase (Titone & Connine, 1994). Idiom comprehension is highlighted throughout the literature as being an important aspect of pragmatic language development in children. Idioms are commonly used in both written and spoken language and are widely used in classroom settings (Kerbel & Grunwell, 1997; Nippold & Martin, 1989; Norbury, 2004). As stated previously, many researchers have recognized that focusing on how children learn to decode idiom phrases can actually guide treatment planning for individuals with speech and language impairments (Norbury, 2004). This is due, in part, to the fact that the comprehension of idioms is different than other models

used to describe standard language comprehension (Titone & Connine, 1994). The following sections will highlight past and present research findings related to idiom comprehension. Key findings include: the importance of context for idiom comprehension; explanations for two theories of idiom comprehension; differences in decoding based on idiom transparency, familiarity, and opaqueness; and underlying language influences in both clinical and nonclinical populations of children.

Context for Idiom Processing

Norbury (2004) conducted a study to compare idiom comprehension in a clinical versus nonclinical population of children. Interestingly, the study found that all children performed better on the idiom task when they had context; however, the children with language impairments (with and without autism) did not benefit from context as much as the children without language impairments. This suggests that, with the help of contextual cues, children can form a basic understanding of new or unfamiliar idioms. In addition, the study found that age, language ability, and memory for story context predicted idiom comprehension.

Two Theories to Explain Idiom Processing

As stated previously, figurative language develops gradually and begins in early childhood (Adams, 2002; Ryder & Leinonen, 2014). The development of idioms follows the same trajectory and is dependent on a number of factors that will be described in the next section. Researchers have explained that idiom comprehension requires both top-down and bottom-up processing. Top-down processing is required for using the appropriate contextual information and bottom-up processing is utilized for analyzing the

semantics in each idiom phrase (Norbury, 2004). Past and present literature has outlined two theories for idiom comprehension. One theory posits that children process idioms as giant lexical units where the literal meaning of the idiom is comprehended in chunks. This is similar to the way that single lexical items are interpreted. Due to the underlying figurative meaning, it is difficult to interpret idioms by solely analyzing each word in the phrase (Nippold & Duthie, 2003).

The second theory for idiom comprehension explains that children process the idiom through analyzing each part of the phrase. “A central question in all of the above approaches to idiom processing, but also more broadly to figurative language processing, is whether literal meaning are accessed first, and whether at all” (Vulchanova et al., 2015, p. 3). Regardless of which theory is most accurate for understanding idiom processing, many researchers have agreed that the meaning of an idiom is easier to interpret when the individual is given contextual cues such as an accompanying story, picture, or scenario (Ackerman, 1982; Norbury, 2004; Ryder & Leinonen, 2014; Vulchanova et al., 2015).

Differences Among the Types of Idioms

While all types of idioms have been used to measure a child’s figurative language skills, they have varying levels of difficulty for decoding (Nippold & Duthie, 2003). Research has suggested that the ease with which idioms are decoded and interpreted depends greatly on their level of transparency. For instance, some idioms are more transparent and can be understood without much semantic or contextual support. Other idioms are more opaque and difficult to interpret without visual or verbal context. Norbury (2004) uses the example of the phrases: *skating on thin ice* versus *kick the*

bucket. An individual can use the visual of skating on thin ice to infer that it means a risky situation. On the other hand, it would be very difficult for someone to guess that kick the bucket is related to death without using any available contextual information or having previous exposure to the phrase. In addition to considering transparency, certain idioms are rated higher in familiarity than others. These idioms are thought to be easier to interpret, particularly in young children, because they are used widely in mainstream culture (Norbury, 2004; Vulchanova et al., 2015; Whyte et al., 2014). Another factor that affects the ease of understanding idioms is called decompositionality (Titone & Connine, 1994). Similar to the idea of transparency, this concept is related to how close of a relationship there is between each word in the idiom phrase and the figurative meaning of the entire phrase. For instance, the phrase, *save my skin* would be easier for an individual to understand than the phrase, *hit the sack* (Whyte et al., 2014).

Interestingly, some research has found that opaque idioms are easier for children to decode compared to transparent idioms both with and without context. “Given that the figurative meanings of opaque idioms cannot be deduced from their semantic forms, children must be using another mechanism” (Norbury, 2004, p. 1189). When thinking about how children develop other forms of language, this theory makes sense. For instance, as stated previously, many aspects of language require children to use their memory and problem solving abilities for communication input and output due to the nuances of language.

Idiom Comprehension and Theory of Mind

The research regarding the relationship between theory of mind (TOM) and language ability has been widely debated in the literature. Some studies have suggested that understanding the speaker's intentions is important for idiom understanding, especially for individuals with ASD (Whyte et al., 2014). For example, a child must understand that the intent of the speaker is not for the listener to take the idiom phrase literally (Gibbs, 1987; Norbury, 2004). However, other researchers emphasize that individuals can learn idioms without having an understanding of the speaker's intention or mental state (Happe, 1994). Norbury (2004) argues that, "this may be true once the idiomatic meanings are known but does not speak to how they might be acquired in the first place" (p. 1180).

Many standardized assessments that measure pragmatic language also include a TOM task. However, the findings in various studies have revealed conflicting information on how much TOM ability actually contributes to pragmatic language skills. For example, Norbury (2004) found that TOM ability did not significantly contribute to the participant's ability to understand idioms when controlling for language abilities. Norbury (2004) posits two explanations that could account for this in her study. First, the TOM task and the idiom task had a similar language load. Another possibility is that TOM, or the ability to understand the intentions of a speaker, may not be directly related to an individual's ability to understand idioms. While this finding may provide some interesting implications for future research, it is well documented in the literature that

both idiom comprehension and TOM abilities contribute to overall pragmatic language abilities (Norbury, 2004).

Performance Differences in Idiom Comprehension Across Clinical Populations

Few studies to date have examined the relationship between idiom comprehension and specific language or developmental disorders (Norbury, 2004). The studies that have explored this relationship have presented conflicting information, which validates the need for more research in this area. The current study intended to contribute to the research in this area by providing an additional standardized measure of pragmatic language, which may lead to a more sophisticated understanding of the differences in performance across populations, particularly with children with ASD or ADHD.

It has been widely suggested throughout the literature that individuals with ASD have trouble using contextual cues to solve implicit or ambiguous problems regardless of their language abilities (Jolliffe & Baron-Cohen, 1999; Nippold & Duthie, 2003; Norbury, 2004). Context plays an important role in an individual's ability to understand language. Thus, it can be assumed that individuals who struggle to use contextual information to understand language will have difficulty decoding language, especially that which is less literal in nature (e.g., figurative language). Central coherence theory illustrates this concept by suggesting that the ability to "integrate sources of information to establish meaning" is often a weakness for individuals with ASD (Jolliffe & Baron-Cohen, 1999, p. 150). Based on this theory, the current study hypothesized that children with autism or ASD will struggle to correctly identify the meaning of idioms even when they are given contextual cues in the form of pictures. Conversely, other children in the

clinical population (i.e., children with ADHD) are hypothesized to be able to use context cues in the form of pictures to guess at unfamiliar idioms.

As stated previously, the ability to interpret idioms is a complex process that requires an individual to not only have basic language skills, but also have a working understanding of the intentions of others (Whyte et al., 2014). The differential diagnosis of high functioning ASD and ADHD can be challenging due to the similar communication and social impairments across both disorders (Geurts et al., 2004; Staikova et al., 2013). The current study aimed to demonstrate that the Test of Idioms is a useful tool for identifying pragmatic language difficulties among a clinical group, as well as helping differentiate between children with ASD and ADHD based on their performance and ability to use contextual cues.

CHAPTER III

METHODOLOGY

This chapter outlines the study research design and analyses to test the research questions. It also includes a discussion of the participants, procedure, and data analysis. This study was completed at Cook Children's Behavioral Health outpatient clinics for participants in the clinical group. Participants for the nonclinical group were recruited through a community sample of children in the Dallas/Fort Worth Metroplex. Approval for this study was granted by Cook Children's Institutional Review Board (IRB) as well as Texas Woman's University's IRB.

Participants

The study used the Test of Idioms to compare the performance of children in a clinical sample, who were diagnosed with ASD or ADHD, with children in a nonclinical sample who had no suspected or current diagnoses for psychological or developmental disorders. A total of 36 participants completed the study. The study recruited 18 participants for the clinical group and 18 participants for the nonclinical group. All participants in the study resided in the Dallas/Fort Worth/Denton area in the state of Texas. More information regarding the demographic makeup of all participants in the study is discussed in the next chapter.

Recruitment for the Clinical Group

Participants for the clinical sample were recruited through the Cook Children's Behavioral Health clinics in Denton and Lewisville, Texas. Cook Children's Behavioral Health is part of Cook Children's Medical Center, a large children's hospital located in Fort Worth, Texas with outpatient and specialty clinics located in a 10 county area. The outpatient behavioral health clinics provide a broad range of services for children ages 3 to 17 including psychological testing, psychiatric evaluations, medication management, parent education, and individual, family, and play therapy. Psychologists on staff at Cook Children's were informed of the study during a staff meeting and psychologists at the recruitment clinics were also provided with additional information regarding the target population and details about the study. Participants for the clinical sample were then recruited by the psychologists and postdoctoral fellows on staff at the beginning of their therapy or testing appointments. Guardians who were interested in allowing their child to participate in the study met with the investigator for a consent appointment to go over the risks and benefits of the study as well as answer any questions they had regarding participation. The study proceeded once consent was obtained from the guardian and assent was given by the participant (Appendix E).

Recruitment for the Nonclinical Group

The investigator recruited participants for the nonclinical group through a community sample utilizing convenience and snowball sampling for children residing in the Dallas/Fort Worth Metroplex area. Consent was obtained from guardians in the same procedure utilized for the clinical group, ensuring that it aligned with the IRB guidelines

(Appendix D). Detailed information about the consent process is outlined in the following Procedures section.

Inclusionary Criteria for Participants in the Clinical Group

Individuals eligible to participate in this study as part of the clinical group were required to meet all of the following inclusion criteria to be registered in the study.

- Males and females, ages 7 to 12
- Children referred to Cook Children's Behavioral Health for psychological or neuropsychological testing or psychotherapy
- Children who speak English as their primary language
- Children who have the ability to understand study procedures and to comply with them for the entire length of the study

Inclusionary Criteria for Participants in the Nonclinical Group

Individuals eligible to participate in this study as part of the nonclinical group were required to meet all of the following inclusion criteria to be registered in the study.

- Males and females, ages 7 to 12
- Children with no suspected or existing cognitive, academic, or social/emotional diagnoses
- Children who speak English as their primary language
- Children who have the ability to understand study procedures and to comply with them for the entire length of the study

Exclusionary Criteria for All Participants in the Study (Clinical and Nonclinical)

Individuals who met any of the following exclusion criteria were not eligible to participate in the study:

- Children with significant visual impairments
- Children with significant expressive/receptive language deficits
- Children with a primary language other than English
- Unwillingness of a guardian to give written informed consent

Procedures

Consent Process

Before recruitment and enrollment in the current study, all potential participants and their guardians were given a full explanation of the study and the opportunity to review the consent form. Participants and their guardians were also informed that involvement in this study was completely voluntary and they could withdraw from the study at any time without penalty. All participants and their guardians were also told that they had the right to ask questions at any time during the study. Participants were informed that they had the opportunity to take part in research to enhance the understanding and assessment of pragmatic language skills in children.

Once this information was provided and interest in participation was confirmed, the investigator obtained informed consent (and child assent). This was conducted through a conference wherein the investigator discussed with the participants and their guardian(s) the purpose of the study, procedures to be followed, the duration of participation, and the risks and benefits of participation, as described in the consent form.

The consent form was signed only after the participants and guardians had all of their questions answered and investigator was assured that the participants and their guardians understood the implications of participating in the study.

Collection of Demographics

For the clinical sample, the investigator gathered brief medical and developmental history from medical records including demographic information (e.g., age, gender, race/ethnicity); current diagnoses; performance on other pragmatic, problem solving, or social perception instruments administered during the course of assessment or treatment including select subtests from the NEPSY-II (Affect Recognition and Theory of Mind), the TOPS-3, the TOPL-2, and the ADOS-2; and reason for assessment or therapy. For the nonclinical sample, the investigator gathered demographic information including age, gender, and race/ethnicity.

Subject Withdrawals or Discontinuation of the Study

Participants or their guardians could withdraw voluntarily from participation in the study at any time and for any reason. While none of the participants chose to withdraw from the study, their guardians were informed during the consent process that they could elect to have their child's information removed from the study at any time.

Measure (The Test of Idioms)

A protocol consisting of 25 written idioms, along with illustrated pictures, was created for the purpose of this study (Appendix B). Idioms are defined as common phrases or terms whose meaning is not real, but can be understood by their popular use, such as, *it's a piece of cake* (Snodgrass, 2004). The idioms and pictures were taken from

the children's book, *Super Silly Sayings that are Over Your Head* by Catherine S. Snodgrass. The author, who currently holds all of the publishing rights for the book, gave written permission to use her book with the understanding that she would receive acknowledgement on the protocol and her contribution recognized should any publications result after the completion of the study.

The study intended to design a new measure and determine if the scores from that measure prove valid and reliable for assessing pragmatic language in children (Miller, Lovler, & McIntire, 2013). The measure utilized in the study, the Test of Idioms, was developed by the investigator using 25 idioms from the children's book discussed previously. Each item in the assessment was designed to fit into one of five categories including items relating to food, parts of the body, the home or school setting, animals, and colors/shapes. Items were designed to be dual criterion and worth two points each, making the total points possible 50 for the entire assessment. For each item, if the participant did not answer correctly after being introduced to the idiom phrase, he or she was given the opportunity to look at the pictorial clue and take a guess. If he or she guessed correctly after looking at the picture, then 1 point was awarded for that item. All 25 idiom phrases and corresponding pictures were printed on separate pages and placed in a three-ring binder. A protocol was developed to track the participants' responses and award participants with 0, 1, or 2 points for each item.

Administration of the Assessment

Each participant was enrolled in the study for the amount of time it took to complete the protocol, which was between approximately 10 and 20 minutes per

participant. The entire data collection took place over a 10-month period. The study took place at the outpatient behavioral health clinics for the clinical sample and at a public library, recreation center, or residential area for the nonclinical sample.

During the administration, the investigator introduced the assessment to the participant by saying, “Sometimes people say the strangest things. I wonder what these silly sayings really mean. Listen to the following sayings and tell me what each one might mean.” Then, the investigator introduced each item by asking, “What does it mean if/when...?” After the introduction was given, each of the 25 items was administered. All items and associated pictures were printed and kept in a three-ring binder so that the participant could follow along while the investigator read each item aloud. When participants responded incorrectly or with “I don’t know” to an item, they were shown a picture on the next page and asked to take a guess. If they guessed correctly, they were awarded one point for that item. Participants were only shown the pictures associated with the items to which they responded incorrectly or indicated that they did not know the answer in order to avoid confusion or changes in their responses before the end of the assessment. If a participant asked to see the picture associated with an item, the investigator said, “You will have a chance to look at each picture when we are finished.” In order to follow a standardized format for administration, a list of scripted responses for the examiner was created. Participants were allowed to change their responses until the next item was administered and the last response was scored though multiple responses were not encouraged. To clarify, the investigator would state, “You said ____ and _____. Which one is it?”

Scoring and Interpretation of Assessment

While the meaning of idioms appears intuitive or obvious to people who are familiar with them, many idioms have multiple meanings, which could have raised some potential concerns for scoring the assessment. In order to ensure that the assessment was a reliable measure for assessing pragmatic language, certain considerations needed to be made to determine the criteria for scoring each item. During the administration, each response that a participant gave was recorded verbatim on the protocol so that the investigator could correctly score the protocol after administration. For responses in which it was difficult to determine immediately whether they were correct or incorrect, the investigator used best judgment to determine if the pictorial cue needed to be given. Correct responses to the idiom phrases were determined by using the online idiom bank, *Farflex Dictionary of Idioms*. This database provides a detailed definition for various idioms and includes sources such as the *American Heritage Dictionary of the English Language* and *McGraw-Hill's Dictionary of American Slang and Colloquial Expressions* (Farflex, 2016).

Item scoring. Based on the dictionary of idiom phrases listed above, as well as any available and credible outside resources, a list of correct versus incorrect responses was created for each idiom to ensure the most accurate scoring. For example, correct responses for *it's a piece of cake* included: a very easy task, something very easy to do, something that is easily accomplished. Incorrect responses included: rephrasing of the idiom (e.g., “when something is a piece of cake”), something people like to do, people

who like to eat cake, or simply describing the picture without indicating what it means (e.g., “it’s like switching on a light bulb”).

Inner-rater reliability. After all of the data were collected, 50% of the data were reviewed by an independent reviewer, who was previously trained in psychological assessment, in order to test the reliability or consistency in scoring between the raters. Inner-rater reliability was calculated by computing a percentage of agreement between the two raters (Gravetter & Forzano, 2012). Scores ranging from .80 to 1.00 (i.e., perfect agreement) were deemed acceptable. The percentage of agreement between the two raters ranged from .92 to 1.00 and therefore is considered acceptable agreement.

Cut scores. A common practice used in test development is the identification of cut scores. These are defined as scores “at which the decision changes” (Miller et al., 2013). For instance, in the current study, a cut score may have helped determine the cutoff needed to identify which scores fall within the various ranges (e.g., below average, average, above average). Generally, there are two approaches for the identification of cut scores. First, a panel of expert judges can be used to determine the number of test items that a minimally qualified person would likely be able to answer correctly (Miller et al., 2013). Second, a correlation between the test score for the current assessment and an outside criterion is used to predict the test score for a given participant. This approach is viewed as being more empirically supported as it uses a regression formula to predict the score a person is likely to obtain (Miller et al., 2013). Because this study was exploratory in nature, cut scores for determining minimal performance qualifications were not

utilized. If the test moves into test development after the study, it will be important to consult an expert panel to determine cut scores and performance level scales.

Data Analysis

This study utilized a quasi-experimental design (Non-Equivalent Groups Design) with an experimental group (clinical sample) and control group (nonclinical sample). All field data were evaluated for completeness and missing information. Data analyses were executed utilizing [IBM SPSS 24 (SPSS Inc, Chicago, IL, U.S.A.)]. All statistical tests were completed without specifying a directional hypothesis *a priori*; with a critical alpha level of .05 used for determining statistical significance. When basic assumptions were examined, the continuous variables did not fall within standard skewness and kurtosis cutoffs. Due to deviations of normality and the small sample size, nonparametric statistics were chosen for all analyses. Since the overall sample size was small ($N = 36$), Shapiro-Wilks tests of normality and Kolmogorov-Smirnov goodness-of-fit tests were used. The histograms, Q-Q plots, and box plots demonstrated that most of the variables had adequate normal distributions. To correct unequal distributions among ethnicity, all participants who identified as having an ethnicity other than Caucasian (e.g., African American, Hispanic, bi-racial) were recoded into one variable.

Research Question One

To answer the first research question, “Is the Test of Idioms a Psychometrically Sound Instrument with Strong Reliability and Validity?” a Spearman’s correlation was run to compare the Test of Idioms with another well known measure of problem solving in children (TOPS 3) and determine the convergent validity, which is the degree to which

two measures of constructs that theoretically should be related, are in fact related. The TOPS 3 was chosen as the comparison measure because it was the assessment that was most frequently given to participants in the clinical group as part of their evaluation ($N = 8$) compared to the TOPL 2 [$N = 1$]).

TOPS 3. The TOPS 3 Elementary is described as a measure that focuses on a child's linguistic ability to think and reason. The questions are designed to measure language skills such as the ability to think, reason, problem solve, classify, infer, predict, associate, determine causes, understand directions, and sequence. The TOPS 3 is related more specifically to language development than other measures of problem solving because it measures, "discrete skills that form the foundation of language-based thinking, reasoning, and problem-solving abilities" (Bowers, Huisinigh & LoGiudice, 2005, p. 1). While the TOPS 3 is not described as a direct measure of social or pragmatic language, it is considered a measure to assess pragmatic competence, as well as the skills needed for developing social competence. The TOPS 3 was normed on a nationally representative pool of 1,406 subjects. According to the manual, the TOPS 3 has a test-retest reliability coefficient of .84 and satisfactory reliability for all tasks and the total test score for all age levels (Bowers et al., 2005).

In order to analyze the reliability for the Test of Idioms, the investigator planned to conduct an Exploratory Factor Analysis (EFA) to evaluate the factor loadings for the five composite scores; however, due to the small sample size and violations of normality, a nonparametric statistic (Cronbach's alpha) was utilized instead to examine the internal consistency. Results from the inter-item reliability were provided.

Research Question Two

The second research question, “How Useful is the Test of Idioms for Screening Pragmatic Skills in Children Ages 7 to 12?” was answered by running a Mann Whitney-*U* test. The investigator intended to use a multivariate analysis of variance (MANOVA) to determine the differences between the experimental (clinical) and control (nonclinical) groups; however, because statistical assumptions were violated, the nonparametric equivalents of the previously mentioned analysis were conducted. A MANOVA was originally chosen as the statistical analysis because the investigator wanted to examine mean group differences between the clinical and nonclinical group’s performance on the Test of Idioms. A MANOVA is used to examine the effects of the independent variable on the dependent variable, in addition to measuring the relationships between multiple dependent variables (Meyers, Gamst, & Guarino, 2013). Instead, the nonparametric equivalent to independent samples *t*-tests, (Mann Whitney – *U*) was utilized to compare the performance of the clinical and nonclinical group on the Test of Idioms and determine if a statistically significant difference existed.

Research Question Three

In order to address the third research question, “How Well Does the Test of Idioms Differentiate Between Children with ADHD and ASD Based on their Performance?” an additional Mann Whitney – *U* analysis was conducted. Results from the analysis are provided and discussed.

Statistical Considerations for a Pilot Study: Item Analysis

This study was conducted as a pilot test, which is defined as a “scientific investigation of evidence that suggests that the test scores are reliable and valid for their specified purpose” (Miller et al., 2013, p. 354). To ensure that the test could be considered an appropriate measure for assessing pragmatic language in children, certain factors including item difficulty, item discrimination, inter-item correlations, and item bias were examined. To address each of these factors various statistical analyses were performed.

Item difficulty. This refers to the number of participants who respond correctly or incorrectly to each item (Miller et al., 2013). It was important to calculate the item difficulty in order to know which items are too easy or too difficult, as these do not provide useful information for statistical comparison. Item difficulty for the study was calculated in SPSS by running descriptive statistics in order to get the mean and standard deviation for each item. Means closer to 2.00 indicated that the majority of the participants got the maximum amount of points for the item and means closer to 0.00 indicated that the majority of the participants got the minimum amount of points for the item. Analyzing the difficulty of each item provided useful information about which idioms may be more familiar to participants and which require previous exposure or strong inferencing skills (Miller et al., 2013).

Item discrimination. Miller et al. (2013) suggest that on well-constructed tests, there is a statistical relationship between each item and the overall score for each

participant. This was evaluated by running a Spearman's correlation to compare the Overall score on the Test of Idioms with each of the 25 items.

Inter-item correlation. This method was utilized to analyze the correlation between the items that make up each composite score and the overall score on the test using Spearman's correlations. This was helpful in determining which items appeared to measure the same construct and which items may have measured different constructs. This method helped determine which items within a construct may need to be revised or omitted to increase internal consistency (Miller et al., 2013).

Item bias. Finally, it was important to consider which items had a strong bias in order to reduce performance differences between groups (e.g., gender and ethnicity). Miller et al. (2013) stresses that all items on a test should be of equal difficulty to all groups. While it is difficult to eliminate all bias, it was important to consider how cultural biases may have influenced participants' performance on the test. Item bias was examined using crosstabulations for gender and ethnicity to determine if differences in performance on each item exist between groups. Statistically significant differences between groups based on each item were presented and discussed.

Data Collection

The investigator collected demographic information from both the clinical and nonclinical group. Demographic information, or Protected Health Information (PHI) for the clinical group was collected through guardian inquiry and from the participant's medical chart. Demographic information for the nonclinical group was collected through guardian inquiry. All data including performance on the Test of Idioms and demographic

information were entered and stored in an encrypted Excel database. Once the data were ready to be analyzed, they were transferred from an encrypted Excel file and directly entered into SPSS in order to run the statistical analyses in the SPSS program. A code number was assigned to each participant to ensure confidentiality. The assessment protocol and data collection sheet remained in a locked file cabinet in the investigator's office and will be shredded within three years after the completion of the study. All data entered in the database were coded and de-identified.

Summary

This chapter revisited research questions and outlined the procedure for test development, data collection and statistical analyses. The data collection and data management procedures as well as the analytic methods used to answer the research questions were presented and discussed in detail. Results of the data analysis will be presented in the following chapter. By potentially providing a new instrument for assessing pragmatic language, this study intends to enhance the assessment and treatment planning for pragmatic language impairments in children within specific clinical populations such as ASD and ADHD.

Research Questions Revisited and Associated Hypotheses

1. Is the Test of Idioms a psychometrically sound instrument with strong reliability and validity?
 - a. Hypothesis One: The Test of Idioms will have moderate to strong convergent validity with another measure of social problem solving.

- b. Hypothesis Two: The Test of Idioms will support a five factor model, with loadings on each of the five composite scores.
- 2. How useful is the Test of Idioms for screening pragmatic skills in children ages 7 to 12?
 - a. Hypothesis Three: There will be a significant difference in performance between the clinical and nonclinical group on the Test of Idioms.
- 3. How well does the Test of Idioms differentiate between children with ADHD and ASD based on their performance?
 - a. Hypothesis Four: There will be a significant difference between the clinical groups (ASD and ADHD) based on the ability to guess at the unfamiliar idioms using the pictorial cues.

CHAPTER IV

RESULTS

The purpose of this section is to describe the results of this study after completing all necessary statistical analyses. First, the preliminary analyses are presented which include a description of the sample, descriptive statistics for the dependent variables, and relationships between the demographic variables and dependent variables. Finally, a summary of the primary analyses that were used to answer each research question is presented.

Preliminary Analyses

Sample Description

Frequencies and percentages for the categorical demographic variables are displayed in Table 1. The majority of participants were male (61.1%) and White/Caucasian (83.3%). In terms of age, 41.7% of participants were between 7 years and 8.11 years of age, 36.1% of participants were between ages 9 to 10.11 years old, and 22.2% were 11 to 12.11 years old. Next, there was an even number of participants in the clinical (50%) and nonclinical groups (50%). Finally, for the clinical group, 43.8% of participants had a primary diagnosis of ASD, 56.3% of participants had a primary diagnosis of ADHD, and 5.6% of participants had a diagnosis other than ASD or ADHD. Participants that were categorized as 'Other' were coded as missing for the statistical

analyses. A further breakdown for the categorical demographic variables for the clinical and nonclinical group is displayed in Table 2.

Table 1

Frequencies and Percentages for Demographic Variables

Categorical variable	<i>n</i>	%
Gender		
Male	22	61.1
Female	14	38.9
Ethnicity		
White/Caucasian	30	83.3
Black/African American	3	8.3
Hispanic	2	5.6
Selected two or more	1	2.8
Age		
7 to 8.11	15	41.7
9 to 10.11	13	36.1
11 and higher	8	22.2
Group		
Clinical	18	50
Nonclinical	18	50
Diagnosis		
ASD	7	43.8
ADHD	9	56.3
Other	2	5.6

Table 2

Frequencies and Percentages for Demographic Variables by Group

Categorical Variable	<i>n</i>	%
Clinical Group		
Gender		
Male	13	72.2

Female	5	27.8
Ethnicity		
White/Caucasian	15	83.3
Black/African American	2	11.1
Selected two or more	1	5.6
Age		
7 to 8.11	6	33.3
9 to 10.11	8	44.4
11 and higher	4	22.2
Diagnosis		
ASD	7	43.8
ADHD	9	56.3
Other	2	5.6
Nonclinical Group		
Gender		
Male	9	50
Female	9	50
Ethnicity		
White/Caucasian	15	83.3
Black/African American	1	5.6
Hispanic	2	11.1
Age		
7 to 8.11	9	50
9 to 10.11	5	27.8
11 and higher	4	22.2

Descriptive Statistics for Dependent Variables

Descriptive statistics for the participants' performance on each of the 25 items on the Test of Idioms are shown in Table 3. As shown, item scores ranged from 0 to 2 with means ranging from ($M = .22$, $SD = .59$) on item 10, to ($M = 1.89$, $SD = .46$) on item 8.

Table 3

Means and Standard Deviations for the 25 Items on the Test of Idioms

Continuous variable	<i>N</i>	<i>M</i>	<i>SD</i>	Min	Max
Item 1	36	.64	.639	0	2
Item 2	36	1.72	.454	1	2
Item 3	36	1.81	.467	0	2
Item 5	36	.67	.793	0	2
Item 6	36	1.00	.894	0	2
Item 7	36	1.06	.630	0	2
Item 8	36	1.89	.465	0	2
Item 9	36	.92	.937	0	2
Item 10	36	.22	.591	0	2
Item 11	36	.47	.736	0	2
Item 12	36	1.58	.604	0	2
Item 13	36	1.22	.929	0	2
Item 14	36	1.86	.424	0	2
Item 15	36	.75	.937	0	2
Item 16	36	1.47	.810	0	2
Item 17	36	1.78	.540	0	2
Item 18	36	1.25	.874	0	2
Item 19	36	.89	.820	0	2
Item 20	36	1.22	.760	0	2
Item 21	36	.58	.874	0	2
Item 22	36	.81	.889	0	2
Item 23	36	.50	.655	0	2
Item 24	36	1.42	.692	0	2
Item 25	36	.97	.506	0	2

Descriptive statistics for the Overall score on the Test of Idioms, Parts of the Body composite score, Food composite score, Home and School composite score, Animal composite score, and Colors and Shapes composite score are shown in Table 4. As shown, the Parts of the Body composite score ranged from 1 to 9 ($M = 5.83$, $SD = 1.98$), the Food composite score ranged from 0 to 9 ($M = 5.08$, $SD = 2.36$), the Home and School composite score ranged from 0 to 10 ($M = 5.89$, $SD = 2.38$), the Animal composite score ranged from 1 to 10 ($M = 6.56$, $SD = 2.51$), and the Colors and Shapes composite score ranged from 1 to 9 ($M = 4.31$, $SD = 1.86$). Finally, the Overall score ranged from 5 to 45 ($M = 27.67$, $SD = 9.41$).

Table 4

Means and Standard Deviations for the Overall Score and Five Composite Scores

Scale/Subscale	<i>N</i>	<i>M</i>	<i>SD</i>	Min	Max
Parts of the body	36	5.83	1.98	1	9
Food	36	5.08	2.36	0	9
Home and school	36	5.89	2.38	0	10
Animal	36	6.56	2.51	1	10
Colors and shapes	36	4.31	1.86	1	9
Overall	36	27.67	9.41	5	45

Spearman's correlations were conducted to examine the relationship between the Overall score on the Test of Idioms and the five composite scores (Parts of the Body composite, Food composite, Home and School composite, Animal composite, and Colors

and Shapes composite). The results revealed that all five composite scores as well as the Overall score were significantly and positively related, $p < .01$. Further details of relationships among these variables are shown in Table 5.

Table 5

Spearman's Correlations between the Overall Score on the Test of Idioms and the Five Composite Scores

Variable	Parts of the body	Food	Home and School	Animal	Colors and Shapes	Overall
Parts of the body	--	.761**	.609**	.709**	.608**	.872**
Food	.761**	--	.665**	.544**	.619**	.856**
Home and school	.609**	.665**	--	.710**	.561**	.836**
Animal	.709**	.544**	.710**	--	.568**	.835**
Colors and shapes	.608**	.619**	.561**	.568**	--	.765**
Overall	.872**	.856**	.836**	.835**	.765**	--

** $p < .01$.

Next, Spearman's correlations were conducted to examine the relationship between the Overall score on the Test of Idioms and each of the 25 Items. The results revealed that there was a moderate correlation between item 1, item 2, item 4, item 5, item 13, item 16, item 18, item 19, item 20, item 21, and item 22 and the Overall score. Further, the results indicated that there was a strong correlation between item 6, item 9, and item 15 and the Overall score. Based on these results, items 7 and 25 should be considered for removal moving forward since they do not significantly correlate with the

Overall score. Further details of relationships among these variables are shown in Table

6.

Table 6

Spearman's Correlations between the Overall Score on the Test of Idioms and the 25 Items.

Variable	Overall score
Item 1	.508**
Item 2	.532**
Item 3	.439**
Item 4	.521**
Item 5	.625**
Item 6	.727**
Item 7	.297
Item 8	.374*
Item 9	.771**
Item 10	.450**
Item 11	.411*
Item 12	.332*
Item 13	.616**
Item 14	.389*
Item 15	.712**
Item 16	.520**

Item 17	.353*
Item 18	.591**
Item 19	.584**
Item 20	.616**
Item 21	.547**
Item 22	.567**
Item 23	.386*
Item 24	.486**
Item 25	-.166

* $p < .05$, ** $p < .01$.

Relationships between Demographic Variables and Dependent Variables

Crosstabulations using Pearson's chi-square and Cramer's V tests were conducted to examine the relationship between the score on each of the 25 items and gender. As shown in Table 7, the relationship was only significant for item 6-spilled the beans, $\chi^2(2) = 6.77, p < .05$, Cramer's $V = .43$. The result for item 6 demonstrates that a greater proportion of participants who received 0 points were female (64.3%) than were male (22.7%).

Table 7

Crosstabulations for the 25 Items by Gender

Variable	Male		Female		χ^2	p	Cramer's V
	n	%	n	%			
Item 1					2.75	.253	.276

0 points	12 ^a	54.5	4 ^a	28.6			
1 point	8 ^a	36.4	9 ^a	64.3			
2 points	22 ^a	9.1	14 ^a	7.1			
Item 2					.460	.497	.113
0 points	--	--	--	--			
1 points	7 ^a	31.8	3 ^a	21.4			
2 points	15 ^a	68.2	11 ^a	78.6			
Item 3					5.00	.082	.373
0 points	0 ^a	0	1 ^a	7.1			
1 points	5 ^a	22.7	0 ^a	0			
2 points	17 ^a	77.3	13 ^a	92.9			
Item 4					.234	.890	.081
0 points	7 ^a	31.8	5 ^a	35.7			
1 points	7 ^a	31.8	5 ^a	35.7			
2 points	8 ^a	36.4	4 ^a	28.6			
Item 5					5.07	.079	.375
0 points	9 ^a	40.9	10 ^a	71.4			
1 points	9 ^a	40.0	1 ^a	7.1			
2 points	4 ^a	18.2	3 ^a	21.4			
Item 6					6.77	.034*	.434
0 points	5 ^a	22.7	9 ^b	64.3			
1 points	7 ^a	31.8	1 ^a	7.1			
2 points	10 ^a	45.5	4 ^a	28.6			
Item 7					1.13	.569	.177
0 points	4 ^a	18.2	2 ^a	14.3			
1 points	12 ^a	54.5	10 ^a	71.4			
2 points	6 ^a	27.3	2 ^a	14.3			
Item 8					1.35	.246	.193
0 points	2 ^a	9.1	0	0			
1 points	--	--	--	--			
2 points	20 ^a	90.9	14 ^a	100			
Item 9					1.29	.525	.189
0 points	9 ^a	40.9	8 ^a	57.1			
1 points	4 ^a	18.2	1 ^a	7.1			
2 points	9 ^a	40.9	5 ^a	35.7			

Item 10						.142	.931	.063
0 points	19	^a	86.4	12	^a	85.7		
1 points	1	^a	4.5	1	^a	7.1		
2 points	2	^a	9.1	1	^a	7.1		
Item 11						.394	.821	.105
0 points	14	^a	63.6	10	^a	71.4		
1 points	5	^a	22.7	2	^a	14.3		
2 points	3	^a	13.6	2	^a	14.3		
Item 12						.134	.935	.061
0 points	1	^a	4.5	1	^a	7.1		
1 points	7	^a	31.8	4	^a	28.6		
2 points	14	^a	63.6	9	^a	64.3		
Item 13						.374	.829	.102
0 points	7	^a	31.8	5	^a	35.7		
1 points	3	^a	13.6	1	^a	7.1		
2 points	12	^a	54.5	8	^a	57.1		
Item 14						1.64	.441	.213
0 points	0	^a	0	1	^a	7.1		
1 points	2	^a	9.1	1	^a	7.1		
2 points	20	^a	90.9	12	^a	85.7		
Item 15						.334	.846	.096
0 points	12	^a	54.5	9	^a	64.3		
1 points	2	^a	9.1	1	^a	7.1		
2 points	8	^a	36.4	4	^a	28.6		
Item 16						1.55	.460	.208
0 points	5	^a	22.7	2	^a	14.3		
1 points	4	^a	18.2	1	^a	7.1		
2 points	13	^a	59.1	11	^a	78.6		
Item 17						1.50	.473	.204
0 points	2	^a	9.1	0	^a	0		
1 points	2	^a	9.1	2	^a	14.3		
2 points	18	^a	81.8	12	^a	85.7		
Item 18						2.77	.251	.277
0 points	5	^a	22.7	5	^a	35.7		

1 points	3 ^a	13.6	4 ^a	28.6			
2 points	14 ^a	63.6	5 ^a	35.6			
Item 19					.254	.881	.084
0 points	8 ^a	36.4	6 ^a	42.9			
1 points	8 ^a	36.4	4 ^a	28.6			
2 points	6 ^a	27.3	4 ^a	28.6			
Item 20					.334	.846	.096
0 points	4 ^a	18.2	3 ^a	21.4			
1 points	8 ^a	36.4	6 ^a	42.9			
2 points	10 ^a	45.5	5 ^a	35.7			
Item 21					2.10	.349	.242
0 points	14 ^a	63.6	10 ^a	71.4			
1 points	1 ^a	4.5	2 ^a	14.3			
2 points	7 ^a	31.8	2 ^a	14.3			
Item 22					.513	.774	.119
0 points	11 ^a	50	7 ^a	50			
1 points	5 ^a	22.7	2 ^a	14.3			
2 points	6 ^a	27.3	5 ^a	35.7			
Item 23					1.29	.526	.189
0 points	14 ^a	63.6	7 ^a	50			
1 points	7 ^a	31.8	5 ^a	35.7			
2 points	1 ^a	4.5	2 ^a	14.3			
Item 24					.242	.886	.082
0 points	2 ^a	9.1	2 ^a	14.3			
1 points	8 ^a	36.4	5 ^a	35.7			
2 points	12 ^a	54.5	7 ^a	50			
Item 25					.249	.883	.083
0 points	3 ^a	13.6	2 ^a	14.3			
1 points	17 ^a	77.3	10 ^a	71.4			
2 points	2 ^a	9.1	2 ^a	14.3			

Note. For each row category, pairs of column proportions with different superscripts differed significantly, $p < .05$.

Crosstabulations using Pearson's chi-square and Cramer's V tests were also conducted to examine the relationship between the score on each of the 25 items and ethnicity. As shown in Table 8, the relationship was significant for item 5-cold shoulder, $\chi^2(2) = 6.44, p < .05$, Cramer's $V = .42$. A greater proportion of participants who received 0 points were African American, Hispanic, or bi-racial (100%) than were Caucasian (43.3%). The relationship was also significant on item 6-spilled the beans, $\chi^2(2) = 6.56, p < .05$, Cramer's $V = .43$. A greater proportion of participants who received 0 points were African American, Hispanic, or bi-racial (83.3%) than were Caucasian (30%). In addition, a greater proportion of participants who received 2 points were Caucasian (38.9%) than were African American, Hispanic, or bi-racial (0%). A significant relationship was also found on item 20-butterflies in stomach, $\chi^2(2) = 6.67, p < .05$, Cramer's $V = .43$. This indicated that a greater proportion of participants who received 0 points were African American, Hispanic, or bi-racial (50%) than were Caucasian (13.3%). Further, a greater proportion of participants who received 2 points were Caucasian (50%) than were African American, Hispanic, or bi-racial (0%). Finally, there was a significant relationship for item 24-back to square one, $\chi^2(2) = 7.03, p < .05$, Cramer's $V = .44$. A greater proportion of participants who received 1 point were African American, Hispanic, or bi-racial (83.3%) than were Caucasian (26.7%).

Table 8

Crosstabulations for the 25 Items by Ethnicity

Variable	African American, Hispanic, and Bi-Racial		Caucasian		χ^2	<i>p</i>	Cramer's <i>V</i>
	<i>n</i>	%	<i>n</i>	%			
Item 1					.662	.718	.136
0 points	3 ^a	50	13 ^a	43.3			
1 point	3 ^a	50	14 ^a	46.7			
2 points	0 ^a	0	3 ^a	10			
Item 2					1.77	.183	.222
0 points	--	--	--	--			
1 point	3 ^a	50	7 ^a	23.3			
2 points	3 ^a	50	23 ^a	76.7			
Item 3					2.40	.301	.258
0 points	0 ^a	0	1 ^a	3.3			
1 point	2 ^a	33.3	3 ^a	10			
2 points	4 ^a	66.7	26 ^a	86.7			
Item 4					1.20	.549	.183
0 points	3 ^a	50	9 ^a	30			
1 points	1 ^a	16.7	11 ^a	36.7			
2 points	2 ^a	33.3	10 ^a	33.3			
Item 5					6.44	.040*	.423
0 points	6 ^a	100	13 ^b	43.3			
1 points	0 ^a	0	10 ^a	33.3			
2 points	0 ^a	0	7 ^a	23.3			
Item 6					6.56	.038*	.427
0 points	5 ^a	83.3	9 ^b	30			
1 points	1 ^a	16.7	7 ^a	23.3			
2 points	0 ^a	0	14 ^b	46.7			
Item 7					2.84	.242	.281
0 points	2 ^a	33.3	4 ^a	13.3			

1 points	4 ^a	66.7	18 ^a	60			
2 points	0 ^a	0	8 ^a	26.7			
Item 8					1.70	.193	.217
0 points	1 ^a	16.7	1 ^a	3.3			
1 points	--		--	--			
2 points	5 ^a	83.3	29 ^a	96.7			
Item 9					4.83	.089	.366
0 points	5 ^a	83.3	12 ^a	40			
1 points	1 ^a	16.7	4 ^a	13.3			
2 points	0 ^a	0	14 ^a	46.7			
Item 10					1.16	.560	.180
0 points	6 ^a	100	25 ^a	83.3			
1 points	0 ^a	0	2 ^a	6.7			
2 points	0 ^a	0	3 ^a	10			
Item 11					1.74	.419	.220
0 points	5 ^a	83.3	19 ^a	63.3			
1 points	0 ^a	0	7 ^a	23.3			
2 points	1 ^a	16.7	4 ^a	13.3			
Item 12					4.53	.104	.355
0 points	0 ^a	0	2 ^a	6.7			
1 points	4 ^a	66.7	7 ^a	23.3			
2 points	2 ^a	33.3	21 ^a	70.0			
Item 13					4.56	.102	.356
0 points	4 ^a	66.7	8 ^a	26.7			
1 points	1 ^a	16.7	3 ^a	10			
2 points	1 ^a	16.7	19 ^a	63.3			
Item 14					.825	.662	.151
0 points	0 ^a	0	1 ^a	3.3			
1 points	1 ^a	16.7	2 ^a	6.7			
2 points	5 ^a	83.3	27 ^a	90			
Item 15					3.77	.152	.324
0 points	5 ^a	83.3	16 ^a	53.3			
1 points	1 ^a	16.7	2 ^a	6.7			
2 points	0 ^a	0	12 ^a	40			

Item 16						.069	.966	.044
0 points	1	^a	16.7	6	^a	20		
1 points	1	^a	16.7	4	^a	13.3		
2 points	4	^a	66.7	20	^a	66.7		
Item 17						.600	.741	.129
0 points	0	^a	0	2	^a	6.7		
1 points	1	^a	16.7	3	^a	10		
2 points	5	^a	83.3	25	^a	83.3		
Item 18						1.31	.519	.191
0 points	2	^a	33.3	8	^a	26.7		
1 points	2	^a	33.3	5	^a	16.7		
2 points	2	^a	33.3	17	^a	56.7		
Item 19						2.83	.243	.280
0 points	3	^a	50	11	^a	36.7		
1 points	3	^a	50	9	^a	30		
2 points	0	^a	0	10	^a	33.3		
Item 20						6.87	.035*	.431
0 points	3	^a	50	4	^b	13.3		
1 points	3	^a	50	11	^a	36.7		
2 points	0	^a	0	15	^b	50		
Item 21						3.60	.165	.316
0 points	6	^a	100	18	^a	60		
1 points	0	^a	0	3	^a	10		
2 points	0	^a	0	9	^a	30		
Item 22						5.66	.059	.397
0 points	3	^a	50	15	^a	50		
1 points	3	^a	50	4	^b	13.3		
2 points	0	^a	0	11	^a	36.7		
Item 23						.686	.710	.136
0 points	3	^a	50	18	^a	60		
1 points	2	^a	33.3	10	^a	33.3		
2 points	1	^a	16.7	2	^a	6.7		
Item 24						7.03	.030*	.442
0 points	0	^a	01	4	^a	13.3		

1 points	5 ^a	83.3	8 ^b	26.7			
2 points	1 ^a	16.7	18 ^a	60			
Item 25					2.40	.301	.258
0 points	0 ^a	0	5 ^a	16.7			
1 points	6 ^a	100	21 ^a	70			
2 points	0 ^a	0	4 ^a	13.3			

Note. For each row category, pairs of column proportions with different superscripts differed significantly, $p < .05$.

Primary Analyses

Research Question One

To explore convergent validity with another measure of pragmatic skills, Spearman's correlations were conducted to examine the relationship between the Overall score and the five composite scores on the Test of Idioms with the TOPS 3 score. The Overall score on the Test of Idioms was not significantly correlated with the TOPS 3 score. However, the results revealed that the Food composite score and the TOPS 3 score were significantly and positively related at $p < .05$. In addition, the Home and School Composite score and the TOPS 3 score were significantly and positively related, $p < .01$. While the Overall score and the Colors and Shapes composite were not statistically significant when compared to the TOPS 3, they were moderately correlated. This suggests that a larger sample size may show a stronger relationship between the measures. Further details of relationships among these variables are shown in Table 9.

Table 9

Comparison of the Test of Idioms with the TOPS 3

Variable	TOPS 3
Overall score	.612
Parts of the body	.281
Food	.753*
Home and school	.873**
Animal	.380
Colors and shapes	.665

* $p < .05$, ** $p < .01$.

Next, the five composite scores as well as the Overall Score on the Test of Idioms were subjected to an inter-item reliability analysis to determine the reliability of the scale items. As seen in Table 10, the results revealed that four of the five composite scores demonstrated moderate inter-item reliability; the Parts of the Body composite score (Cronbach's alpha= .564), the Food composite score (Cronbach's alpha= .657), the Home and School composite score, (Cronbach's alpha= .624), and the Animal composite score (Cronbach's alpha= .657). The Colors and Shapes composite score indicated low inter-item reliability (Cronbach's alpha = .200). Finally, the Overall score demonstrated strong inter-item reliability (Cronbach's alpha = .885).

Table 10

Inter-Item Reliability with Cronbach's Alpha for Five Composites and Overall Score

	<i>N</i>	Cronbach's Alpha
Parts of the body	36	.564
<i>Over your head</i>		
<i>Button your lip</i>		
<i>Lend a hand</i>		
<i>Paid an arm and a leg for it</i>		
<i>Gave her the cold shoulder</i>		
Food	36	.657
<i>Spilled the beans</i>		
<i>Apple of my eye</i>		
<i>Piece of cake</i>		
<i>Bit off more than I could chew</i>		
<i>Butter you up</i>		
Home and school	36	.624
<i>It's on the house</i>		
<i>Drives me up a wall</i>		
<i>Teacher's pet</i>		
<i>Class clown</i>		
<i>Rings a bell</i>		
Animal	36	.657
<i>Raining cats and dogs</i>		
<i>Hold your horses</i>		
<i>Monkey business</i>		
<i>Ants in my pants</i>		
<i>Butterflies in my stomach</i>		
Colors and shapes	36	.270
<i>Passed with flying colors</i>		
<i>Have a green thumb</i>		
<i>Tickled pink</i>		
<i>Go back to square one</i>		
<i>Bent out of shape</i>		
Overall	36	.885

Research Question Two

Nonparametric Mann–Whitney U tests were conducted to examine differences between the two groups (clinical and nonclinical) on Test of Idioms including the overall score and each composite score. Results revealed a significant difference between groups for the Home and School composite score, $U = 3.50, p < .05$. The mean ranks for the nonclinical group were significantly greater ($MR = 22.69$, Sum of Ranks = 408.50) than were the mean ranks for the clinical group ($MR = 14.31$, Sum of Ranks = 257.50). The results also indicated a significant difference between groups for the Animal composite score, $U = 86.50, p < .05$. The mean ranks for the nonclinical group were significantly greater ($MR = 22.56$, Sum of Ranks = 406.00) than were the mean ranks for the clinical group ($MR = 14.44$, Sum of Ranks = 260.00). These results indicate that children in the nonclinical group performed significantly better on two of the composites compared to the clinical group.

Table 11

Mean Differences of the Overall and Composite Scores on the Test of Idioms

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>U</i>	<i>p</i>
Overall				105.00	.071
Clinical group	18	24.33	9.67		
Nonclinical group	18	31.00	8.07		
Parts of the body				134.50	.374
Clinical group	18	5.33	2.35		
Nonclinical group	18	6.33	1.41		
Food				135.50	.396
Clinical group	18	4.67	2.38		
Nonclinical group	18	5.50	2.33		

Home and school				86.50	
Clinical group	18	4.89	2.32		.016*
Nonclinical group	18	6.89	2.03		
Animal				89.00	
Clinical group	18	5.61	2.55		.020*
Nonclinical group	18	7.50	2.15		
Colors and shapes				121.50	.192
Clinical group	18	3.83	1.76		
Nonclinical group	18	4.78	1.90		

* $p < .05$

Research Question Three

Nonparametric Mann–Whitney U tests were conducted to examine differences between the two diagnostic groups within the clinical sample (i.e., ASD and ADHD) on the Test of Idioms. Results revealed that there were no significant differences between the groups for number of 1-point, ($U = 24.00, p = .418$) or the number of 2-point ($U = 28.50, p = .750$) responses obtained.

Table 12

Means Differences of the Diagnostic Group and the Number of 1-Point and 2-Point Responses Obtained

	n	M	SD	U	p
1 point responses				24.00	.418
ASD	7	5.14	1.95		
ADHD	9	6.22	2.82		
2 point responses				28.50	.750
ASD	7	9.14	5.67		
ADHD	9	8.44	4.53		

CHAPTER V

DISCUSSION

Within this section, there is a summary of the findings of this study which are integrated with the current literature. Implications of these findings for research and practice are noted, followed by the delineation of the strengths and limitations of the study. Based on all of these, a final set of conclusions is provided at the end of this chapter.

Review of the Study Rationale

The current literature supports the idea that there is a need for more psychometrically sound instruments to assess pragmatic language in children (Reisinger et al., 2011). While there are several measures currently being utilized (e.g., TOPL-2, CCC-2, TOPS 3, MIGDAS, and the Theory of Mind subtest from the NEPSY-II), there is no gold standard for how to most effectively assess social and pragmatic language (Adams, 2002; Volden & Phillips, 2010). The current study aimed to assess pragmatic language in children within a clinical and nonclinical population by using the Test of Idioms, which was developed for the purpose of this study. The study also hoped to provide a quantitative way to differentiate between ASD and ADHD based on group differences in performance, as well as group differences in the ability to guess at unfamiliar idioms using pictorial cues.

Summary of the Findings

Hypothesis One

The first hypothesis suggested that the Test of Idioms would have moderate to strong convergent validity with other pragmatic language measures. The results indicated that this hypothesis was partially supported in that there was a significant relationship between two of the five composite scores (i.e., Food, Home and School) on the Test of Idioms with the TOPS 3 score after conducting a Spearman's correlation. One similarity between these two composites and the TOPS 3 is that both measures require children to make inferences about subjects related to the home and school environment, as well as food. A child who can apply problem solving or make inferences to understand figurative language, as well as make predictions or determine causes based on their background and experiences, may perform similarly on both measures. This, along with the moderate correlation on the Overall score and the Colors and Shapes composite score, suggests that the Test of Idioms shows promise for measuring similar constructs as other standardized measures of pragmatic language; however, a larger sample size and more comparison data between other closely related measures such as the TOPL-2 or the CCC-2 is needed to further support this hypothesis.

Hypothesis Two

The second hypothesis indicated that the Test of Idioms would support a five factor model, with loadings on each of the five composite scores. Due to the small sample size, this was conducted through analyzing the inter-item reliability using Cronbach's alpha. Four of the five composite scores demonstrated moderate inter-item reliability

(i.e., Parts of the Body, Food, Home and School, Animal) and one composite indicated low reliability (i.e., Colors and Shapes). While three of the five composites (i.e., Food, Animal, Home and School) were just below the threshold of .70, which is considered acceptable reliability among social science research, the Overall score on the Test of Idioms had strong inter-item reliability (Gravetter & Forzano, 2012). This provided evidence that each of the 25 items were measuring the same underlying construct of idiom comprehension.

Hypothesis Three

Hypothesis three suggested that there would be a significant difference in performance between the clinical and nonclinical groups on the Test of Idioms. This hypothesis was partially supported as the nonparametric analysis revealed that there was a significant difference in the performance on two of the composites (e.g., Home and School, Animal). Children in the nonclinical group performed significantly better when asked to explain the meaning of idioms related to animals or the home and school environment. As stated previously, the Home and School composite was significantly correlated with the TOPS 3. Based on the results of that analysis, it was expected that there would be significant group difference between the clinical and nonclinical groups on the Home and School composite. This information, combined with the results of the reliability analysis, indicate that these two composite scores not only show promise in their ability to measure the same underlying construct, but also in their success of accurately screening pragmatic language skills in children. Taking this into consideration, these results suggest that the Test of Idioms shows potential as a measure of pragmatic

language and would be appropriate to move forward into the next phase of test development.

Hypothesis Four

Hypothesis four indicated that there would be a significant difference between the clinical groups (ASD and ADHD) based on the ability to guess at the unfamiliar idioms using the pictorial cues. The investigator tested this hypothesis by comparing the group differences in 1-point versus 2-point responses using nonparametric statistics. No significant difference was found between the groups in the number 1- and 2-point responses they obtained. There are a few potential reasons that may explain why this hypothesis was rejected. First, the investigator was unable to get a sample of participants without additional comorbid diagnoses (e.g., depression, anxiety, adjustment disorder). Additional or comorbid diagnoses could have had an effect on the overall participant performance in the study. In addition, age may have acted as a confounding variable but due to the small sample size, age could not statistically be controlled in the study. Finally, the small sample, with less than 10 participants in each diagnostic group, could have affected the overall outcome. Based on the literature, children with ASD have more difficulty than other clinical groups (e.g., ADHD) using contextual information to understand and decode language, especially when it is less literal. Future research should continue to explore clinical group differences in the ability to apply context and derive meaning from pictures through idioms (Jolliffe & Baron-Cohen, 1999; Nippold & Duthie, 2003; Norbury, 2004).

Implications for Future Research

By providing a new instrument for assessing pragmatic language, the current study intended to enhance the assessment and treatment planning process for pragmatic language impairments in children within specific clinical populations such as ASD and ADHD. Based on the findings, many aspects of the Test of Idioms show promise for becoming an effective measure for assessing pragmatic language in children. Based on the correlational findings, the five composites and overall scores were highly correlated and would have justified running multivariate statistics (i.e., MANOVA) to compare group differences if the sample size had been larger. Based on the nonparametric comparisons of means (Mann Whitney – *U*), there were significant mean differences between groups with two of the five composite scores. This alone arguably justifies moving into the next phase of test development with a larger, more representative sample after some adjustments to the test are made. In terms of reliability, four of the five composite scores had moderate inter-item reliability. In addition, the overall score had strong inter-item reliability supporting that when all of the composites were taken together, they were strongly related to the overall score. With some item and composite tweaking, specifically looking at the means for all 25 items and replacing items that were deemed too easy or too difficult as well as items that indicated gender and cultural bias, the inter-item reliability for the composite scores could increase.

Implications for Practice

The Test of Idioms proved to be a quick, easy-to-use assessment for pragmatic language. Its user-friendly nature, along with the positive feedback from the children,

makes it attractive for clinicians who are looking to gather more information for their assessment of social and pragmatic language in children. In addition, how children perform on the 1- versus 2-point items could provide great qualitative information for clinicians on how children are able to make inferences and use context clues. If the Test of Idioms successfully moves into the next phase of test development and gathers a larger sample, the practical implications could potentially include adding a measure that will commonly be used in conjunction with other well-known measures as part of a comprehensive evaluation of social and pragmatic language.

Strengths of Study

One of the biggest strengths of this study is its novelty. Based on the current literature, there is not another standardized measure for quantitatively assessing pragmatic language through a series of idioms and associated pictures. Thus, the newly created Test of Idioms is the only measure that provides composite scores as well as an overall score for performance. In addition, this study included a visual component to assess the participant's ability to guess using context clues. While the current study was unable to differentiate between the ASD and ADHD groups based on their performance or ability to guess using the pictures, a larger sample of participants may yield different results. In addition, the majority of the participants in both the clinical and nonclinical group indicated that the pictures were "very helpful" for their understanding of what the unknown or unfamiliar idioms meant. Only one participant indicated that the pictures were "not helpful at all." After they were administered the assessment, children made comments such as, "When I get to the pictures, I know what to do," "The pictures helped

me a lot,” and, “The pictures made me know what to say.” When asked about their overall impression of the test, all but two children (95%) indicated that they enjoyed the assessment.

Limitations of the Study

While the current study had several areas of strength, there are also some limitations. First, the sample size of the study was small and required the use of nonparametric statistics due to violations of the assumptions necessary for parametric tests. A much larger sample size would have allowed for more rigorous parametric statistics (e.g., MANOVA, EFA). There was also limited diversity represented in the sample, as well as an unbalanced ratio of males to females. Even though efforts by the investigator were made to obtain a more diverse sample, it should be noted that the current sample is more homogenous in terms of race/ethnicity, geographic location, and gender and thus, may not be as generalizable as a larger, more heterogenous sample. Next, the study would ideally use only children for the clinical sample who had a diagnosis of ADHD or ASD without other comorbid disorders. However, because the majority of the children eligible for the study had at least one other diagnosis, it was not realistic to only include children with one existing diagnosis. Further, it cannot be confirmed that participants in the nonclinical group were completely without any developmental or psychological diagnoses as their qualification for the group was based on parent report alone. It is possible that some participants in the nonclinical sample had previous or current diagnoses that were not made known to the investigator.

In terms of assessing convergent validity, the investigator would have ideally used a measure, such as the TOPL-2, that more closely resembled the Test of Idioms. However, since the investigator did not administer a standardized measure of pragmatic language as part of the study, the data was limited to what the participants had been given as part of their evaluation at Cook Children's. Only one participant had been given the TOPL-2 compared to eight participants who had been given the TOPS 3. The comparison of a more similar measure may have yielded more significant or different findings for convergent validity.

In terms of cultural biases, literature on the cultural variations of idiom comprehension is sparse (Boers & Demecheleer, 2001; Liu, 2012; Yağiz & Izadpanah, 2013). It can be assumed that the idioms in the study are strongly associated with Western culture. Thus, children from diverse cultural backgrounds may perform below children who have been exposed to mainstream Western culture. After examining performance differences between groups, it was determined that there was one item (item 6-spilled the beans) with significant gender differences and four items (item 5-cold shoulder, item 6-spilled the beans, item 20-butterflies in stomach, item 24-back to square one) with significant performance differences among different ethnic groups. These idioms are considered to have some level of cultural bias and should be removed or replaced before the next phase of test development. More information on cross-cultural considerations for pragmatic language and idiom comprehension is needed in order to provide the most effective treatment and intervention strategies for all children.

Conclusion

The current study intended to contribute to the research in the area of pragmatic and social language by developing a novel standardized measure, the Test of Idioms, which could be used with children of different ages, ethnic or racial groups, genders, and diagnoses. The Test of Idioms consisted of 25 idioms with associated pictures and children were asked to identify the meaning of the various figurative phrases. The study included participants from a clinical and nonclinical sample. Results from the analyses demonstrated that two of the composites on the Test of Idioms (i.e., Food, Home and School) showed significant correlations with another measure of pragmatic competence (i.e., TOPS 3). In addition, through a comparison of mean scores, two composites (i.e., Animal, Home and School) demonstrated the ability to differentiate between the clinical and nonclinical groups. Finally, the reliability analysis showed that three of the five composites (i.e., Animal, Food, Home and School) were just below the threshold of being considered acceptable while the overall score showed strong inter-item reliability. Overall, the Test of Idioms showed potential as a reliable and valid measure for assessing pragmatic language in children. In addition, it proved to be a quick and user-friendly assessment that most children enjoyed. Future directions for the Test of Idioms include making adjustments to the measure based on the item analysis results, consulting with a publishing company and an expert panel, and collecting a larger, more diverse sample. Moving the measure into the next phase of test development will potentially provide the field with a new measure for pragmatic language. Access to more psychometrically sound measures will lead to a more sophisticated understanding of the differences in

performance across populations, particularly with children with ASD and ADHD, as well as a more universal method for assessing social and pragmatic language skills in children.

REFERENCES

- Abkarian, G. G., Jones, A., & West, G. (1992). Young children's idiom comprehension: Trying to get the picture. *Journal of Speech, Language, and Hearing Research*, 35(3), 580-587.
- Ackerman, B. P. (1982). On comprehending idioms: Do children get the picture? *Journal of Experimental Child Psychology*, 33, 439-454.
- Adams, C. (2002). Practitioner review: The assessment of language pragmatics. *Journal of Child Psychology and Psychiatry*, 43(8), 973-987.
- American Psychiatric Association [APA]. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- American Speech-Language-Hearing Association [ASHA]. (2016). *Social language use (pragmatics)*. Retrieved from <http://www.asha.org/public/speech/development/Pragmatics>
- Ashcraft, M. H., & Radvansky, G. A. (2010). *Cognition* (5th ed.). Upper Saddle River, NJ: Prentice Hall.
- Baird, J., Stevenson, J. C., & Williams, D. C. (2000). The evolution of ADHD: A disorder of communication? *The Quarterly Review of Biology*, 75, 17-35.
- Banich, M. T., & Compton, R. J. (2011). *Cognitive neuroscience* (3rd ed.). Belmont, CA: Wadsworth.

- Bignell, S., & Cain, K. (2007). Pragmatic aspects of communication and language comprehension in groups of children differentiated by teacher ratings of inattention and hyperactivity. *British Journal of Developmental Psychology*, 25(4), 499-512. doi:10.1348/026151006x171343
- Bishop, D. V. M. (2000). Pragmatic language impairment: A correlate of SLI, a distinct subgroup, or part of the autistic continuum? In D. V. M. Bishop & L. Leonard (Eds.), *Speech and language impairments in children: Causes, characteristics, intervention and outcome*. Hove, UK: Psychology Press.
- Bishop, D. V. M. (2006). *Children's Communication Checklist, Second Edition*. New York, NY: The Psychological Corporation.
- Bishop, D. V. M., & Baird, G. (2001). Parent and teacher report of pragmatic aspects of communication: Use of children's communication checklist in a clinical setting. *Developmental Medicine & Child Neurology*, 43, 809-818.
- Bloom, R. L., Pick, L. H., Borod, J. C., Rorie, K. D., Andelman, F., Obler, L. K., . . . Welkowitz, J. (1999). Psychometric aspects of verbal pragmatic ratings. *Brain and Language*, 68, 553-565.
- Boers, F., & Demecheleer, M. (2001). Measuring the impact of crosscultural differences on learners' comprehension of imageable idioms. *English Language Teachers Journal*, 55(3), 255-262.
- Botting, N., & Conti-Ramsden, G. (1999). Pragmatic language impairment without autism. *Autism*, 3(4), 371-396.

- Bowers, L., Huisingsh, R., & LoGiudice, C. (2005). *Tops 3 elementary: A test of reasoning in context: Skill area: Problem solving and reasoning, developmental ages: 6-0 through 12-11*. Austin, TX: LinguSystems.
- Camarata, S. M., & Gibson, T. (1999). Pragmatic language deficits in attention-deficit hyperactivity disorder (adhd). *Mental Retardation and Developmental Disabilities Research Reviews*, 5, 207-214.
- Corbett, B., & Gunther, J. (2011). Autism spectrum disorder. In S. Goldstein & C. R. Reynolds (Eds.), *Handbook of neurodevelopmental and genetic disorders in children*. New York, NY: The Guilford Press.
- Coulthard, R. (1985). *An introduction to discourse analysis*. London, UK: Longman.
- Farflex. (2016). Farflex Dictionary of Idioms. Retrieved from <http://idioms.thefreedictionary.com>
- Gernsbacher, M. A., & Pripas-Kapit, S. R. (2012). Who's missing the point? A commentary on claims that autistic persons have a specific deficit in figurative language comprehension. *Metaphor and Symbolic Activity*, 27(1), 93-105. doi:10.1080/10926488.2012.656255
- Geurts, H. M., Verté, S., Oosterlaan, J., Roeyers, H., Hartman, C. A., Mulder, E. J., . . . Sergeant, J. A. (2004). Can the children's communication checklist differentiate between children with autism, children with ADHD, and normal controls? *Journal of Child Psychology and Psychiatry*, 45(8), 1437-1453. doi:10.1111/j.1469-7610.2004.00326.x

- Gibbs, R. W. (1987). Linguistic factors in children's understanding of idioms. *Journal of Child Language*, 14, 569-586.
- Gibson, J., Adams, C., Lockton, E., & Green, J. (2013). Social communication disorder outside autism? A diagnostic classification approach to delineating pragmatic language impairment, high functioning autism and specific language impairment. *Journal of Child Psychology and Psychiatry*, 54(11), 1186-1197. doi:10.1111/jcpp.12079
- Glackin, S. N. (2010). Universal grammar and the Baldwin effect: a hypothesis and some philosophical consequences. *Biology & Philosophy*, 26(2), 201-222. doi:10.1007/s10539-010-9225-3
- Goldstein, S. (2011). Attention-deficit/Hyperactivity disorder. In S. Goldstein & C. R. Reynolds (Eds.), *Handbook of neurodevelopmental and genetic disorders in children*. New York, NY: The Guilford Press.
- Gravetter, F. J., & Forzano, L. B. (2012). *Research methods for the behavioral sciences (4th ed.)*. Belmont, CA: Wadsworth.
- Grice, H. P. (1975). Logic and conversation. In P. Cole & J. Morgan (Eds.), *Studies in syntax and semantics*. New York, NY: Academic Press.
- Hamberger, M. J. (2007). Cortical language mapping in epilepsy: A critical review. *Neuropsychology Review*, 17, 477-489.
- Happe, F., G., E. (1993). Communicative competence and theory of mind in autism: A test of relevance theory. *Cognition*, 48, 101-119.

- Happe, F., G., E. (1994). An advanced test of theory of mind: Understanding of story characters' thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *Journal of Autism and Developmental Disorders*, 24(2), 129-154.
- Hoffman, A., Martens, M. A., Fox, R., Rabidoux, P., & Andridge, R. (2013). Pragmatic language assessment in williams syndrome: A comparison of the test of pragmatic language-2 and the children's communication checklist-2. *American Journal of Speech-Language Pathology*, 22, 198-204.
- Jolliffe, T., & Baron-Cohen, S. (1999). A test of central coherence theory: Linguistic processing in high-functioning adults with autism or asperger syndrome: Is local coherence impaired? *Cognition*, 71, 149-185.
- Kerbel, D., & Grunwell, P. (1997). Idioms in the classroom: An investigation of language unit and mainstream teachers' use of idioms. *Child Language Teaching and Therapy*, 13, 113-124.
- Ketelaars, M. P., Cuperus, J., Jansonius, K., & Verhoeven, L. (2010). Pragmatic language impairment and associated behavioural problems. *International Journal of Language & Communication Disorders*, 45(2), 204-214. doi:10.3109/13682820902863090
- Kim, O. H., & Kaiser, A. P. (2000). Language Characteristics of Children with ADHD. *Communications Disorders Quarterly*, 21(3), 154-165.

- Landa, R. J. (2005). Assessment of social communication skills in preschoolers. *Mental Retardation and Developmental Disabilities Research Reviews*, *11*(3), 247-252.
doi:10.1002/mrdd.20079
- Leonard, M. A., Milich, R., & Lorch, E. P. (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.
doi:10.1044/1092-4388(2010/10-0058
- Lindell, A. K. (2006). In your right mind: Right hemisphere contributions to language processing and production. *Neuropsychology Review*, *16*, 131-148.
- Liu, D. (2012). Translation and culture: Translating idioms between english and chinese from a cultural perspective. *Theory and Practice in Language Studies*, *2*(11), 2357-2362. doi:10.4304/tpls.2.11.2357-2362
- Mashal, N., & Kasirer, A. (2011). Thinking maps enhance metaphoric competence in children with autism and learning disabilities. *Research in Developmental Disabilities*, *32*(6), 2045-2054. doi:10.1016/j.ridd.2011.08.012
- McKown, C. (2007). Concurrent validity and clinical usefulness of several individually administered tests of children's social-emotional cognition. *Journal of Clinical Child and Adolescent Psychology*, *36*(1), 29-41.
- Meyers, L. M., Gamst, G., & Guarino, A. J. (2013). *Applied multivariate research: Design and interpretation (2nd ed.)*. Thousand Oaks, CA: SAGE Publications, Inc.

- Miller, L. A., Lovler, R. L., & McIntire, S. A. (2013). *Foundations of psychological testing: A practical approach (4th ed.)*. Thousand Oaks, CA: SAGE Publications, Inc.
- Murza, K. A., & Nye, C. (2013). Pragmatic language intervention for adults with asperger syndrome or high-functioning autism: A feasibility study. *Contemporary Issues in Communication Science and Disorders, 40*, 85-97.
- Nippold, M. A., & Duthie, J. K. (2003). Mental imagery and idiom comprehension: A comparison of school-age children and adults. *Journal of Speech, Language, and Hearing Research, 46*, 788-799.
- Nippold, M. A., & Martin, S. T. (1989). Idiom interpretation in isolation versus context: A developmental study with adolescents. *Journal of Speech, Language, and Hearing Research, 32*, 59-66.
- Norbury, C. F. (2004). Factors supporting idiom comprehension in children with communication disorders. *Journal of Speech, Language, and Hearing Research, 47*, 1179-1193.
- Norbury, C. F. (2005). The relationship between theory of mind and metaphor: Evidence from children with language impairment and autistic spectrum disorder. *British Journal of Developmental Psychology, 23*(3), 383-399. doi:10.1348/026151005x26732
- Phelps-Terasaki, D., & Phelps-Gunn, T. (2007). *Test of Pragmatic Language, Second Edition*. Austin, TX: Pro-Ed.
- Picoult, J. (2010). *House rules*. New York, NY: Atria Books.

- Rajendran, G., Mitchell, P., & Rickards, H. (2005). How do individuals with Asperger syndrome respond to nonliteral language and inappropriate requests in computer-mediated communication? *Journal of Autism and Developmental Disorders*, 35(4), 429-443. doi:10.1007/s10803-005-5033-z
- Rasmussen, T., & Milner, G. (1977). The role of early left-brain injury in determining lateralization of cerebral speech function. *Annals of the New York Academy of Sciences*, 299, 355-369.
- Reisinger, L. M., Cornish, K. M., & Fombonne, E. (2011). Diagnostic differentiation of autism spectrum disorders and pragmatic language impairment. *Journal of Autism and Developmental Disorders*, 41(12), 1694-1704. doi:10.1007/s10803-011-1196-y
- Russell, R. L., & Grizzle, K. L. (2008). Assessing child and adolescent pragmatic language competencies: toward evidence-based assessments. *Clinical Child and Family Psychology Review*, 11(1-2), 59-73. doi:10.1007/s10567-008-0032-1
- Ryder, N., & Leinonen, E. (2014). Pragmatic language development in language impaired and typically developing children: incorrect answers in context. *Journal of Psycholinguistic Research*, 43(1), 45-58. doi:10.1007/s10936-013-9238-6
- Ryder, N., Leinonen, E., & Schulz, J. (2008). Cognitive approach to assessing pragmatic language comprehension in children with specific language impairment. *International Journal of Language & Communication Disorders*, 43(4), 427-447. doi:10.1080/13682820701633207

- Sacks, H., Schlegelhoff, E., & Jefferson, G. (1974). A simplest systematics for the organization of turn-taking for conversation. *Language*, 50(4), 696-735.
- Safwat, R. F., Hamind, A. A., Salam, A. A., Amin, O. R., Mostafa, A., & Hamed, H. (2013). Pragmatic skills in attention-deficit hyperactivity disorder (adhd). *Egyptian Journal of Neurology, Psychiatry, & Neurosurgery*, 50(1), 61-66.
- Simmons, E. S., Paul, R., & Volkmar, F. (2014). Assessing pragmatic language in autism spectrum disorder: The yale in vivo pragmatic protocol. *Journal of Speech, Language, and Hearing Research*, 57, 2162-2173. doi:10.1044/2014_JSLHR-L-14-0040
- Snodgrass, C. L. (2004). *Super silly sayings that are over your head: A children's illustrated book of idioms*. Higganum, CT: Starfish Specialty Press.
- Sperber, D., & Wilson, D. (1995). *Relevance communication and cognition (2nd ed.)*. Oxford, UK: Blackwell.
- Staikova, E., Gomes, H., Tartter, V., McCabe, A., & Halperin, J. M. (2013). Pragmatic deficits and social impairment in children with ADHD. *Journal of Child Psychology and Psychiatry*, 54(12), 1275-1283. doi:10.1111/jcpp.12082
- Titone, D. A., & Connine, C. M. (1994). Descriptive norms for 171 idiomatic expressions: Familiarity, compositionality, predictability, and literality. *Metaphor and Symbolic Activity*, 9(4), 247-270.
- Tolchinsky, L. (2004). The nature and scope of later language development. In R. A. Bernam (Ed.), *Language development across childhood and adolescence* (pp. 233-247). Philadelphia, PA: John Benjamins Publishing House.

- Volden, J., & Phillips, L. (2010). Measuring pragmatic language in speakers with autism spectrum disorders: Comparing the children's communication checklist-2 and the test of pragmatic language. *American Journal of Speech-Language Pathology, 19*, 204-212.
- Vulchanova, M., Saldana, D., Chahboun, S., & Vulchanov, V. (2015). Figurative language processing in atypical populations: the ASD perspective. *Frontiers in Human Neuroscience, 9*, 24. doi:10.3389/fnhum.2015.00024
- Whyte, E. M., Nelson, K. E., & Khan, K. S. (2011). Learning of idiomatic language expressions in a group intervention for children with autism. *Autism, 17*(4), 449-464. doi:10.1177/1362361311422530
- Whyte, E. M., Nelson, K. E., & Scherf, K. S. (2014). Idiom, syntax, and advanced theory of mind abilities in children with autism spectrum disorders. *Journal of Speech, Language, and Hearing Research, 57*(1), 120. doi:10.1044/1092-4388(2013/12-0308)
- Yağiz, O., & Izadpanah, S. (2013). Language, culture, idioms, and their relationship with the foreign language. *Journal of Language Teaching and Research, 4*(5). doi:10.4304/jltr.4.5.953-957
- Young, E. C., Diehl, J. J., Morris, D., Hyman, S. L., & Bennetto, L. (2005). The use of two language tests to identify pragmatic language problems in children with autism spectrum disorders. *Language, Speech, and Hearing Services in Schools, 36*, 62-72.

APPENDIX A

Idioms Used in the Study

Body Parts

1. When something is over your head
2. If someone tells you to button your lip
3. If someone asks you to lend a hand
4. When someone says, "I paid an arm and a leg for it"
5. If someone says, "I gave her the cold shoulder"

Food

6. If someone says, "I spilled the beans"
7. When someone says, "You're the apple of my eye"
8. If something is a piece of cake
9. If someone says, "I bit off more than I could chew"
10. If someone is trying to butter you up.

Home/School Related

11. If someone says, "It's on the house"
12. If someone says, "That drives me up a wall"
13. If someone says, "You're the teacher's pet"
14. When someone says, "He's the class clown"
15. When someone says, "That rings a bell"

Animals

16. When someone says, "It's raining cats and dogs"
17. When someone says, "You need to hold your horses"
18. If someone says, "He's into monkey business"
19. If someone says, "I've got ants in my pants"
20. If someone says, "I have butterflies in my stomach"

Colors and Shapes

21. If someone says, "I passed with flying colors"
22. When someone says, "I have a green thumb"
23. If someone says, "I'm tickled pink"
25. When someone says, "I need to go back to square one"
25. If someone says, "I was bent out of shape"

APPENDIX B

Testing Protocol

1. When something is over your head		0	2
Visual Cue		0	1
2. If someone tells you to button your lip		0	2
Visual Cue		0	1
3. If someone asks you to lend a hand		0	2
Visual Cue		0	1
4. When someone says, "I paid an arm and a leg for it"		0	2
Visual Cue		0	1
5. If someone says, "I gave her the cold shoulder"		0	2
Visual Cue		0	1
6. If someone says, "I spilled the beans"		0	2
Visual Cue		0	1
7. When someone says, "You're the apple of my eye"		0	2
Visual Cue		0	1
8. If something is a piece of cake		0	2
Visual Cue		0	1
9. If someone says, "I bit off more than I could chew"		0	2
Visual Cue		0	1
10. If someone is trying to butter you up.		0	2
Visual Cue		0	1
11. If someone says, "It's on the house"		0	2
Visual Cue		0	1
12. If someone says, "That drives me up a wall"		0	2
Visual Cue		0	1
13. If someone says, "You're the teacher's pet"		0	2

Visual Cue	0	1	
14. When someone says, "He's the class clown"			0 2
Visual Cue	0	1	
15. When someone says, "That rings a bell"			0 2
Visual Cue	0	1	
16. When someone says, "It's raining cats and dogs"			0 2
Visual Cue	0	1	
17. When someone says, "You need to hold your horses"			0 2
Visual Cue	0	1	
18. If someone says, "He's into monkey business"			0 2
Visual Cue	0	1	
19. If someone says, "I've got ants in my pants"			0 2
Visual Cue	0	1	
20. If someone says, "I have butterflies in my stomach"			0 2
Visual Cue	0	1	
21. If someone says, "I passed with flying colors"			0 2
Visual Cue	0	1	
22. When someone says, "I have a green thumb"			0 2
Visual Cue	0	1	
23. If someone says, "I'm tickled pink"			0 2
Visual Cue	0	1	
24. When someone says, "I need to go back to square one"			0 2
Visual Cue	0	1	
25. If someone says, "I was bent out of shape"			0 2
Visual Cue	0	1	

APPENDIX C

Written Approval from Catherine S. Snodgrass

from: **Kathryn Buchanan** <kbuchanan@twu.edu>
to: catherine@[REDACTED]
date: Thu, Jan 14, 2016 at 5:53 PM
subject: Permission to use idioms and illustrations from your
book for dissertation research
mailed-by: twu.edu

Dear Ms. Snodgrass,

My name is Katy Caldwell and I am currently a doctoral candidate studying school psychology at Texas Woman's University in Denton, Texas. I am in the process of working on my dissertation and am interested in examining pragmatic language primarily in children with autism and also possibly in children with ADHD. While completing a practicum at Cook Children's Hospital this past fall, my supervisor and I came up with a research idea that I am hoping to investigate for my dissertation. When assessing pragmatic language skills in children and adolescents, it is often hard to find a measure that will give a comprehensive view of the child's strengths and weaknesses.

My supervisor has a copy of your book, *Super Silly Sayings That are Over Your Head: A Children's Illustrated Book of Idioms* that she has used to help children learn idioms and develop better pragmatic language skills. After brainstorming ways to measure pragmatic language, we came up with the idea to focus on idioms. I am interested in using some of the idioms and illustrations from your book in a pilot study to examine pragmatic language in children with autism and ADHD. I was inspired to read your bibliography and learn that you wrote the book in order to help your son learn idioms. I would be honored if you would allow me to use the idioms and illustrations from your book for my dissertation research. My supervisors, Dr. Amanda Smith and Dr. Lisa Elliott, and I are currently working with Cook Children's Hospital to obtain permission from their Institutional Review Board (IRB) to conduct the research.

I have attached a brief research proposal that outlines how I plan to conduct the pilot study. Hopefully, this gives you a good idea of how I plan to use the idioms and illustrations, if I am granted permission. If I am able to use the content from the book, I will absolutely cite you and give you co-authorship on the testing protocol and in my dissertation. If there are any further steps I need to take or anything you need clarified, please don't hesitate to contact me or my supervisors. I am including their contact information below. I attempted to send an email to your publisher, but it was returned back to me.

It is my hope that this research will help enhance our understanding of pragmatic language deficits, particularly those in children with autism and ADHD. I appreciate your time and look forward to your response.

Sincerely,

Katy Caldwell
Doctoral Candidate in School Psychology
Texas Woman's University

from: **Catherine Snodgrass** <catherine@[REDACTED]>
to: Kathryn Buchanan <kbuchanan@twu.edu>
date: Thu, Jan 14, 2016 at 9:07 PM
subject: Re: Permission to use idioms and illustrations from your book for
dissertation research

Hello Katy,

Thank you for contacting me. It is my understanding that you wish to use the contents of my book, *Super Silly Sayings that are Over Your Head* in a pilot study for your dissertation. Since you are not requesting licensing rights, permission to reprint illustrations or text, and/or use for profit, I would be my pleasure to have my book be utilized in your study. I fully support your venture and the understanding of social communication disorders in the autism/ADHD community is something very personal and dear to me.

Thank you for offer to cite me and provide co-authorship on the testing protocol and your dissertation. I look forward to the results of your research and would only ask that you share a final copy with me. Good luck!

Best,
Catherine S. Snodgrass

Catherine Snodgrass <catherine@[REDACTED]>
to: Kathryn Buchanan <kbuchanan@twu.edu>
date: Wed, Feb 22, 2017 at 1:19 PM
subject: Re: Permission to use idioms and illustrations from your book for
dissertation research

Hello Katy,

Yes, I hold the rights to "Super Silly Sayings That Are Over Your Head". At this time, the book is out of print and is only available as an Ebook.
I'm glad to hear that my book was helpful to you and I wish you all the best on your dissertation!

Best,
Catherine S. Snodgrass

APPENDIX D

Nonclinical Group Consent Form

TEXAS WOMAN'S UNIVERSITY
COOK CHILDREN'S HEALTH CARE SYSTEM
CONSENT TO PARTICIPATE IN RESEARCH
Parent/Legally Authorized Representative (LAR) Consent Form and Child Assent

Title: Evaluating Pragmatic Language Skills in Children Through the Use of Idioms

TWU Principal Investigator: Katy Caldwell, B.A.....817-xxx-xxxx
Faculty Advisor: Wendi L. Johnson, Ph.D.940-898-2329
Cook Children's Health Care System Principal Investigator: Amanda Smith, Ph.D....940-484-4311

Explanation and Purpose of the Research

Your child is being asked to participate in a research study examining the utility of a brief measure of pragmatic language skills in children.

Description of Procedures

Pragmatic language is defined as the social use of language that includes both verbal and nonverbal skills. It also requires individuals to incorporate their knowledge of social information with contextual cues when interacting with others. Pragmatic language impairments are often identified in children who struggle with the recognition of social cues, who have a difficulty understanding and engaging in 'small talk', and who tend to give conversational responses that are socially inappropriate. Currently, there is no gold standard for assessing and diagnosing pragmatic language skills.

Each participant in this study will be given a series of 25 idiom phrases, such as, "it's a piece of cake" and will be asked to identify what the phrase means. Visual cues will also be provided as part of the assessment. The assessment is estimated to take approximately 20 minutes and the results will be examined to determine the effectiveness of the measure for assessing pragmatic language skills.

Potential Risks

A potential risk is the loss of confidentiality. Your child's privacy will be protected at all times. Only those individuals directly involved in the project (e.g., investigator, research team) will have access to your child's assessment results. During the study, the assessment protocols will be maintained by the primary investigator in a locked file cabinet. After the information from the protocol is entered into the secure database, the protocol will go in a locked file cabinet and will be stored in the investigator's office. Each participant will be given a code number at the initiation of the study. This code number will be used in the database and any other information pertaining to the research study. The master list with the code number and corresponding participant's name will be stored separately from the other identifiable data. A code number, not your child's real name, will be used on all identifiable information. All paper documents will be stored in a locked cabinet in the investigator's office during the study. Data will be entered using an

encrypted excel file and will be stored on a secure database server. User privileges will be granted only to the research team.

When used for scientific abstract or publication, all identifiable information, including your child's name and any other identifiable information will be removed. The information obtained in the study will be used for educational purposes only.

There is also the potential loss of anonymity. Your child will be informed of the nature of the study and assent will be obtained for their participation. Parents or legally authorized representatives (LAR) and children have the right to withdrawal from the project at any time.

If you choose to participate, your child will be informed of the research study prior to beginning the assessment. All children and parents/LAR have the right to ask questions at any time during the study.

The researcher(s) will try to prevent any problem that may occur as a result of this research. You should let the researcher(s) know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in the research. Please contact the primary investigator, Katy Caldwell, at 817-308-8537 should you have any questions or concerns.

Participation and Benefits

Your child's involvement in this study is completely voluntary and you may withdraw from the study at any time. Participants will have the opportunity to take part in research to enhance the understanding and assessment of pragmatic language skills in children. It is the hope that a better understanding of how to correctly identify pragmatic language deficits will improve treatment planning and interventions for children across ages and disabilities.

Questions Regarding the Study

You will be given a copy of this signed and dated consent form to keep. If you have any questions about the research study you should ask the researchers; their phone numbers are at the top of this form. If you have questions about your child's rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at IRB@twu.edu.

Signature of Parent/LAR

Date

Child Assent

The research study has been explained to me and I have had the opportunity to ask questions.

[] I agree to participate in the project _____ (child signature).

[] I do not agree to participate in the study due to _____.

Date assent was obtained: _____.

APPENDIX E
Clinical Group Consent Form

**COOK CHILDREN'S HEALTH CARE SYSTEM (CCHCS)
CONSENT FOR RESEARCH AND PERMISSION TO
USE OR DISCLOSE PROTECTED HEALTH INFORMATION**

Title of Research: Evaluating Pragmatic Language Skills in Children
Through the Use of Idioms

CCHCS Department: Behavioral Health

Principal Investigator: Amanda Smith, Ph.D.

Telephone #: (940) 484-4311

This form is an invitation to take part in a research project. Before deciding to join us, it is important for you to understand:

- What the research project is and why we invited you to join us.
- How we do the research project.
- Related risks or problems.
- How this study helps you.
- Costs and payments.
- What happens to your research records and information
- Your rights and responsibilities

Please take your time reading this form and know that you are not alone if parts of it seem confusing. Talking to your doctor, family, or friends often helps. It also helps to write down your questions and concerns.

How we present information

People learn in different ways. We explain this information using discussions, diagrams, pictures, and handouts. Please let us know if some of these ways are easier for you to understand.

Who Are We?

Different groups of people make up our research project. You may meet one or all of these people during the study.

The Research Team:

1. Principal Investigator (PI): The primary person who oversees the research study. He or she will answer any questions you or your child may have about the research study.
2. Sub-Investigator (Sub-I): Other health care providers involved with the research study. Like the PI, they can answer any questions you or your child may have about the research study.

Why Are We Doing this Research?

The purpose of this research is to look at a new tool that can be used to measure pragmatic language skills. Pragmatic language is the ability to use language appropriately in a social situation. It includes the ability to recognize social cues and engage in 'small talk'. Currently, there is no standard tool for assessing pragmatic language.

We are asking your child to take part in this research because he/she between the age of 7 and 12 years and is being seen at the Cook Children's Behavioral Health Clinic for testing or therapy.

We plan to include about 60 participants in this research. About 30 participants will be from the Behavioral Health Clinic at Cook Children's. The other 30 participants will be from the community.

How Do We Select Participants?

Not everyone can take part in a research study. The investigator thinks your child may qualify based on his/her medical records. We may also use other information to find out if your child can take part in the research study.

This information includes:

- The ability to understand and follow study requirements.

Research Tests or Procedures

In this research study we are using idioms to measure pragmatic language. Idioms are common phrases or terms whose meaning is not real, but can be understood by their popular use, such as “it’s a piece of cake”.

Your child will be given a series of 25 idiom phrases and asked to identify what the phrase means. If your child does not guess correctly on the first attempt, he or she will be shown a picture that illustrates the idiom and asked to guess again. The assessment will take approximately 20 minutes.

We will also collect some health information from your child's medical record, including current diagnoses, demographic information (age, gender, ethnicity) and scores on any other assessments that have been administered.

Research Groups

Research participants will be divided into two groups:

- Participants from the Cook Children’s Behavioral Health Clinic.
- Participants from the community.

Length of Research Study

Your child will be in this research for as long as it takes him/her to complete the assessment (approximately 20 minutes). The total study will take us approximately one year to complete.

Stopping the Study

It may be necessary to stop taking part in this study if:

1. Your child is not able to follow the study requirements.

The research team will decide if stopping the study is necessary. **Taking part in this research study is voluntary.**

- You and/or your child may choose not to take part.
- You and/or your child may stop at any time.
- If you and/or your child decide to stop, Cook Children’s will continue to provide the standard (regular) treatment available, just as before.

Risks & Side Effects of this Research Study

Possible risks and side effects are a part of all research studies. We can list the risks and side effects we know about, but there may be others we do not know about at this time.

- A potential risk of participating in this research study is the possible loss of confidentiality; however, every precaution will be taken to ensure your child's personal information is protected. Each participant will be given a code number at the start of the study. This code number will be used instead of your child's real name on study documents. All study documents will be kept in a locked file cabinet in the Principal Investigator's office.
- As with any assessment administered, there is the potential for the risk of your child becoming discouraged or emotionally upset during the assessment. If this occurs, we will work with your child to help relieve any potential discomfort.

Will this Research Study Help Me?

If you agree to take part in this research study, there are no direct benefits to you or your child.

We hope the information we learn from this research will help future patients who have problems with pragmatic language. The information that we learn from this study will help us understand pragmatic language skills in children. We hope that understanding how to correctly identify pragmatic language problems will improve treatment for children of all ages and disabilities.

What Are My Other Choices?

You may decide not to join this study and this will not affect your child's clinical care at Cook Children's Medical Center.

Remember: You and/or your child can always choose to stop taking part in the research study. If you want to stop, your PI and/or a member of the research team will explain how you can do this.

Costs and Compensation

Aside from your time, there are no costs for participating in this research study.

You (or your insurance company) are still responsible for the costs of standard (regular) medical care during this research study.

Standard (regular) medical care: This is the usual medical care your child would need for his/her health condition if he/she were not taking part in this research study.

If you have any questions or concerns about the cost of your child's care, please talk with our CCHCS financial counselors or your child's investigator about this

It is unlikely that your child will be injured as a result of taking part in this study. However, if he (or she) is Cook Children's has not set aside any funds (money) to pay for your children's emergency medical treatment or ongoing medical care related to this research study. You or your insurance company may be responsible for costs associated with any necessary emergency medical treatment. If you need continuing medical care and/or hospitalization, you or your insurance company may be responsible for these costs.

Payment or Compensation for being in this Research Study

Payment

1. Each research study is different. Some studies pay participants for their time and effort related to taking part in a research study. And some do not.
2. You or your child will not be paid for taking part in this research study. There is no money to pay you for parking, travel, childcare, lost wages, or time lost from work.

Will You Keep My Records Private?

The Health Insurance Portability and Accountability Act (HIPAA) limits the use and disclosure of your private Protected Health Information (PHI). This means by law, we cannot share your child's personal or medical information.

However, by signing this consent form, you are giving us permission to share this information. You are allowing us to give out some of your child's private records. It is important for you to know what information we will share. This information may include:

- History and diagnosis of your child's disease
- Current and previous treatments your child received

- Other medical conditions that may affect your child's treatment
- Laboratory, radiology and pathology test results
- Follow-up information about your child's general health

Other Information that May be Used or Shared

This includes any information about your child's physical or mental health, your child's health care, or payment for your child's health care. It also includes your child's:

- | | |
|-----------------------|------------------|
| • Name | • Birth date |
| • County of residence | • Zip Code |
| • Gender | • Race/Ethnicity |
| • Diagnosis | • Diagnosis Date |
| • Disease Status | |

Who Will See My Information?

CCHCS will protect your child's protected health information (PHI). However, once you give us permission, we cannot absolutely guarantee this privacy, nor guarantee that your child's private information will remain protected. For example, the law may require us to give information to the courts or the health department.

Depending on the study, your private health information (PHI) may be shared with several groups including:

These can include:

- CCHCS Institutional Review Board (IRB) – a selected team of people who make sure that the rights of research participants are protected and respected.
- CCHCS Legal and Compliance Departments.
- Federal Office for Human Research Protections (OHRP)

How Will You Use My Protected Health Information?

If you give us permission, the researchers may use or share your child's protected health information (PHI) for this research study.

The researchers may report their findings about this research study in scientific journals or meetings, but these reports will not identify your child.

What If I Do Not Give Permission?

If you refuse to give permission, your child can still get standard, non-research health care from CCHCS. But, your child would not be able to take part in this research study.

Can I Cancel My Permission?

You have the right, at any time, to cancel permission for the researchers to use or share your child's protected health information (PHI).

If you cancel your permission, your child can still get standard, non-research health care from CCHCS. But, your child would not be able to take part in this research study.

To cancel permission, you must write to the Principal Investigator (PI) or the CCHCS Privacy Officer, at 801 Seventh Avenue, Fort Worth, TX, 76104. Or, you may email the CCHCS Privacy Officer at privacyofficer@cookchildrens.org

How Long Can You Use or Share My Child's Information?

There is no time limit for using your child's information: Unless you cancel your permission in writing, the Cook Children's researchers can continue to use or share your child's information indefinitely.

If you cancel your permission: As soon as you cancel your permission, we will stop the following research activities:

1. Direct or indirect interactions with you that allowed us to gather data for the research study.
2. Obtaining additional identifiable protected health information for the research study by collecting or receiving new information from other sources.

What Are My Rights as the Parent/Guardian of a Research Participant?

1. You have the right to find out about the release of your child's Protected Health Information.
2. You and your child have the right to withdraw your participation in the research at any and all levels at any time.
3. You and your child have the right to have all your questions and concerns addressed and answered to the best of our ability.
4. You have the right to any new information that becomes available during your child's participation in this research that may affect your health or willingness to continue in the research.

What Are My Responsibilities as the Parent/Guardian of a Research Participant?

It is your responsibility to do the following:

1. Ask questions about anything you do not understand.
2. Follow instructions.

What if I Have Questions or Problems?

If you have questions about this research study, you may call the Principal Investigator or any member of the research team at (940) 484-4311. If you are injured, you may call the Principal Investigator or any member of the research team at (940) 484-4311.

For information about your child's rights as a research participant, you may call the Cook Children's Institutional Review Board (IRB) at 682-885-1764.

A representative of the IRB may call you and ask about your child's experience with this research study. They want to make sure your child's rights as a research participant have been protected and respected. You have the right to answer or refuse to answer any questions the IRB may ask.

STATEMENT OF CONSENT and AUTHORIZATION

Your signature below means that you want (consent) your child to take part in this research study. It also means that you give permission (authorize) the CCHCS researchers to use and share (disclose) any of your child's Protected Health Information (PHI) that is related to this research.

You should not sign this form until you have had the opportunity to read it (or have it read to you) and have all your questions and concerns answered. You should not sign this form unless you have made a free and voluntary choice to allow your child to be in the research and to give permission for your PHI to be used and shared.

Taking part in the research and giving permission for CCHCS researchers to use and share your child's PHI are voluntary. Refusing to take part or to give your permission will not result in any loss of benefits to which you or your child are otherwise entitled. Your child will still be able to get standard, non-research health care from CCHCS.

You may withdraw from the research or cancel permission for your child's PHI to be used or shared at any time. Withdrawing from the research or canceling your permission will not result in any loss of benefits to which you or your child are otherwise entitled. Your child will still be able to get standard, non-research health care from CCHCS.

Your signature below means:

- You have read the information above (or it has been read to you)
- You have received answers to your questions at this time
- You have freely decided to allow your child to take part in this research
- You have freely given permission for CCHCS researchers to use or share your child's Protected Health Information for the purposes of this research.
- You are not giving up any of your legal rights.

You will receive a copy of this form.

PRINTED NAME OF PARTICIPANT

PRINTED NAME OF LEGALLY AUTHORIZED
PARENT OR GUARDIAN

SIGNATURE OF LEGALLY AUTHORIZED
PARENT OR GUARDIAN

DATE

PRINTED NAME OF
PERSON OBTAINING CONSENT

SIGNATURE OF PERSON
OBTAINING CONSENT

DATE

TIME

PRINTED NAME OF WITNESS
(IF REQUIRED)

SIGNATURE OF WITNESS
(IF REQUIRED)

DATE

NOTE:

The Witness Signature above indicates that the witness has observed (Please check one of the following):

- The informed consent conference involving the participant and the person obtaining consent.
- The signing of this form by the participant (or legally authorized representative) and the person obtaining consent.
- Both of the above.

OR:

The Witness Signature was not obtained because the subject and/or legally authorized representative are fluent in English and are not illiterate.

NOTE: Informed consent must be obtained in language understandable to the subject. This requires use of either (i) a full, translated informed consent document approved by the CCHCS IRB, or (ii) a translated, IRB-approved "short form" a translator and witness for the consent process.

APPENDIX F

Texas Woman's University IRB Approval Letter



Institutional Review Board
Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX 76204-5619
940-898-3378 email: IRB@twu.edu
<http://www.twu.edu/irb.html>

DATE: February 8, 2017

TO: Ms. Kathryn Buchanan
Psychology & Philosophy

FROM: Institutional Review Board (IRB) - Denton

Re: Approval for Evaluating Pragmatic Language Skills in Children Through the Use of Idioms (Protocol #: 19453)

The above referenced study has been reviewed and approved by the Denton IRB (operating under FWA00000178) on 2/6/2017 using an expedited review procedure. This approval is valid for one year and expires on 2/6/2018. The IRB will send an email notification 45 days prior to the expiration date with instructions to extend or close the study. It is your responsibility to request an extension for the study if it is not yet complete, to close the protocol file when the study is complete, and to make certain that the study is not conducted beyond the expiration date.

If applicable, agency approval letters must be submitted to the IRB upon receipt prior to any data collection at that agency. Please use the consent form with the most recent approval date stamp when obtaining consent from your participants. A copy of the signed consent forms must be submitted with the request to close the study file at the completion of the study.

Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

cc. Dr. Shannon Rich Scott, Psychology &
Philosophy Dr. Wendi L. Johnson, Psychology &
Philosophy Graduate School