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Social Competencies and Social Skills of Adolescent Females With Attention Deficit Hyperactivity Disorder

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Walden University
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Abstract

Social Competencies and Social Skills of Adolescent Females With Attention Deficit Hyperactivity Disorder

by

Mary Kniola

MA, George Washington University, 1990

BS, Ohio University, 1988

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology

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Abstract

Attention deficit hyperactivity disorder (ADHD) is one of the most prevalent disorders diagnosed in children and adolescents in the United States, many of whom experience peer rejection and are at risk for subsequent employment difficulties, depression and anxiety, school failure, and substance abuse. The purpose of this study was to evaluate differences in the social skills and social competence of females with and without ADHD in 6th and 12th grades. The theoretical foundation for this study was Barkley's theory of ADHD. Facebook, Qualtrics, and Prolific were used to recruit 80 parents, who were placed into four groups based on the self-reported ADHD diagnosis and grade level of their children. Participants completed a survey containing items from the Vanderbilt ADHD Diagnostic Parent Rating Scale, the Social Skills Improvement System–Rating Scale, and the Home and Community Social Behavior Scales. The Kruskal-Wallis test was used to compare the level of social skills and social competence of the four groups as a function of age and ADHD diagnosis. The results indicated a significant difference in the levels of social skills and social competence between adolescent females without ADHD in the 12th grade and adolescent females with ADHD in the 6th grade; however, there was not a significant difference found in these levels when comparing the females with ADHD with their peers. This study furthers knowledge of social competence and social skills, specifically in adolescent females with ADHD. The positive social change implications of this study are improved understanding of the social skill and competence deficit experienced by adolescent females with ADHD provide clinicians to the ability develop interventions to address deficiencies in the experienced in these areas.

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Dedication

I want to dedicate this work to my amazing children, Sam and Max, who not only inspired me to begin this journey but to persevere when I did not think I was going to make it. They are the light and love of my life. They constantly motivate me to be a better mother and person.

Acknowledgments

I would like to acknowledge several very important people without whom this dissertation would not have been completed. All of these special individuals have not only supported me through this particular professional journey but have also served a pivotal role in my life and have contributed tremendously to my personal and professional development and to the person, mother, and professional I am today. For that I will be eternally grateful.

To begin, I would like to extend my gratitude to the members of my dissertation committee for their unwavering support and commitment to this project. My deepest thanks to Dr. Medha Talpade, my dissertation chairperson, for patiently guiding me through this very long journey. I not only respect the brilliant professional you are but admire and value your kind nature and pleasant personality. You have made this challenging process not only doable but also enjoyable and satisfying. My honest appreciation is therefore extended for all that you have done and all that you are.

Next, I wish to acknowledge family and friends whose belief in me has inspired and motivated me to see this project to its completion. I am immensely grateful for having such loving people in my life and feel forever indebted for the emotional and physical support they have provided throughout my life and particularly during my professional journey.

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Chapter 1: Introduction to the Study

Attention deficit hyperactivity disorder (ADHD) is one of the most prevalent disorders diagnosed in children and adolescents in the United States. The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed; American Psychiatric Association [APA], 2013) includes three subtypes of ADHD: primarily hyperactive, primarily inattentive, and combined. The subtype diagnosis is based on which symptoms are the most prevalent in the individual. (APA, 2013). For the purpose of this study, I do not differentiate between the three subtypes.

Data collected between 2001 and 2004 as part of the National Comorbidity Survey Adolescent Supplement showed that approximately 49.5% of U.S. children between the ages of 13 and18 had a diagnosable mental disorder. (Merikangas et al., 2010). Within this group, the lifetime prevalence of ADHD was 8.7%. According to the Centers for Disease Control and Prevention (2022), between 2016 and 2019, approximately 6.1 million children 3-17 years of age in the United States were diagnosed with ADHD. Almost half of these individuals experience peer rejection putting them at risk for long-term negative consequences, which include employment difficulties, depression and anxiety, school failure, and substance abuse (Bellanti, 2000). Research also indicates that their capacity for emotional understanding is impaired, which negatively impacts their social functioning and peer acceptance (Kats-Gold & Priel, 2009). Of the U.S. population of children and adolescents with ADHD, boys between 3 and 17 years of age are twice as likely to have ADHD as girls in this age range (U.S.

Department of Health & Human Services, 2007). As a result, researchers have focused on males (Curtis, 2020).

Research on the relationship between social skills and social competence in adolescent females with ADHD may therefore address a gap in the literature. Clinicians may be able to use this knowledge to develop interventions to address deficiencies in the social skills and social competence of adolescent females with ADHD, which may improve this population group's social functioning and peer acceptance and lower their risk for adverse academic and other impacts. In this chapter, I provide a brief review of the current literature on adolescents with ADHD and social competence and skills. The chapter also includes an overview of the study, including the problem and purpose of the study; research questions (RQs) and related hypotheses; theoretical framework; nature of the study; definitions of key concepts; and the assumptions, scope and delimitations, limitations, and significance of the study.

Background

An important part of every child's development is learning appropriate social skills. Research indicates that as children mature through adolescence, their social skills increase (Sorie et al., 2021). Social skills cover a wide range of behaviors such as showing empathy, participating in group activities, showing generosity, helping others, communicating with others, negotiating, and problem-solving (Lynch & Simpson, 2010). The development of social skills has been linked to the development of the executive function (EF) processes that occur in the prefrontal cortex of the brain (Jacobson et al., 2011). Although researchers have not formulated an agreed-upon definition of EF, they

are in agreement that EF processes are multidimension and encompass several skills that provide a foundation for learning and development (Jacobson et. al., 2011, p. 256). Research has indicated a link between developmental disorders such as autism, pervasive developmental disorders (PDD) and ADHD and children's ability to learn and effectively use social skills (Barkley et. al. 1991; Hagopian et al., 2009).

Research also has indicated a link between EF deficits and developmental disorders (Gioiaet al., 2002). The EF deficits related to developmental disorders, such as ADHD, negatively impact individuals' ability to implement the appropriate social skills they have learned (Semrud-Clikemane et al., 2010). The ability to appropriately use social skills is an important factor in the development of an individual's social competence. Social competence is the ability of individuals to appropriately use the social skills they have learned in a given situation (Semrud-Clikeman & Schafer, 2000). Effective use of social skills increases individuals' ability to develop positive relationships with others and their surroundings. (Lynch & Simpson, 2010, p. 3). The ineffective use of these skills has a negative effect on the interactions that individuals with developmental disorders have with others.

Research also supports a relationship between EF processes and social competence. Jacboson et al. (2011) examined the role of EF processes in predicting the academic and social competence of 6th grade students. The results indicated a correlation between deficits in EF processes and unsuccessful social interactions. Individuals with ADHD experience a domino effect; due to a deficit in their EF processes, they may be unable to effectively implement the social skills they have developed in environmental

situations leading to lower social competence. Although this study does not focus on EF processes, it clarifies that the relationship between ADHD and deficits in EF processes is relevant to understanding why individuals with ADHD have social skill deficits.

To date, researchers examining social skill and social functioning with adolescents with ADHD have focused on males primarily due to their higher rates of diagnosis than females. Of the population of children and adolescents between 2 and 17 years of age, boys are 3 times as likely to be diagnosed with ADHD than girls in this age range (Centers for Disease Control and Prevention, 2022). Recently, however, research has begun to focus on understanding the impact of ADHD on females (Crawford, 2003). Although there has been an increase in the number of studies focused on girls with ADHD, a gap remains in research on social competence and social skills in adolescent females with ADHD. The gap that I addressed in this study was the lack of research on adolescent and young adult females with ADHD, specifically with regard to the social competence and skill deficits of this population.

Problem Statement

Children with ADHD struggle with the ability to self-regulate resulting from deficits in all of the major EFs (Barkley, 2012). These issues with self-regulation "create disorders mainly of performance rather than of knowledge or skills" (Barkley, 2012, p. 3). One of the deficits specifically addressed in Barkley's (1997) theory of ADHD is the inability of children with ADHD to use the social skills they have learned effectively in social situations. This inability to effectively use social skills is an indication of the social competence deficit experienced by children and adolescents with ADHD.

Purpose of the Study

The purpose of this study was to measure the social skills and social competence of females with and without ADHD in 6th and 12th grades to determine whether differences exist in social skills level and social competencies based on a diagnosis of ADHD and age. For this study, I followed a quantitative approach and used behavioral rating scales. The independent variable was a diagnosis of ADHD and age. The diagnosis of ADHD was based on the parent/guardian responses to the Vanderbilt ADHD Diagnostic Parent Rating Scale (VADPRS). To achieve variation in the age of participants, I recruited parents and guardians of adolescent females in middle school (sixth grade) and the last year of high school (12th grade). The dependent variables were social skills, as measured by the Social Skills Rating System–Rating Scale (SSRS-RS), and social competence, as measured by the Home and Community Social Behavior Scales (HCSBS), of the female adolescents, who varied by age. Parents/guardians reported on the diagnosis and age of their daughters and their social skills and social competence.

Research Questions and Hypotheses

RQ1: Does the social skill level of adolescent females differ as a function of ADHD diagnosis and age?

$H_0$1: There is no difference in the measurement of social skills development among adolescent females as a function of the presence versus absence of ADHD and age.

H_a1: There is a difference in the social skills development, as measured by the SSRS-RS, among adolescent females as a function of the presence versus absence of ADHD and age. Specifically, the social skills of 6th- and 12th-grade girls with ADHD are predicted to be lower than those without ADHD.

RQ2: Does the social competency level of adolescent females vary as a function of ADHD diagnosis and age?

H_02: There is no difference in the measurement of social competence of adolescent females as a function of the presence versus absence of ADHD and age.

H_a2: There is a difference in the social competence, as measured by the HCSBS, of adolescent females as a function of the presence versus absence of ADHD and age. Specifically, the social competencies of 6th- and 12th- grade girls with ADHD are predicted to be lower than the social competence of 6th and 12th grade girls without ADHD.

Theoretical Framework

For the theoretical framework, I used Barkley's theory of ADHD, which is a leading theory of the disorder. Barkley (1997) observed that existing theories were not theoretically based, did not consider all cognitive and behavioral deficits associated with ADHD, and did not distinguish between the type of inattention manifested in the three subtypes. His theory pulls together components of other theories to create a single approach to the relationship between response inhibition and four EFs: working memory, internalization of speech, self-regulation of affect-motivation-arousal, and reconstitution (Barkley, 1997). According to Barkley (2008), the deficit that children with ADHD have

is not in their knowledge of social skills, but rather in their ability to apply those skills at the *point of performance*. He defined point of performance as the place and time in adolescents' natural settings where they should have used what they knew but did not. A review of existing research findings (Banks, 2004) supports this statement. Since developing his theory of ADHD, Barkley has continued to update and refine his theory based on continued research in this area.

Barkley's theory provides the underlying premise that children with ADHD have the same level of social skills as children without ADHD, but they do not have the ability to perform these skills in social situations. In this study, I examined whether a discrepancy between social skills and social competence exists in adolescent females with ADHD and if this discrepancy decreases with age. A quantitative approach offered the best method of comparison between adolescents with and without ADHD and in two distinct age groups.

Nature of the Study

Researchers studying the social-emotional state of children and adolescents have used six primary methods: behavioral observation, behavior rating scales, interviewing, self-report instruments, projective-expressive techniques, and sociometric techniques (Merrell, 2001). I employed sociometric techniques to measure the level of social skills and social competence of adolescent females in 6th grade with and without ADHD and adolescent females in 12th grade with and without ADHD. Adolescent females in 6th grade are between 11 and 12 years of age (Association International Schools, 2012).

Those in 12th grade are between 17 and 18 years of age (Association International Schools, 2012).

I collected data from one parent or legal guardian of the adolescent females who qualified for this study. For data collection, I used an initial questionnaire and three existing assessment tools: the VADPRS, the SSIS-RS, and the HCSBS. The collected data were coded and entered into Statistical Program for the Social Sciences (SPSS) 28.0 to conduct the statistical analysis. Any participant submitting an incomplete assessment package was eliminated from the study. Demographic information was coded to assist with the cross-group comparisons.

Definitions

The following terms are defined as they are used in the study:

Attention deficit hyperactivity disorder (*ADHD*): A neurodevelopmental condition characterized by developmentally inappropriate levels of inattention, impulsivity, and hyperactivity (Guy-Evans, 2022).

Executive functions (EFs): "The major classes of behavior towards oneself used in self-regulation" (Barkley, 2001, p. 5). They include the following neurological processes: inhibition, resistance to distraction, self-awareness, verbal and nonverbal working memory, emotional self-control, and self-motivation (Barkley, 2012).

Point of performance: "That place and time in the natural setting of the person's life where they are failing to use what they know – they are failing to engage in effectively in EF (self-regulation)" (Barkley, 2012, p. 5).

Self-regulation: Any self-directed action that changes the individual's subsequent response to an event, hence altering the likelihood of a future consequence or attainment of a goal (Barkley 1997, 2000, 2012). Self-regulation is tied closely to EFs.

Social behavior: Individual's behavior that causes or impacts another's behavior (Schmitt, 1988).

Social competence: "An evaluative term based upon judgment (given certain criteria) that a person has performed a task adequately" (Gresham et al., 2010, p. 4).

Social cognition: "The ability to construct representations of the relations between oneself and others, and to use those representations flexibly to guide social behavior" (Adolphs, 2001, p. 231).

Social skills: Behaviors that promote positive interaction with others and the environment (Lynch & Simpson, 2010).

Assumptions

In conducting this study, I had some basic assumptions. The main assumption was that parents/guardians could adequately rate their children's knowledge of social skills and level of social competence. The theoretical assumption was that Barkley's theory of ADHD was appropriate and adequate to understand the research topic. The next assumption was that the criteria contained in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, text revision (*DSM-IV TR*; American Psychiatric Association, 2000) were appropriate for the diagnosis of ADHD. The final assumption was that all participants would truthfully respond to questions regarding their daughter's behavior.

Scope and Delimitations

The scope of this study was the level of social skills and social competence of adolescent girls in 6th grade and 12th grade with and without ADHD. I addressed the gap in research on adolescent females with ADHD. The scope of the study did not include the subtypes of ADHD or other age groups. Also, I explored social and social competence skills in individuals with ADHD; I did not examine any other variables that may be associated with ADHD. A delimitation of the study is the age and ADHD diagnosis of the adolescent females as reported by parent respondents in the study. The participants were self-reported parents or guardians of females who were either in 6th grade (11-12 years of age) or 12th grade (17-18 years of age) who responded to questions about the level of social skills and social competence of their daughters.

Limitations

Several limitations need to be considered when analyzing the results of this study. One of the limitations of the study is that it was conducted with the parents or legal guardian of the adolescents. Research has shown that teachers may be more reliable than parents when rating ADHD behaviors in children's parents (Hartman et al., 2007). Rhee et al. (2007) conducted a study comparing parent-teacher disagreements in ADHD ratings. Their findings suggest that the disagreements between parents and teachers may be due to differences in ADHD behaviors that each group observes. Rhee also noted that teachers may be more objective, and parents more biased, when rating ADHD behaviors of children. A second limitation is that participants might have anticipated the results of the study and responded to the questions accordingly. To manage this limitation, I did not

make participants aware of the expected outcome that the adolescent females with ADHD would have a lower level of social skills and competence. A third limitation is that some of the adolescent female children of participants may have received social skills intervention prior to the study. This intervention may have impacted how the parents or guardians assessed the adolescents' social skills or social competence. A fourth limitation is that the information was collected from the parents/guardian and not directly from the adolescents.

Significance

Social competence is an area of impairment for individuals with ADHD (Sibley, et al., 2010). This impairment begins early on in an individual's development and continues through adolescence. Both boys and girls are diagnosed with ADHD; however, boys between the ages of 2 and 18 years old are 3 times more likely to be diagnosed with ADHD than girls in the same age range. As a result of this imbalance in the diagnosis of this disorder, much of the research on ADHD has focused on boys (Biederman et al., 1999, Kok et al., 2016). The significance of this study lies in it addressing the gap found in research on the relationship between social skills and social competence in females with ADHD, specifically in adolescent females with ADHD. There has been limited evidence of females with ADHD, and this study adds to the knowledge on the social characteristics of this limited segment of the population.

Summary

Based on the severity of ADHD, adolescents diagnosed with ADHD may struggle with social competence and social skills (CHADD, 2022). In this study, I focused

specifically on these deficits among adolescent females diagnosed with ADHD. In Chapter 2, I provide an overview of related literature. Chapter 3 consists of a review of the methodology used for the study. Chapter 4 includes the results of the study. In Chapter 5, I discuss the results and the implications that they have in the field of ADHD research.

Chapter 2: Literature Review

Introduction

Researchers have studied ADHD for over 100 years (Barkley, 2010). As a result of this research, several theories have been developed to explain the social skills development and level of social competence of adolescents with ADHD. In this chapter, I will discuss Barkley's theory of ADHD, which was based on Fuster's and Bronowski's theories of the disorder. I also discuss the relationship suggested in the literature between the EFs of the brain, the development of social skills, and social competence deficits identified in girls with ADHD. Before reviewing the literature, I discuss the literature search strategy and theoretical framework.

Literature Search Strategy

I conducted a literature review using several keywords. The keywords search of *Barkley, ADHD,* and *Fuster* resulted in five peer-reviewed journal articles. Keywords *girls* and *ADHD* resulted in 541 peer-reviewed journal articles. Keywords *boys* and *ADHD* resulted in 1,514 peer-reviewed journal articles. The keywords *ADHD* and *boys* and *girls* resulted in 1,253 peer reviewed journal articles. Keywords *ADHD* and *social skills* resulted in 854 peer reviewed journal articles. I searched for peer-reviewed articles published between 2007 and 2022. The following databases and search engines were searched: Academic Search Complete, APA PsychArticles, APAPsycInfo, and Mental Measurements Yearbook with Tests in Print. The literature review in this chapter is organized in the following manner: (a) Barkley's theory of ADHD; (b) studies related to ADHD as a function of gender; (c) studies related to the relationship between social skill

development, social competence deficits, and ADHD; and (d) studies related to gender as a factor in the social competence and social skills of individuals with ADHD.

Theoretical Framework

Barkley developed one of the primary theoretical models of ADHD. Barkley stated that existing theories were not theoretically based, did not consider all cognitive and behavioral deficits associated with ADHD, and did not distinguish between the types of inattention manifested in the three subtypes. Barkley's initial theory of ADHD was based on several overlapping theories related to prefrontal functions of the brain. He synthesized and built on these theories to develop a single model of executive functioning and its role in ADHD. Barkley built on the theories of Bronowski (1977, 1976) and Fuster (2008, 2000, 1995).

Bronowski (1976; 1977) focused on human language. His theory on the uniqueness of human language explains the difference between human language and animal language as humans' capacity to inhibit and delay responses, which allows them the ability to reflect on the message. This capacity is related to four mental activities that occur in the prefrontal cortex: prolongation, separation of affect, internalization, and reconstitution. Prolongation allows individuals to look backward and forward in time and then communicate with others about future activity (Barkley, 1997). The form of memory used to create a relationship between past and future events has been equated to the neuropsychological concept of working memory. Barkley included working memory as one of the EFs in his model. Separation of affect is individuals' ability to separate their emotions from the content of their message. The delay which occurs between the event

and the response provides the opportunity for an internal review of possible responses. This process is the internalization of speech and takes the external communication process and internalizes it. Barkley included internalization of speech as one of the EFs in his model. Reconstitution occurs once the message has been internalized. At this point, the message is analyzed and synthesized, allowing individuals the opportunity to manipulate and construct a new message or response. Barkley (2021) used this initial structure developed by Bronowski as the framework for his model.

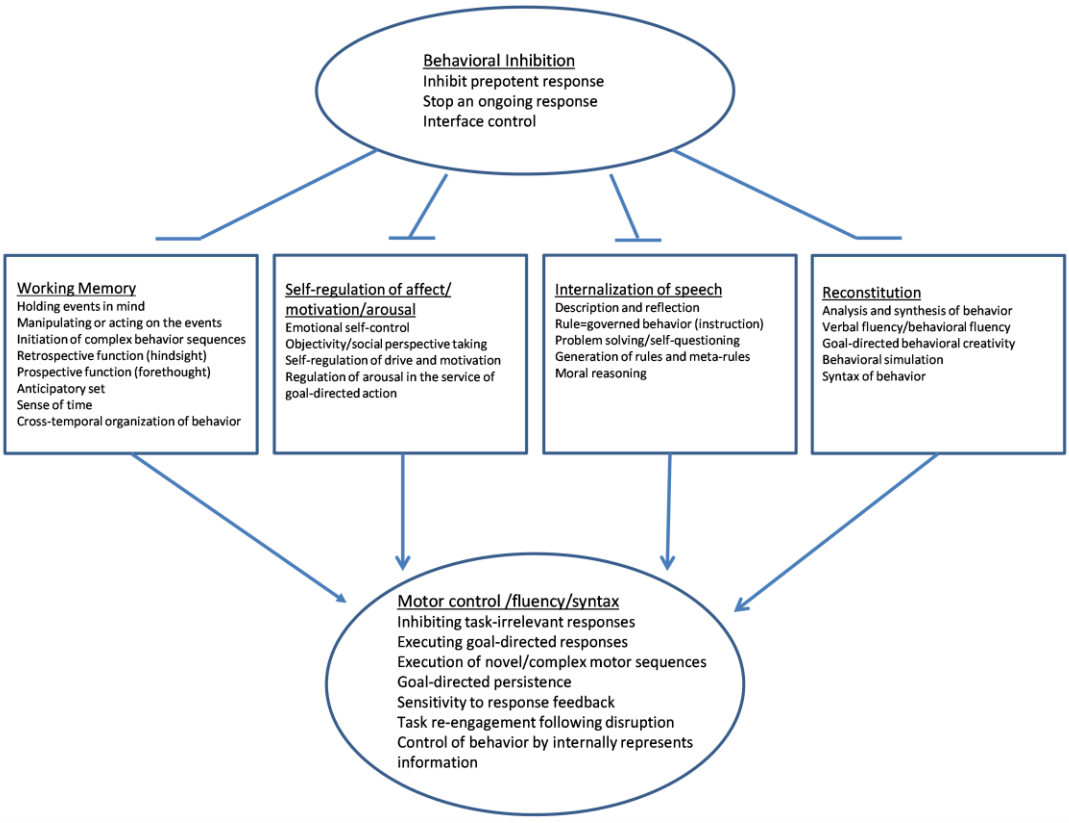
In theorizing prefrontal functions, Fuster theorized that the primary function of the prefrontal cortex is to provide individuals the ability to form cross-temporal structures and integrate multiple sensory, motor and cognitive functions into a single behavior (Barkley, 1997). Fuster (2000) identified two temporal functions which must occur in order for these structures to be linked across time. The first is active short-term memory (also known as working memory). Active short-term memory allows individuals to retain past details in the order they occurred relating to a goal. The second is short-term attentive set (also known as motor memory). These two functions work together to allow individuals to using working memory to retain information about past events and motor memory to prepare to act in anticipation of an event (Barkley, 1997).

One of the key overlapping components of Fuster (2008, 2000, 1995) and Bronowski (1977, 1976) is the focus on the neurological activity associated with EF occurring in the prefrontal cortex. Building on these ideas, Barkley (1997) developed his model based on four EFs: working memory, self-regulation, internalization of speech, and reconstitution. He later adjusted his theory and split the EF working memory into two

separate EFs: verbal working memory and nonverbal working memory (Barkley, 2000). Along with the neurological component, behavioral inhibition is a necessary component that sets the stage for the execution of the four EFs. Two important elements of this theory are (a) the core deficit is lack of inhibition and (b) the failure to develop the four EFs identified in this theory can impact the ability to control motor output and several behaviors symptomatic of ADHD (Foley et al., 2004). Figure 1 is an overview of how behavioral inhibition works in conjunction with the four EFs to influence the motor system.

Figure 1

Barkley's Theory of ADHD



Note. ADHD = attention deficit hyperactivity disorder. From "Behavioral inhibition, sustained attention, and executive functions: Constructing a unifying theory of ADHD," by R. Barkley, *Psychological Bulletin, 12*(1), p. 73. (https://doi.org/10.1037/0033-2909.121.1.65.)

Based on research supporting a link between ADHD and impairment of the prefrontal cortex which regulates EFs, Barkley (1997) extended his theoretical model of EF to explain what occurs when individuals are diagnosed with ADHD. His model views ADHD as a neurological-related disorder attributed to presumed impairments in prefrontal (and interconnected striatal) systems (Foley et al., 2004). Impairments in the prefrontal systems create deficits in behavioral inhibition that negatively impacts the ability of adolescents with ADHD to effectively self-regulate to attain goals (Barkley, 2012). Barkley included self-regulation in his model; self-regulation is any self-directed action that changes the individual's subsequent response to an event, hence altering the likelihood of a future consequence or attainment of a goal (Barkley 1997, 2000, 2012). According to Barkley's model, individuals' ability to self-regulate future behavior is an innate part of EF. Based on Barkley's theoretical model, deficits in behavioral inhibition that are identified in adolescents with ADHD should result in secondary deficiencies in working memory and related functions

Working memory (also called nonverbal working memory) involves the processes of recalling previous behavior and utilizing this information to determine future behavior. Through these processes, individuals develop self-awareness of their own behaviors and

vicarious learn from the behaviors of others (Barkley, 2000). Barkley identified six deficits associated with working memory and ADHD:

- Inability to remember and copy extended sequences of behavior demonstrated by others,
- Impaired sense of time,
- Disorganized memory recall,
- Disorganized syntax of motor planning and execution,
- Limited references to time, past and future, during discussions, and
- Decreased ability to apply social skills and adapt behavior based on future consequences. (Barkley, 1997).

These deficits impact adolescents' social competence. Barkley (2012) emphasized that the difficulty that adolescents with ADHD face is not their knowledge of social skills rather, their ability to perform social skills appropriately at the point of performance.

Internalization of speech (also called verbal working memory) is the ability of individuals to use self-directed speech to reflect, instruct and question themselves. This EF works with working memory in the development of internal governing rules which provide moral guidance of behavior. As a result of the deficit in internalized speech, adolescents with ADHD have difficulty implementing rules to govern behavior and moral reasoning (Barkley, 1997). The inability of children with ADHD to use internal guidance to self-regulate increases the likelihood of uninhibited behavior.

Self-regulation of emotion and motivation is the ability to internally monitor the emotion and motivation behind behavior using response delay and moral reasoning. Adolescents with ADHD who have a deficit in this area experience

> (a) Greater emotional reactivity to emotionally charged immediate events; (b) fewer anticipatory emotional reactions to future emotionally charged events (in view of the decreased capacity for forethought; (c) decreased ability to act with the impact of their emotions on others in mind; (d) less capacity to induce and regulate emotional, drive or motivational, and arousal states in the service of goal-directed behavior)(the further away in time the goal, the greater the incapacity to sustain the arousal and drive toward the goal); and the corollary of d, (e) greater dependence on external sources affecting drive, motivation and arousal that are within the immediate context in determining the degree of persistence of effort in goal-directed actions (Barkley, 1997, p. 80)

This lack of self-regulation makes adolescents with ADHD more likely to respond to external factors in their environment than to be controlled by internal information (Barkley, 1997). The inability to self-regulate behavior increases the likelihood adolescents with ADHD will not apply the appropriate social and adaptive skills to their behavior despite having the knowledge. Adolescents diagnosed with ADHD may experience deficits in working memory and internalized speech. These two EFs are involved in the reconstitution process.

Reconstitution involves the application of working memory and internalization of speech. Individuals actively recall and analyze past experiences

and synthesize the information to create possible responses and behaviors to achieve future goals (Barkley, 2000). In his theory, Barkley proposed that "response inhibition is most obviously deficient in individuals with ADHD and that this impairment may lead to the impairments observed in the psychological and social abilities associated with the other four executive functions." (Spencer et al, 2002, p. 7). Adolescents with ADHD experience a deficit in the reconstitution process which can lead to difficulties with tasks, settings, and interpersonal interactions (Barkley, 1997). These individuals struggle with time, timing, and timeliness of their behavior. They tend to focus on their immediate behaviors without using past experience or future consequences to assist in self-regulation.

Barkley's theoretical model of ADHD relates the deficits in behavior inhibition and self-regulation presented by adolescents with ADHD to the deficits experienced by individuals' neurological impairment in the prefrontal cortex. His model demonstrates that these deficits impair the social intelligence of adolescents with ADHD (Barkley, 2000, 2012 Another key component of his model is the expression of utilization behavior (UB) by adolescents with ADHD. UB "is a neurobehavioral syndrome documented in individuals with damage or dysfunction in the frontal areas of the brain" (Archibald et al., 2005). UB manifests in adolescents with ADHD through the appropriate use of an object in a contextually inappropriate manner. (Foley et al, 2004). This inability to behave within socially accepted constructs ties in with Barkley's point that the primary

deficit in adolescents with ADHD is not in their social skills but their social intelligence or competence.

Literature Review Related to Key Variables and/or Concepts

ADHD and Gender

While ADHD is a disorder is diagnosed in both males and females. research indicates that boys tend to be diagnosed and referred for clinical treatment more often than girls (Mowlen et al., 2018). Input from the public and teachers indicates that ADHD is more difficult to recognize in females (Quinn & Wigal, 2004). The U.S. Department of Health and Human Services (2007) looked at the population of children and adolescents and found boys between 3 and 17 years of age are twice as likely to be diagnosed with ADHD than girls. These findings are indicative of the difficulty in identifying girls with ADHD.

A quantitative analog study by Ohan and Visser (2009) examined the gender gaps that exist between boys referred for service versus girls. The study participants included 96 parents and 140 elementary school teachers from the Melbourne, Australia metropolitan area. The parents all had highly symptomatic children with ADHD and the elementary teachers had all taught at least one child with ADHD with most having recommended or sought services for one or more of the children they taught. They surveys were given containing a series of vignettes of hypothetical situations of children with ADHD. Half of the participants received vignettes containing boys' names and the other half received vignettes containing girls' names. The findings from this study

indicated that parents and teachers were more likely to seek services for boys because they believed boys would benefit more from learning assistance than girls.

Another theory of why boys are diagnosed with ADHD more often than girls is the disorder presents differently in boys than girls. A quantitative study by Hartung et al. (2002) supported this theory. For this study, 127 children who met the *DSM-IV* criteria for one of the three sub-types of ADHD, along with 125 children without ADHD were recruited. They ranged in age from 3 years 10 months to 7 years 0 months. Of the children with ADHD, 22 were girls and 105 were boys. Of those without ADHD, 24 were girls and 101 were boys. The children and their parents were given the assessment and interviewed during a clinic visit; while the teachers completed and returned their rating scales by mail after the clinic visits were completed. The measures used for this study were the DISC-2.3, DBD checklist, Stanford-Binet Intelligence Scale (4^{th} ed.) and Woodcock-Johnson Psychoeducational Battery (revised), Peer preference scale, Teacher Assessment of Social Behavior (TASB), Social Skills Rating System (SSRS), Loneliness scale, and other measures of functional impairment. The response from teachers who participated in the study indicated that boys tend to be more hyperactive and inattentive in the classroom. The results also indicated that boys with ADHD are more likely to exhibit comorbid disruptive behavior which may lead to more frequent referrals than girls with ADHD.

A study by Robison et al. (2002) examined the trends in the diagnosis of ADHD among and prescription of stimulant as a treatment approach. Using a single national data source, they analyzed the number and rate of office-based physician visits resulting in a

diagnosis of ADHD for children between 5 and 18 years of age from 1990 to 1998 based on the data from the U.S. National Ambulatory Medical Survey. They did four gender-specific trend analyses: 1991 to 1992, 1993 to 1994, 1995 to 1996, and 1997 to 1998. Their findings from the analysis indicated an increase in the diagnosis of ADHD among girls between 1991 to 1992 and 1997 to 1998; however, office visits by boys with ADHD still exceeded those of girls with ADHD.

A study by Bruchmüller et al. (2012) examined the influence of gender on a therapist's diagnosis of ADHD. Their hypothesis was that males were diagnosed more often than females. They created four vignettes based on the ADHD criteria contained in the *DSM-IV* and International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10) randomly selected psychotherapists specializing in children and adolescents from the following German states: Baden-Württemberg, Bavaria, Lower Saxony, and Hesse and received 473 responses. For the purposes of the study, they created four vignettes based on specific criteria from the *DSM-VI* and ICD-10 with a specific diagnosis in mind. To test for gender differences in diagnosing ADHD, they created a boy and girl version of each vignette, The results of the study confirmed one of the researchers` hypothesis that ADHD was diagnosed more often for the boy vignettes than the girls. The results of the studies supported this hypothesis noting that with the same symptoms in the boy and girl vignettes, boys were diagnosed with ADHD more often than girls.

A longitudinal study conducted by Murray et al. (2019) examined the role of developmental trajectories of ADHD symptoms between males and females in the

diagnosis of ADHD and if that trajectory for females is characterized by later symptom onsets. The study included 1,571 participants who were 7 years old at the start of the study. The study followed them through age 15. Of this number, 761 were female and 810 were male. The data was collected from the children's teachers. The measurements used for the study were the teacher-report version of the Social Behavior Questionnaire (SBQ). The results of the study supported the researchers' hypothesis that "males would be more likely to show trajectory categories characterized by early onsets" (Murray et a., 2019, p. 11). The females in the study didn't begin to show evidence of increased symptoms of ADHD until adolescence while the males displayed high levels of hyperactivity/impulsivity prior to reaching adolescence. The delay in the developmental trajectories of symptoms in females could play a role in males being diagnosed sooner and with a higher degree than females.

The results of these studies indicate an agreement that boys tend to be diagnosed and referred for treatment of ADHD more often than girls. However, they don't indicate agreement on the explanation of why this discrepancy occurs. It is also noted that while an increase in the number of girls diagnosed with ADHD has begun to increase in recent years; that number is still lower than the number of boys diagnosed with ADHD. As a result of the higher population of boys diagnosed with ADHD than girls, there is a larger pool of male participants for research in this area. Studies around ADHD which included males and females were comprised of larger populations of males than females making it difficult to do a separate analysis of the impact of ADHD on females (Murray et al. 2017,

Mowen et al., 2018). This study focuses specifically on females in an effort to reduce the gap which exists in this research.

ADHD, Social Competence, and Social Skills

Barkley's theory indicates that EF deficits impair the social intelligence of individuals with ADHD (Barkley, 2000). These problems begin in early childhood and can impact children's ability to have positive peer relationships and achieve social acceptance from their peers. It is necessary to understand to what level adolescents without ADHD may experience a social skills deficit. Gresham et al. (2010) used the Social Skills Improvement System–Rating Scales (SSIS-RS) to measure social skills, problem behaviors, and academic competence of 4,550 children and adolescents between 3 and 18 years of age. The results of the study showed that less than 1% of the standardization sample showed signs of social skills acquisition deficits. The researchers indicated that due to the nature of disorders like ADHD, children and adolescents with the disorder would experience a higher level of social skills deficit.

A quantitative study by Sibley et al. (2010) provided evidence that the social functioning issues which begin in early childhood continue into adolescence. The study compared the social interactions of 27 students with ADHD to those of 18 students without ADHD. Participants completed an "individual evaluation that included parent completion of rating scales assessing various aspects of social functioning and adolescent completion of three tasks that assessed social cognitive skills" (p. 196). They also attended a three-hour social activity in groups of 8 – 11 and then completed peer average liking ratings immediately afterwards. Parents were asked to complete the parent version

of the Impairment Rating Scale. The participants' response suggested that the social cognitive problems experienced by children with ADHD continue into adolescence. The adolescents with ADHD who participated in this study "also displayed inferior performance on social cognitive tasks that measured social comprehension and social problem-solving ability as compared to non-ADHD peers" (p. 199).

While research indicates children with ADHD experience social cognitive problems, it does not necessarily indicate they experience academic problems. A longitudinal study conducted by Lee et al. (2008) examined how well preschool age children diagnosed with ADHD adjusted socially as they matured into adolescence. The participants, 96 boys and girls with ADHD and 126 without were assessed seven times over an 8-year period. The children were between 4 and 6 years of age at the time of the first assessment. Six areas were identified to represent. Their findings indicated that while adolescents with ADHD tend to be less well-adjusted than those without ADHD, they were well-adjusted academically which was not expected. This study puts forth the idea that a positive correlation does not necessarily exist between social competency and academic competency.

A quantitative study by Barkley et al. (1991) found that adolescents with ADHD tended to be rated by parents and teachers as "more impaired in social competence, behavioral and emotional adjustment, and school performance" (p. 752). The study evaluated 181 adolescents and their parents. The ADHD group consisted of 84 adolescents: 76 boys and eight girls. The control group consisted of 77 adolescents: 63 boys and 14 girls. The self-reports by the adolescent participants in the ADHD group

differed from the parental reports for this group. The adolescents tended to rate their social competence higher than their parents and teachers indicating a possible lack of personal awareness in this population.

While these adolescents may rate their social competence higher than their parents and teachers, they still have trouble with peer relationships. Shattell et al. (2008) conducted a phenomenological study of the experiences of children with ADHD within the contexts of home, school, and friendship. Sixteen college students (3 males and 13 females) between 18 and 25 years of age participated in the study. All the participants were receiving some type of treatment for their ADHD. Nondirective individual interviews were used to collect the data about the impact ADHD had on their lives during childhood, specifically in the three contexts noted above. The participants all reported having difficulty with peer relationships during childhood. Two common themes identified were feelings of being different and being misunderstood. As a result of these feelings, the participants noted they often avoided social situations. Based on the data collected, Shattell et al. note that the social problems children with ADHD may experience "may not be due to lack of knowledge of social rules" (p. 54). These real-life stories support the findings that these children know the social rules but struggle to follow them.

A mixed methodology study by Grenell et al. (1987) focused on the knowledge and performance of social skills by hyperactive children. While not specifically dealing with children with ADHD, hyperactivity has been characterized as one of the primary symptoms of ADHD. The study participants included 30 boys between 7 and 11 years of

age: 15 hyperactive boys and 15 control boys. Through individual interviews (Social Knowledge Interview) with the children and observation of their behavior by judges and peers, their findings indicated that while these children can initiate friendships, their social skills deficits negatively impact their ability to maintain friendships and manage interpersonal conflict. The findings from this study indicated hyperactive children experience deficits in social knowledge, as well as the ability to implement this knowledge through socially skilled behavior.

Many children diagnosed with ADHD receive some type of intervention; medical, behavioral, or a combination of both. Research has been done on these different interventions to determine which ones are effective in helping children with ADHD deal with the social behavior problems they experience (Hagopian et al, 2009; Abikoff et. al., 2004; Hinshaw et al., 1984)

In a study by Hinshaw et al. (1984), they examined cognitive-behavioral and pharmacologic interventions. Twenty-four boys with ADHD and nine boys without ADHD (the control group) between 8 and 13 years of age were observed over a 5-week period at a summer program. Reinforced self-evaluation was the cognitive-behavioral intervention used for the study and methylphenidate was the stimulant medication used. The results of the study indicated both intervention approaches had a positive influence on social behavior in the short-term. However, the positive effects of the use of methylphenidate seen in the younger participants did not carry through to the older participants.

The effect of the continued use of methylphenidate was examined by Abikoff, et. al. (2004) who compared the following social function interventions for children with ADHD: (a) methylphenidate alone, (b) methylphenidate in conjunction with intensive multimodal psychosocial intervention including social skills training, and (c) methylphenidate plus nonspecific psychosocial treatment (attention control) For the study, 103 medication-free children with ADHD between 7.0 and 9.9 years of age were randomly assigned to one of the three interventions. The results from this study indicated parent and teacher ratings of social function improved for children in all three intervention groups. An analysis of the baseline changes related to methylphenidate compared to changes which occurred between month 12 and 24 indicated the primary benefits to social behavior occur early on and continued treatment did not improve the positive effect.

These studies (Sibley et al., 2010; Lee et al., 2008; Shattell et al., 2008; Barkley et al., 1991; Grenell et al., 1987) all support Barkley's (2000) theory that children with ADHD struggle to achieve social competency. These studies diverge regarding the cause of the social competency issues children with ADHD face. Some findings support these problems stemming from the inability of children with ADHD to accurately assess their social competency. Other findings support these problems stemming from the inability of these children to implement the appropriate social skills once they have initiated a friendship (Grenell et al., 1987). Finally, findings also support a combination of lack of social skills and the ability to implement these skills as the cause of social behavior problems experienced by children with ADHD (Sibley et. Al., 2010; Grenell et al., 1987).

The results from the studies above indicate stimulant medication alone or with cognitive-behavioral interventions have a positive effect initially, but it is not enough to maintain this effect over the long-term. They also did not support the use of clinic-based social skills training in bringing about a long-term positive effect. While this study does not focus on specific interventions, it acknowledges that intervention can have a positive effect on the social skills and social competence of children with ADHD.

A quantitative study by Hinshaw (2002) looked at social functioning in preadolescent girls with ADHD. The study was conducted during summer camp sessions over a three-year period. The 228 girls between 6 and 12 years of age participated in the study. Ninety-three were diagnosed with ADHD combined type, 47 were diagnosed with inattentive type, and 88 were in the comparison group. Most of the participants were not medicated during these sessions. Prior to the summer camp sessions, the participants went through a series of screening and diagnostic assessments. During the summer sessions, the girls participated in a variety of indoor and outdoor activities which allowed for the "collection of peer sociometric nominations, daily behavior ratings from staff, and objective observations of naturalistic social interactions by trained observers" (p. 1088). The findings in the areas of behavioral, cognitive, and psychosocial functioning indicated that girls with ADHD experience problems with externalizing and internalizing behaviors and peer rejection which negatively impacts their peer relationships. This study was one of the first to focus solely on girls with ADHD.

These findings were supported by a quantitative study by Hoza et al. (2005) examining peer relationships of boys and girls with ADHD. The data for this study was

collected from participants at three of the six sites in the Multimodal Treatment Study of Children with ADHD (MTA). The participants included 165 children with ADHD: 130 boys and 35 girls. Each of these children was paired with a same-sex class member who served as a comparison child. Using a developmental psychopathology perspective, the various aspects of peer interactions between the children with ADHD and their classmates were observed in a natural setting. Along with observation, sociometric methods and a multilevel assessment approach were used to understand the social problems faced by children with ADHD. Their findings indicated boys and girls deal with similar levels of impairment to these relationships. The problem with the findings from this study was the population of boys participating in the study was larger than the population of girls. This discrepancy in size may have impacted the ability to identify potential differences in the level of impairment. While supporting Hinshaw, additional research is needed to better understand the peer relationships of girls with ADHD.

Ohan and Johnston (2011) attempted to address this problem with a multi-methodology study on the social impact of ADHD on girls. They used lab tests along with mothers' and teachers' ratings and direct observation during lab tasks in order to measure social skills, relational aggression, and overt aggression. The participants included 40 girls with ADHD and 40 girls without between 9 and 12 years of age and their mothers. The results of their study indicated girls with ADHD experience social problems as a result of ADHD. They also supported findings noted above that these girls do have social skills but lack the ability to use those skills to maintain positive long-lasting social relationships. These results support the finding of Grenell et al. (1987)

indicating that the problem adolescents with ADHD experience is not initiating friendships, it is trying to use their social skills appropriately to maintain those friendships.

A study conducted by Ragnarsdottir et al. (2018) continued the research into the role gender differences may play in development of peer problems and prosocial behavior among children diagnosed with ADHD. The sample population included the parents of 592 students: 410 boys between 5.1 and 10.10 years of age and 182 girls between 5.1 and 10.9 years of age. These students met the diagnostic criteria for ADHD and were not taking any type of medication. The comparison population included the parents of 215 students: 110 boys between 6 and 10 years of age and 105 girls between 6 and 10 years of age. Two measurement tools were used for the study. The Kiddie-SADS Diagnostic Interview-Present and Lifetime Versions (K-SADS-PL) was used to assess the presence of ADHD symptoms in the students based on the parents' input. The Strengths and Difficulties Questionnaire (SDQ) was used to assess the both the child's strengths and weaknesses. For this study, only the scores for the peer problems and prosocial behavior scales. The teachers and parents of children in the sample groups completed the SDQ while for the comparison group, only parents completed it. The results of the study indicated "children with ADHD were rated by their parents as having more peer problems and showing less prosocial behavior than children without ADHD" (Ragbarsdottir et al., p. 272) which supported the first hypothesis put forth by the researchers. When examining the impact of gender on social skills deficits, the result found that the older girls with ADHD assessed as part of the study had more peer

problems than the older boys with ADHD. This result did not hold true for the younger children. The results of the study also found that while parents of girls in the clinical group indicated similar peer problems in the older girls as the younger girls; teachers indicated that these older girls also showed more prosocial behavior than the younger girls. The results did not find a difference between the prosocial behavior exhibited by older boys compared to the younger boys in the clinical group. These results "suggest a possible different pathway for the development of social skills for boys and girls with ADHD" (Ragbarsdottir et al., p. 275).

ADHD, Age, Social Skills and Social Competencies

One of the areas the researcher examined was the relationship between age and social skills and social competence. The assumption was that normal developing children would have an increase in social skills and social competence as they mature while children with ADHD would not necessarily see the same increase due to deficits in EF. In Barkley's theoretical approach, deficits in behavior inhibition and self-regulation which are part of EF negatively impact the social intelligence of adolescents with ADHD. Two areas that impact social intelligence are theory of mind (ToM) and EF (Yeh, 2013).

Several studies have examined the development in these areas as children move into adolescence. The traditional concept of ToM was related to how an individual sees and understands others' mental states (Korucu et. al, 2017). The concept has evolved into the modified concept which has taken a broader approach to include not only thinking about other's beliefs and thoughts but about one's own beliefs and thoughts (Westby & Robinson, 2014). How individuals see others and themselves plays a role in the

development of their social competence. Research has shown that a child's ToM is positively correlated with the level of social competence (Liddle & Nettle, 2006).

In a review conducted by Best and Miller (2010), the researchers examined three aspects of EF, inhibition, working memory, and shifting in relation to age. The findings indicated that all three aspects of EF improve as pre-school age children move into adolescence and young adulthood.

A study conducted by Parke et al. (2018) examined how social cognitive deficits experienced by adolescents with ADHD could impact their ability to make social connections and communicate effectively. As part of their examination of social cognition in adolescents between 7 and 13 years of age, they measured Affective ToM and Cognitive ToM. The results of the study found that the adolescents with ADHD had deficits in both affective and cognitive ToM. The deficits impact their ability to understand the behavior and emotions of others and respond appropriately.

A meta-analysis conducted by Bora and Pantelis (2015) examined the social cognition of individuals with ADHD compared to healthy individuals and individuals with autistic spectrum disorder. As part of the analysis, they examined whether deficits in ToM experienced by individuals with ADHD continue as the move from childhood to adulthood. One of the findings was the social cognitive impairment experienced by individuals with ADHD was less pronounced as they got older. The studies included in this meta-analysis included individuals from 8 to 35 years of age. The findings indicated that age is a significant factor in the differences in social cognitive deficits between individuals with ADHD and health individuals. In the pediatric samples, there was a

medium effect size observed in social cognition between the individuals with and without ADHD. While there were no studies that provided this information for adolescents and young adults, with ADHD, the studies with participants over 22 years of age found the social cognitive deficit effect size was small and for ToM was non-significant.

Summary and Conclusions

The findings from the studies reviewed in this chapter (Sibley et al., 2010; Lee et al., Hinshaw; 2008; Shattell et al, 2008; Hinshaw, 2002; Barkley et al., 1991; Grenell et al, 1987) all indicate that children with ADHD struggle with social competency and social skills. They also indicate the ability of these children to initiate social relationships with their peers but an inability to maintain these relationships over time. Limited research has been done examining the developmental differences among girls with ADHD on these social cognitions, which encompass social competence and social skills.

A search of the impact of ADHD and age related to theory of mind (ToM), socials skills, and social competencies revealed that as individuals with ADHD get older, they may see a decreased social competency deficit and improved cognitive performance (Gordon & Hinshaw, 2020; Bora & Pantelis, 2015, Coghill et al., 2014). While this finding included participants ranging in age from 8 to 35 years old, the research on age related changes is sparse, especially related to changes in social skills and social competency, among individuals with ADHD. This study will therefore include this demographic of age.

While an increase in the number of studies focused on or including girls with ADHD (Gordon & Hinshaw, 2020; Ohan & Johnson, 2011; Miller & Hinshaw, 2010) can be seen since this research study was started, several questions still need to be answered. Additional research is needed is in the areas of social skills and social competence. in adolescent females with ADHD. This study will measure the level of social skill and social competence of 6th grade and 12th grade adolescent females with and without ADHD. The relationship between level of social competence and social skills will also be examined.

Chapter 3: Research Method

Introduction

I drew from Barkley's (1997) theory of ADHD in conducting this study. Barkley's theoretical model proposes that the deficit experienced by individuals with ADHD is in their ability to use the social skills they have learned and use them effectively in social situations. Barkley also noted the lack of research to examine this deficit. This lack of research has continued in the 25 years since Barkley put forth his theory. The purpose of this study was to measure the social skills and social competence of females with and without ADHD in 6th and 12th grades to determine whether there were differences in social skills and social competencies based on a diagnosis of ADHD and age. In this section, I describe the methodology, population selected, measurement instruments, and research design used to address the RQs and related hypotheses.

Research Design and Rationale

The research methodology selected for this study was a quantitative approach using a 2X2 factorial design with group (presence versus absence of a diagnosis of ADHD) and age (6th grade versus 12th grade) as factors and social skills and social competence as the dependent variables. Use of a quantitative approach allows a researcher "to explain the causes of changes in social facts, primarily through objective measurement and quantitative analysis" (Firestone, 2005, p. 16.). Quantitative researchers attempt to understand the relationship that may exist between a certain population and a specific variable or variables whereas qualitative researchers attempt to understand the individuals in that population (Leibe, 2009).I concluded that the quantitative method

provided the best approach to examining the relationship between level of social skill and social competence in girls with ADHD of two grade levels.

Researchers who assess the social-emotional state of children and adolescents have used six primary methods: behavioral observation, behavior rating scales, interviewing, self-report instruments, projective-expressive techniques, and sociometric techniques (Merrell, 2001). In his review of methods for assessing social skills of children and youth, Merrell (2001) discussed six sociometric assessment techniques. Merrell divided the techniques into three groups: first-line, second-line, and third-line.

In Merrell's (2001), typology, the first-line methods of assessment are behavioral observation and behavioral rating scales. Behavioral observation does not require the use of any specific assessment instrument. Researchers develop observational protocols appropriate for the specific situation, which can include descriptive notes about what the researcher sees and reflective notes about the researcher's personal thoughts (Creswell, 2009). This approach allows researchers to observe children's behavior in natural settings. The primary setting for observing children's social skills is school because of the amount of peer interaction that occurs in this setting (Creswell, 2009). There are three potential problems with this approach: the amount of time required for the entire observation process, the validity of the results due to poor planning or implementation, and the determination of how many observations are required in order for the observations to be reliable and useful (Merrell, 2001).

I selected the behavioral ratings scale method for this study. Behavioral rating scales are used by teachers and parents to quantitatively rate the social-emotional

behaviors of children and adolescents. This method of assessment has several advantages in comparison with other methods, as noted by Merrell (2001). One advantage of behavioral rating scales compared to direct behavioral observation is that less time and training are required for this type of assessment. A second advantage is the ability of behavioral rating scales to identify low frequency, but important behaviors, which may not be seen during direct observation. A third advantage of behavioral rating scales compared to unstructured interviews and projective-expressive techniques is that, as an objective method, the data collected are more reliable. A fourth advantage is that individuals who cannot provide the information themselves are still able to be assessed with this method. A fifth advantage is that a single assessment can capture information based on multiple observations of children or adolescents in their natural environment. A sixth advantage is that raters are highly familiar with the behaviors of the child or adolescent providing more accurate data. These advantages were key in determining to use this approach to collect data.

Methodology

Population

The target population for the study was the parent or guardian of adolescent females in either 6th or 12th grade with and without ADHD. I used Cohen's d to determine the target sample size. Cohen's *d* is the measure of the mean difference divided by the standard deviation; a mean difference greater than 0.8 standard deviations indicates a large effect (Gravetter & Wallnau, 2007). An effect size (ES) greater than 2indicates that ADHD has a large effect on the social competence of a child (Merrell & Boelter, 2001).

Based on the results of Merrell and Boelter (2001) study, I used a Cohen's *d* of 0.9 to estimate the appropriate sample size for this study. Using a two-tailed alpha of .05 at 80% power and a Cohen's *d* of 0.9, the target sample size for this study was 21 participants per group for a total of 84 participants. The participants were grouped according to their child's grade and whether their child had been diagnosed with ADHD.

Sampling and Sampling Procedures

The sampling strategy selected for this study was stratified random. The criteria for stratification were based on age and a diagnosis of ADHD. I strove to recruit an equal number of participants from the same geographical area for each of the designated groups.

The population selected for this study were parents/guardians of adolescent girls in 6^{th} grade and 12^{th} grade. Based on the self-report of the parent/guardian, the sample was divided into two groups: referred and nonreferred. The referred group consisted of girls from 6^{th} and 12^{th} grades who had received a formal diagnosis of ADHD from either a pediatrician, psychologist, or psychiatrist. No differentiation was made based the type of ADHD diagnosed or treatment approach. The nonreferred group consisted of girls from both grades who had not received any type of mental health diagnosis.

Procedures for Recruitment, Participation, and Data Collection

I used the following online options to recruit participants: ADHD Support Facebook groups, CHADD Online Study, Walden Participant Pool, Qualtrics Online Survey, and Prolific Online Survey. Individuals who satisfied the inclusionary criteria

were invited to participate in the study on all the online platforms. To be eligible for the study, participants had to be parents or guardians with a daughter in 6th or 12th grade.

For the Facebook recruitment, I placed an administrator-approved post on ADHD Support Group pages requesting participation of parents or guardians with a daughter in 6th or 12th grade. For Qualtrics, I paid for the recruitment of all participants with a daughter without ADHD and a portion of the participants with daughters with ADHD. Once Qualtrics identified the participants, they were provided the link to the survey. Prolific was used to recruit the remainder of the parents or guardians of adolescent females with ADHD. A prescreen survey was used to identify the target participant population. Once a participant was prequalified, they were directed to the Qualtrics survey link. The informed consent was placed at the beginning of the survey and provided background information on the study. By completing the survey, the participants provided their consent and agreed to the terms of the study. The CHADD and the Walden Participant Pool did not deliver any participants. In total, 80 usable responses were collected through Facebook, Qualtrics, and Prolific. Data collection for the study was completed in June 2021.

Instrumentation and Operationalization of Constructs

Vanderbilt ADHD Diagnostic Parent Rating Scale (VADPRS)

The VADPRS is part of the Vanderbilt Assessment Scales (VAS) developed by Mark Wolraich (Wolraich et al., 2003.) and is freely accessible to the public. Along with the VADPRS, the VAS includes a Parent Follow-Up Scale, a Teacher Rating Scale, and a Teacher Follow-Up Scale. The VADPRS was developed to assist in the screening,

referral, and diagnosis of ADHD, mood and anxiety symptoms, and academic and social performance. Assessment of behaviors is based on the 18 criteria for ADHD contained in the *DSM-IV*, along with eight criteria for oppositional defiant disorder, 12 criteria for conduct disorder (CD), and seven criteria from the Pediatric Behavior Scale developed by Lindgren and Koeppl (Wolraich et al., 2003). The severity of the behaviors is rated on a 4-point scale ranging from 0 (*never*) to 3 (*very often*). Examples of an item rated on the 4-point scale are (a) "does not pay attention to detail or makes careless mistakes, such as in homework" and (b) "is forgetful in daily activities." Academic and social performance are rated on a 5-point scale ranging from 1 (*excellent*) to 5 (*problematic*). Examples of items rated on the 5-point scale are (a) reading and (b) relationships with peers.

Wolraich et al. (2003) collected data from 1,526 eligible students to determine the psychometric properties of the VADTRS. The students were all in elementary school (Grades K-4). Their analysis covered the following areas: internal consistency reliability, item analysis, factor structure, concurrent validity, and comorbid scales for factor structure, reliability, and validity. They compared the data they gathered to the Vanderbilt ADHD Teacher Rating Scale and the Computerized Diagnostic Interview Schedule for Children-IV, Parent Version. Regarding internal consistency reliability, the results indicated good internal consistency in all methods and samples, with all cases returning a Cronbach's alpha $\geq .90$. The item analysis evaluated part-whole correlations. All items had adequate part-whole correlations. The factor analysis of the VADPRS ADHD scale assessed the consistency of the *DSM-IV* measurement model for ADHD, which views ADHD as consisting of two separate but associated components: inattention and

hyperactivity/impulsivity. The results showed a high correlation between the VADPRS and the *DSM-IV* two-factor model. The correlation of the VADPRS to the C-DISC-IV was examined in order to determine the concurrent validity of the VADPRS. The results indicated a high concurrent validity of the item total (r = .79) indicating that it measures basically the same thing as the C-DISC-IV. The results also indicated internal consistency reliabilities between the two tools of .93 or higher while the observed correlation was .93 leading to the conclusion that the VADPRS and C-DISC-IV are similar but not parallel measures.

Along with the two ADHD scales, the VADPRS has two comorbidity scales to assess internalizing problems (anxiety and depression) and externalizing problems (oppositional defiant disorder and conduct disorder). The reliability analysis of the comorbid scales indicated internal consistency was adequate. The Cronbach's alpha for oppositional defiant disorder-conduct disorder (20 items) was .91; for anxiety-depression (seven items), it was .79. The results of the different analyses done to determine the psychometric properties of the VADPRS indicate that this tool is effective in identifying ADHD behaviors along with comorbid internalizing and externalizing problems. It is not a stand-alone tool for diagnosing ADHD. I used the instrument to screen out parents of girls in the nonreferred group who did not meet the criteria for one of the three types of ADHD. Bard et al. (2013) examined the psychometric properties of the VADPRS based on the responses of teachers and parents of children in elementary and middle school. The findings from this study support the use of the VADPRS as an effective tool in

identifying ADHD behaviors based on a review of the construct and concurrent criterion validities in comparison with the Diagnostic Interview Schedule for Children-IV.

Social Skills Improvement System-Rating Scales (SSIS-RS)

The social skills improvement system – rating scales (SSIS-RS) (Gresham et al., 2011) is a norm-referenced tool used to measure the social skills of children ages 3 to 18 years of age. Four versions are available: teacher, parent, child (ages 8-12), and child (ages 13-18). Initially called the SSRS, the SSIS-RS is the latest revision of this tool by Gresham and Elliott. The SSIS-RS provides "a broader conceptualization of key social behaviors and psychometrically superior assessment results when using the SSIS-RS over the SSRS" (Gresham et al., 2011, p. 27). A comparison of the two instruments showed numerous advantages to using the SSIS-RS instead of the SSRS. These advantages included:

> (a) Updated national norms; (b) four additional subscales (communication, engagement, bullying, and autism spectrum); (c) greater overlap in topics covered across raters, improved psychometric properties, validity scales; (d) Spanish versions of parent and student forms; (e) scoring and reporting software; and (f) a direct link from item scores to skill-focused interventions (p. 33).

All three forms of the SSIS-RS contain common social skills from seven subdomains: communication, cooperation, assertion, responsibility, empathy, engagement, and self-control. Informants rate their perception of the frequency of

a behavior using a 4-point scale (0 = *never*, 1 = *seldom*, 2 = *often*, and 3 = *almost always*), The parent and teacher forms contain 46 social skills. Examples of items found in this section of the tool are (a) "expresses feelings when wronged" and (b) "asks for help from adults."

The parent form included a section to assess problem behaviors from five subdomains: externalizing, bullying, hyperactivity/inattention, internalizing, and autism spectrum. They rate the importance of these behaviors using a 3-point importance rating (0 = *not important*, 1 = *important*, and 2 = *critical*). The parents rank 33 problem behavior characteristics using this scale. The items in SSIS-RS have an item-total correlation greater than .40 on the Teacher and Parent Forms. Examples of items found in this section are (a) "repeats the same thing over and over" and (b) "breaks into or stops group activities."

The SSIS has been normed by Gresham and Elliot (2008) using the 2006 U.S. Census Bureau demographic data. Four thousand seven hundred students between ages 3 and 18 were divided into age groups consisting of an equal number of boys and girls participated in the standardization. Demographically, this group matched the American population rations of race/ethnicity and socioeconomic status by geographic region. Children with various educational disabilities and mental disorders, such as autism spectrum disorder, developmental delay, ADHD, emotional/behavioral disturbance, intellectual disability, specific learning disability, and speech/language impairment. Major revisions were made to the SSIS rating scales compared to those used for the

SSRS. A series of statistical analyses were done on the new rating scales to ensure they were technically sound. The internal consistency for the scales' total standard scores provided the strongest internal consistency while the internal consistency across the subdomains was adequate. The Problem Behavior Scales for the Parent form returned coefficient alphas which ranged from .76 to .95. The Parent form returned test-retest reliability results with median adjusted correlations of .86 across 61-day intervals. Correlations between to independent parent raters for the SSIS Rating Scale standard scores ranged from .61 to .68.

The composite scores were calculated using SPSS. A composite score was determined for each of the 7 social skill subdomains and the 5 problem behavior subdomains. The results from this assessment were not used for diagnostic purposes. They were used for comparison purposes of the social skills of the girls in the referred group to the girls in the non-referred group and across the different age groups.

Home and Community Social Behavior Scales (HCSBS)

The HCSBS is a 64-item behavior rating scale developed to measure social competence and antisocial behavior. Only the scoring for the social competence section of this instrument was calculated as antisocial behavior was not in the scope of the study. It is often used as the parent form in conjunction with the School Social Behavior Scales (Coladarci, 2005; Stein & Diaz, 2010). It is used by parents and caregivers of children between 5 and 18 years of age. The HCSBS is divided into two parts: Scale A measures social competence and contains 32 items and Scale B measures antisocial behavior and

contains 32 items. These two scales consist of a set of subscales. For Social Competence, the subscales are Peer Relations which measures positive peer interactions and Self-Management/Compliance which measures the child's response to the social expectations of adults. The Antisocial Behavior section was not scored as it was not applicable to the study. A 5-point Likert scale which ranges from 1 (*never*) to 5 (*frequently*), is used to rate adolescent's behavior based on the past 3 months. Examples of behaviors on the Social Competence Scale are (a) "asks for help in an appropriate manner" and (b) "is invited by peers to join in activities." An issue associated with this assessment is the rating of never is assigned if a behavior is not exhibited or the rater does not observe a behavior. The ratings from the HCSBS are scored for the four subscales and two main scales providing the initial raw scores. These raw scores which are on an interval scale are converted to T-scores and percentile ranks (Coladarci, 2005).

These scores can be interpreted on three different levels. The first is the normative comparison which uses the T-scores and percentile ranks. The norms and conversion tables used to analyze the T-scores and percentile ranks are derived separately for ages 5-11 and 12-18. Based on the population selected for this study, the information based on the group age 12-18 was used.

The second level of interpretation uses Social Functioning Levels (SFLs) which are used as labels for various percentile intervals. Four SFLs are assigned to each of the Social Competence scale and subscales: high functioning, average, at-risk, and high risk. The high functioning label applies to scores above the 80^{th} percentile, the average label applies to scores between the 20^{th} and 80^{th} percentile, the at-risk label applies to scores

between the 5th and 20th percentile, and the high-risk label applies to scores below the 5th percentile. Three SFLs are assigned to the Antisocial Behavior scale and subscales: average, at-risk, and high risk. The average label applies to scores below the 80th percentile, the at-risk label applies to scores between the 80th and 95th percentile, and the high-risk label applies to scores above the 95th percentile. The third level of interpretation focuses on identifying specific behavioral concerns based on a qualitative examination of individual item responses. Only the first level of interpretation was used for this study.

The HCSBS was standardized using a sample of 788 boys, 749 girls, and 25 unknowns due to no collection of gender data. Individuals were representative of all four major geographic areas. The group was divided into two norming samples of younger (5-11) and older (12-18). Norms were not separated by gender. The raters consisted primarily of mothers (70%) with the remainder consisting of fathers, stepmothers, grandmothers, stepfathers, and grandfathers. The ethnic diversity of the sample was reflective of the general U.S. population based on the 2000 U.S. Census.

The evidence supporting reliability and validity of the HCSBS as an effective behavior rating scale is strong. The internal consistency for the two main scales returned alpha and split-half coefficients ranging from .94 - .97 and the subscale coefficients range from .91 - .95. The test-retest reliability is somewhat lower and differs by scale: the Social Competence scale and subscale ranged from .82 to .84. Test-retest used a subset of 137 participants from the norming sample over a 2-week interval. The significance of reliability coefficients is sufficient when using the HCSBS for screening or research.

The interrater reliability is based on ratings by both parents from a subset of 83 participants. The Social Competence scales interrater coefficients ranged from .85 to .86. The interrater coefficient for the Social Competence scales supports strong interrater reliability.

To determine the validity of the HCSBS, Merrell et al. (2001) performed three different studies. The first study compared the HCSBS with the SSRS and Conners Parent Rating Scale-Revised Short Form. The results from this study showed the Pearson product-moment correlations were all significant at the $p<.001$ level. The strongest relationships were found between the following HCSBS Antisocial Behavior scale and the SSRS problem behavior scales: Hyperactivity (.75), Externalizing Problems (.77), and Problem Behavior Composite (.80) scores. Another important finding was the positive correlation between the HCSBS Social Competence and SSRS Social Skills Composite (.72) which provided "evidence that the SSRS Social Competence scale taps the general construct of social skills" (Merrell et al., 2001, p. 317).

Research indicates that ADHD has a large impact on an individual's social skill level. A study by Merrell and Boelter (2001) examined the relationships between social behavior and ADHD in children and adolescents. One of the assessment tools used in the study was the HCSBS. The participants for this part of the study were parents of 164 children between 6 and 12 years of age. Of this group of children, half had been formally diagnosed with ADHD according to their parents. The other half were randomly selected to approximate the demographic variables of the ADHD group. The children in the comparison group could not be receiving any special education services or have any

known disabilities or psychological disorders. The data from the HCSBS collected from parents of children with ADHD compared to that of parents of children without ADHD resulted in an effect size (ES) higher than 2 on both the social competence scale and antisocial behavior scales.

Operationalization

The variables that were measured in this study are age, social skills, and social competence. For this study, age was defined as female adolescents in 6th grade and 12th grade. In public schools in the United States, adolescent females in 6th grade are between 11 – 12 years of age. Those in 12th grade are between 17 – 18 years of age (U.S. Dept. of Education, 2011). Female adolescents are defined as having ADHD if they have received an official diagnosis from a pediatrician, psychologist, or psychiatrist at least 6 months prior to the study. The SSIS-RS was used to measure the social skills of adolescent females. The HCSBS was used to measure the female adolescents' social competence.

Data Analysis Plan

After collecting the data, I coded and entered it into the SPSS 28.0 to conduct the statistical analysis. Any participant submitting an incomplete assessment package was eliminated from the study. Nineteen responses were eliminated from the data analysis. I used SPSS to answer the following two RQs and related hypotheses:

RQ1: Does the social skill level of adolescent females differ as a function of ADHD diagnosis and age?

$H_0$1: There is no difference in the measurement of social skills development among adolescent females as a function of the presence versus absence of ADHD and age.

H_a1: There is a difference in the social skills development, as measured by the SSRS-RS, among adolescent females as a function of the presence versus absence of ADHD and age.

RQ2: Does the social competency level of adolescent females vary as a function of ADHD diagnosis and age??

$H_0$2: There is no difference in the measurement of social competence of adolescent females as a function of the presence versus absence of ADHD and age.

H_a2: There is a difference in the social competence, as measured by the HCSBS, of adolescent females as a function of the presence versus absence of ADHD and age.

The approach to data analysis for both hypotheses was similar. For each hypothesis, an omnibus analysis of variance F-test of Age (6^{th} and 12^{th} grade) ADHD (presence versus absence) was conducted on the social skills, and social competence of the adolescent females as reported by their parent/guardian. Tests for main effects and interactions were then conducted as appropriate. Prior to conducting the data analysis, the assumptions associated with this test were checked to ensure they were met. The three underlying assumptions of a two-way ANOVA are (a) the dependent variable is normally distributed for each of the population, (b) the population variances of the dependent

variable are the same for all cells, and (c) the cases represent random samples from the populations, and the scores on the dependent variable are independent of each other, such as data on the interval/ratio scale (Green & Salkind, 2007). If tests for skewness and kurtosis for each cell, homogeneity of variances among cells, and assessment of sampling and testing protocols indicate that any of these assumptions are not met, a non-parametric test such as the Kruskal-Wallis test were used for data analysis. The benefit of this test is it does not assume that the data are normally distributed. The three underlying assumptions of this test are (a) the continuous distributions for the test variable are the same for the different populations, (b) the cases represent random samples from the populations and the scores on the test variable are independent of each other, and (c) the chi-square statistic for this test is only approximate and becomes more accurate with larger sample sizes (Green & Salkind, 2007).

Threats to Validity

Steps were taken to control possible threats to validity which includes external, internal, statistical conclusion, and construct (Creswell, 2009). One potential threat to external validity was demand characteristics which occurs when participants begin to anticipate the results of the study and respond to the questions accordingly. To minimize this threat, participants were not made aware of the expected outcome. A second potential threat was population validity in which the study results are generalized to all adolescent females. To minimize this threat, any inferences of the results were specific to the population targeted for this study, female adolescents in 6^{th} and 12^{th} grade, with the

acknowledgment that these were based on the parental/guardian reports. All participants were provided with compensation for their time.

A potential threat to statistical conclusion validity was inaccurate inferences drawn from the data (Creswell, 2009). To minimize this threat, all statistical analysis were reviewed to ensure the statistical analysis has been carried out correctly and no statistical assumptions were violated. A potential threat to the studies construct validity was variability in the definition of variables or data collection methods. To minimize this risk, the operational definitions have been provided and measures with established and adequate validity and reliability have been selected to answer the questions addressed in this study. These measures include the VADPRS, the SSIS-RS, and the HCSBS.

Ethical Procedures

To ensure the rights of the participants, the following ethical procedures were put in place. First, the instructions at the beginning of the study inform the participants that by completing the questionnaire, they have read the consent form and agree to participate. Second, agreement was obtained from the measurement tool developers to ensure the proper permissions have been obtained to use these tools for the purpose of this study. All these letters were reviewed and approved by the Institutional Review Board prior to being sent (approval no. 01-20-15-0069183). Third, to protect the anonymity of the participants, names were not requested from any participants. Fourth, ownership of the data was clearly explained to the participants and no specific data were shared with individuals not involved in the study. Fifth, the data from the study will be

maintained for 5 years at which time it will be destroyed and discarded in a secure manner.

Summary

In conclusion, a quantitative methodology was used to measure the social skills and social competence of females with ADHD and females without ADHD in 6th grade and 12th grade to determine the following: the degree of difference in social skills level based on a diagnosis of ADHD and age; the degree of difference in social competencies based on diagnosis of ADHD and age. The parents of adolescent females in 6th and 12th grade were recruited. The measurement tools selected for this study are the VADPRS, SSIS-R Parent Version, and HCSBS Parent Version. The VADPRS will only be administered to the parents of the female adolescents without ADHD to ensure these adolescents do not exhibit signs of ADHD. The other tools were administered to all participants to measure social skills and social competence.

The results of these assessments are presented next in Chapter 4.

Chapter 4: Results

Introduction

The purpose of this study was to measure the social skills and social competence of females with and without ADHD in 6th and 12th grades to determine whether differences exist in social skills level and social competencies based on a diagnosis of ADHD and age. The RQs the study addressed were related to the impact of ADHD on adolescent females' ability to develop social competence. RQ1 was, Does the social skill level of adolescent females differ as a function of ADHD diagnosis and age? RQ2 was, Does the social competency level of adolescent females vary as a function of ADHD diagnosis and age?

Data Collection

The original plan to collect data was to recruit participants through local pediatricians and psychiatrist offices. The data collection process began in 2014. When no participants were identified during through this approach to data collection, the recruitment approach expanded to include a local charter school. I did not recruit any participants using this recruitment approach. Recruitment was then expanded to include the following online options: ADHD Support Facebook groups, CHADD Online Study, Walden Participant Pool, Qualtrics Online Survey, and Prolific Online Survey. No participants were recruited through CHADD or Walden Participant Pool. In total, 80 usable responses were collected through Facebook, Qualtrics, and Prolific. Data collection for the study was completed in June 2021.

The initial number of participants (parent/guardian) targeted for this study was 84 with 21 participants in each group. Fifty-four guardians whose daughters had not received a diagnosis of ADHD participated in the study. Of those 54, 30 had daughters in 6th grade, and 24 had daughters in 12th grade. Due to the difficulty in recruiting guardians of adolescent females with ADHD, only 26 participants were included in this group. Of those 26, 17 had daughters in 6th grade, and nine had daughters in 12th grade. The breakdown of daughters as reported by their parent/guardian is reported by grade and ADHD diagnosis in Table 1.

Table 1

Breakdown of Adolescent Females With and Without ADHD in the Study

Group	No. of daughters by grade level	
	6th grade	12th grade
Adolescent females with ADHD	17	9
Adolescent females without ADHD	30	24
Total	47	33

The year of birth for the participants ranged from 1946 through 1992. The level of education of the participants ranged from less than a high school diploma to possession of a professional or doctoral degree. Of the participants, 23.8% had a high school diploma or less. The participants with a 2-year associate degree or some college made up 7.5% of the responses; 11.3 % of participants had some college but no degree, and 17.5%. of participants had a 4-year bachelor's degree. Thirty one percent of participants indicated that they had a master's degree. The remaining 8.8% had a doctoral degree (5.0%) or a professional degree (3.8%). Table 2 is a summary of participants' education level.

Table 2

Participants' Level of Education

Level of education	No. of participants
Professional degree	3
Doctoral degree	4
Master's degree	25
4-year bachelor's degree	14
2-year degree	6
Some college but no degree	9
High school diploma or equivalent	14
Less than a high school diploma	5
Total	80

The majority of the respondents (83.8%) identified their race as White. Of the remaining participants, 7.5% identified as more than on race, 3.8% identified as Black/African American, 3.8% identified as Hispanic, and 1.3% identified as Asian. No one identified solely as Native American or Native Hawaiian. Of the 80 respondents, 47.5% (38) reported that they were male (the father/guardian of the adolescents), and 52.5% (42) reported that they were female (the mother/guardian of the participants). Regarding income level, the largest percentage of respondents, 20%, fell in the $150,000 or more annual household income range followed by 16.3% who fell into the $100,000-$149,999 household income range. The smallest percentage of respondents, 2%, fell in the $70,000-$79,999 and $80,000-$89,999 household income ranges. All the participants recruited for the study lived in the United States at the time of the study.

The demographics collected about the daughter of each participant included grade, age, race, and type of treatment received, if any. Of the 80 participants, over half (55%) had daughters in 6th grade, and 45% had daughters in 12th grade. The girls' ages

ranged from 11 to 18. Of the adolescent females with ADHD, 62% (16) were taking medication to treat their ADHD, and 65% (17) had received social skills and/or behavioral interventions.

Results

The study included three existing measurement and assessment tools: the VADPRS, the SSIS-RS, and the HCSBS. I obtained permission to use the SSIS-RS from Pearson Assessment (see Appendix B). Permission to use the HCSBS was received from Brooks Publishing (see Appendix C).

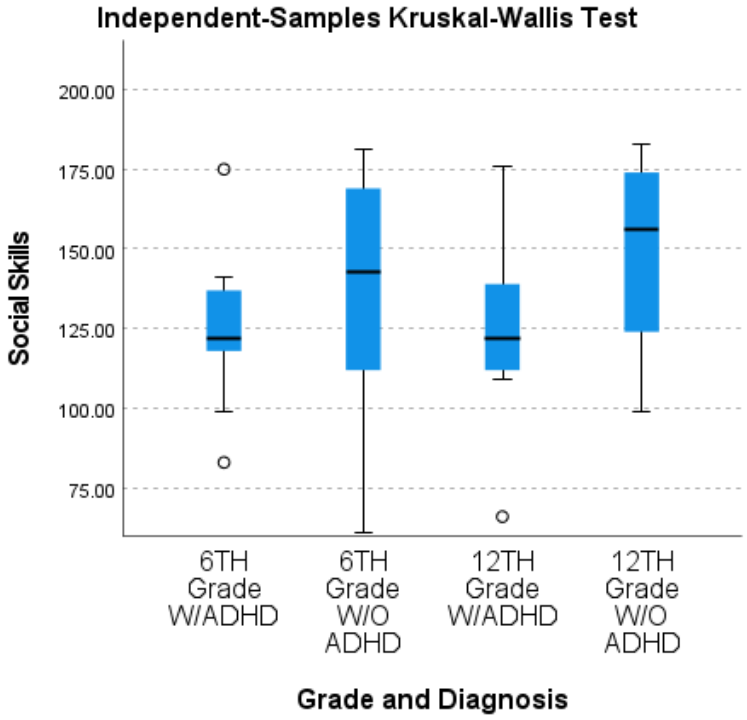
The three statistical assumptions made for this study were (a) the dependent variable was normally distributed for each of the population, (n) the population variances of the dependent variable were the same for all cells, and (c) the cases represented random samples from the populations. The initial target size was 21 participants per group for a total of 84 participants based on a two-tailed alpha of .05 at 80% power and a Cohen's *d* of 0.9. Because only 80 participants were recruited and the assumption of normal distribution was not met, a nonparametric test was used for data analysis. The nonparametric test selected was the independent samples Kruskal-Wallis test. This test was selected because this test has been found effective in comparing three or more groups of cases of unequal or different sample sizes (McKight & Najab, 2010).

RQ1 was, Does the social skill level of adolescent females differ as a function of ADHD diagnosis and age? To answer this RQ, I used the SSIS-RS to measure the social skills of the daughters as reported by their parent/guardian. The Kruskal-Wallis test was conducted to examine the difference in these measurements. A significant difference (*H*

(3) = 9.235, p = .026) was found across the four groups support the hypothesis that the level of social skills is not the same for adolescent females without ADHD in 6th and 12th grades and adolescent females with ADHD in the 6th and 12th grades (see Figure 2).

Figure 2

Social Skills by Grade Level and ADHD Diagnosis



Note. ADHD = attention deficit hyperactivity disorder.

I used the independent samples Kruskal-Wallis test to compare social skill ratings of the control group and experimental groups across grades. A pairwise comparison of the SSIS-RS social skills composite by and across grade and diagnosis found a significant difference in the level of social skills measurement in adolescent females with ADHD in the 6th grade and adolescent females without ADHD in the 12th grade (see Table 3).

However, a comparison of the level of social skills of adolescent females in 6th grade with and without ADHD and the level of social skills of adolescent females in 12th grade with and without ADHD did not show any significant difference. Based on the results of this analysis, there were no significant differences between the level of social skills of adolescent females as a function of a diagnosis of ADHD, thus, there was a failure to reject the null hypothesis.

Table 3

SSIS-RS Social Skills Composite Pairwise Comparison by Grade and Diagnosis

Sample 1–Sample 2	Test statistic	*SE*	Std. Test Statistic	Sig	Adj Sig[a]
6th grade w/ADHD–12th grade w/ADHD	-1.500	9.578	-.157	.876	1.000
6th grade w/ADHD–6th grade w/o ADHD	-12.73	7.053	-1.805	.071	.426
6th grade w/ADHD–12th grade w/o ADHD	-20.187	7.265	-2.741	.006	.037
12th grade w/ADHD–6th grade w/o ADHD	11.233	8.830	1.272	.203	1.000
12th grade w/ADHD–12th grade w/o /ADHD	-18,687	9.081	-2.058	.040	.238
6th grade w/o ADHD–12th grade w/o ADHD	-7.454	6.363	-1.172	.241	1.000

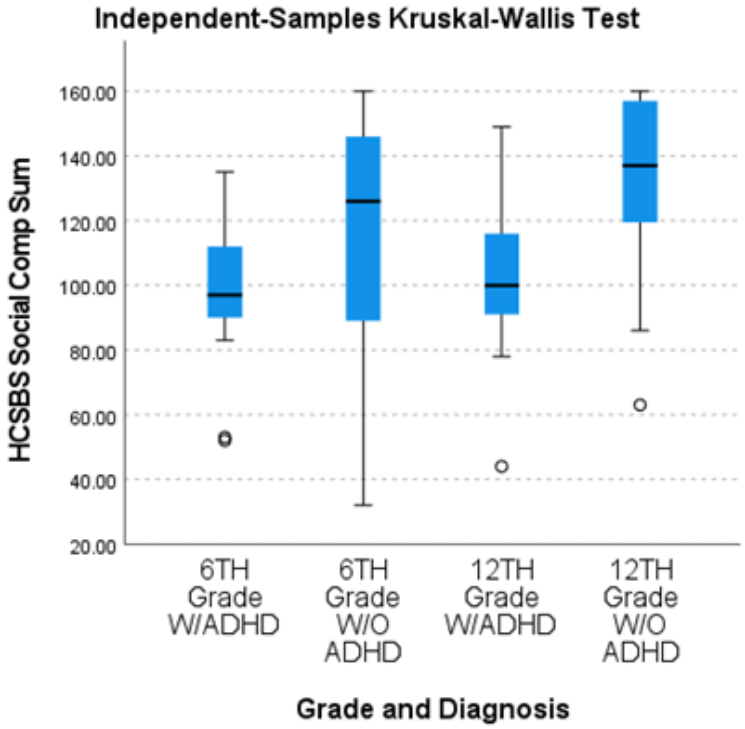
Note. Asymptotic significances (2-sided tests) are displayed. The significance level is .050. SSIS-RS = Social Skills Improvement System SSIS Rating Scales; ADHD = attention deficit hyperactivity disorder.

[a] Significance values have been adjusted by the Bonferroni correction for multiple tests.

RQ2 was, Does the social competency level of adolescent females vary as a function of ADHD diagnosis and age? The HCSBS was used to measure the social competency of the daughters as reported by their parent/guardian. A significant difference (H (3) = 13.775, p = .003) was found across the four groups support the hypothesis that the level of social competence is not the same adolescent females without ADHD in 6th and 12th grades and adolescent females with ADHD in the 6th and 12th grades (see Figure 3).

Figure 3

Social Competence by Grade Level and Diagnosis



Note. ADHD = attention deficit hyperactivity disorder.

The independent samples Kruskal-Wallis test was used to compare social competence ratings of the control group and experimental groups across grades. A pairwise comparison of the HCSBS social competence sum by and across grade and diagnosis found a significant difference in the level of social competence measurement in adolescent females with ADHD in the 6th grade and adolescent females without ADHD in the 12th grade (see Table 4). However, a comparison of the level of social competence of adolescent females in 6th grade with and without ADHD and the level of social skills of adolescent females in 12th grade with and without ADHD did not show any significant

difference. Based on the results of this analysis, there were no significant differences between the level of social competence of adolescent females as a function of a diagnosis of ADHD, thus, there was a failure to reject the null hypothesis.

Table 4

HCSBS Social Competence Sum Pairwise Comparison by Grade and Diagnosis

Sample 1–Sample 2	Test statistic	*SE*	Std. Test Statistic	Sig	Adj Sig[a]
6th grade w/ADHD– 12th grade w/ADHD	-2.928	9.576	-.307	.759	1.000
6th grade w/ADHD– 6th grade w/o ADHD	-14.632	7.053	-2.075	.038	.228
6th grade w/ADHD– 12th grade w/o ADHD	-25.216	7.364	-3.424	.001	.004
12th grade w/ADHD– 6th grade w/o ADHD	11.694	8.829	1.325	.185	1.000
12th grade w/ADHD– 12th grade w/o /ADHD	-22,278	9.080	-2.453	.014	.085
6th grade w/o ADHD– 12th grade w/o ADHD	-10.593	6.362	-1.664	.098	.577

Note. Each row provides test results for the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .050. HCSBS = Home and Community Social Behavior Scales (HCSBS); ADHD = attention deficit hyperactivity disorder.

[a] Significance values have been adjusted by the Bonferroni correction for multiple tests.

Summary

In conclusion, I examined the data to answer the two RQs for the study. The first question centered on whether there was a difference in the measurement of social skills development among adolescent females as a function of the presence versus absence of

ADHD and age. The second concerned whether there was a difference in the measurement of social competence among adolescent females as a function of the presence versus absence of ADHD and age The analysis was based on 80 responses received primarily through Qualtrics, a web-based survey tool, and Facebook ADHD Support Groups. Due to the inconsistency in the group sizes, the initial analysis plan was adjusted, and non-parametric analyses were conducted. The results did not support the researcher's hypotheses that adolescent females with ADHD would significantly differ from their peers when measuring their level of social skills and social competence.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to measure the social skills and social competence of females with and without ADHD in 6th and 12th grades to determine whether differences exist in social skills level and social competencies based on a diagnosis of ADHD and age. The RQs that the study addressed were related to the impact of ADHD on adolescent females' ability to develop social competence. RQ1 was, Does the social skill level of adolescent females differ as a function of ADHD diagnosis and age? RQ2 was, Does the social competency level of adolescent females vary as a function of ADHD diagnosis and age?

I collected the data for the study by sharing an online survey in Prolifics, Qualtrics, and Facebook groups for the parents of children with ADHD. A significant difference was found in the level of social skills in adolescent females with ADHD in the 6th grade and adolescent females without ADHD in the 12th grade. However, no significant difference was indicated between the level of social skills of adolescent females with and without ADHD in the same grade as hypothesized. Regarding social competence, a significant difference was found in the level of social competence in adolescent females with ADHD in the 6th grade and adolescent females without ADHD in the 12th grade. However, no significant difference was indicated between the level of social competence of adolescent females with and without ADHD in the same grade as hypothesized. In this chapter, I analyze and discuss these findings, review the limitations of this study, and provide recommendations for future research.

Interpretation of the Findings

The research findings did not support the hypothesis that children with ADHD struggle with social skills and social competency, which can lead to an inability to maintain these relationships over time. RQ1 was, Does the social skill level of adolescent females differ as a function of ADHD diagnosis and age? Specifically, I predicted the social skills of 6th and 12th grade girls with ADHD to be lower than those without ADHD. The initial results showed a significant difference in the level of social skills in adolescent females with ADHD in the 6th grade and adolescent females without ADHD in the 12th grade; however, these findings do not support this hypothesis. This finding was not expected based on the results from previous research (Diamantopoulou et al., 2007; Grenell et al, 1987), which indicated that adolescents with ADHD symptoms are more likely to have poor social functioning skills. The results of the current study did not show a statistically significant difference between the level of social skills of 6th grade girls without ADHD and those with ADHD or between 12th grade girls without ADHD and those with ADHD. This finding was expected based on previous research by Gresham et al. (2010). The results from their study found the base rate social skills deficits of the standardized population included in the study was less than 1% while those with a diagnosis of ADHD were expected to have a higher number of skills acquisition deficits. These results, in conjunction with the findings from the study conducted by Sibley (2010), led to the expectation that adolescents with ADHD would have a significantly higher level of social skills deficit and those without ADHD.

Although not statistically significant, the results of the study indicated that the difference between the measure of social skills in adolescent females in 6th grade without ADHD and with ADHD was lower (.426) than the difference between adolescent females in 12th grade without ADHD and with ADHD (.238). The expectation was that the statistical difference between the measure of social skills would be higher in the comparison between the adolescents in 6th grade than those in 12th grade. I based this expectation on the assumption that an adolescent's level of social skills would increase with maturity, which is supported by the results of a study conducted by Sørlie et al. (2021).

RQ2 was, Does the social competency level of adolescent females vary as a function of ADHD diagnosis and age? The initial results showed a significant difference in the level of social competence in adolescent females with ADHD in the 6th grade and adolescent females without ADHD in the 12th grade with the control group scoring higher. However no statistically significant difference was found in the comparison of adolescent females in 6th grade without ADHD and those with ADHD or the comparison of the adolescent females in the 12th grade. Several studies (Aduen et al., 2018; Barkley et al., 1991; Grenell, et al., 1987; Lee et al.; 2008; Shattell et al., 2008; Sibley et al., 2010) support Barkley's (2000) theory that children with ADHD struggle to achieve social competency. Based on this research, I expected a significant statistical difference in the group comparisons. Aduen et al. (2018) focused on the level of social knowledge of hyperactive children and found that they experience deficits in social knowledge, as well as the ability to implement this knowledge through socially skilled behavior. These

findings supported my expectation that adolescent females would have a lower level of social competence than their peers without ADHD. However, the results of the comparison did not show a significant difference between the level of social competence of 6th grade girls without ADHD and those with ADHD or between 12th grade girls without ADHD and those with ADHD as expected. Contrary to my expectation, I did not find a statistically significant difference in the level of social competence of adolescent females in the 6th grade with ADHD compared to those without ADHD.

Although not statistically significant, the results of the study showed a difference between the measure of social competence in adolescent females in 6th grade without ADHD and with ADHD was higher (.228) than the difference between adolescent females in 12th grade without ADHD and with ADHD (.085) indicating that the discrepancy in social competence may decrease with age. This may suggest that at a younger age, the adolescent females with ADHD had more deficiencies in social competencies compared to adolescent females without ADHD. Also, as revealed by the results based on parental reports, younger girls with ADHD had significantly lower social competencies compared to older girls without ADHD. These findings were not in line with the expected findings. The changes in level of skills as a function of age is explained by Sørlie et al. (2021).

Limitations of the Study

One limitation of the study was that the number of participants was not evenly distributed across the four groups with the sample size smaller than the initial number needed for the results to be considered statistically significant. Unequal group sizes

required that I adjust the initial approach to statistical analysis selected for the study. This inequity in group size may have impacted the strength of the analysis.

A second limitation was the number of sources needed to collect the number of responses needed to run a statistical analysis that would have value. Due to the variety of methods used to collect the data, there may be an issue with the quality of the data. The participants who were recruited through Qualtrics or Prolifics were paid while participants recruited through Parent ADHD Facebook groups were not. The participants who were paid may have put forth the same level of effort as those who chose to participate with no incentive.

A third limitation was external validity. Due to the various methods used to collect the data, the results from the survey are difficult to generalize across similar populations. Another impact to external validity is that the sample size of each group was not equal, so the statistical analysis had to be adjusted to provide a weighted analysis which accounted for the different sample sized. However, the results from the study are in line with those of other studies of the deficits of individuals diagnosed with ADHD (Aduen et al., 2018; Sørlie et al., 2021).

A fourth limitation of the study was the statistical analysis did not factor in whether the adolescent females with ADHD were taking medication and the potential impact on the results. This analysis could have shown if the use of medication had a positive impact on the social skills and social competence of these adolescent females. While this analysis would have provided additional information on the role medication may play in increasing social skills and social competence, the results still indicated that

a significant difference does exist between adolescence females with and without ADHD in these two areas.

Recommendations

There are several opportunities to further expend on the research conducted for this study. One recommendation is to repeat the survey and draw the participants from the same geographic area. A second recommendation is to conduct a longitudinal study where the parent or guardian of the same group of girls in the test and control groups are asked to complete the study when the girls are entering the 6th grade and again when there are entering the 12th grade. This type of study would provide a more specific examination of the relationship between knowledge of social skills and social competence along with the changes that may occur in these areas between 6th and 12th grade.

A second recommendation for a future study is to compare the difference in the level of social skills between adolescent females in 12th grade with ADHD and those in 6th grade to the difference in the level of social skills between adolescent females in 12th grade without ADHD and those in 6th grade and if the difference is statistically significant. The same comparison would be made regarding the social competence of these groups. This study provides the opportunity to see if the increase in the level of social skills of adolescent females in 12th grade without ADHD compared to those in 6th grade is statistically significant compared to the increase in the level of social skills of adolescent females in 12th grade with ADHD compared to those in 6th grade.

Implications

The research helps to put the spotlight on the differences in social skills and social competencies that exist between adolescent females with ADHD compared to those without ADHD. To date, research in this area has primarily focused males and the impact of ADHD on their lives. This study focused only on females examining the potential impact of ADHD on their level of social skills and social competence. The inability to learn and effectively implement these skills can have a negative impact on an individual's ability to behave in a socially appropriate manner and form friendships with their peers. Research has shown a cyclical relationship between the development of social skills and social competences. Adolescents with social skills deficits experience rejection by their peers impacting the development of their social competence; this low level of social competence may limit their positive interaction with their peers which are important to the continued learning of social skills (Li, 2022). Research has shown that the social rejection experienced by adolescents with ADHD can put them at a higher risk of substance abuse (Green et al.,

An individual's social competence plays an important role not only in the successful development of friendships but also in successful academic achievement. A study by Tabassum et al. (2020) examined the relationship between social competence and academic performance in university students. The results of the study indicated that a significant relationship exists between academic achievement and social competence. The results of this study also indicate that adolescents with ADHD may experience less academic success in the future. Having this knowledge allows for parents and teachers to

provide early intervention to help improve their social competence thus helping to improve their academic achievement.

While the findings from the comparison of the social skills and social competence of adolescent females in 6th and 12th grades without ADHD and with ADHD were not statistically significant, they did indicate a level of difference between the control group and the ADHD group. The social skills deficits and lower level of social competence experience by adolescent females with ADHD can have long term negative impacts. The awareness of these long-term negative impact of such deficits provides parents the opportunity to be more proactive in obtaining the appropriate treatment to help their daughters overcome these deficits.

One intervention that has proven to be effective in improving social skills in adolescents with ADHD is psychoeducation intervention (Powell et al., 2022). An alternate intervention that has also proven to be effective in improving social interactions of adolescents with ADHD is methylphenidate (Abikoff et al., 2004). Parents can seek out the intervention that is most effective to help their daughter overcome any social skills deficits related to their ADHD and increase their level of social competence.

Conclusion

A cross-sectional survey conducted by Xu et al. (2018) shows an increase in the estimated number of U.S. children and adolescents diagnosed with ADHD. Whether this increase is due to an actual increase in the number of adolescents with ADHD or an increase in the diagnosis of ADHD, more children are dealing with the negative neurological impacts of ADHD on their social skills and social competence. Research has

shown social competence and social skills are important for children to establish positive relationships with others which in turn optimize academic success. (Kennedy, 2018). The deficit in social skills and social competence identified in these adolescent females with ADHD in this study can have long lasting negative impacts on their ability to establish lasting friendships and achieve academic success. Additional research is needed in this area to better understand what can be done to increase the level of social skills and social competence of this population and to increase their chance of success in all aspects of their life.

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Appendix A: Permission to Use the Social Skills Improvement System-Rating Scale

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Appendix B: Permission to Use the Home and Community Social Behavior Scales

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